

Civil Engineering Development
Department

Agreement No. CE 9/2011
Increasing Land Supply by
Reclamation and Rock Cavern
Development cum Public
Engagement - Feasibility Study
Final Report - Reclamation Sites

REP/FIN/002

(Addendum No. 1 incorporated)

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 217499

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As the report was completed in 2014, some information of the report may not reflect the latest situation.

ARUP

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1 Introduction

1.1 Project Background

On 30 June 2011, the Civil Engineering and Development Department commissioned Ove Arup and Partners HK Ltd. (Arup) as the Consultants to undertake this Feasibility Study to strive for an enhanced land supply strategy by focusing on two land supply methods, i.e. reclamation outside Victoria Harbour on an appropriate scale and rock cavern development. The Study includes a two-stage Public Engagement exercise to gauge public views and foster public's understanding and acceptance of the issues.

Land demand is influenced by various factors, including demographic change, economic performance, property market, Government policy, social needs, public expectations and nature conservation, etc. These factors and their influence to the land demand are difficult to predict, especially in relation to the long-term demand. Owing to the scarce resources of developable land in Hong Kong, ever changing land demand and the long lead time required for land production, it is the prime objective of the Government to increase the supply of developable land as a long-term strategy to cope with future development needs and to capture windfall opportunities in the fast changing market.

The Government is currently relying on rezoning, redevelopment, land resumption and redevelopment of ex-quarry sites as the major methods to supply land. However, these methods have their own challenges and problems and have been significantly affecting the Government to supply land in a timely manner. While the Government will continue to make use of these existing land supply methods, the Government is actively pressing ahead with two other land supply methods which are not commonly used in recent years, including reclamation and rock cavern development.

1.2 Objectives of Assignment

The main objectives of the assignment are to:

- a) conduct a territory-wide site search in Hong Kong to identify potential reclamation and rock cavern development sites to be taken forward for more detailed study based on broad technical and environmental assessment;
- b) launch a two-stage Public Engagement exercise to engage the public regarding increasing the land supply by reclamation outside Victoria Harbour on an appropriate scale and rock cavern development.

1.3 Purpose of Report

The purpose of this Final Report is to summarize the key findings of various stages of works undertaken throughout this Study with regards to selection of potential reclamation sites.

1.4 Disclaimer

Any proposals pertaining to the extent, shape, land use, transport infrastructure, etc. for the reclamation and rock cavern development sites shown in any report, are solely hypothetical assumptions for the purpose of broad technical assessment and strategic environmental assessment only. They do not represent the extent, shape, land use and transport infrastructure to be implemented in future regardless of whether the sites are selected for further study or not. Indeed, all these development parameters will be developed based on future feasibility study, statutory process including the Environmental Impact Assessment Ordinance (EIAO), Town Planning Ordinance (TPO), etc. and public consultation.

Due to the hypothetical nature of the extents and land uses, a simplified extent was used to present the sites to the public during PE2. The generalised extents presented were shown so as not to indicate that an exact shape or specific land use had been established for each site, as described above. The extents shown for the sites within this report therefore differ slightly from those presented in PE2, nevertheless these are still solely hypothetical assumptions and this should not in any way be deemed as confirmation of any detail of the sites.

2 Nomenclature and Abbreviations

The following table lists out the abbreviated titles of government bureaux, departments, offices, statutory bodies and public organizations adopted in this Assignment:

Abbreviation	Full title
ACE	Advisory Council on the Environment
AFCD	Agriculture, Fisheries and Conservation Department
AMO	Antiquities and Monuments Office of the Leisure and Cultural Services Department
ArchSD	Architectural Services Department
CEDD	Civil Engineering and Development Department
CIG	Central Internet Gateway
CPLD	Committee on Planning and Land Development
DEVB	Development Bureau
DLO	District Lands Offices
DO	District Offices
DSD	Drainage Services Department
EACSB	Engineering and Associated Consultants Selection Board
ENB	Environment Bureau
EPD	Environmental Protection Department
ETWB	Environment, Transport and Works Bureau (former Bureau)
FSD	Fire Services Department
FEHD	Food and Environmental Hygiene Department
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
HAD	Home Affairs Department
HD	Housing Department
HKPF	Hong Kong Police Force
HyD	Highways Department
LandsD	Lands Department
LCSD	Leisure and Cultural Services Department
LDAC	Land and Development Advisory Committee
LegCo	The Legislative Council
MD	Marine Department
PFC	Public Fill Committee
PlanD	Planning Department
ProPECC	Professional Persons Environmental Consultative Committee
PWL	Public Works Laboratory

Abbreviation	Full title
SB	Security Bureau
SWD	Social Welfare Department
TD	Transport Department
THB	Transport and Housing Bureau
TPB	Town Planning Board
WSD	Water Supplies Department

The following table lists out the meaning of abbreviation for expression adopted in this Assignment:

Abbreviation	Full meaning
ASR	Air Sensitive Receiver
BTA	Broad Technical Assessment
C&D material	Construction and Demolition Material
C&DMMP	Construction and Demolition Material Management Plan
CDF	Confined Disposal Facilities
CASET	Computer Aided Sustainability Evaluation Tool
CV	Curriculum Vitae
DEVBTC(W)	Development Bureau Technical Circular (Works)
DIA	Drainage Impact Assessment
DR	Director's Representative
E&M	Electrical and Mechanical
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance, Cap 499
EIS	Ecologically Important Streams
EM&A	Environmental Monitoring & Audit
EP	Environmental Permit issued under EIAO
EPI	Environmental Performance Indicator
ERA	Estimating using Risk Analysis defined under WBTC No. 22/93
ETWBTC(W)	Technical Circulars (Works) issued by the then Environment, Transport and Works Bureau
GA	Geotechnical Assessment
GEOTGN	Technical Guidance Notes issued by GEO
GIS	Geographic Information System
HKSAR	Hong Kong Special Administrative Region
HKPSG	Hong Kong Planning Standards and Guidelines
LMPO	Land (Miscellaneous Provisions) Ordinance, Cap 28

Abbreviation	Full meaning
LPG	Liquefied Petroleum Gas
NENT	North East New Territories
NSR	Noise Sensitive Receiver
NTHA	Natural Terrain Hazard Assessment
PAH	Project Administration Handbook by the HKSAR Government
PE	Public Engagement
PHIs	Potentially Hazardous Installations
PWP	Public Works Programme
RCD	Rock Cavern Development
SA	Sustainability Assessment
SEA	Strategic Environmental Assessment
SEM&A	Strategic Environmental Monitoring and Audit
SENT	South East New Territories
SI	Site Investigation
SIA	Sewerage Impact Assessment
SRM	Systematic Risk Management
SSC	Site Selection Criteria
SSSI	Sites of Special Scientific Interest
TTIA	Transport and Traffic Impact Assessment
UIA	Utility Impact Assessment
VM	Value Management
WBTC	Technical circulars issued by the then Works Bureau, the then Works Branch, the then Lands & Works Branch or the then Public Works Department
WENT	West New Territories
WSR	Water Sensitive Receiver
XP	Excavation Permit

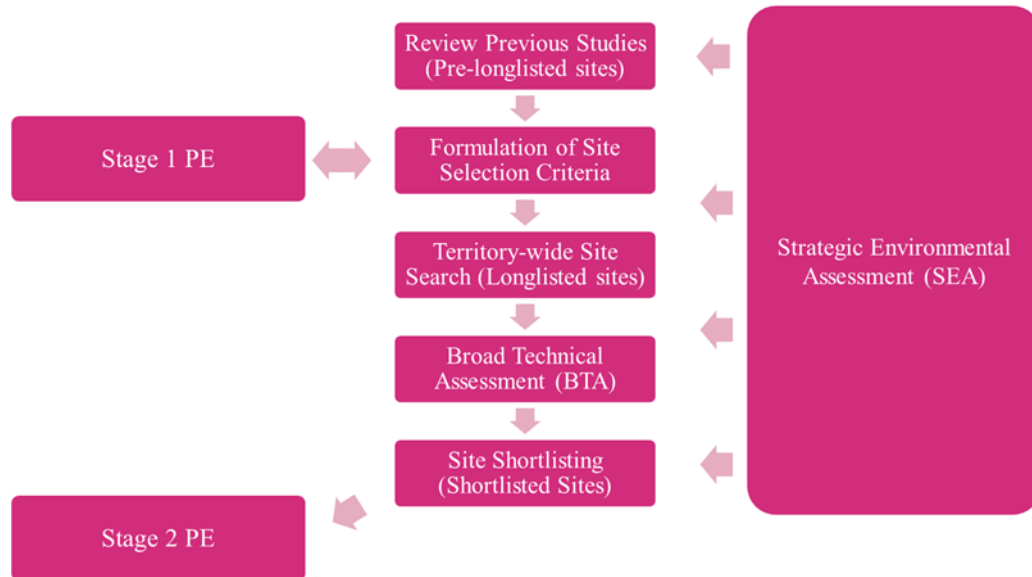
The following table lists out the meaning of words and expressions adopted in this Assignment:

Abbreviation	Full meaning
Cavern Study	CE 66/2009 (GE) – Enhance Use of Underground Space in Hong Kong – Feasibility Study
CDF Study	FM 01/2010 – Preliminary Engineering Feasibility Study on Confined Disposal Option for Contaminated Sediment
Government	Government of the Hong Kong Special Administrative Region
Longlisted Sites	A list of potential sites selected from the pre-longlisted sites based on Site Selection Criteria for further shortlisting

Abbreviation	Full meaning
PR sub-consultants	Separate Public Relations Firm satisfying the qualification requirements stipulated in the Brief
Pre-longlisted Sites	An initial list of potential sites identified based on review of previous studies and constraints mapping
RCD-released Sites	Sites that could be released from relocation of existing government facilities to rock caverns by means of rock cavern development (RCD)
RCD-receiving Sites	Rock caverns to receive the government facilities relocated from the RCD-released sites
Shortlisted Sites	A list of at potential sites selected from the longlisted sites for consultation in Stage 2 Public Engagement based on findings of Broad Technical Assessment
Study	CE 9/2011 (CE) – Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement – Feasibility Study
Study Webpage	Webpage for the Study

3 Overall Site Selection Methodology

The site selection process carried out under this Study is broadly illustrated below:



Main tasks include:

- review of previous studies and constraints for identification of pre-longlisted sites;
- Stage 1 Public Engagement for formulation of initial site selection criteria (SSC);
- selection of longlisted sites from the pre-longlisted sites based on the initial SSC;
- refined SSC after stage 1 PE;
- broad technical assessment (BTA) for the longlisted sites;
- site shortlisting based on the findings of BTA, refined SSC after Stage 1 PE and SEA to shortlist sites for consultation in PE2 and further detailed study;
- Stage 2 Public Engagement to consult the public on the shortlisted sites.

Strategic Environmental Assessments (SEA) was also carried out to provide environmental input for the entire site selection process.

4 Review of Previous Studies and Constraints

4.1 Overview

There is a broad range of constraints and considerations, in relation to the local community, environment, planning and engineering. The site search exercise is required to bring together all these constraints and considerations, and the associated potential of development with/against these constraints for the ultimate goal of identifying suitable sites or areas. Given that previous studies on reclamation and rock cavern developments were carried out across different timeframe and for different planning/development objectives in generally local areas, a comprehensive territory-wide constraint mapping exercise is carried out in this Study to establish a portfolio of the most recent features, constraints and planning/ engineering proposals.

The following sections outline the constraints and considerations for reclamation.

4.2 Methodology

A review of the previous studies has been carried out, including the previously studied reclamation projects, their opportunities and constraints. This review forms the basis of this Study with regards to the site selection process.

In addition to the review of previous studies, constraints mapping has been adopted to identify pre-longlisted sites based on Geographic Information System (GIS). The technique provides an effective means to account for areas of constraints to potential development. A constraint mapping exercise begins with the identification of key constraints, including predominantly physical, environmental and planning constraints, and a digital map for each category of constraints. These maps were overlaid to provide an overall constraint map.

4.3 Constraints & Considerations

For comprehensive site search, constraints and considerations across the territory are identified and the relevant data was collated from the relevant government departments and/or other sources available. The constraints and considerations cover a range of aspects, including conservation, cultural heritage, physical and engineering. These can be grouped into environmental constraints and other constraints. Based on the current development presumptions or requirements, these constraints and considerations can be either classified as “stop areas” or “constrained areas”, of which their definitions are as follows.

- “Stop areas” - areas where there is strong presumption against development or where developments are not statutorily permitted under the existing legislation.
- “Constrained areas” - areas where any development may be limited by existing constraints or known constraints that will be likely in place in the future.

These constraints are listed in **Table 4.3.1** and shown in **Figures 1 to 35**.

Table 4.3.1 List of Constraints

	Stop Area	Constrained Area	Development Considerations and Constraints
Environmental Constraints			
Ecology			
1. Country Park and Special Area (Figure 1)	✓		Designated and protected under the Country Parks Ordinance (Cap 208). Managed by AFCD. Taking of, destruction of or interference with vegetation within a country park are prohibited or restricted. Development within Country Parks or Special Areas is avoided, considering their high protection status and importance for conservation
2. Potential Country Park (Figure 2)		✓	No legal status for these potential country parks before their gazettal.
3. Marine Park and Marine Reserve (Figure 3)	✓		Designated and protected under Cap 476. Managed by AFCD. Development within the Marine Parks or Marine Reserve is avoided, considering their high protection status and importance for conservation.
4. Proposed, Committed and Potential Marine Park (Figure 4)		✓	Though there is no legal status for these proposed, committed and potential Marine Parks before their gazettal, they should still be taken as constraints in the site search exercise as their status might elevate in future. Consulting with AFCD before any developments at proposed, committed and potential Marine Parks is required.
5. Restricted Area (Figure 5)	✓		Designated and protected under the Wild Animals Protection Ordinance (Cap 170). Entry to Restricted Areas in Restricted Period is not allowed without permit.
6. Ramsar Site (Figure 6)	✓		All gei wais and the majority of the mangroves and mudflats inside the Ramsar Site are within a Restricted Area under Wild Animals Protection Ordinance (Cap 170), and thus protected from human disturbance. The majority of the Ramsar Site is covered by several SSSIs, and thus precludes any developments unless they are required to support the conservation of the wetland ecosystem in the area. Special land use zones are designed by the Town Planning Board to conserve these areas and guidelines for planning application for development within Deep Bay area is issued.
7. Mai Po Nature Reserve (Figure 6)	✓		The entire reserve is within the Restricted Area under Wild Animals Protection Ordinance (Cap 170), and thus protected from human disturbance.

	Stop Area	Constrained Area	Development Considerations and Constraints
8. Sites of Special Scientific Interest (SSSI) (Figure 7)	✓		Normally, no new developments are permitted within a SSSI unless they are necessary to support the conservation of the features of special scientific interest in the site, to maintain and protect the existing character of the site, or for educational and research purposes. Administrative approaches and planning measures are adopted to protect SSSIs.
9. Conservation Area (Figure 8)	✓		There is a general presumption against development in this conservation zoning in Statutory Town Planning. In general, only developments that are needed to support the conservation of the existing natural landscape or scenic quality of the area or are essential infrastructure projects with overriding public interest may be permitted.
10. Coastal Protection Area (Figure 9)	✓		There is a general presumption against development in this conservation zoning in Statutory Town Planning. In general, only developments that are needed to support the conservation of the existing natural landscape or scenic quality of the area or are essential infrastructure projects with overriding public interest may be permitted.
11. Wetland Conservation Area (Figure 10)	✓		New development within the Wetland Conservation Area would not be allowed unless it is required to support the conservation of the ecological value of the area or the development is an essential infrastructural project with overriding public interest.
12. Wetland Buffer Area (Figure 10)		✓	Developments having negative ecological impact on Wetland Buffer Area are not supported, unless ecological impact assessment can demonstrate that the negative impact could be mitigated through mitigation measures.
13. Priority Sites for Enhanced Conservation (Figure 11)		✓	Under the New Nature Conservation Policy, development at an agreed scale would be allowed at the ecologically less sensitive portion of a Priority Site provided that the project proponent undertakes conservation and management, on a long-term basis, the rest of the site that is more ecologically sensitive.
14. Ecologically Important Streams (Figure 11)		✓	ETWB TCW No. 5/2005 provides an administrative framework for the protection of natural streams/rivers from adverse impact arising from construction works associated with government projects and private developments.
15. Seagrass Beds (Figure 12)		✓	The TM-EIAO indicated that areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of (Appendix A) Annex 16) shall be conserved as far as possible, any project that is likely to result in adverse ecological impact in areas of ecological importance shall not normally be permitted unless the project necessary; it has been proven

	Stop Area	Constrained Area	Development Considerations and Constraints
			that no other practical and reasonable alternatives are available, and, adequate on-site and/or off-site mitigation measures are to be employed. Hence, all proposed developments that will affect these habitats should undergo ecological assessment.
16. Mangrove (Figure 13)		√	Mangroves are taken as constraints in the site search exercise as they are considered as an important habitat type. According to TM-EIAO, an ecological assessment will be needed if a proposed development will affect established mangrove stands of any size as listed in Note 2 of Appendix A, Annex 16. The TM-EIAO indicated that areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of (Appendix A) Annex 16) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impact in areas of ecological importance shall not normally be permitted unless the project necessary.
17. Key Coral Areas (Figure 14)		√	Key coral areas are taken as constraints in the site search exercise as they are considered as an important habitat type. According to TM-EIAO, an ecological assessment will be needed if a proposed development will affect established coral communities stands of any size as listed in Note 2 of Appendix A, Annex 16. The TM-EIAO indicated that areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of (Appendix A) Annex 16) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impact in areas of ecological importance shall not normally be permitted unless the project necessary.
18. Intertidal Mudflats (Figure 15)		√	According to TM-EIAO, an ecological assessment will be needed if a proposed development will affect mudflats over 0.5 ha in area size as listed in Note 2 of Appendix A, Annex 16. The TM-EIAO indicated that areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of (Appendix A) Annex 16) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impact in areas of ecological importance shall not normally be permitted unless the project necessary; it has been proven that no other practical and reasonable alternatives are available, and, adequate on-site and/or off-site mitigation measures are to be employed.
19. Woodland (Figure 16)		√	Woodland in particular Fung Shui Woods would be taken as constraints in the site search exercise as they are considered as an important habitat type. According to TM-EIAO, an ecological assessment will be needed if a proposed development will affect over 1ha of woodland as

	Stop Area	Constrained Area	Development Considerations and Constraints
			listed in Note 2 of Appendix A, Annex 16. The TM-EIAO indicated that areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of (Appendix A) Annex 16) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impact in areas of ecological importance shall not normally be permitted unless the project necessary.
20. Juvenile Horseshoe Crab Sites (Figure 17)		√	Juvenile Horseshoe Crab Sites are taken as constraints in the site search exercise as they are of importance for the life cycle of a concerned species. The direct and indirect impact on Juvenile Horseshoe Crab Sites should be considered for reclamation works nearby or encroaching the Sites.
21. Dolphin Hotspots (Figure 18)		√	Chinese White Dolphin hotspots are taken as constraints in the site search exercise as they are of importance for a concerned species as listed in international conventions for conservation of wildlife. An ecological assessment will be required if the proposed development will affect habits supporting significant population of Chinese White Dolphin according to the TM-EIAO.
22. Finless Porpoise Hotspots (Figure 19)		√	Finless Porpoise hotspots are taken as constraints in the site search exercise as they are of importance for a concerned species as listed in international conventions for conservation of wildlife and IUCN Red Data Books. An ecological assessment will be required if the proposed development will affect habits supporting significant population of Finless Porpoise according to the TM-EIAO.
Fisheries			
23. Fish Culture Zones (Figure 20)		√	Under the Marine Fish Culture Ordinance (Cap 353), polluting water quality and injuring fishes in the Fish Culture Zone are also not allowed. In accordance with the Water Pollution Control Ordinance Cap 358 Section 21, no new effluent will be allowed within 200m of the seaward boundaries of a marine fish culture zone and within 100m of the landward boundaries.
24. Artificial Reef Development Areas (Figure 21)		√	Artificial Reef Deployment Areas are taken as constraints in the site search exercise as they are of value for fisheries resources enhancement.
25. Area of Oyster Production (Figure 22)		√	Oyster Production Area is taken as constraints in the site search exercise as it is the only site for this aquaculture operation.
Water			

	Stop Area	Constrained Area	Development Considerations and Constraints
26. Water Gathering Grounds and Reservoir (Figure 23)		√	WSD only accepts environmentally sustainable developments within the gathering grounds that will not cause pollution to the water resources. For any development works in Water Gathering Grounds, WSD should be consulted. Standards for effluents discharged into the water gathering grounds are stipulated under the Water Pollution Control Ordinance Cap 358 Section 21.
27. Gazetted Beach and To be Gazetted Beach (Figure 24)		√	According to the Water Pollution Control Ordinance Cap 358 Section 21, no new effluent will be allowed within 100m of the boundaries of a gazetted beach in any direction, including rivers, streams and storm water drains.
Cultural Heritage			
28. Declared Monument (Figure 25)	√		No person shall undertake acts on declared monuments that are prohibited under Section 6 of the Antiquities and Monuments Ordinance (Cap 53), such as excavation, carrying out building or other works, or planting or felling trees, without a permit granted by the Antiquities Authority. Only adaptive use which will not cause detriment to their conditions and protected values are allowed.
29. Site of Archaeological Interest (Figure 26)		√	In accordance with the Antiquities and Monuments Ordinance, Cap. 53, no person, other than the Antiquities Authority and a designated person authorized by him, shall excavate or search for antiquities except in accordance with a licence granted to him.
30. Graded and Proposed Graded Historic Building (Figure 27)		√	Although the grading has no legal effects, graded historic buildings are protected by administrative measures as far as possible.
Hazard to Life			
31. Consultation Zones of PHIs (Figure 28)		√	Within the Consultation Zone of PHIs, planning restrictions may need to be imposed on future developments. Proposals for development that will result in an increase in the number of persons living or working in the Consultation Zone have to be submitted to CCPHI for consideration. Sizable developments are normally not approved. Development proposals in the Consultation Zone will be assessed against the Government risk guidelines to ensure that risks to the public are confined to within acceptable limits.
32. Safety Zone of PHIs (Figure 28)	√		Within the Safety Zone for explosives depots, no inhabited buildings or congregation of people will be allowed.
Landfill Gas Hazard			

	Stop Area	Constrained Area	Development Considerations and Constraints
33. Existing Landfill Site (Figure 29)		✓	An evaluation of the risks posed by landfill gas hazard assessment is required for proposed development falling within the 250m Consultation Zone of landfill.
34. Landfill Extension (Figure 29)		✓	An evaluation of the risks posed by landfill gas hazard assessment is required for proposed development falling within the 250m Consultation Zone of landfill.
35. Restored Landfill Site (Figure 29)		✓	An evaluation of the risks posed by landfill gas hazard assessment is required for proposed development falling within the 250m Consultation Zone of landfill.
Noise			
36. Hong Kong International Airport Aircraft Noise Exposure Forecast (NEF) 25 Contours (Figure 30)		✓	Under the HKPSG, noise sensitive uses relying on open window for ventilation, including domestic premises, education institution, etc, within the NEF 25 contour are not allowed.
Other Constraints			
Material Disposal and Storage Areas			
37. Public Fill Bank (Figure 31)		✓	Under the Statutory Plan of Town Planning Board, Tseung Kwan O Area 137 is designated as 'Deep Waterfront Industry' where it is intended for special industrial which require marine access, access to deep water berths or water frontage ¹ . As a result, further reclamation adjacent to this area may not be favourable for marine accessing and/or deep water berthing activities. According to Statutory Plan of Town Planning Board, zone of Tuen Mun Area 38 "is intended primarily for the provision of land for land-extensive and capital-intensive industry as well as for other special industries." ² .
38. Sediment Disposal Areas (Figure 31)		✓	The identification and management of the supply and demand of marine fill resources and the disposal of dredged/excavated sediment are dealt with by the Marine Fill Committee (MFC) under the chairmanship of the Director of Civil Engineering and Development. Development encroaching sediment disposal areas is constrained.
39. Explosives Dumping Grounds (Figure 31)		✓	Precautions need to be taken before further development above or near explosives dumping ground.
40. Marine Borrow Area (Figure 31)		✓	There areas of natural sand deposits below seabed have been borrowed in Hong Kong for

¹ Planning Department, Draft Tseung Kwan O Outline Zoning Plan No. S/TKO/19² Planning Department, Approved Tuen Mun Outline Zoning Plan No. S/TM/28

	Stop Area	Constrained Area	Development Considerations and Constraints
			reclamation and other purposes. Development encroaching marine borrow area is constrained.
Planning & Landscape			
41. Geopark (Figure 32)	✓		Located within the Country Parks, Special Areas and Marine Parks, Geoparks are managed by AFCD and protected under the Country Parks Ordinance and the Marine Parks Ordinance. According to Country Park Ordinance Cap 208 Section 10, "No new development shall be carried out within country park area shown in the draft map without the prior approval of the Authority".
42. Green Belt (Figure 32)		✓	The planning intention of the "Green Belt" zone is primarily for defining the limits of urban and sub-urban development areas by natural features and to contain urban sprawl as well as to provide passive recreational outlet, with a general presumption against development.
43. Traditional Burial Grounds (Figure 32)	✓		Encroachment of traditional burial ground is not allowed due to their social and cultural significance.
44. Recognized Indigenous Villages (Village Type Development) (Figure 32)		✓	"V"zones comprise zones covering recognized villages (village type development) and zone covering other villages. Development within "V"zones is constrained.
Restriction Zone			
45. Victoria Harbour (Figure 33)	✓		The harbour is preserved as a special public asset and a natural heritage under the Protection of Harbour Ordinance (Cap 531) and the Vision Statement promulgated by the Town Planning Board. According to the judgment handed down by the Court of Final Appeal on 9 Jan 2004 on the Town Planning Board's appeal against the High Court's ruling in respect of the Wan Chai North Outline Zoning Plan, the presumption against reclamation can only be rebutted by establishing an overriding public need for reclamation.
46. Closed Area (Figure 33)	✓		Access to this area is strictly controlled under the Public Order Ordinance.
47. Military Sites (Figure 33)	✓		According to LegCo Secretariat Paper No.IN04/10-11 of 17.1.2011, there are 14 military sites scattered over Hong Kong area. Further development at these sites may need approval from both sides of Central's People's Government and Hong Kong government.
48. Airport Exclusion Zone (Figure 33)		✓	Within these restricted areas, the air-draughts of the entering vessel is restricted based on regulation 23 of the Shipping and Port Control Regulations (Cap. 313A). Permission to pass through these areas must be granted from Marine Department and Airport Authority. Although, there is no ordinance restricted any development under adjacent to this area, any

	Stop Area	Constrained Area	Development Considerations and Constraints
			factor that would induce to population increase should be avoided for safety reason.
49. Airport Height Restriction (Figure 33)		✓	Hong Kong Airport (Control of Obstructions) Ordinance Cap 301 was enacted to provide for the restriction and the reduction of building heights in the interest of the safety of airport, for the control of lighting and for the erection or provision and the maintenance of aids to air navigation.
50. Deed of Restrictive Covenant of the Hong Kong Disneyland (Figure 33)		✓	When the Hong Kong Disneyland was developed, the Hong Kong Government entered a Deed of Restrictive Covenant with Walt Disney. The covenant was agreed such that the public outside the park would not be able to see in, and those inside not be able to see the world outside, so as to maintain the aura of fantasy. The Deed requires that any new development or redevelopment should not breach the height limits. In addition, there are other development restrictions regarding uses and visual buffer in the Hong Kong Disneyland Deed of Restrictive Covenant.
Marine & Submarine			
51. Anchorages & Designated Bunkering Areas (Figure 34)		✓	For the time being, no ordinance restricts the development at anchorage or bunkering areas. If development at anchorage or bunkering areas is proposed, re-provisioning should be considered in consultation with the Authority of Marine Department.
52. Fairway & Navigation Channel (Figure 34)		✓	Fairways are main channels and passageways for vessel transit north-south or east-west direction. In order to maintain the regularity of shipping activity and safety, it is recommended not to divert these fairways.
53. Sub-sea Tunnel (Figure 34)		✓	Provide vehicular and rail passages between Hong Kong Island and Kowloon within the Victoria Harbour, development over sub-sea tunnels is restricted.
54. Marine Facilities (Figure 34)		✓	Those accessible by the public are maintained by the government, whilst others are maintained and operated by private companies. Re-provisioning should be considered if development over these facilities.
55. Submarine Pipelines, Cables & Utilities (Figure 34)		✓	Re-provisioning should be considered if development over these facilities.
56. Ship Wrecks (Figure 34)		✓	For reclamation works, marine archaeological study is required for sites at or close to existing identified shipwreck under the Antiquities and Monuments Ordinance (Cap 53).
Future Development			
57. Infrastructure & Development under Construction		✓	Development interfacing with the infrastructure and development which is under construction and/or feasibility study is restricted.

	Stop Area	Constrained Area	Development Considerations and Constraints
and/or Feasibility Study (Figure 35)			
58. Planning Infrastructure & Development (Figure 35)		√	Development interfacing with the planning infrastructure and development is restricted.

4.4 Pre-Longlisted Sites

Based on the stop and constrained areas, a total of 48 nos. of pre-longlisted reclamation sites were identified. These sites are shown in **Figure 36** and listed in **Table 4.4.1** below.

Table 4.4.1 Pre-Longlisted Reclamation Sites

Site No.	Map Sheet Number (1:20000)	Location
1	4	Mirs Bay
2	4	Tap Mun
3	5	Lung Kwu Tan
4	5	Tuen Mun Promenade
5	5	Tuen Mun Area 40
6	6	Tuen Mun Area 27 (Sam Shing)
7	6	Tai Lam Chung
8	6	Tsing Lung Tau
9	6	Sham Tseng
10	7	Tai Po Industrial Estate
11	7	Shuen Wan
12	7	Tai Po Kau
13	7	Ma Liu Shui Extension
14	7	Ma Liu Shui
15	7	Wu Kai Sha
16	7	Whitehead
17	9	Northwest Lantau
18	9	Tung Chung East 3
19	10	Siu Ho Wan
20	10	Sham Shui Kok
21	10	Sunny Bay
22	10	Tsing Chau Tsai East
23	10	Southwest Tsing Yi
24	10	Penny's Bay East
25	10	Discovery Bay

Site No.	Map Sheet Number (1:20000)	Location
26	10	Nim Shue Wan
27	10	Kau Yi Chau West
28	10	Silver Mine Bay North
29	10	Silver Mine Bay South
30	10	Hei Ling Chau West
31	10	Hei Ling Chau Typhoon Shelter
32	10	Peng Chau – Hei Ling Chau
33	10	Lamma North
34	11	Sandy Bay
35	11	Heng Fa Chuen
36	11	Tseung Kwan O Area 131
37	12	Tseung Kwan O East
38	12	Jin Island
39	13	Shek Pik
40	14	Shek Kwu Chau Northwest
41	14	South Cheung Chau
42	14	Yung Shue Wan
43	15	Lamma Quarry
44	15	Shek O Quarry
45	15	Beaufort Island
46	18	Tai Long Wan Offshore
47	19	Eastern Waters
48	20	Southeast Offshore

5 Stage 1 Public Engagement and Formulation of Site Selection Criteria (SSC)

The Stage 1 Public Engagement (PE1) was conducted between November 2011 and March 2012. The aim of PE1 was to seek public views on land supply by reclamation outside Victoria Harbour and rock cavern development, and the site selection criteria.

To enhance the public awareness of the PE1 exercise and to encourage public participation, a series of PE activities including public forums and roving exhibitions were organized. The consultation document, PE1 Digest, was widely disseminated to the public at various outlets including District Offices, roving exhibition counters and public forums. A web version of the PE1 Digest and a promotional video was uploaded onto the Study website.

A set of SSC initially formulated through collaboration with various government departments in a Value Management Workshop (I) was put forward for discussion in PE1.

The proposed SSC were found to be largely agreeable to the general public. For reclamation, the impacts on environment and local community are identified as being relatively more important than other SSC, while for rock cavern development, the social impact, environmental impact and engineering feasibility are considered relatively more important among others. The SSC include:

Guiding Principles	For Reclamation	For Rock Cavern Development
Social Harmony & Benefits	<i>Impact on local community</i>	Social benefits at the releasing site upon relocation of existing facilities
	Site location and accessibility	<i>Social impact at the cavern development site</i>
	Meeting local needs	
Enhanced Environmental Performance	<i>Environmental impacts</i>	<i>Environmental impacts at the cavern development site</i>
	Environmental benefits	Environmental benefits in the vicinity of the releasing site upon relocation of existing facilities
Economic Efficiency & Practicality	Cost effectiveness	Cost effectiveness
	Planning flexibility	Specific requirements of facilities
	Engineering feasibility	<i>Engineering feasibility</i> Suitability of relocation based on existing facility status

Other major views, in particular for reclamation, collected during Stage 1 Public Engagement are summarized as follows:

- a) There was broad support for establishment of land reserve;

- b) There was broad consensus that more land required to meet the needs for providing more housing and community facilities, improving the living environment and enabling infrastructural development;
- c) There was broad support for a six-pronged approach for enhancing land supply;
- d) Impacts on the environment and local communities are the most important site selection criteria for reclamation;
- e) There was no consensus on reclamation, with strong opposition to reclamation at some specific sites, and major concerns of those against reclamation are related to impacts on environment and local communities;

Site location is regarded as important when considering reclamation. The Stage 1 Public Engagement Report and Executive Summary can be found on the Study website <http://www.landsupply.hk>.

6 Selection of Longlisted Sites

6.1 Methodology

A longlisting exercise was carried out and is a screening process to select a smaller batch of sites from the pre-longlist for further study. In the longlisting exercise, each pre-longlisted sites underwent preliminary evaluation. Each site was graded with A, B or C with reference to different site selection criteria based on the preliminary assessment. These grades only provide preliminary indications of the relative performance of the sites with reference to the site selection criteria and are not to indicate their absolute values, and may vary with the results of any further detailed studies/assessment. In this broad comparison of the sites, the more grade As that are identified for the sites, it is assumed that it is more likely for these sites to be suitable for being selected for further study under this Assignment. A total of 48 nos. of pre-longlisted reclamation sites were identified for longlisting.

6.2 Initial Site Selection Criteria

6.2.1 Impact on local community

This criterion considers the impact on local community that could be brought to the area around the reclamation site. Issues that have been considered in the exercise include impact on local cultural or heritage features, distance between reclamation and the shore or existing residential development, visual impact, etc.

Table 6.1.1 SSC – Impact on Local Community

Grading	Description
A	No obvious impact on local community e.g. offshore reclamation site, or reclamation site is far away or separated from existing residential developments by open space or trunk road
B	Some impact on local community e.g. reclamation site separated from existing residential developments by existing local distributor road(s), or reclamation site located near sites of archaeological interest, burial grounds, Fung Shui Area and other cultural features
C	Adverse impact on local community e.g. reclamation site immediately in front of existing residential developments without separation or promenade, creating substantial visual impact for existing residential developments

6.2.2 Site location and accessibility

This criterion considers the accessibility of the site location, condition of existing infrastructures, scale of new infrastructure required for connection to the site, etc.

Table 6.1.2 SSC – Site Location and Accessibility

Grading	Description
A	Site location is easily accessible and only requires minimum new infrastructure for connection e.g. reclamation site is close to existing trunk road or distributor road or local road, and major upgrade is not expected
B	Site location is reasonably accessible and requires reasonable new infrastructure for connection e.g. reclamation site can be made accessible to existing trunk road by a new distributor road, reclamation site accessibility can be achieved by upgrade of existing trunk road
C	Site location is difficult to access and significant new infrastructure for connection e.g. For offshore reclamation, new marine or land transport connection is required

6.2.3 Can it meet local needs

This criterion considers whether the proposed works can potentially meet any local needs (e.g. are there any needs of creating GIC / housing area or job opportunities in the local community) identified from District Council and relevant planning studies, how these needs are satisfied by the formation of reclaimed land, etc.

Table 6.1.3 SSC – Can it meet local needs

Grading	Description
A	There are identified housing needs for local community which can be addressed by the formation of new land, e.g. District Council's support and relevant planning study has been carried out
B	There are identified local needs other than housing for certain local community, e.g. industrial use, or housing need either supported by DC or studied in previous planning study
C	There is no specific local need identified. No DC's support nor any previous planning study

6.2.4 Environmental impacts

The environmental impacts on natural resources and surrounding environment for the reclamation sites are considered based on the established constraints map and identified environmental resources and constraints in previous studies. Issues considered include distance of reclamation site from SSSI, bathing beach, Marine Park or Marine Reserve, Proposed, Committed and Potential Marine Park, Fish Culture Zone, Restricted Area, Coastal Protection Area, Conservation Area, Country Park, Special Areas, recognized heritage sites, and other ecological sensitive areas, etc.

Table 6.1.4 SSC – Environmental Impacts

Grading	Description ^[1]
A	<p>No obvious insurmountable environmental impacts on natural resources and surrounding environment. Details as below:</p> <ul style="list-style-type: none"> • More than 500m from the nearest boundary of ^[2]: <ul style="list-style-type: none"> ○ Site of Special Scientific Interest; ○ Bathing Beach^[3]; ○ Marine Park or Marine Reserve^[3]; ○ Fish Culture Zone; ○ Restricted Area; ○ Coastal Protection Area; ○ Conservation Area; ○ Country Park; and ○ Special Areas; AND • More than 50m from the nearest boundary of recognized heritage sites ^[5]; AND • More than 100m from an existing residential area^[2]; AND • No significant impacts on surrounding environment identified based on constraints map and previous studies.
B	<p>Some environmental impacts on natural resources and surrounding environment. Details as below:</p> <ul style="list-style-type: none"> • Less than 500m but without encroachment from the nearest boundary of ^[2]: <ul style="list-style-type: none"> ○ Marine Park or Marine Reserve; ○ Restricted Area; ○ Coastal Protection Area; ○ Conservation Area; ○ Country Park; and ○ Special Areas; OR • Less than 500m but more than 200m from the seaward boundaries of a marine Fish Culture Zone or a Site of Special Scientific Interest^[5]; OR • Less than 500m but more than 100m from the a Gazetted Beach ^[6]; OR • Less than 50m but without encroachment from the nearest boundary of recognized heritage sites ^[5]; OR • Less than 100m from an existing residential area^[2]; OR • Some potential impacts on surrounding environment identified based on constraints map and previous studies. However, the impact is anticipated to be acceptable with mitigation measures in place.
C	<p>Significant environmental impacts on natural resources and surrounding environment based on constraints map (i.e. encroachment of identified constrained areas, less than 200m from seaward boundaries of a marine Fish Culture Zone or a Site of Special Scientific Interest, less than 100m from a Gazetted Beach^[5]) or any previous studies.</p>

Note:

- [1] Sea Water Intakes are not taking into account as any impact on them can be resolved by re-provisioning. Hence, the constraints has been considered in “Engineering Feasibility”;
- [2] A Guide to the Environmental Impact Assessment Ordinance, Appendix 1 Designated projects listed in Schedule 2 and 3 of the EIA Ordinance, Item C2 of Part 1, Schedule 2, EPD 2007;
- [3] “Marine Park or Marine Reserve” means any marine park or marine reserve which is designated according to Marine Parks Ordinance (Cap.476);
- [4] “Bathing beach” means any bathing beach which is specified in the Fourth Schedule to the Public Health and Municipal Services (Cap. 132);
- [5] Development Bureau Technical Circular (Works) No. 6/2009, Heritage Impact Assessment Mechanism for Capital Works Projects, Development Bureau, 2009;
- [6] Technical Memorandum Standard for Effluents Discharged Into Drainage and Sewerage Systems, Inland and Coastal Waters, Water Pollution Control Ordinance, Cap 358, 1997.

This Site Selection Criteria “Environmental Impacts” focuses on the impacts from the proposed reclamation on natural resources and surrounding environment, while the impacts from Landfill Sites, Potentially Hazardous Installations, air quality/odours emission sources and noise emission will be considered in “Planning Flexibility”. Sea water intakes have been identified in the study. As the seawater intake can be re-provisioned, the constraints from Sea Water Intakes have been considered in “Engineering Feasibility”.

6.2.5 Environmental benefits

The environmental performance of potential environmental benefits for the reclamation site is considered based on the surrounding environment and site selection criteria. Issues considered include potential of enhancing the local ecological, fisheries, cultural heritage and landscape value and visual aspects, local water quality, volume of public fill that the reclamation works can absorb, etc.

Table 6.1.5 SSC – Environmental Benefits

Grading	Description
A	<ul style="list-style-type: none"> Some enhancement of local ecological, fisheries, cultural heritage and landscape value and visual aspects; or Some enhancement of local water quality.
B	<ul style="list-style-type: none"> Few enhancement of local ecological, fisheries, cultural heritage and landscape value and visual aspects; or Few enhancement of local water quality; or Volume of public fill can be used for reclamation is more than 10Mm³ (10Mm³ is translated from a Grade A cost effective reclamation area of 100ha with a typical water depth of 5m (i.e. 50% of 10m and 10m is the maximum of water for technically feasible seawall construction))
C	<ul style="list-style-type: none"> No obvious enhancement of ecological, fisheries, cultural heritage and landscape value and visual aspects; and No obvious enhancement of local water quality.

6.2.6 Cost effectiveness

The construction cost to reclamation area ratio generally decreases as the reclamation area increases. Therefore, in terms of cost effectiveness, it is generally more economically to reclaim a larger area.

Table 6.1.6 SSC – Cost Effectiveness

Grading	Description
A	Reclaimed site area > 100 ha
B	Reclaimed site area 30 - 100 ha Offshore island with reclaimed site area > 100ha but require major infrastructure connection
C	Reclaimed site area < 30 ha

6.2.7 Planning flexibility

This criterion assesses whether the reclamation site is near or within any constraint upon which any development within the reclamation site will be constrained thus reducing the flexibility in planning for the development. Issues considered include potential constraints on development imposed by the nearby environment (e.g. Airport Height Restrictions, or re-provisioning of an existing anchorage area, noise or air quality, existence of NIMBY/industrial uses/facilities, etc.).

Table 6.1.7 SSC – Planning Flexibility

Grading	Description
A	No obvious constraints on development imposed by the nearby environment
B	There are some constraints imposed by the nearby environment on development e.g. Airport Height Restrictions, or height restriction for development in the vicinity of HK Disneyland, or re-provisioning of an existing anchorage area
C	There are major constraints on development e.g. town planning constraints may restrict the planning flexibility for future land use of the reclamation sites including noise or air quality, or the existence of NIMBY or industrial areas may restrict the planning flexibility for future land use of the reclamation sites

6.2.8 Engineering feasibility

Feasibility of reclamation development is subject to whether the engineering constraints, if any, can be resolved practically within the bounds of feasible engineering solutions. Issues considered include presence of submarine pipeline(s) or cable(s), presence of existing marine facilities (e.g. typhoon shelter) at or in the vicinity of the sites, reclamation works potentially limited by clearance restrictions from adjacent bridges, water depth, impact on strategic marine utilities, re-provisioning of substantial length of quays or strategic infrastructure, or the site is so remote that there could be difficult for utilities connection etc.

Table 6.1.8 SSC – Engineering Feasibility

Grading	Description
A	No obvious engineering constraints, including the case where re-provisioning of jetty is required
B	Minor engineering constraints e.g. presence of submarine pipeline(s) or cable(s) across the site, or presence of existing marine facilities (e.g. typhoon shelter) at or in the vicinity of the sites which may affect the engineering design, or reclamation works potentially limited by clearance restrictions from adjacent bridges
C	Major engineering constraints e.g. water depth > 10m (10m is the depth of seawall that can be built at reasonable cost), or presence of strategic marine utilities, or re-provisioning of a substantial length of quays or strategic infrastructure, or the site is so remote that there could be difficult for utilities connection or drainage/sewage discharge

6.3 Longlisted Sites

The longlisted reclamation sites are divided into 4 categories:

- Category A – Artificial Island
- Category B – Reclamation to connect islands
- Category C - Reclamation upon artificial or disturbed shoreline
- Category D - Reclamation upon natural but not protected shoreline

The pre-longlisted reclamation sites have been evaluated under each of the initial SSC outlined above. 27 nos. of reclamation sites are selected to form the longlisted sites as listed in **Table 6.2.1**. The locations of these longlisted reclamation sites are shown in **Figure 37**.

Table 6.2.1 Longlisted Reclamation Sites

Ref. No.	Site Location
A1	Hei Ling Chau West
A2	South Cheung Chau
A3	Lamma North
A4	Tsing Chau Tsai East
A5	Kau Yi Chau West
B1	Peng Chau-Hei Ling Chau
B2	Beaufort Island
C1	Tuen Mun Area 40
C2	Tuen Mun Area 27
C3	Tsing Lung Tau
C4	Siu Ho Wan
C5	Sunny Bay

Ref. No.	Site Location
C6	Southwest Tsing Yi
C7	Silver Mine Bay South
C8	Tai Po Industrial Estate
C9	Tai Po Kau
C10	Ma Liu Shui
C11	Sandy Bay
C12	Lamma Quarry
C13	TKO East
D1	Lung Kwu Tan
D2	Tai Lam Chung
D3	Silver Mine Bay North
D4	Shuen Wan
D5	Wu Kai Sha
D6	TKO 131
D7	Shek O Quarry

7 Broad Technical Assessment (BTA)

7.1 Methodology

Broad technical assessments were carried out for the longlisted sites, which included the following key aspects:

- a) land use, urban planning and urban design;
- b) geotechnical appraisal;
- c) broad environmental assessment;
- d) traffic impact assessment;
- e) civil works (e.g. water, drainage, sewage, etc.);
- f) impact of aircraft and helicopter operation;
- g) sustainability assessment;
- h) implementation, construction and costing.

Any proposals pertaining to the extent, shape, land use, transport infrastructure, etc. for the reclamation sites shown in any report, are solely hypothetical assumptions for the purpose of broad technical assessment and strategic environmental assessment only. They do not represent the extent, shape, land use and transport infrastructure to be implemented in future regardless the sites were selected for further study or not. Indeed, all these development parameters were developed based on future planning and engineering feasibility study, statutory process including EIAO, TPO, etc. and public consultation.

7.2 Land Use, Urban Planning and Design

7.2.1 Introduction

The existing land use has been reviewed and future land use on proposed reclamation area have been assumed for BTA. Any proposals pertaining to the extent, shape, land use, transport infrastructure, etc. for the reclamation sites shown in this report, are solely hypothetical assumptions for the purpose of BTA only. They do not represent the extent, shape and land use and transport infrastructure to be implemented in future regardless the sites were selected for further study or not.

7.2.2 Site Characteristics

Desk top study of topography of the proposed reclamation area, Outline Zoning Plans, Development Permission Area Plans (if applicable) and previous studies relevant to individual reclamation sites are reviewed. Existing land use in the vicinity of the proposed reclamation site are also reviewed. Any development opportunities and constraints in the proposed reclamation site are investigated.

7.2.3 Assumed Land Use / Hypothetical Land Use

The land use is assumed based on the site characteristics, development opportunities and constraints in the vicinity of the proposed reclamation site. Infrastructural developments together with community facilities provision are also assumed with reference to the existing and future needs of the community.

7.3 Geotechnical Assessment

7.3.1 Introduction

As part of the Broad Technical Assessment a geotechnical appraisal was undertaken on each site. This comprises a study of the available desktop information including, but not limited to:

- Geological maps published by the Hong Kong Geological Survey;
- Existing ground investigation information from Geotechnical Information Unit (GIU);
- Bathymetry plans;
- Meteorological and oceanographic (metocean) information; and
- Aerial photographs taken between 1963 and 2011.

7.3.2 Geology

The geology of the sites have been interpreted from the relevant geological publications and associated geological maps of scale 1:5,000 or 1:20,000 by the Hong Kong Geological Survey of the Geotechnical Engineering Office.

In addition to the geological maps, existing ground investigation data has been obtained through CEDD's Geotechnical Information Unit and Arup's internal database to confirm the findings from the maps. Only relevant boreholes were considered in the interpretation depending on the likely scope of works for the proposed reclamation site.

The assessment of the geology was aimed at detecting complex or difficult ground conditions, such as dissolution features or faulting, which may impose constraints on the type, scope or cost of the proposed development.

7.3.3 Bathymetry

The bathymetry is shown on the Charts for Local Vessels (Hong Kong Waters) 2011 and the electronic navigational charts available through the Marine Department.

7.3.4 Metocean Conditions

Port Works Design Manual (PWDM) is referenced to for the sea levels (mean sea level, mean higher high water level and mean lower low water level) at tidal stations nearest to the proposed reclamation sites.

7.3.5 Site History

A number of aerial photographs, dating from 1963 to 2011 were obtained via Aerial Photograph Library of the Geotechnical Engineering Office. Aerial photograph interpretation was carried out to give a brief account of site development history of the proposed reclamation site, as well as any regional geological features that may require considerations for the proposed development.

7.4 Environmental Assessment

7.4.1 Introduction

The environmental aspects of the BTA take into account of air quality, noise, water quality, waste management, ecology, fisheries, cultural heritage, landscape and visual, hazard to life and landfill gas hazard issues. The following sections provide the methodology of each assessment, potential impacts during construction and operational phases, and strategic mitigation measures recommended.

However, given the broad brush nature of this environment assessment, the environmental acceptability of the sites and the practicability and effectiveness of the recommended environmental mitigation options are subject to the future detailed studies and/or statutory EIA process under the EIAO. Detailed assessments and/or statutory EIA procedures have to be implemented in future to confirm the environmental performance of the sites.

7.4.2 Air Quality

All key potential Air Sensitive Receivers (ASRs) within the 500m assessment boundary of each potential reclamation site, i.e. residential buildings, schools and hospitals etc., were identified. During reclamation and construction phase, potential air quality impacts may arise from fugitive dust emission during construction activities. Strategic mitigation measures, such as good site practice, were recommended when required.

During operational phase, potential air pollution sources, i.e. industrial / chimney emissions in the vicinity, vehicular emission from road networks, marine emission and odour emission sources, etc., were identified. The potential impact on existing, planned and proposed future ASRs were addressed through desk-top study. Strategic mitigation measures, such as provision of sufficient setback distance, building height restrictions, were recommended to minimize the impact.

7.4.3 Noise

All key potential Noise Sensitive Receivers (NSRs) within the 300m assessment boundary of each potential reclamation site, i.e. residential buildings, schools and hospitals etc., were identified.

During construction phase, airborne construction noise will be generated by the use of Powered Mechanical Equipment (PME) during reclamation and land-based construction works. Potential adverse impacts on nearby NSRs will be addressed and strategic mitigation measures, such as use of noise barriers, were recommended.

During operational phase, potential noise pollution sources, i.e. aircraft noise, helicopter noise, fixed plant noise, road traffic noise, railway noise, marine traffic noise, etc., were identified. Potential noise impact on future NSRs on each reclamation site from identified pollution sources will be addressed and strategic mitigation measures, such as provision of sufficient setback distance, noise barrier, semi-enclosure or non-noise sensitive uses etc., were recommended if necessary.

7.4.4 Water Quality

The potential water sensitive Receivers (WSRs), e.g. seawater intake points, beaches, fish culture zones, key coral areas, etc., were identified and the existing water quality conditions were collected through desktop research.

During construction phase, reclamation may involve dredging, disposal of potentially contaminated sediment, filling of reclamation materials and other marine works. Potential water quality impacts will be addressed and strategic mitigation measures, such as potential employment of non-dredging method, were recommended.

During operational phase, the reclaimed site may change the flow regime and flushing capacity, potential contaminants may release from increasing surface runoff and generated sewage. The potential water quality impacts will be addressed at strategic level and mitigation measures were recommended to minimize the impact.

7.4.5 Waste Management Implications

The storage, handling, collection, transport and disposal of various types of wastes arising from the construction and operation of the project were assessed.

During the construction phase, waste generating activities during reclamation and land-based construction works were identified. Wastes generated during the construction phase would generally include construction and demolition wastes, dredged marine sediment, chemical waste and workforce waste.

During the operational phase, different kinds of wastes generated from the proposed developments were identified. Proper collection, transfer and disposal system were explored to encourage reuse of solid wastes and reduce secondary impacts such as odour nuisance, vermin, water pollution and visual impact

7.4.6 Ecological Impact

Ecological resources and sensitive receivers within the vicinity of potential reclamation sites, i.e. important terrestrial, marine and intertidal habitats, sites of conservation of importance etc., were identified. Direct and indirect impacts during construction and operational stages including loss/disturbance to ecological important habitat and sites of conservation interest were discussed at strategic level. Strategic mitigation measures were recommended to minimize the potential impacts.

7.4.7 Fisheries Impact

Key fisheries resources within the vicinity of potential reclamation sites, i.e. fish culture zone, fish spawning ground, fish nursery ground, high fisheries production area (adult and fry fish) etc., were identified. Potential direct and indirect impacts during construction and operational phase were identified. Strategic mitigation measures, such as deployment of artificial reefs, water quality control measures etc., were recommended to minimize or compensate the adverse impact.

7.4.8 Cultural Heritage

Cultural heritage resources within the vicinity of potential reclamation sites, i.e. Declared Monuments, Site of Archaeological Interest and Marine Archaeology etc., were identified. Potential direct (i.e. encroachment of Sites of Archaeological Interest and Marine Archaeology etc.) and indirect impacts (i.e. vibration and construction dust from construction works etc.) during construction and operational stages will be addressed. Mitigation measures, such as sequencing and scheduling of construction works, were recommended.

7.4.9 Landscape and Visual

Landscape resources (LRs), landscape character areas (LCAs) and visually sensitive receivers (VSRs) within the vicinity were identified. Potential direct and indirect impacts on LR, LCAs and VSRs during both construction and operational phases will be assessed. Mitigation measures, such as minimizing the area of reclamation, well-planning of future land uses, provision of landscape buffers, tree planting etc., were recommended when necessary.

7.4.10 Hazard to Life

For potential reclamation sites which fall within the Consultation Zone of a PHI, potential hazard to life issue was identified. Quantitative hazard assessments for the relevant shortlisted sites are required.

7.4.11 Landfill Gas Hazard

For potential reclamation sites which fall within the 250m Consultation Zone of a landfill site, a qualitative assessment of LFG hazard were undertaken in accordance with the Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97) and the Landfill Gas Hazard Assessment for Developments Adjacent to Landfills (ProPECC PN 3/96) based on the “Source – Pathway – Target” model. Mitigation measures for development within the Consultation Zone, e.g. forced ventilation and gas detection system, were recommended.

7.5 Traffic Impact Assessment

7.5.1 Introduction

This Section first review the existing traffic condition of the sites. With due consideration to the likely traffic impact due to the assumed land use proposal on

the adjacent road network, suitable traffic and transport strategies including improvement proposal have been identified.

7.5.2 Vehicle to Capacity (V/C) Ratio Calculation

The vehicle to capacity ratio is calculated using the most up to date data available at the time of completing this report. Volume to Capacity (V/C) Ratio indicates the proportion of peak hour traffic flow to the capacity of a road link.

The current vehicular usage has been taken from the most recent in-house or externally available surveys (such as flow data from the published Annual Traffic Census 2012) of the relevant roads and junctions within the vicinity of the sites.

Once the most relevant flow data have been identified the V/C ratio is calculated by dividing the number of vehicles using the road by the capacity. Therefore a V/C ratio between 0 to <1 is considered acceptable; a ratio above 1.0 indicates the onset of mild congestion; a ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A V/C ratio above 1.2 indicates the onset of more serious congestion.

7.5.3 Traffic Forecast Methodology

The Broad Technical Assessment for each potential reclamation site was appraised with the aids of the Local Area Transport Model (LATM) which has been established based on the 2008-based Base District Traffic Models (BDTMs) developed by Strategic Roads Divisions of Transport Department. The area of influence adopted for each potential reclamation area is site specific, and the assessment mainly covers the major road networks at this stage of the Study.

7.5.4 Future Traffic Condition

This Study adopts 2021 as a design year for the Broad Technical Assessment to assess the immediate impact on the traffic and transport network. In deriving the future traffic condition, the latest available input assumptions were taken into consideration as far as possible.

In terms of development trip generation, it is assumed that the full population intake will be in year 2021. The vehicle trips generated by the potential reclamation have been estimated based on the findings from Travel Characteristics Survey 2002 conducted by Transport Department and the projected population for each potential reclamation area. Table below summarises the key parameters applied and the corresponding assumptions made.

Parameters	
Trip Rate*	2.0 trips/person
AM Peak Factor*	12% of daily traffic
PM Peak Factor*	10% of daily traffic
AM Peak Bi-directional Split#	Outbound – 70% and Inbound – 30%, of total person trips generated during AM peak
PM Peak Bi-directional Split#	Outbound – 40% and Inbound – 60%, of total person trips generated during PM peak

Parameters								
Transport Mode	Franchised Bus	Rail	Public Light Bus	Private Vehicle	Special Purpose Bus	Taxi	Tram	Ferry
Modal Split*	33%	25%	12%	11%	9%	7%	2%	1%
Occupancy (passenger)#	100	-	16	2	50	2	-	-
PCU Factor#	2.5	-	1.5	1	2	1	-	-

Note:

* Denotes the finding from Travel Characteristics Survey 2002

Assumptions made based on other trip generation and attraction surveys and Transport Planning and Design Manual (TPDM)

Based on these assumptions, the trip generation and attraction for each potential reclamation site can be broadly estimated. The trip generation and attraction of the potential reclamation sites together with the input assumptions made on the future traffic condition, the impact on the existing major road links due to the potential reclamation can then be assessed. The assessment result for each potential reclamation site has been presented individually.

7.6 Civil Works

For identification of the drainage and sewerage constraints arising from the longlisted sites, the following sources of information have been specifically referred to:

- Environmental Protection Department (EPD) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No.: EPD/TP 1/05;
- Drainage Services Department (DSD) Sewerage Manual – Key Planning Issues and Gravity Collection System;
- Drainage Services Department (DSD) Stormwater Drainage Manual – Planning, Design and Management; and
- Drainage Record Plans obtained from DSD.

For identification of the water supply constraints arising from the proposed sites, the following sources of information have been specifically referred to:

- Water Supplies Department (WSD) Department Instruction DI 1309; and
- Existing Waterworks Record Plans obtained from WSD.

7.7 Implementation, Construction and Costing

7.7.1 Implementation

Reclamation Programme for each longlisted reclamation site with reference to the construction rates of Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works, Contract No. HY/2010/02. The implementation programme for each site is site specific with different constraints and considerations. The programme takes into account the relocation of PHI, reprovisioning of affected facilities and phasing.

Generally the following implementation strategy has been considered:

- 1) Project commencement;
- 2) Preliminary work, including feasibility, ordnance authorisation detailed design, EIA, etc.;
- 3) Construction – single or phased approach;
- 4) Civil and utilities infrastructure
- 5) Connecting infrastructure
- 6) Development

It is likely that some of these stages will be completed concurrently at least in part.

For identification of the development programme from the proposed sites, Kai Tak Development has been referred.

As mentioned previously, due to the increased level of uncertainties and risks involved in the large artificial island sites proposed in the central waters of Hong Kong – namely Tsing Chau Tsai East, Kau Yi Chau West and Lamma North – an implementation programme has not been completed at this stage for these three sites.

8 Site Shortlisting

8.1 Methodology

Site shortlisting is to select shortlisted sites from the longlist by qualitative assessment based on the results of BTA and the refined SSC. This shortlisting process is to select sites that have higher potential for consultation with the public in PE2 and further detailed study. Any of these sites will need to eventually go through separate feasibility study, statutory processes including EIAO (reclamations under item C of Schedule 2 and engineering feasibility studies of urban development projects with study areas more than 20 ha or involving population of more than 100,000 under Schedule 3 are Designated Projects under the EIAO. There would also be other potential Designated Project elements on the shortlisted reclamation sites.), TPO, etc. and public consultation.

A qualitative review of the sites was undertaken to summarise the potential constraints, mitigation measures and issues for each site.

With reference to the feedback from PE1, the shortlisting exercise initially considered the environmental and local community constraints associated with each site as these are considered by the public to be their two primary concerns.

The selected sites are then assessed with reference to other key considerations revealed from the Broad Technical Assessment. These may include, but are not limited to, development potential and constraints, transport links, traffic impact, aircraft and helicopter flight paths, etc.

A qualitative assessment was then completed by assessing the potential impacts and proposing mitigation measures for each of the influencing factors outlined in the review.

Priority is given to near shore reclamation since it can easily be connected to existing road networks and developed areas. Man-made shorelines distances from the existing community are selected as far as possible. It also avoids encroaching on natural shorelines and environmentally sensitive areas.

The shortlisted sites were taken forward for consultation in PE2, while the remaining sites may be studied further if opportunities arise in the future.

8.2 Summary of Qualitative Review for Longlisted Sites

The following section provides a qualitatively description of each of the longlisted sites, summarising the potential constraints and issues with reference to Broad Technical Assessments undertaken for each site.

8.2.1 A1 Hei Ling Chau West

Potential Impact on Environment and Local Community

- The existing correctional institutes on Hei Ling Chau and Chi Ma Wan may be perceived as NIMBY by the future residents of the proposed reclamation. The provision of physical links to Chi Ma Wan or Hei Ling Chau will

require consultation with the Correctional Services Department with regards to their potential security and social impact

- Critical environmental impact: water quality, ecology, fisheries, landscape and visual.

Other Potential Constraints

- No road link is available, future residents will need to rely on ferry services for day-to-day commuting between the urban area and the site.
- Potential visual impact to the recreational users of the Lantau South Country park.

8.2.2 A2 South Cheung Chau

Potential Impact on Environment and Local Community

- Potential direct (loss of habitat) and indirect (disturbance from dust and noise) impacts on finless porpoise during both construction and operational phase.
- Critical environmental impact: water quality, ecology (e.g. finless porpoises), fisheries, fish nursery and spawning grounds, landscape and visual.

Other Potential Constraints

- Remote location of site will likely require ferry services and may make the site unviable as a tourist destination.
- Land uses that generate frequent commuting between the proposed reclamation and existing urban area may not be practical.
- Potential air quality impacts due to chimney emission and odour emission from planned Integrated Waste Management Facilities (IWMF) on the artificial island at Shek Kwu Chau.
- Potential noise impacts on proposed sensitive receivers from the operation of proposed wind farm.
- Potential impact from future connecting infrastructure.
- Potential impact on sediment disposal area around Shek Kwu Chau and possible associated water quality impact.
- Impact on hydrodynamic and water quality, and dispersion and dilution of outfall discharges.
- Impact on coastal protection areas at south Cheung Chau and Shek Kwu Chau, horseshoe crab areas and beaches at southern Lantau.
- Large scale transportation infrastructures will be required, which may affect water flow and water quality.

8.2.3 A3 Lamma North

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, water quality, fisheries, fish nursery ground, water quality of coastal protection area and coral areas to the north of Lamma Island, coral areas to the west of Hong Kong Island, the beaches at the southern Hong Kong Island, visual and landscape impact, etc.

Other Potential Constraints

- Lack of transport links: require strategic transport links to urban area.
- Re-provisioning of Northwest Lamma Anchorage is required.
- Potential air quality impacts on proposed sensitive uses due to chimney emissions from Lamma Power Station.
- Potential noise impact on future development due to departure flight path of HK International Airport and helicopter flight path to Macau.
- Impact on dispersion and dilution of HATS discharge and water quality of East Lamma Channel and West Lamma Channel due to substantial additional sewage loading from the proposed residential development.
- Potential impacts on water quality and hydraulics.

8.2.4 A4 Tsing Chau Tsai East

Potential Impact on Environment and Local Community

- Critical environmental impact: close to Pa Tau Kwu headland, a roosting site of White-bellied Sea Eagles with past breeding record, fish culture zone and mangrove area at Ma Wan, landscape and visual impact, etc.

Other Potential Constraints

- Lack of transport links: require strategic transport links to urban area.
- Two Sites of Archaeological Interest at Pa Tau Kwu are 200-300m away from Tsing Chau Tsai.
- Potential impact from future connecting infrastructure.
- Underneath aircraft flight path and close to GFS helicopter flight path, hence noise impact and planning constraints.
- Noise, air quality and health impact on residential development in the proposed Tsing Chau Tsai reclamation from Disney Land fireworks.
- Restriction imposed by the Deed of Restrictive Covenant of the Hong Kong Disneyland (e.g. building height, visual buffer etc.).
- Impact on the dispersion and dilution of HATS discharge and have hydrodynamic and water quality impacts on Kap Shui Mun and Ma Wan Channel.
- Potential impacts on water quality and hydraulics.

8.2.5 A5 Kau Yi Chau West

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, ecology (e.g. coral areas near Kau Yi Chau and Siu Kau Yi, water quality of coral areas and coastal protection areas at Peng Chau, etc.), landscape and visual.

Other Potential Constraints

- Lack of transport links: require strategic transport links to urban area.
- Underneath aircraft flight path and close to Hong Kong - Macao VFR Helicopter Route A with maximum altitude of 500-900 feet, hence noise impact and planning constraints.
- Re-provisioning of the Kau Yi Chau Dangerous Goods Anchorage.
- Restriction imposed by the Deed of Restrictive Covenant of the Hong Kong Disneyland (e.g. building height, visual buffer, etc.).
- Potential noise impact on future development due to departure flight path of HK International Airport.
- Potential marine traffic impacts.
- Potential impacts on the port operation efficiency.
- Impact on the dispersion and discharge of HATS discharge and the overall hydrodynamic and water quality.
- Potential impacts on water quality and hydraulics.

8.2.6 B1 Peng Chau - Hei Ling Chau

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, air quality, ecology, landscape and visual.

Other Potential Constraints

- The existing correctional institutes on Hei Ling Chau and Chi Ma Wan may be perceived as NIMBY by the future residents of the proposed reclamation. The provision of physical links to Chi Ma Wan or Hei Ling Chau will require consultation with the Correctional Services Department with regards to their potential security and social impact.
- Underneath aircraft flight path, hence noise impact and planning constraints.
- Future residents and visitors will have to rely on ferry services for transportation.
- Gaseous pollutants emission associated with the operation of the Hong Kong Disneyland Resort.

8.2.7 B2 Beaufort Island

Potential Impact on Environment and Local Community

- Beaufort Island was designated as an Inshore Water Protection / Recreation Area under the South West New Territories Development Strategy Review.
- Critical environmental impact: water quality, ecology, fisheries, landscape and visual.

Other Potential Constraints

- Future residents and visitors will have to rely on ferry services for transportation. The proposed reclamation is also considerably remote from the developed urban areas.

8.2.8 C1 Tuen Mun Area 40

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, air quality, noise, landscape and visual.

Other Potential Constraints

- Reprovisioning of the two government facilities (the fireboat station and the Immigration Department) and their berths; and marine access to the existing sawmills.
- The proposed reclamation is likely to be impacted by noise pollution generated from air and road traffic of the proposed strategic transport infrastructure e.g. Tuen Mun-Chek Lap Kok Link, etc.
- The scale of the proposed TM-CLK Link could sterilise adjacent land given the distance that might be required to mitigate visual, noise and air pollution.
- Reclamation surrounded by NIMBY or industrial uses e.g. the existing saw mills, Butterfly Beach Laundry, Pillar Point Sewage Treatment Works, warehouses and open storage, etc.
- Noise pollution from the helipad (CP15) located within the area within the southeast extent of the River Trade Terminal.

8.2.9 C2 Tuen Mun Area 27 (Sam Shing)

Potential Impact on Environment and Local Community

- Impact the existing Castle Peak Bay and the area available for recreational activities.
- Perceived source of visual impact by the existing residents nearby.
- Impact on the water frontage of the seafood stalls on Sam Shing Street.
- Critical environmental impact: water quality, air quality, landscape and visual.

Other Potential Constraints

- The existing Tuen Mun Typhoon Shelter may be perceived by the future residents of the proposed reclamation as a source of nuisances e.g. odour, etc.
- Emissions from vehicles on Castle Peak Road and Tuen Mun Road, Marine from Tuen Mun Public Cargo Working Area, marine vessels and sampans from Castle Peak Fish Market and Joint User Complex and Wholesale Fish Market.
- Odour emission from Castle Peak Wholesale Fish Market and Joint User Complex and Wholesale Fish Market.
- Noise pollution from Castle Peak Road and Tuen Mun Road, the Light Rail at Tuen Mun, loading/unloading from Tuen Mun Public Cargo Working Area, Castle Peak Fish Market & Joint User Complex and Wholesale Fish Market and fixed plant noise from Tube Ice Plant, KMB Bus Depot, Citybus Bus Depot.

8.2.10 C3 Tsing Lung Tau

Potential Impact on Environment and Local Community

- Perceived source of visual impact by the existing residents nearby.
- Critical environmental impact: air quality, noise, landscape and visual.

Other Potential Constraints

- Potential reprovisioning of the existing pier may be required.
- The traffic condition of the area – to a large extent – is constrained by the capacity of Castle Peak Road.
- Vehicular and noise pollution from Castle Peak, Tsing Lung Tau and Tuen Mun Road.

8.2.11 C4 Siu Ho Wan

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, noise, water quality, ecology (e.g. potential ecological impact on Chinese White Dolphins, Committed Marine Park at The Brothers, Tai Ho Stream SSSI, mangrove areas and horseshoe crabs, etc.), fisheries, landscape and visual.

Other Potential Constraints

- The proposed site falls within the Consultation Zone of Potentially Hazardous Installation (Siu Ho Wan Water Treatment Works) and there is potential hazard to life issue from this PHI on the proposed development site boundary. Also, the Sham Shui Kok Chlorine Transshipment Dock is located at Siu Ho Wan (adjacent to the EPD refuse transfer station), chlorine drums and cylinders used by Water Supplies Department (WSD) would be

unloaded in this transshipment dock, there is potential hazard to life issue from this chlorine transshipment dock. Hazard assessment would be required for the proposed development on the site.

- Noise impact and vehicular emission from North Lantau Highway, proposed Road P1, MTR railway lines, GFS helicopter flight path ; NEF 25 contours of HKIA; fixed plant from local works.
- Land use interfacing issues due to nearby NIMBY/industrial facilities (e.g. Sewage Treatment Works, Water Treatment Facilities, Refuse Transfer Station, planned Organic Waste Treatment Facilities, Sham Shui Kok Chlorine Transshipment Stock, bus depots, vehicle pound vehicle examination centre and weigh station and government maintenance depot, etc.).
- Development constraint from NEF 25 Contour.
- Potential pollution from existing and proposed NIMBY development i.e. Refuse Transfer Station and Organic Waste Treatment Facility and columbarium development.
- The proposed reclamation is subject to the Airport Height Restriction ranging from +80mPD to +100mPD.
- Transport links: may require strategic road link to address potential cumulative impact to existing roads and bridges due to various developments in North Lantau.
- The site may have conflict with Lantau Logistic Park under previous study.

8.2.12 C5 Sunny Bay

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, noise, water quality, landscape and visual and potential ecological impact (e.g. impacts on Chinese White Dolphins, committed Marine Park at The Brothers, mangrove areas and seagrass beds, etc).

Other Potential Constraints

- The proposed reclamation is subject to development constraint due to NEF 25 contour for aircraft noise.
- The proposed reclamation is likely to be impacted by noise pollution generated from air and road traffic.
- Marine access of the existing barging point and shipyard.
- Impacts due to the GFS Helicopter operation nearby and potential helicopter noise issue.
- Transport links: may require strategic road link to address potential cumulative impact to existing roads and bridges due to various developments in North Lantau.

- Road traffic noise and vehicular emission from North Lantau Highway and proposed Road P1.
- Railway noise and fixed plant noise from MTR railway lines and station.

8.2.13 C6 Southwest Tsing Yi

Given the strategic location of this site, this site has great potential of integrated development with adjacent area but its development is only feasible if the adjacent industrial uses were relocated. Therefore, this site has been assessed on the assumption that the existing industrial land uses were relocated.

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, air quality and noise.

Other Potential Constraints

- The reclamation site falls within the consultation zones of the five PHIs, including Shell Oil Depot, Chervon HK Ltd. Oil Terminal, ExxonMobil Oil Depot (West), ExxonMobil Oil Depot (East) and Sinopec HK Oil Terminal, along the coastline. Relocation of these five PHI are required before reclamation works. Close liaison with the operators of the five PHIs for the relocation of these five PHIs is required.
- Land use interfacing issues due to nearby NIMBY/industrial facilities (e.g. dockyards, Chemical Waste Treatment Centre, container terminal, industrial buildings, workshops, etc.).
- Potential air and noise impacts on proposed sensitive users due to vehicular emission and road traffic noise from nearby road networks (e.g. Cheung Tsing Highway and Tsing Yi Road); emission from chemical waste treatment center; marine vessels; fixed noise sources from Container Services and Bus Depot and helicopter noise.
- The proposed site is northwest of the submarine outfall of Stonecutters Island Sewage Treatment Works (STW, ~1800m), may have impact on hydrodynamic and water quality due to impact on dispersion and dilution of HATS discharge.
- The site is also being considered for Container Terminal No.10 development under separate consultancy study. Close liaison with the relevant project office is necessary.

8.2.14 C7 Silver Mine Bay South

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, noise, water quality, ecology, landscape and visual.

Other Potential Constraints

- Silver Mine Bay was designated as an Inshore Water Protection / Recreation Area under the South West New Territories Development Strategy Review.
- The proposed reclamation is located within the PHI consultation zone of the existing Silvermine Bay Water Treatment Works. There is a potential hazard to life issue from this PHI on the proposed developments of this site and hazard assessment would be required.
- Relocation of the existing refuse transfer station, dangerous goods store and sewage treatment works will be required.
- The existing sewage outfall will impose development constraint.
- Noise nuisance from the existing helicopter landing pad that is currently occupied by the Hong Kong Air Cadet Corps.
- Vehicular emissions from Mui Wo Ferry Pier Road, Odour nuisance from Mui Wo Sewage Treatment Works (STW).
- Noise pollution from Mui Wo Ferry Pier Road and fixed plants noise from Mui Wo STW, Mui Wo Bus Depot, Concrete Plant adjacent to the Mui Wo STW, Mui Wo Refuse Transfer Station.

8.2.15 C8 Tai Po Industrial Estate

Potential Impact on Environment and Local Community

- The amenities and environs of the existing Tai Po Waterfront Park and associated waterfront promenade will be impacted as a result of the proposed reclamation. The proposed reclamation may cause social disquiet given its impact on the open space provision within the area during construction.
- Critical environmental impact: noise, air quality, landscape and visual.

Other Potential Constraints

- The proposed releasing site fall within the Consultation Zone of the restored Shuen Wan Landfill and a landfill gas hazard assessment would be required for the proposed developments which fall within the consultation zone of landfill.
- The entire site is located within a PHI consultation zone for Gas Production Plant of Hong Kong & China Gas No. Ltd. There is a potential hazard to life issue from this PHI on the proposed development of the site. A separate quantitative assessment (QRA) will be required during the engineering investigation stage.
- Proposed columbarium development to the southwest corner, typically considered as a NIMBY development given its potential traffic impact and cumulative air quality impact during both construction and operation phase.
- Chimney emissions from the Tai Po industrial Estate and odour emission from Tai Po Sewage Treatment Works.

8.2.16 C9 Tai Po Kau

Potential Impact on Environment and Local Community

- Impact on the existing pier.
- Critical environmental impact: air quality, noise, cultural heritage, ecology, landscape and visual.

Other Potential Constraints

- The traffic condition of the area is constrained by the capacity of Tolo Highway.
- Noise nuisance and environmental emission from Tolo Highway and East Rail Line.

8.2.17 C10 Ma Liu Shui

Potential Impact on Environment and Local Community

- Social impacts on the Chinese University.
- Critical environmental impact: air quality, noise, water quality, landscape and visual.

Other Potential Constraints

- Reprovisioning of existing developments with marine access and helipad will be required.
- Noise and air quality impact from the adjacent Tolo and Tate's Cairn Highway and railway noise from the East Rail Line.
- Odour and noise impact due to nearby Shatin Sewage Treatment Works (STW) and marine police helipad. Relocation of these facilities are required.

8.2.18 C11 Sandy Bay

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, ecology, landscape and visual.

Other Potential Constraints

- The traffic condition of the area – to a large extent – is constrained by the capacity of Pok Fu Lam. The existing Sandy Bay area is subject to the Pok Fu Lam Moratorium. The future developments at the proposed reclamation may also be subject to the Pok Fu Lam Moratorium due to the limited traffic capacity within the area.
- Vehicular and noise pollution from Victoria Road and Sha Wan Drive.

8.2.19 C12 Lamma Quarry

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, ecology, fisheries, landscape and visual.

Other Potential Constraints

- Uncertain land use proposal of the ex-Lamma Quarry, still under study.
- The reclamation may be constrained by the capacity of the servicing infrastructure e.g. water, sewage, etc.
- Chimney emission from Lamma Power Station, dust emission from cement plant.
- Noise nuisance from fixed plant noise from the cement works and helicopter noise.

8.2.20 C13 Tseung Kwan O East

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, noise, water quality.

Other Potential Constraints

- General public expectation that there will be no further reclamation in Tseung Kwan O given the decision to take forward the "no further reclamation" option in the Feasibility Study for Further Development of Tseung Kwan O, although the then "considered further reclamation option" actually meant further reclamation in TKO South up to the proposed Cross-bay Link.
- The proposed reclamation will impinge the marine access of the waterfront lots within the Industrial Estate e.g. the Gammon Technology Park.
- The extension of the TKO Industrial Estate may be impact by the traffic capacity of Wan Po Road and subject to the construction of the proposed Cross Bay Link.
- Chimney emission from Tseung Kwan O Industrial Estate, planned Cross Bay Link (CBL), Road D9, etc. and odour emission from Tseung Kwan O biodiesel plant, landfill sites and Tseung Kwan O sewage treatment works.
- Noise pollution sources include planned Cross Bay Link, Road D9, etc. and fixed plants noise from MTR Tseung Kwan O Depot, factories in Tseung Kwan O Industrial Estate, etc.

8.2.21 D1 Lung Kwu Tan

Potential Impact on Environment and Local Community

- Critical environmental impact: air quality, cultural heritage, ecology (e.g. potential ecological impacts on Sha Chau & Lung Kwu Chau Marine Park, committed Marine Park at The Brothers, SSSI at Lung Kwu Chau, Tree Island and Sha Chau, horseshoe crabs, etc), fisheries, landscape and visual.

- Potential disturbance on the Lung Kwu Tan Valley SSSI (400m way) and butterfly hotspot in the proximity.

Other Potential Constraints

- Land use interfacing issues and odour / air quality problems, due to nearby NIMBY/industrial facilities (e.g. power stations, cement plant, steel mill, ecopark, WENT Landfill, planned IWMF, proposed sludge treatment facilitates at Tsang Tsui, etc.).
- Potential noise on proposed sensitive uses, such as resident areas along Lung Kwu Tan shoreline. Road Traffic noise from Lung Kwu Tan Road and Lung Mun Road. Fixed-plant noise from Green Island Cement, Shiu Wing Steel Mill, chimney stacks of Castle Peak A&B Power Station and Black Point Power Station. Marine Traffic noise from main navigation channel, helicopter noise from Castle Peak Power Station Helipad CP08 and Black Point Radar Station Helipad CP02.
- Helicopter noise from Castle Peak power station.
- Potential air quality impact on proposed sensitive uses, such as resident areas along Lung Kwu Tan shoreline. Vehicular emission from Lung Kwu Tan Road and Lung Mun Road. Chimney emission from chimney stacks of Castle Peak A&B Power Station and Black Point Power Station; also chimney emission from Shiu Wing Steel Mill and EcoPark at Tuen Mun Area 38 associated with the recycling processes of waste. Dust emission from Green Island Cement and marine emission from main navigation channel. Odour nuisance from proposed Sludge Treatment Facilities, Integrated Waste Management Facility at Tsang Tsui, WENT Landfill site and WENT Landfill Extension site.
- The proposed site is adjacent to Lung Kwu Tan and Lung Kwu Sheung Tan archaeological sites.
- Marine emission.
- The Lung Kwu Tan area might be perceived as being remote by the public.
- Proximity to traditional burial grounds.

8.2.22 D2 Tai Lam Chung

Potential Impact on Environment and Local Community

- Impact on existing piers along the existing shoreline.
- Critical environmental impact: water quality, cultural heritage, landscape and visual.

Other Potential Constraints

- The traffic condition of the area – to a large extent – is constrained by the capacity of Castle Peak Road. Whilst the alignment proposed for the proposed Tuen Mun to Tsuen Wan Link traverses the area, no railway station has been proposed for Tai Lam Chung.

- Close proximity to the Siu Lam Site of Archaeological Interest.
- The existing HK Petrochemical Company Limited will be perceived as a potential risk to the future residents. The proposed reclamation will also impact its existing marine access. The facility will need to be relocated.
- Vehicular emission and noise pollution from Castle Peak Road and Tuen Mun Road.

8.2.23 D3 Silver Mine Bay North

Potential Impact on Environment and Local Community

- Critical environmental impact: water quality, cultural heritage, landscape and visual.
- Silver Mine Bay was designated as an Inshore Water Protection / Recreation Area under the South West New Territories Development Strategy Review.

Other Potential Constraints

- The proposed reclamation abuts an existing coastline that is currently occupied by a number of graves, which may be perceived as NIMBY by the future residents of the proposed reclamation.
- A number of ruins may also be located along the existing coastline which the site abuts.
- Construction of a coastal road and upgrading of the existing roads within Mui Wo will be required to provide vehicular accessibility.

8.2.24 D4 Shuen Wan

Potential Impact on Environment and Local Community

- The proximity with the proposed columbarium development to the southwest of the golf driving range may be perceived as a source of nuisance by the future residents e.g. smoke and traffic impact, etc.
- The proposed reclamation and its future development will impact the visual amenity of the existing residents nearby.
- Critical environmental impact: air quality, noise, water quality, fisheries, landscape and visual.

Other Potential Constraints

- The proposed reclamation fall within the Consultation Zone of the restored Shuen Wan Landfill and a landfill gas hazard assessment would be required for the proposed developments which fall within the consultation zone of landfill.
- The existing cement works will need to be relocated to avoid land use incompatibility.

- The development potential of the proposed reclamation will be constrained by the traffic capacity of the existing Ting Kok Road.
- Vehicular emissions from Ting Kok Road, dust emission from K Wah Cement Depot.
- Noise pollution from Ting Kok Road and K Wah Cement Depot.

8.2.25 D5 Wu Kai Sha

Potential Impact on Environment and Local Community

- Reprovisioning of the frontage to the Tolo Harbour and pier may be required.
- Impact on an existing beach and therefore on the recreational resources available within the Ma On Shan area.
- The proposed reclamation will impact on the visual and physical amenity of the adjacent Wu Kai Sha Youth Village.
- The proposed reclamation and its future development will impact the visual amenity of the existing residents nearby.
- Critical environmental impact: cultural heritage, landscape and visual.

Other Potential Constraints

- Vehicular emission and noise nuisance from Sai Sha Road.

8.2.26 D6 Tseung Kwan O Area 131

Potential Impact on Environment and Local Community

- The proposed reclamation may impact on the existing natural coastline with additional impact potentially caused by future connection options.
- Impact on the visual amenity of the existing residents at Heng Fa Chuen.
- Critical environmental impact: air quality, water quality, ecology, landscape and visual.

Other Potential Constraints

- General public expectation that there will be no further reclamation in Tseung Kwan O given the decision to take forward the "no further reclamation" option in the Feasibility Study for Further Development of Tseung Kwan O, although the then "considered further reclamation option" actually meant further reclamation in TKO South up to the proposed Cross-bay Link.
- No existing road link is available, therefore the site will require the construction of a tunnel or a coastal road circumference.
- The existing coastline is currently occupied by a number of burial grounds and ruins which may be perceived as NIMBY by the future users of the reclamation.

- Smoke and odour emission from the Junk Bay Chinese Permanent Cemetery and Columbarium, and vehicular emission from the TKO-Lam Tin Tunnel and ventilation buildings.
- Noise pollution from the planned TKO-Lam Tin Tunnel and fixed plants noise from ventilation buildings for TKO-Lam Tin Tunnel.

8.2.27 D7 Shek O Quarry

Potential Impact on Environment and Local Community

- Visual impact to the existing residents at Red Hill Peninsula.
- Impact on proposed Water Sports Centre use after rehabilitation of Shek O Quarry.
- Critical environmental impact: water quality, ecology, landscape and visual.

Other Potential Constraints

- Potential reduced air ventilation due to the excavated rock face of the former Shek O Quarry.
- Site is constrained by the capacity of Shek O Road Vehicular emission and noise pollution from Shek O Road and Cape D'aguiar Road.

8.3 Summary of Site Shortlisting

Based upon the site shortlisting exercise, five nearshore reclamation sites are shortlisted and their opportunities are briefly discussed below:

- (1) **Siu Ho Wan** is located at strategic location in North Lantau. It is near the Airport, enjoys good access to many transport links and infrastructure (e.g North Lantau Highway, railway lines, Tuen Mun Chek Lap Kok Link, Link Road, etc.), and is close to many tourism spots. It offers synergy to other developments in North Lantau including the nearby Tung Chung. The proposed area of reclamation is 133ha, potentially for the development of residential uses, GIC and commercial provisions.
- (2) **Sunny Bay** is located at strategic location in North Lantau. It is close to the Airport, enjoys good access to many transport links and infrastructure (e.g North Lantau Highway, railway lines and station, Tuen Mun Chek Lap Kok Link, etc.), and is close to many tourism spots. Sunny Bay is suitable for recreational development as already stated in the OZP. It offers synergy to other developments in North Lantau. The proposed area of reclamation is 75ha, potentially for the development of recreational and commercial uses.
- (3) **Southwest Tsing Yi** is located in area with good access to existing transportation nodes. Given the strategic location of this site, this site has great potential of integrated development with adjacent area. However, its development potential is limited by adjacent industrial land uses. At present, the site is suitable for extending port facilities to create a regional logistic node. The proposed area of reclamation is 106ha, residential or other development is also feasible if the adjacent industrial land uses were relocated, releasing a large piece of prime land and benefiting the entire

district. Under this Study, this site has been assessed on the assumption that the existing industrial land uses were relocated.

- (4) **Ma Liu Shui** can provide valuable land in developed district for residential development. It is located within area with good access to existing / future traffic and railway network (e.g. Tolo Highway, Tate's Cairn Highway, Shing Mun Tunnel, Shatin Heights Tunnel, Lion Rock Tunnel, Tate's Cairn Tunnel, future SCL, etc.). The proposed area of reclamation is 47ha, potentially for the development of residential uses and other beneficial uses including community and recreational facilities to meet the needs in the district. The reclamation will have synergy with the development proposal on the adjacent Sha Tin Sewage Treatment Works site.
- (5) **Lung Kwu Tan** is easily accessible via existing traffic network (e.g. Lung Kwu Tan Road, Lung Fu Road, Lung Mun Road, etc.) which have spare capacity with further road widening. It presents opportunity for relatively large-scale reclamation (200-300ha) site which is suitable for comprehensive planning. This proposed reclamation site has the potential for a science and business park, residential uses with complementary GIC facilities and local open space.

Besides, the site shortlisting exercise has identified there is great development potential for artificial islands in the central waters that worth further exploring. As regards the option of artificial islands, we have reviewed the eastern waters, the central waters and the western waters of Hong Kong. The eastern waters are of high ecological value whilst the western waters are already heavily constrained by a number of major infrastructure projects. The central waters however are relatively less ecologically sensitive.

These shortlisted sites and the artificial islands in the central waters were taken forward for consultation in PE2, while the remaining sites may be studied further if opportunities arise in the future.

9 Stage 2 Public Engagement

Stage 2 Public Engagement (PE2) was conducted between 21 March 2013 and 21 June 2013. The aim of PE2 was to seek public views on the possible land uses for the shortlisted sites as well as the areas of concern to be addressed in future technical studies.

To enhance the public awareness of the PE2 exercise and to encourage public participation, a series of PE activities including public forums and roving exhibitions were organized. The consultation document, PE2 Digest, was widely disseminated to the public at various outlets including District Offices, roving exhibition counters and public forums. A web version of the PE2 Digest was uploaded onto the Study website.

The Panel on Development of the Legislative Council was consulted on 23 April 2013. Government representatives attended a Special Meeting of the Panel on 1 June 2013 to listen to the views of the deputation. Seven District Councils, in which constituencies the five potential reclamation sites and three rock cavern development sites and the possible artificial islands are located, were also consulted, amongst other stakeholders including green groups, local concerns groups and residents' groups.

The Stage 2 Public Engagement Report and Executive Summary can be found on the Study website <http://www.landsupply.hk>.

Key findings from PE2 include:

- a) land reserve, residential development (in particular public rental housing), recreational or leisure facilities and public parks were the four land uses that received most support among those providing feedback on reclamation.
- b) The dominant themes of concerns about reclamation were about the environment, as in the first stage of the Public Engagement. For the reclamation sites in western waters, the primary concern was the potential impact on marine ecology, in particular the habitats of Chinese White Dolphins.
- c) There was particularly strong resistance against the potential reclamation site at Ma Liu Shui from residents on the opposite bank at On Tai, Chung On and Heng On areas in Ma On Shan and some students of CUHK, conveyed through feedback questionnaire, and the SCPs and FB organized by local groups, residents' groups and some CUHK students. Potential impact on existing community and transportation services, and concerns about the environment including coastal landscape and habitats, marine ecology, air and noise pollution, water flow and quality of Shing Mun River were the key reasons behind the resistance.

- d) The large volume of combined resistance to all potential reclamation sites, mostly generated from the signature campaigns and petitions and Facebook campaign organized by the CUHK Student Union but also from some other sources, could indicate considerable resistance to any of the five reclamation sites. On the other hand, the combined acceptance of all five reclamation sites expressed by some construction industry groups suggested an economic argument for reclamation (e.g. in terms of creating jobs) which was supported in some quarters of the community.
- e) There were fewer specific objections to Sunny Bay and Tsing Yi Southwest. The number of specific objections to artificial islands was also comparatively small.

10 Conclusion

Five nearshore reclamation sites have been selected under this Study through a site selection process, which include:

- a) identification of 48 pre-longlisted sites based on review of previous studies and constraints;
- b) selection of 27 longlisted sites from the 48 pre-longlisted sites based on the SSC consulted in Stage 1 Public Engagement;
- c) broad technical assessment (BTA) for the 27 longlisted sites;
- d) site shortlisting to shortlist 5 potential reclamation sites from the 27 longlisted sites based on the refined SCC and the findings of BTA for further detailed study; the site shortlisting exercise also identified development potential for artificial islands in the central waters that worth further exploring strategically;
- e) Strategic Environmental Assessment (SEA) was carried out to provide environmental input for the entire site selection process.

The five shortlisted nearshore reclamation sites are:

- Siu Ho Wan (C4)
- Sunny Bay (C5)
- Southwest Tsing Yi (C6)
- Ma Liu Shui (C10)
- Lung Kwu Tan (D1)

These shortlisted nearshore reclamation sites and the artificial islands in central water were taken forward for consultation in PE2, while the remaining sites may be studied further if opportunities arise in the future.

It is worth to highlight that throughout the entire site selection process, the Study has identified that all the sites assessed, including the shortlisted sites and artificial islands, possess different environmental and planning issues. It is important that the shortlisted sites and artificial islands are required to go through planning and engineering feasibility studies, statutory processes under the EIAO (reclamations under item C of Schedule 2 and engineering feasibility studies of urban development projects with study areas more than 20 ha or involving population of more than 100,000 under Schedule 3 are Designated Projects under the EIAO. There would also be other potential Designated Project elements on the shortlisted reclamation sites and artificial islands), the Town Planning Ordinance, etc. and public consultations in future to confirm their feasibility/acceptability and address different key issues including:

Reclamation Site		Key Potential Impacts to be Resolved
C4	Siu Ho Wan	<ul style="list-style-type: none"> • Assumption of relocation of PHIs • Hazard to life issue • Land use interfacing issues with existing NIMBY/industrial uses/facilities and future development nearby • Development constraints due to NEF 25 contour of aircraft noise • Noise impact from the flight path of GFS helicopters, highways and aircraft • The potential ecological impact on the habitat of CWD, the Committed Marine Park at The Brothers, Tai Ho Stream SSSI, mangroves areas and horseshoe crab, etc. to be studied in detail in EIA stage • The impact on fisheries due to the encroachment of the proposed reclamation site to the Adult Fish Production Area with production rate >200 • Impact on Tai Ho watercourse • Hydrodynamic and water quality impacts around Urmston Road – cumulative environment impact assessments required
C5	Sunny Bay	<ul style="list-style-type: none"> • Noise impact from the flight path of GFS helicopters and highways and potential impact from 3rd runway • The potential ecological impact on the habitat of CWD, The Committed Marine Park at The Brothers, mangroves areas and seagrass bed, etc. to be studied in detail in EIA stage • Implications of the possible relocation site for GFS Helicopter Base at To Kau Wan • Hydrodynamic and water quality impacts around Urmston Road – cumulative environment impact assessments required • Development constraints due to NEF 25 contour of aircraft noise
C6	Southwest Tsing Yi	<ul style="list-style-type: none"> • Hazard to life issue • Land use interfacing issues with NIMBY/industrial uses/facilities • Assumption of relocation of PHIs • The proposed site is northwest of the submarine outfall of Stonecutters Island Sewage Treatment Works • Octocorals within the subtidal zone of the proposed site • Noise impact from traffic • Hydrodynamic and water quality impacts – cumulative environment impact assessments required

Reclamation Site		Key Potential Impacts to be Resolved
C10	Ma Liu Shui	<ul style="list-style-type: none"> Noise and air quality impact from the adjacent Tolo and Tate's Cairn Highway and railway noise from the East Rail Line Odour emissions from the Shatin STW Helicopter noise from Marine Police site and relocation/reprovisioning of the site Integration with the existing community through suitable site planning and urban design Hydrodynamic and water quality impacts – cumulative environment impact assessments required
D1	Lung Kwu Tan	<ul style="list-style-type: none"> Proximity to traditional burial grounds The proposed site is adjacent to Lung Kwu Tan and Lung Kwu Sheung Tan archaeological sites Potential ecological impact on the habitat of CWD, Sha Chau & Lung Kwu Chau Marine Park, the Committed Marine Park at The Brothers, SSSI at Lung Kwu Chau, Tree Island and Sha Chau, horseshoe crabs, etc. to be studied in detail in EIA stage The impact on fisheries due to the encroachment of the proposed reclamation site to the Adult Fish Production Area with production rate >200 Preservation of natural shoreline Helicopter and traffic noise impact Air quality impact from industrial emissions Hydrodynamic and water quality impacts – cumulative environment impact assessments required Land use interfacing issues with NIMBY/industrial uses/facilities

To address public concerns regarding potential cumulative impact due to various committed, proposed and potential reclamation works, potential impact on Chinese White Dolphins in the western waters and other potential issues/constraints, the government has commissioned separate consultancies to undertake assessment and explore mitigation measures in advance:

- Chinese White Dolphins monitoring in shallow water of Lung Kwu Tan, Siu Ho Wan and Sunny Bay;
- Cumulative Environmental Impact Assessment (CEIA) on ecology, fisheries, air quality and water quality for the three potential nearshore reclamation sites in western waters of Hong Kong to assess quantitatively the total effects of the reclamations; and
- Strategic Study on Artificial Islands in central waters.

Subject to the findings of the above separate consultancies and other projects, the government will carry out further detailed studies including planning and engineering feasibility studies, statutory processes including EIAO, the TPO, etc. and public consultations for the shortlisted reclamation sites, for which the reclamation extent, development parameters, mitigation works, etc. will be developed and further discussed with the public.

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Figure 4 Committed, Proposed, and Potential Marine Parks

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Figure 7 Sites of Special Scientific Interest in Hong Kong

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Figure 9 Locations of Coastal Protection Areas in Hong Kong

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Figure 31 Material Disposal and Storage Area Constraints (Addendum No. 1 incorporated)

Figure 32 Planning & Landscape Constraints

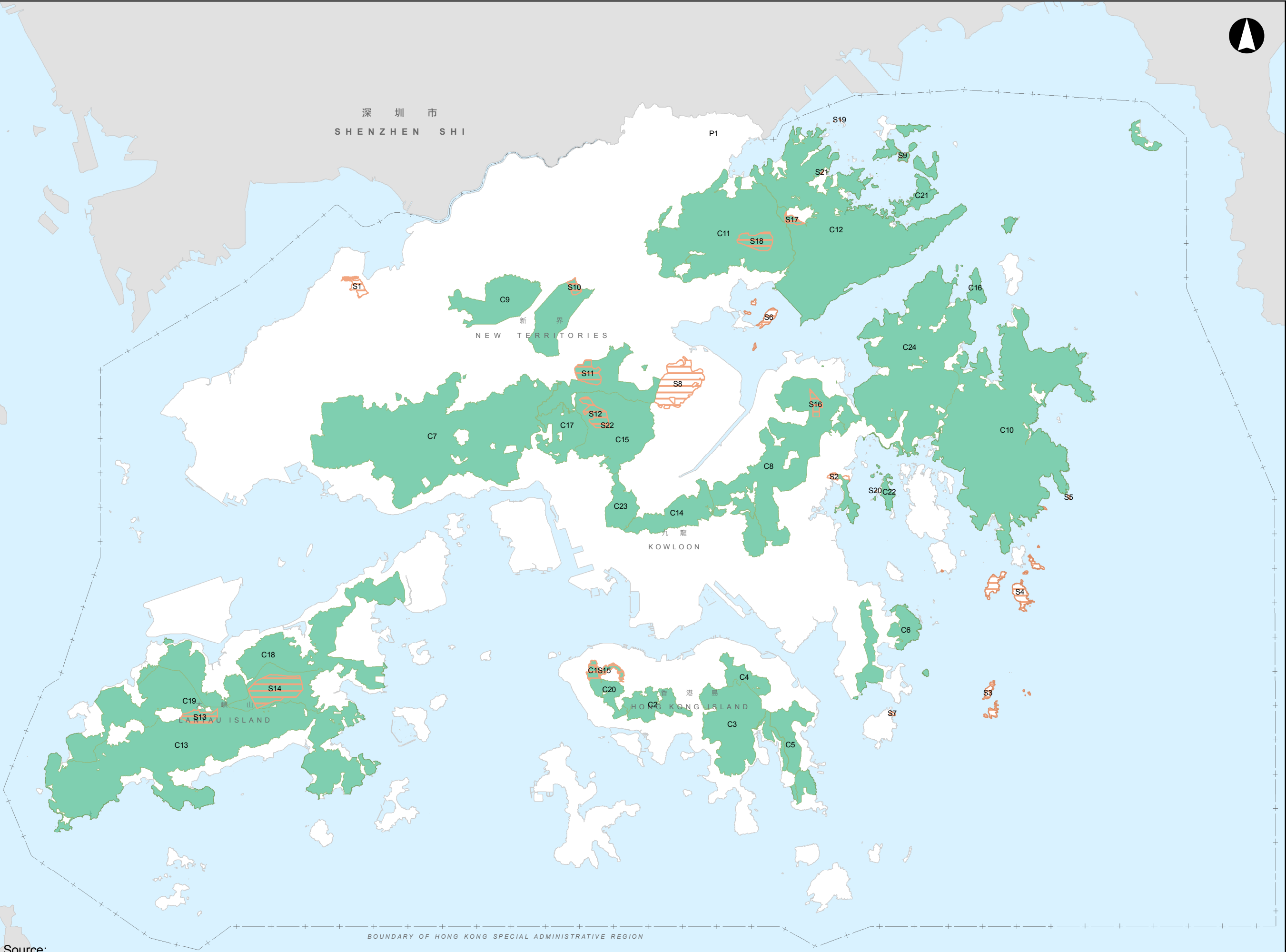
Figure 33 Restriction Zones

Figure 34 Marine & Submarine Constraints

Figure 35 Infrastructure & Development under Construction and/or Feasibility Studies, Planning Infrastructure & Development

Figure 36 Pre-Longlisted Reclamation Sites

Figure 37 Recommended Longlisted Reclamation Sites



Source:
http://www.afcd.gov.hk/english/country/cou_vis/cou_vis_cou/images/KeyPlanCP_SA06012014.jpg

Legend

- Country Park
- Special Area

D3	2013-08-28	SC	RL	ST
Issue	Date	By	Chkd	Appd



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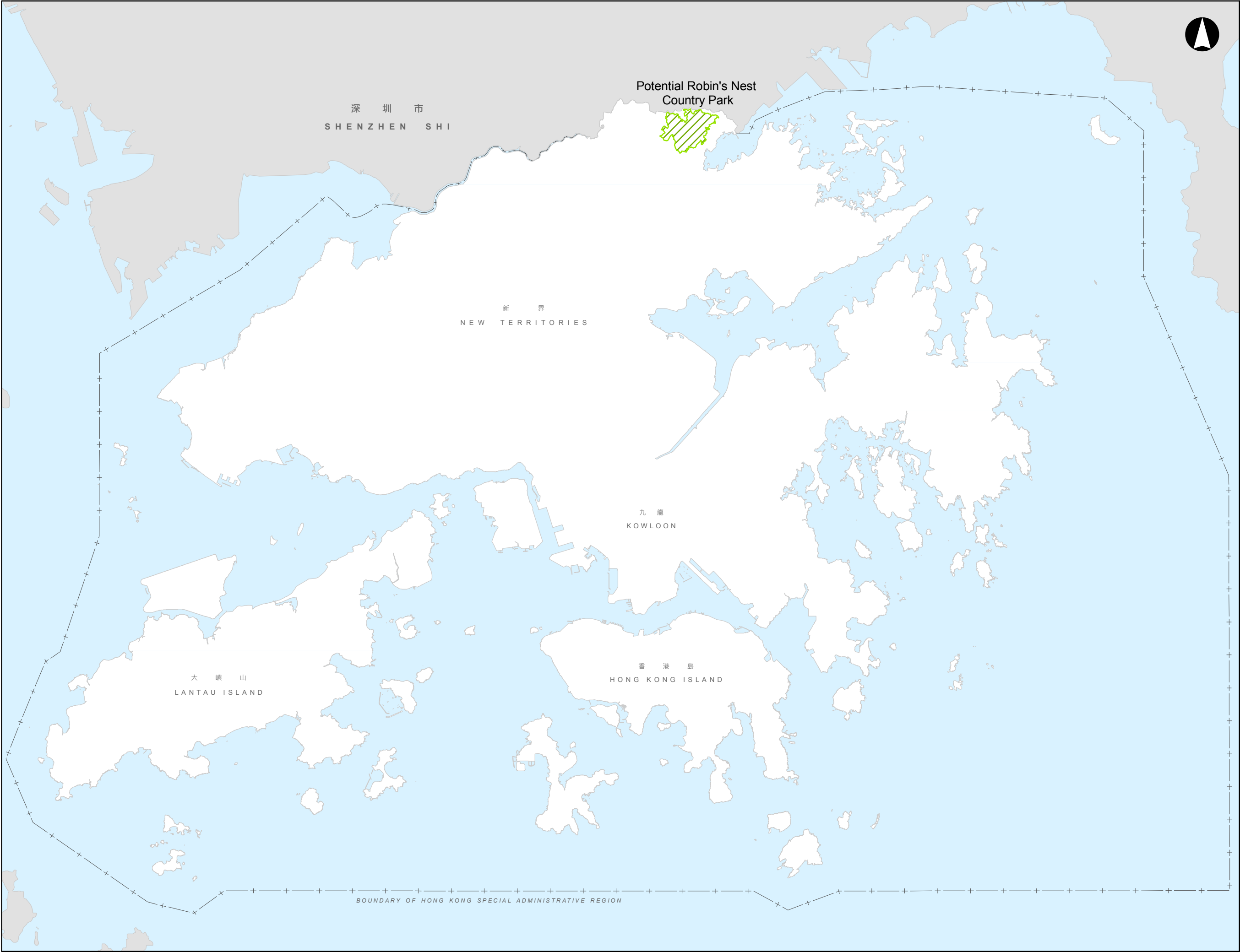
Level 5 Festival Walk
80 Tat Chee Avenue
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Hong Kong

Client
Civil Engineering and Development Department

Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Country Parks and Special Areas in Hong Kong

Scale of A3 1:200,000	Drawing Status Draft	Job No. 217499	Drawing No. 1	Issue D3
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Legend

 Potential Robin's Nest Country Park

D3	2013-08-26	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Drawing Title

Potential Country Park in Hong Kong

Scale of A3

1:200,000

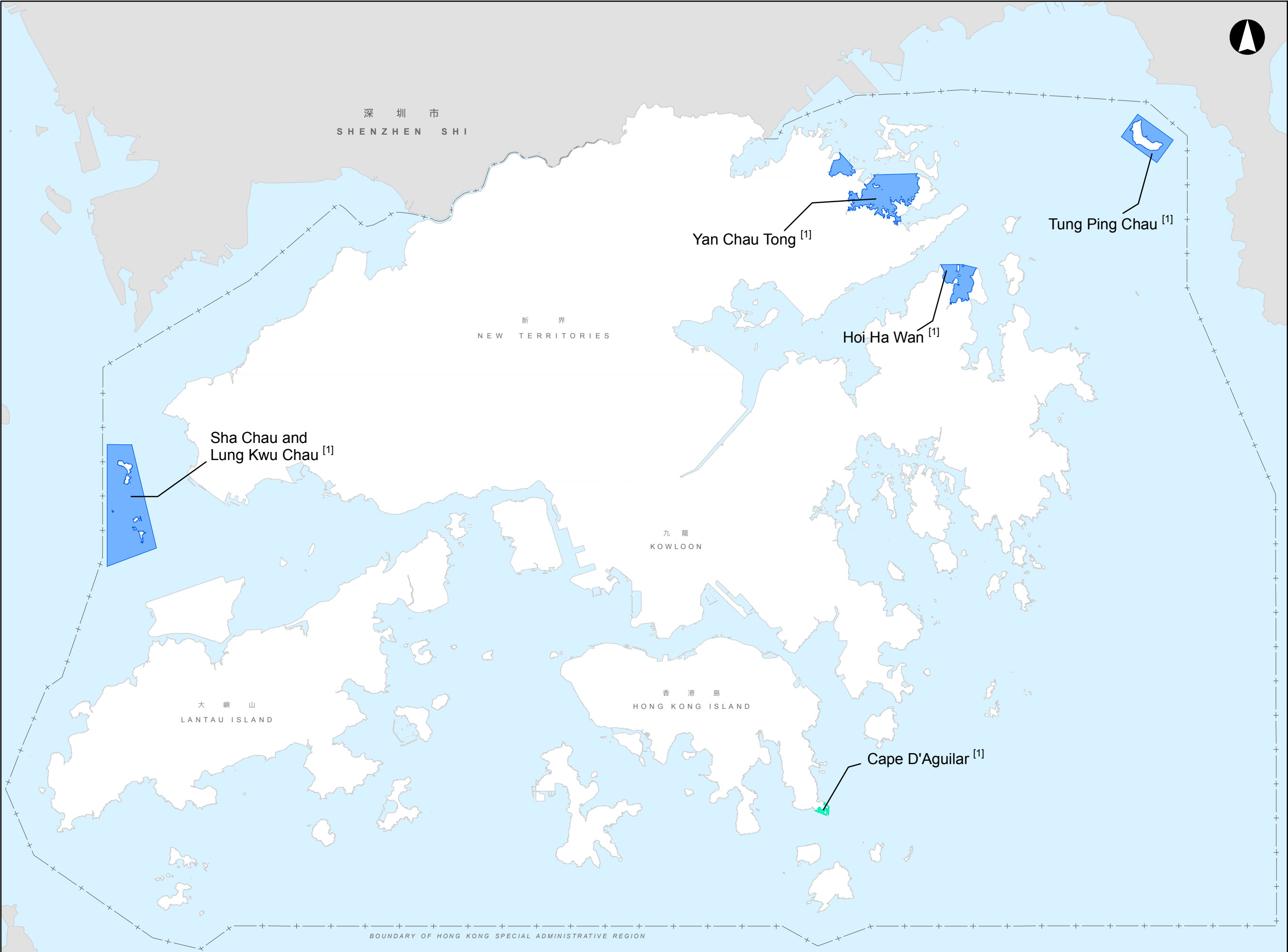
Drawing Status

Draft

Job No
217499

Drawing No
2

Issue
D3



Legend

- Marine Park
- Marine Reserve

D3	2013-08-26	SC	RL	ST
Issue	Date	By	Chkd	Appd

012525 Kilometers57.5

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Hong Kong

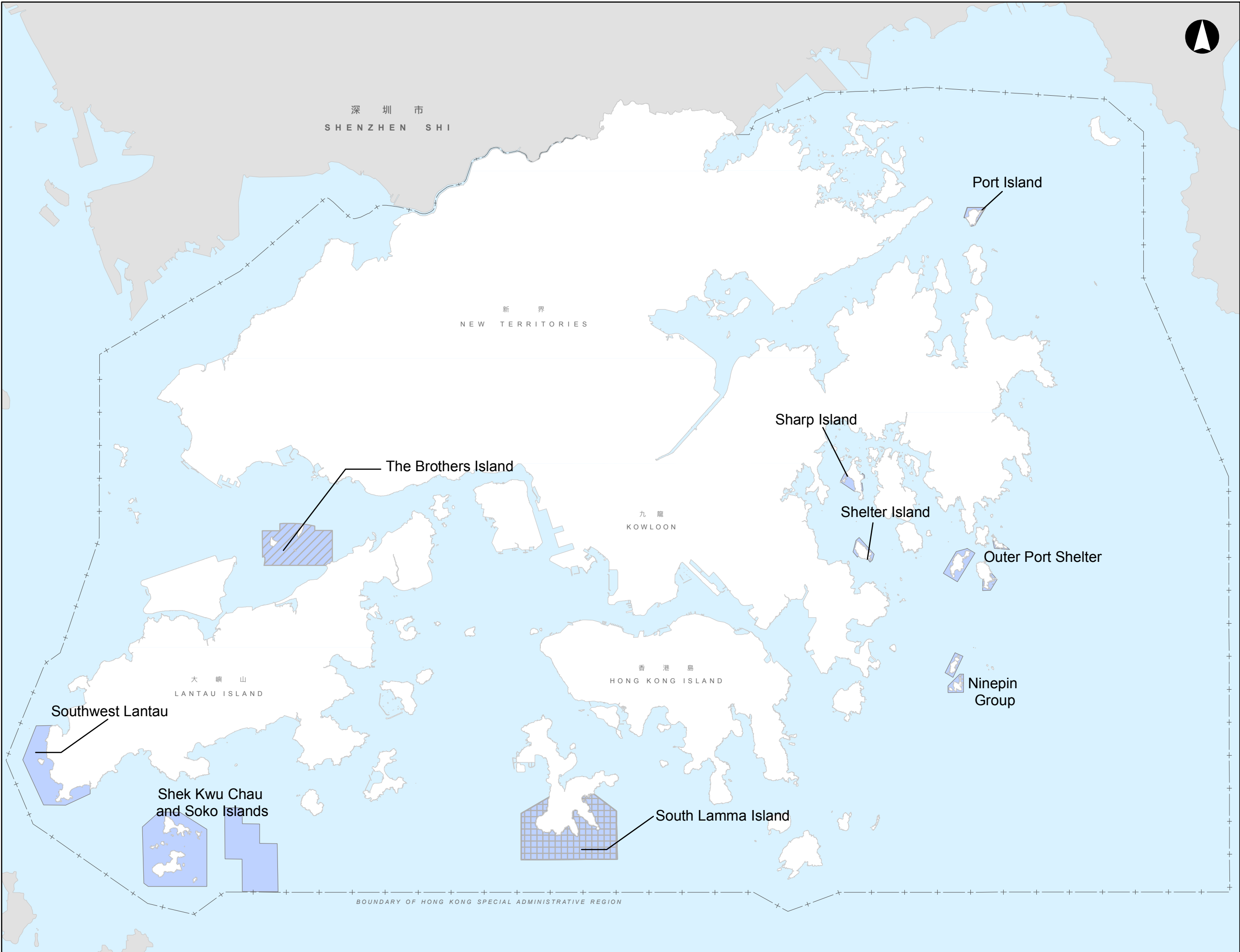
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Drawing Title
Marine Parks and Marine Reserve

Scale of A3 1:200,000	Drawing Status Draft	Job No 217499	Drawing No 3	Issue D3
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Source:
http://www.afcd.gov.hk/english/country/cou_vis/cou_vis_cou/images/KeyPlanCP_SA06012014.jpg



Legend

-  Committed Marine Park
-  Proposed Marine Park
-  Potential Marine Park

D3	2013-08-26	SC	RL	ST
Issue	Date	By	Chk	Appd

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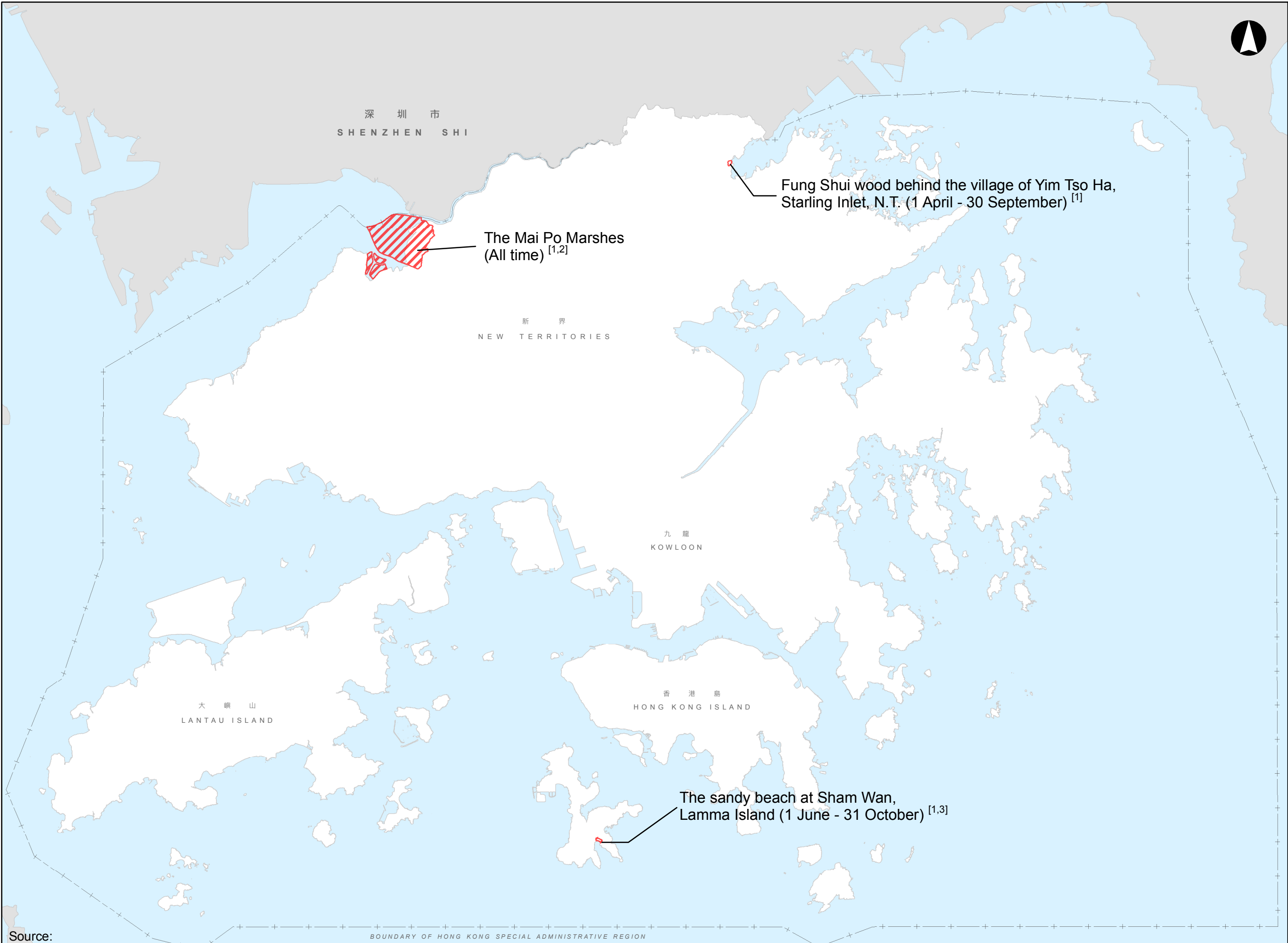
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Drawing Title
Committed, proposed, and Potential Marine Parks

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Drawing Status		
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Legend

 Restricted Area under WAPO

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Check	Appd

0 125 25 Kilometers 5 7.5

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Drawing Title

Restricted Areas under the
Wild Animals Protection Ordinance in Hong Kong

Scale of A3

1:200,000

Drawing Status

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Job No

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5

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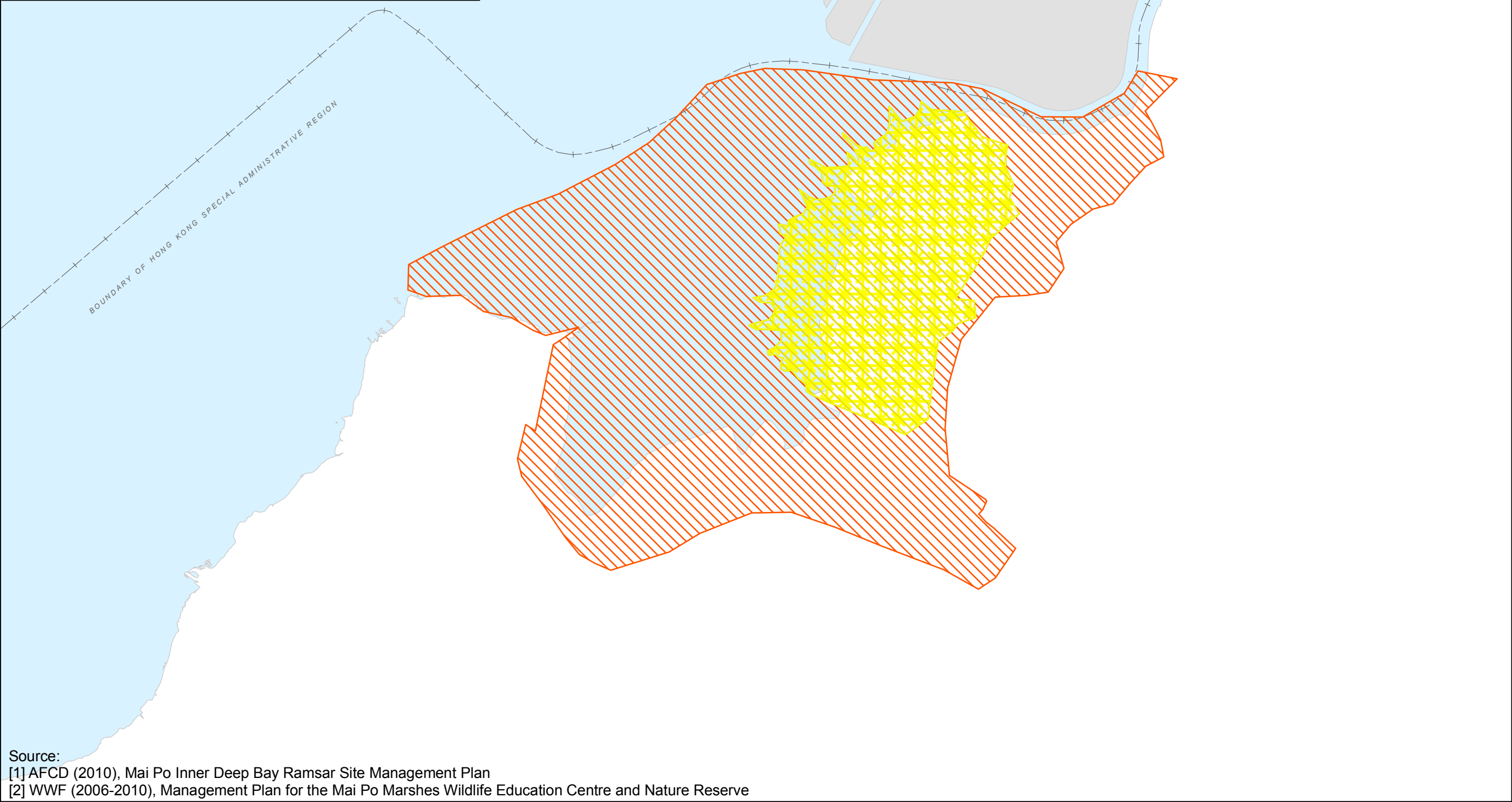
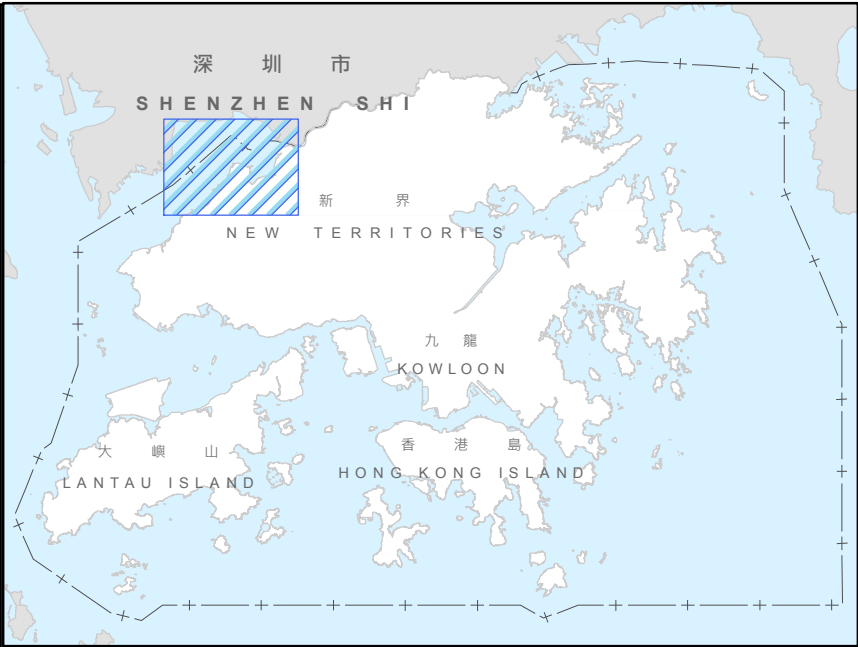
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Source:

[1] Department of Justice (1997), Cap 170 - Wild Animal Protection Ordinance

[2] AFCD Website (2014), Mai Po Marshes Restricted Area

[3] AFCD Website (2014), The Sham Wan Restricted Area



Legend

- Ramsar Site ^[1]
- Mai Po Nature Reserve ^[2]

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd

0 0.25 0.5 1 1.5 Kilometers

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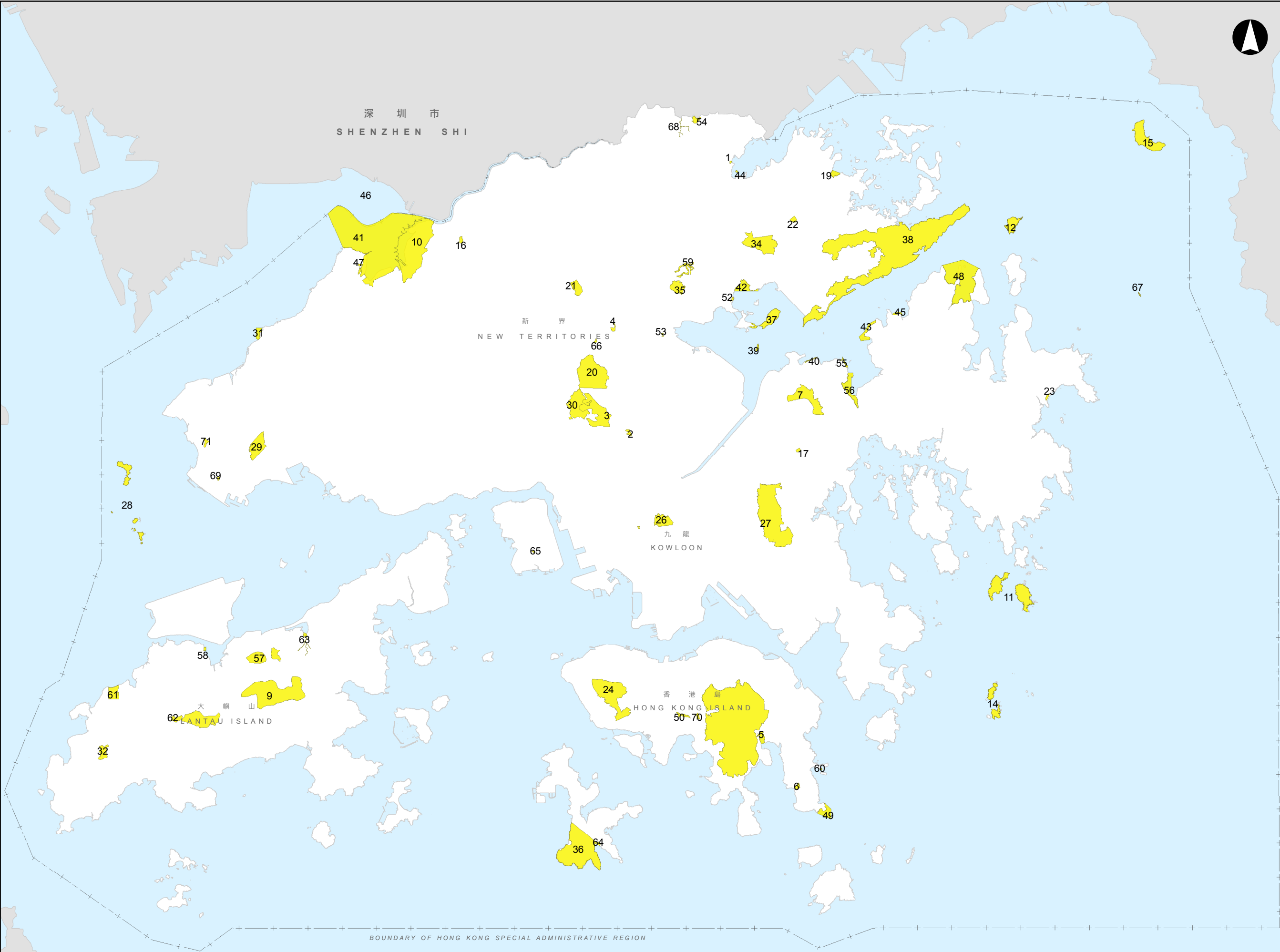
Drawing Title
Ramsar Site, Mai Po Nature Reserve

Scale of A3
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Job No 217499	Drawing No 6	Issue D3
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Source:
[1] AFCD (2010), Mai Po Inner Deep Bay Ramsar Site Management Plan
[2] WWF (2006-2010), Management Plan for the Mai Po Marshes Wildlife Education Centre and Nature Reserve



Legend

Site of Special Scientific Interest

Id	Name
1	Yim Tso Ha Egretry
2	Sheng Mun Fung Shui Woodland
3	Tai Mo Shan Montane Scrub Forest
4	She Shan Fung Shui Woodland
5	Tai Tam Harbour (Inner Bay)
6	D'Aguilar Peninsula
7	Ma On Shan
9	Sunset Peak
10	Mai Po Marshes
11	Bluff Island & Balsalt Island
12	Port Island
14	Ninepin Group
15	Ping Chau
16	Mai Po Village
17	Mau Ping
19	Lai Che Wo Beach
20	Ho Tung Chau
21	Pak Tai To Yan
22	Cho Kung Tam
23	Tai Long Bay
24	Pok Fu Lam Reservoir Catchment Area
25	Tai Tam Reservoir Catchment Area
26	Beacon Hill
27	Ho Chung Villey
28	Lung Kwu Chau, Tree Island & Sha Chau
29	Castle Peak
30	Tai Mo Shan
31	Pak Nai
32	Man Chung Po
33	Lantau Peak
34	Pat Sin Range
35	Fung Yuen Valley
36	South Lamma Island
37	Yim Tin Tsai and Ma Shi Chau
46	Inner Deep Bay
41	Tsim Bei Tsui
47	Tsim Bei Tsui Egretry
69	Siu Lang Shui
61	San Chau
58	San Tau Beach
57	Pok To Yan and Por Kai Shan
62	Ngong Ping
65	South Tsing Yi
64	Sham Wan
50	Ham Fung Road Woodland
70	Deep Water Bay Valley
49	Hok Tsui (Cape D'Aguilar)
60	Shek O Headland
63	Tai Ho Stream
66	Tai Om Fung Shui Woodland
68	Lin Ma Hang Stream
54	Lin Ma Hang Lead Mines
44	A Chau
38	Tolo Channel (Northern Coast)
48	Hoi Ha Wan
45	Lai Chi Chong
43	Sham Chung Coast
40	Nai Chung Coast
55	Tsuen Tau Coast
56	Kei Ling Ha Mangal
67	Shek Ngau Chau
53	Tai Po Egretry
39	Centre Island
52	Shuen Wan Egretry
42	Ting Kok
59	Sha Lo Tung
71	Lung Kwu Tan Valley

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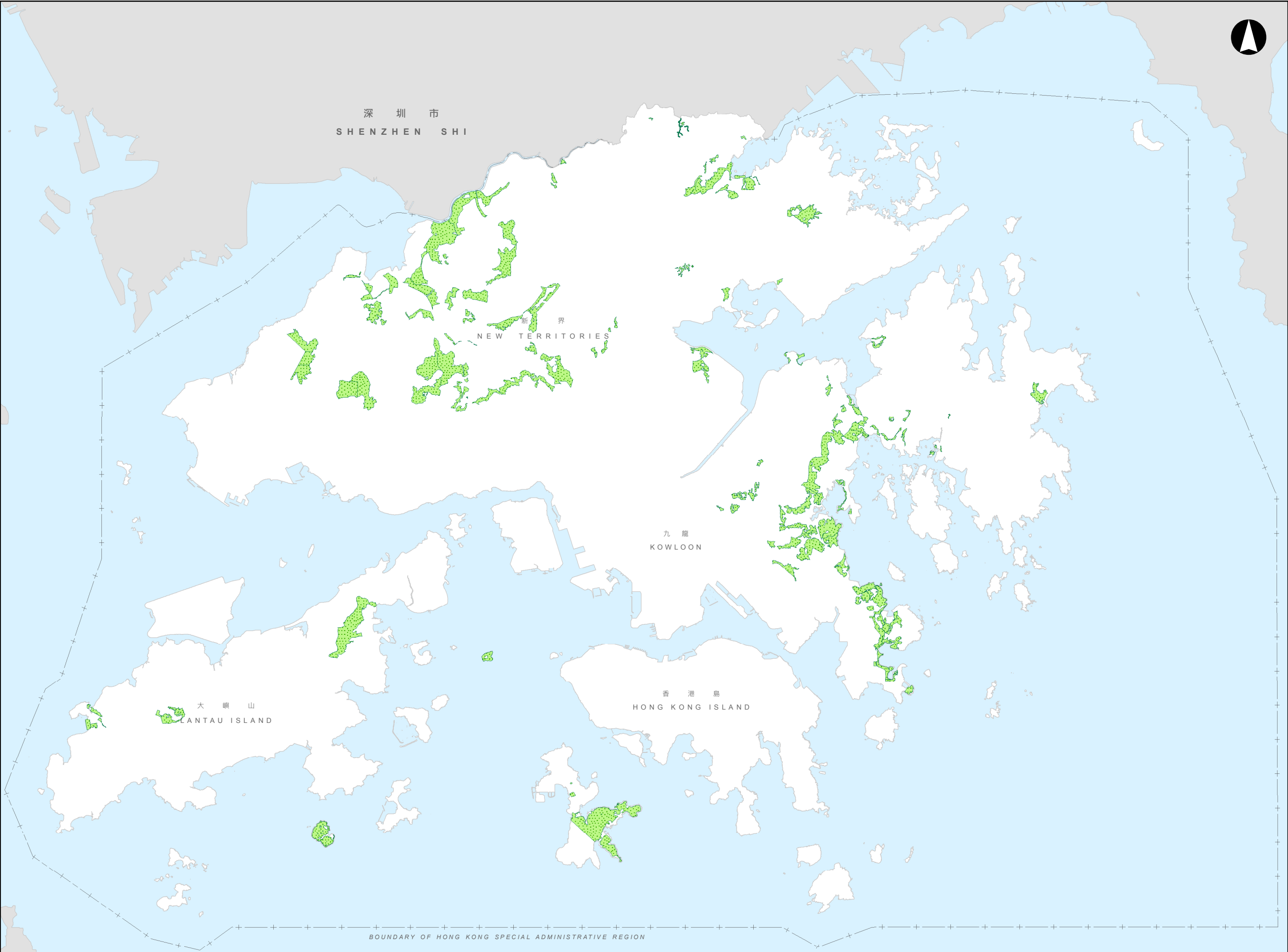
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Drawing Title
Sites of Special Scientific Interest in Hong Kong


Scale of A3
1:200,000

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Job No	Drawing No	Issue
217499	7	D3

Source:
[1] Agriculture, Fisheries and Conservation Department



Legend

 Conservation Area

D3	2013-09-04	SC	RL	ST
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Drawing Title

Locations of Conservation Areas in Hong Kong

Scale of A3

1:200,000

Drawing Status

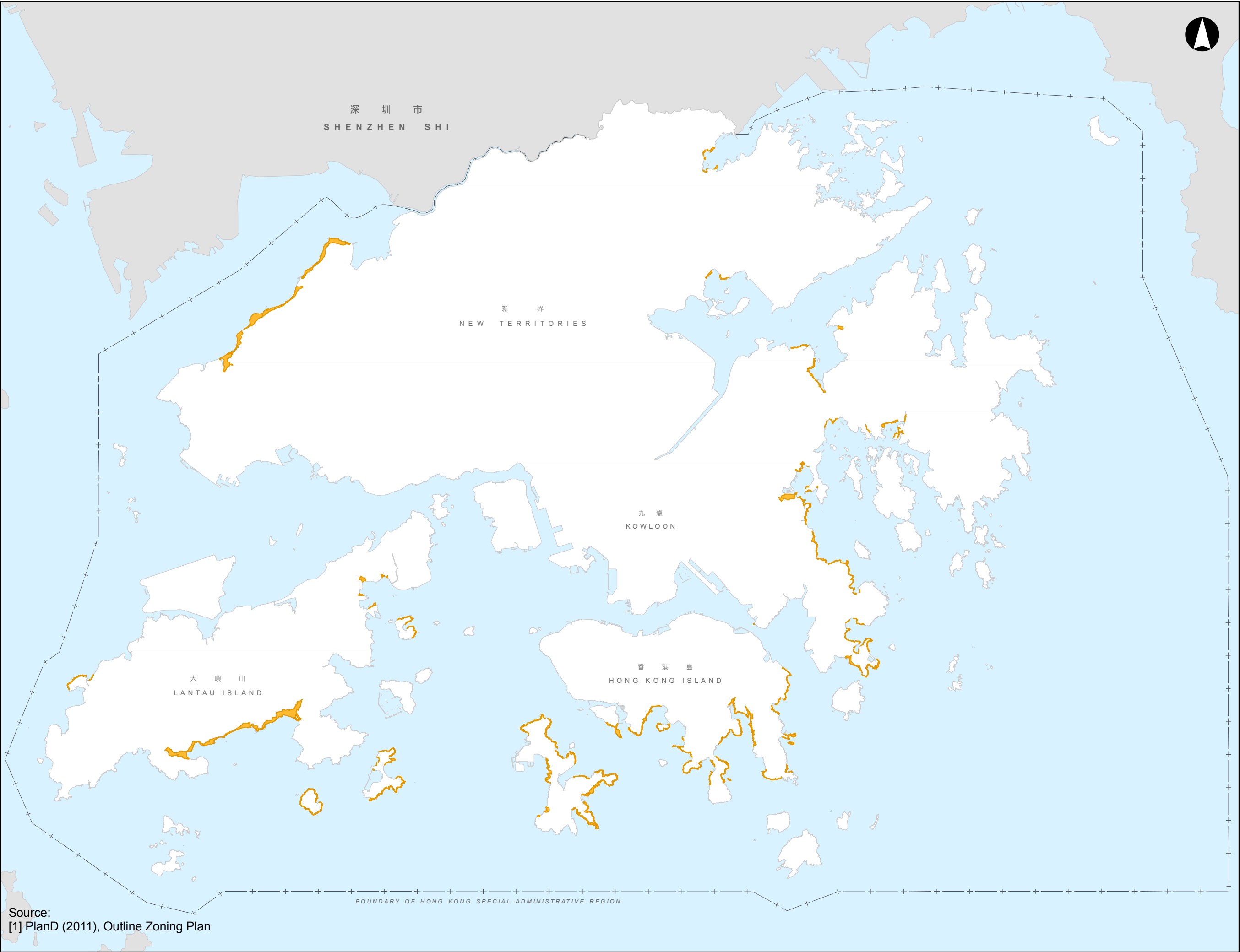
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Job No
217499

Drawing No
8

Issue
D3

Source:
[1] PlanD (2011), Outline Zoning Plan



Legend

Coastal Protection Area

D3	2013-09-04	SC	RL	ST
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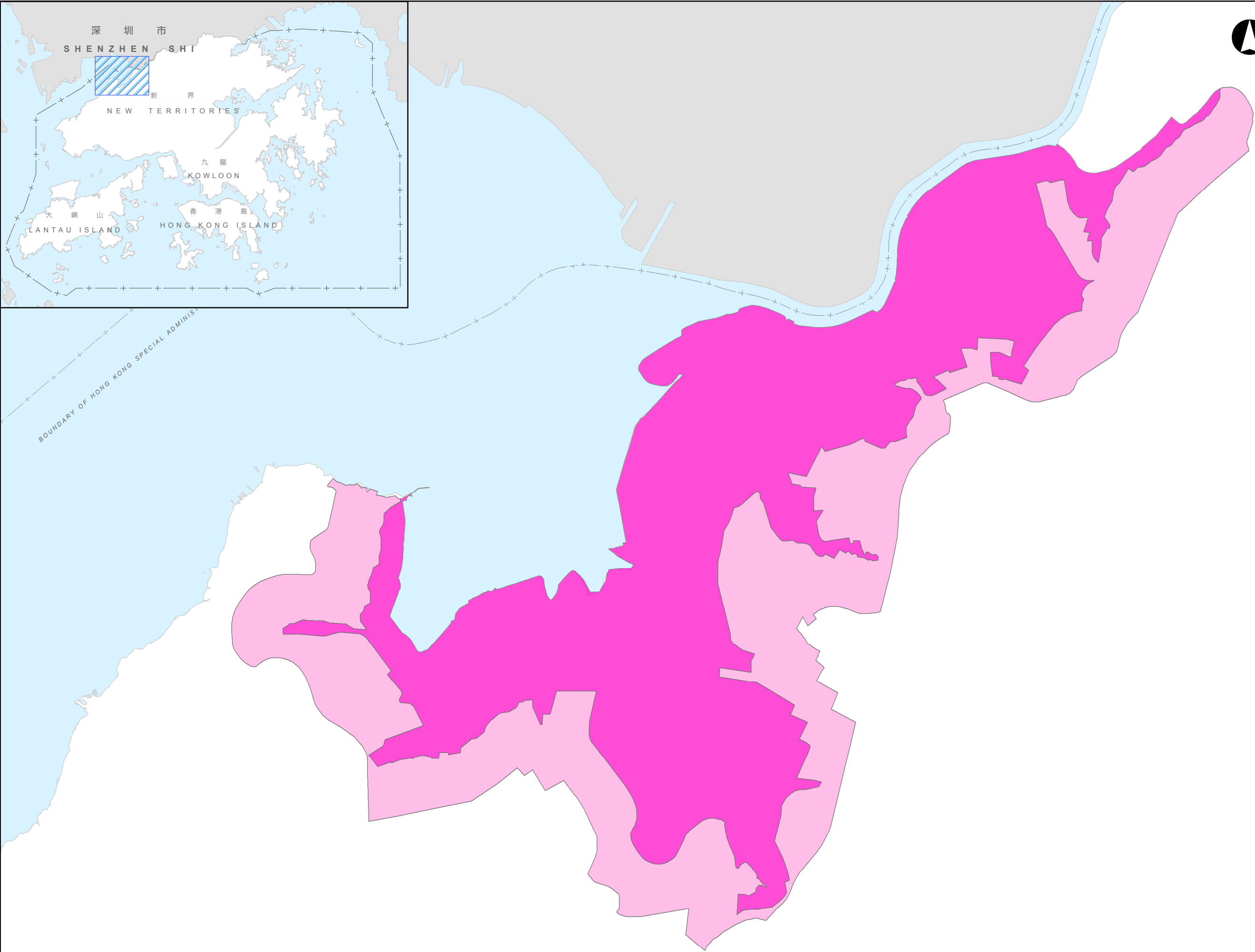
Drawing Title
Locations of Coastal Protection Areas in Hong Kong

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Drafting Status
Draft

Job No 217499	Drawing No 9	Issue D3
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Source:
[1] PlanD (2011), Outline Zoning Plan



Legend

- Wetland Buffer Area
- Wetland Conservation Area

Source:
[1] PlanD (1999), Town Planning Board Guidelines for Application for Developments within Deep Bay Area TPB PG-No. 12B

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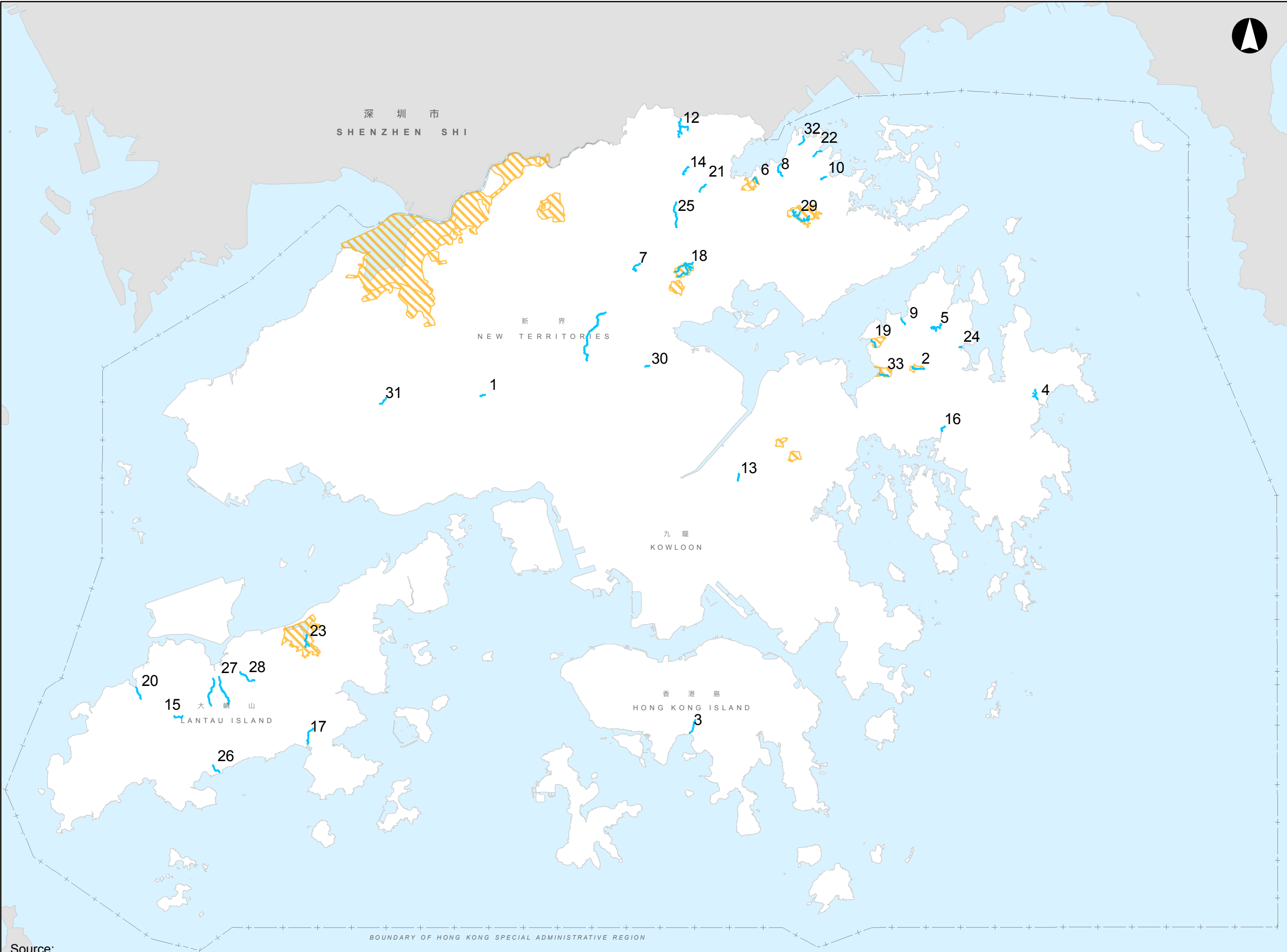
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Drawing Title
Locations of Wetland Conservation Area
and Wetland Buffer Area

Scale of A3
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Job No 217499	Drawing No 10	Issue D3
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Legend

- Ecologically Important Stream
- Priority Sites for Enhanced Conservation

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd

012525 Kilometers57.5

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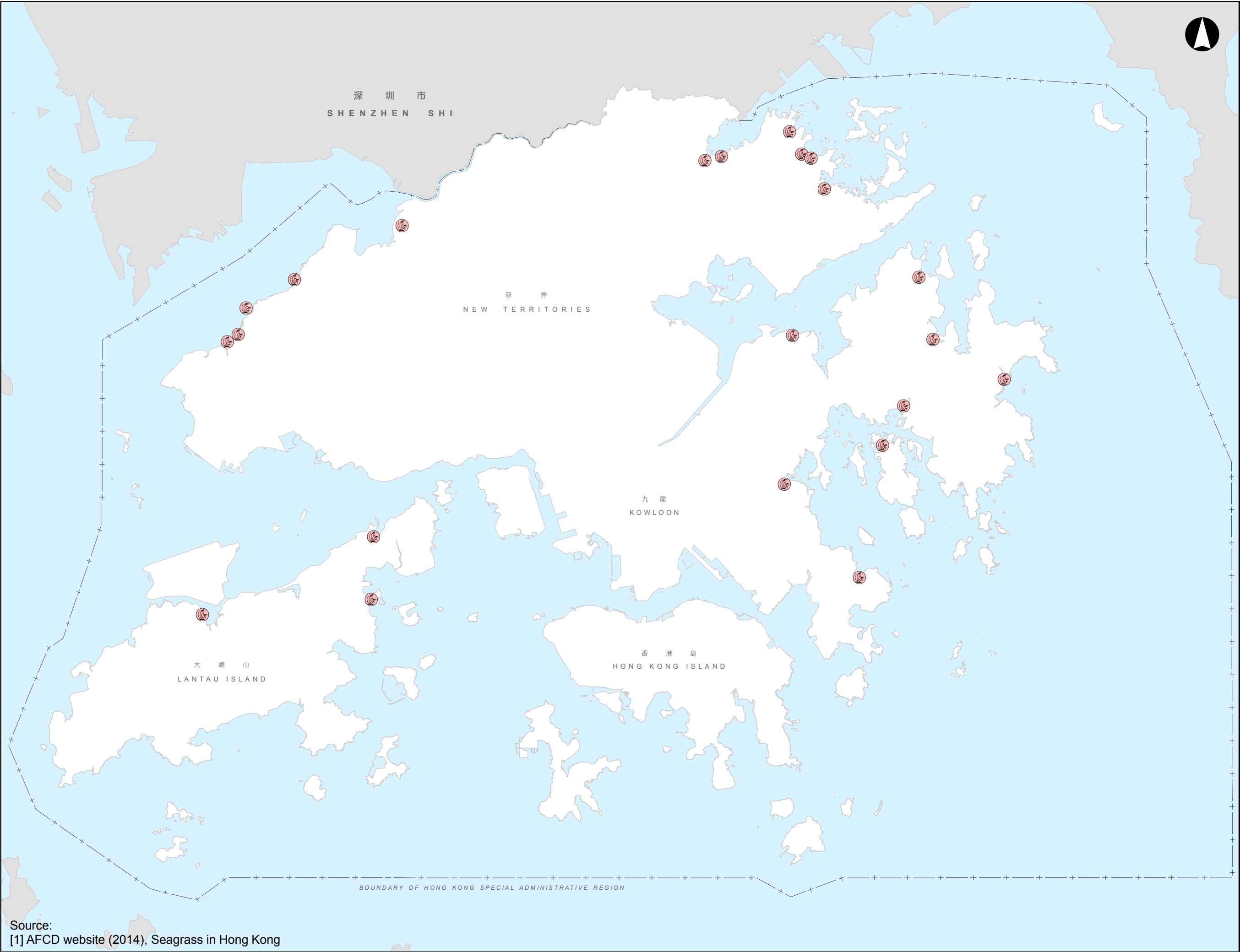
Job Title
Agreement No. CE 9/2011 (CE)
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Drawing Title
Locations of Priority Sites for Enhanced
Conservation and Ecologically Important
Streams (EIS)

Scale of A3
1:200,000

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Job No 217499	Drawing No 11	Issue D3	

Source:
[1] AFCD website (2014), Ecologically Important Streams
[2] AFCD website (2014), List of Priority Sites for Enhanced Conservation



Legend

 Seagrass

D3	2013-08-24	SC	RL	ST
Issue	Date	By	Chk	Appd



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Job Title
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Drawing Title
Locations of Seagrass Beds

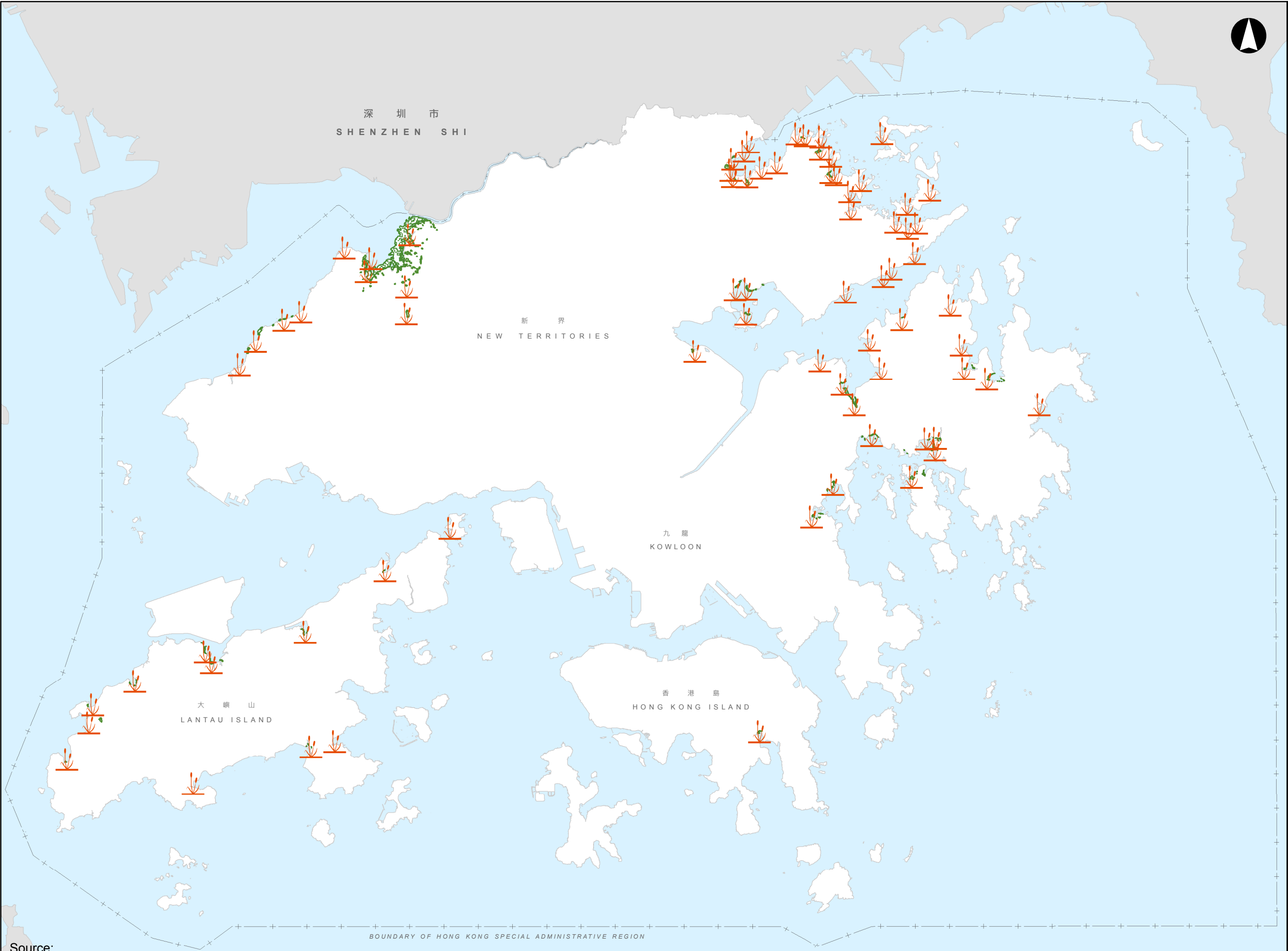
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Drawing Status



Draft

Job No 217499	Drawing No 12	Issue D3
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Source:
[1] AFCD website (2014), Seagrass in Hong Kong



Legend

-  Mangrove (AFCD, 2011)^[2]
-  Mangrove^[1]

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Drawing Title
Locations of Mangroves

Scale of A3

1:200,000

Drawing Status

Draft

Job No

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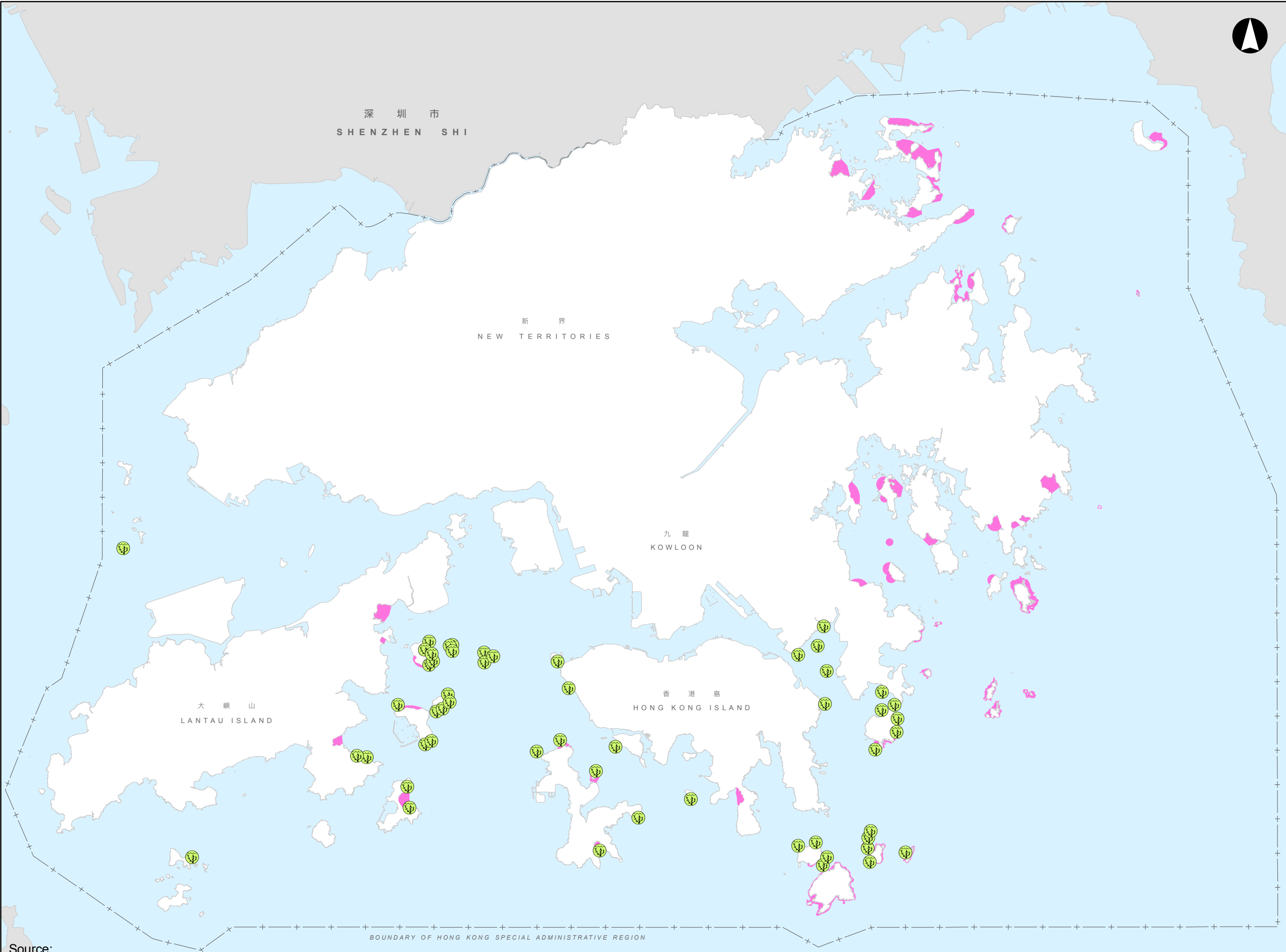
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13



Issue

D3

Source:
[1] ERM (2009), 2008 update of Terrestrial Habitat Mapping and Ranking Based on Conservation Value
[2] AFCD Website (2014), Mangroves in Hong Kong: Distribution



Legend

-  Key Coral Area (EIA-134/2007)
-  Key Coral Area

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chk	Appd

0 125 250 500 750 Meters

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Job Title
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Development cum Public Engagement - Feasibility Study**

Drawing Title
Locations of Key Coral Areas

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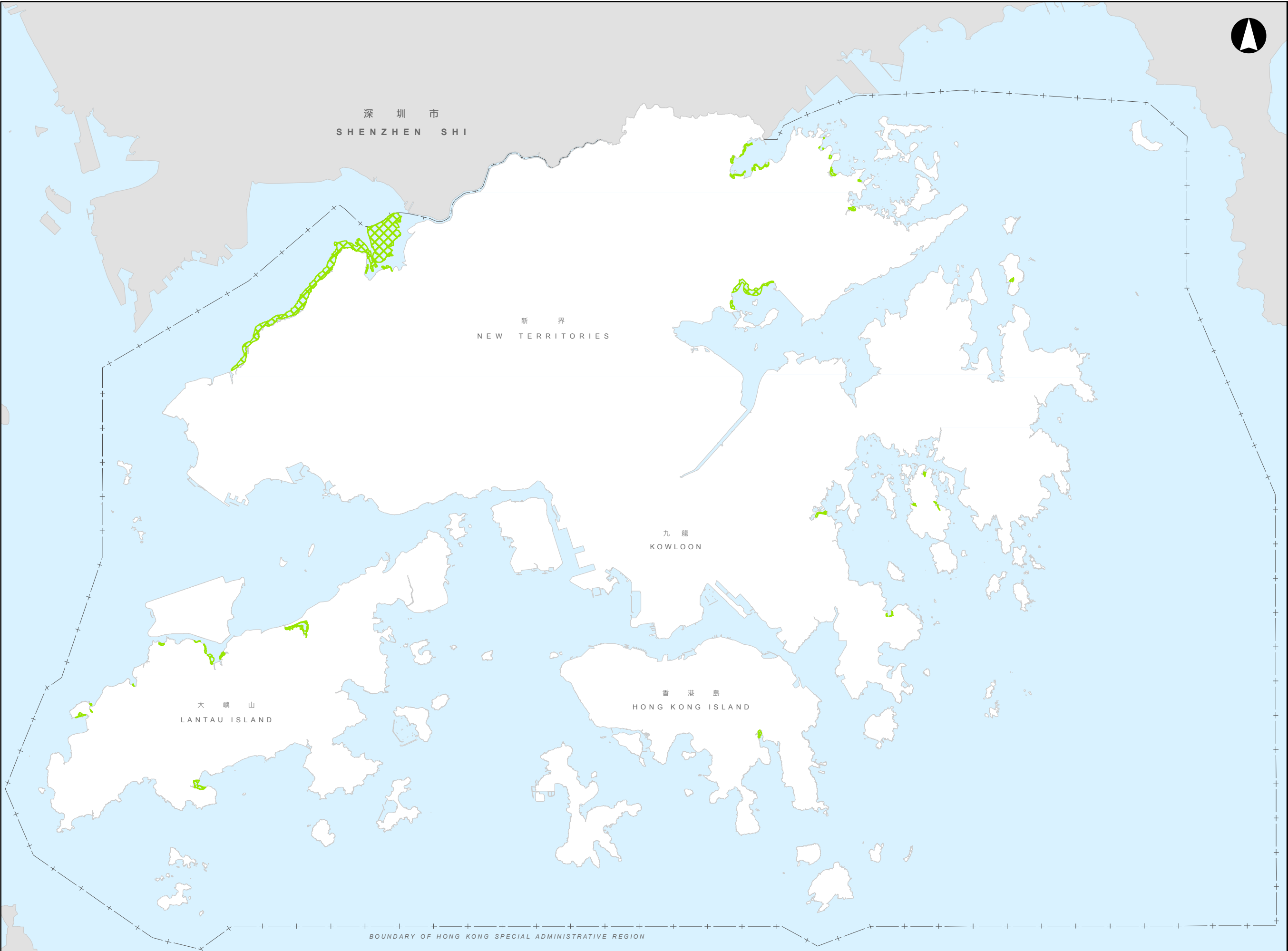
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Job No. Drawing No. Issue


14

D3

Source:
[1] Maunsell Consultants Asia Ltd. (2007) EIA-134/2007
[2] AFCD (2005), Field Guide to Hard Corals of Hong Kong



Legend

 Intertidal Mudflat

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Development cum Public Engagement - Feasibility Study

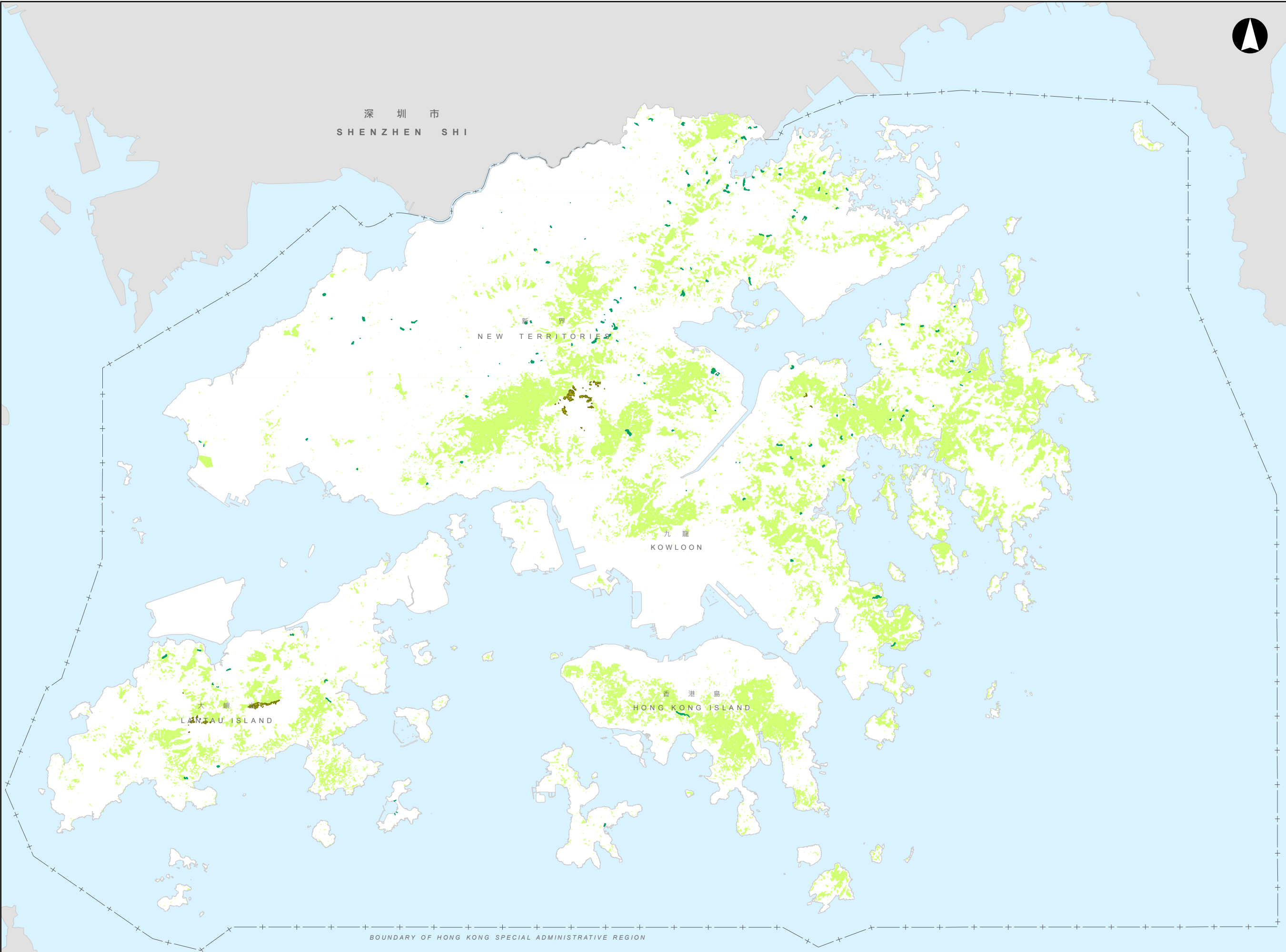
Drawing Title
Locations of Key Mudflat Areas

Scale of A3
1:200,000

Draft

Job No 217499	Drawing No 15	Issue D3
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Source:
[1] ERM (2009) 2008 update of Terrestrial habitat Mapping and Ranking Based on Conservation Value



Legend

- Fung Shui Woods
- Montane Forest
- Lowland Forest

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chk	Appd



ARUP

Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
Hong Kong

Client
Civil Engineering and Development Department

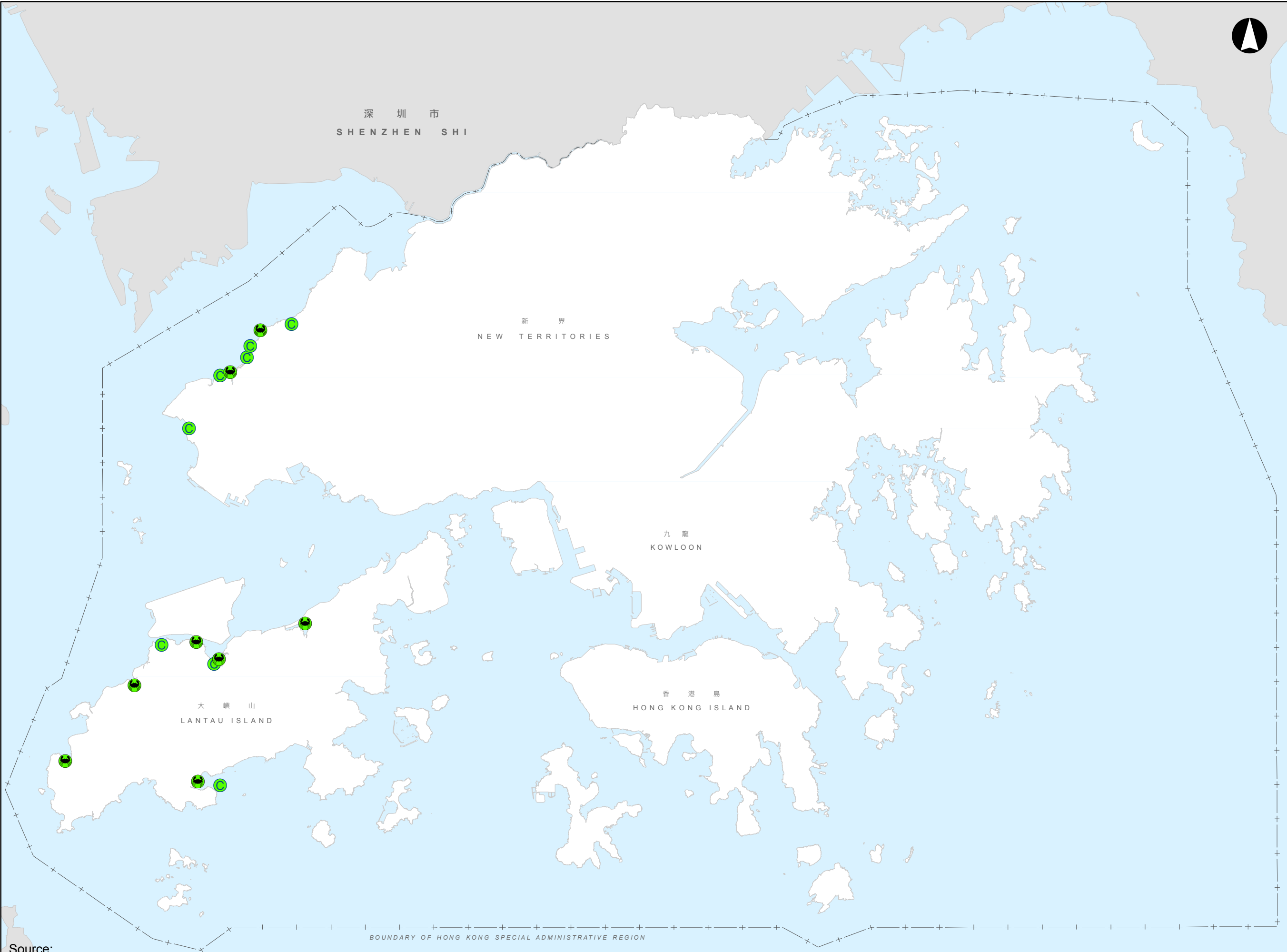
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Locations of Fung Shui Woods, Montane Forest
and Lowland Forests

Scale of A3
1:200,000

Draft		
Job No 217499	Drawing No 16	Issue D3

Source:
[1] ERM (2009) 2008 update of Terrestrial habitat Mapping and Ranking Based on Conservation Value



Legend

- Juveniles Horseshoe Crab Site (AFCD, 2011)^[1]
- Juveniles Horseshoe Crab Site (Morton, 1993)^[2]

Source:
[1] AFCD Website (2014), Horseshoe crabs in Hong Kong
[2] Morton (1999), Asian Marine Biology 16 (Based on survey between March 1993 to June 1998)

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chk	Appd



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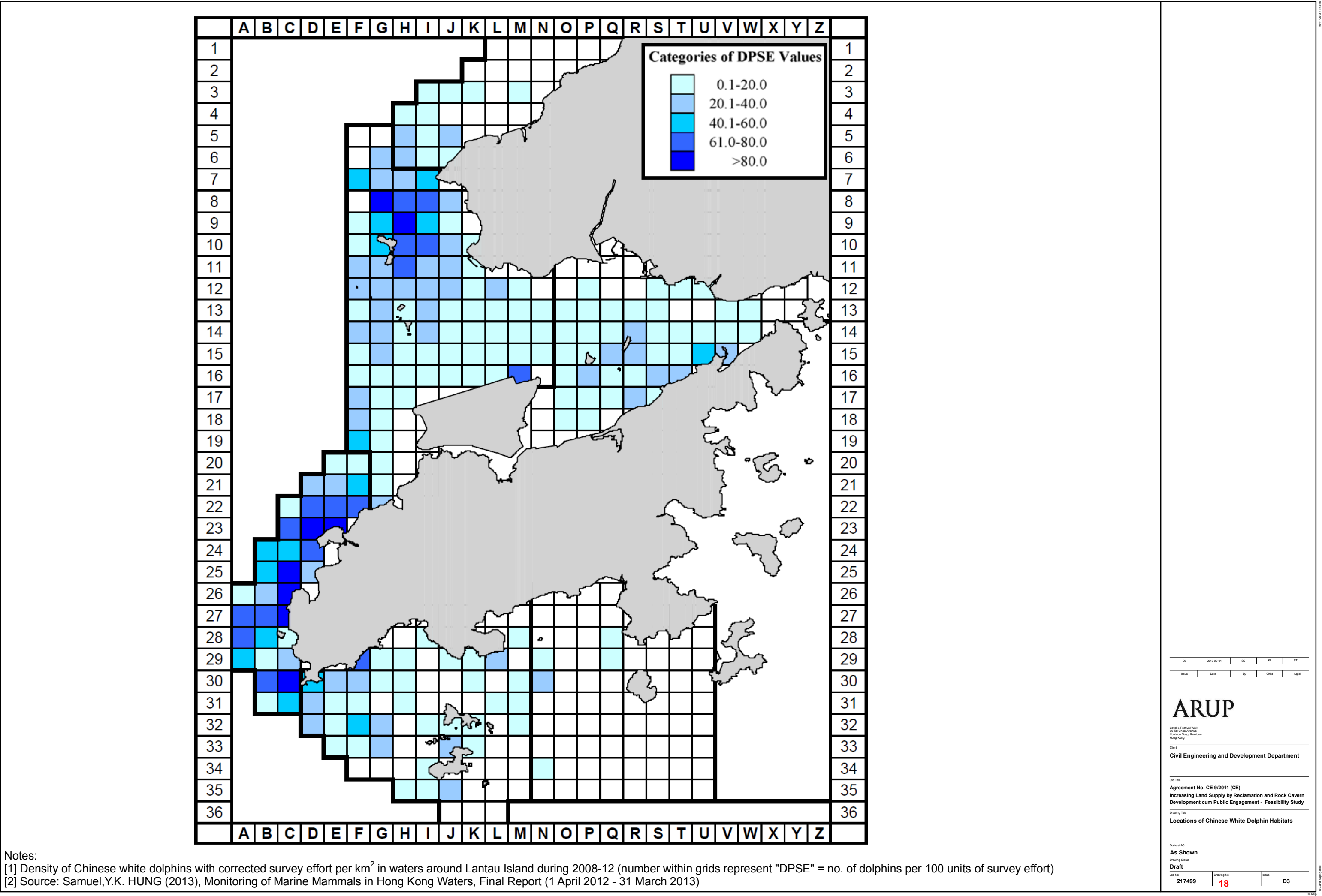
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Locations of these key Juvenile Horseshoe
Crab sites

Scale of A3
1:200,000

Draft

Job No 217499	Drawing No 17	Issue D3
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Notes:
[1] Density of Chinese white dolphins with corrected survey effort per km² in waters around Lantau Island during 2008-12 (number within grids represent "DPSE" = no. of dolphins per 100 units of survey effort)
[2] Source: Samuel,Y.K. HUNG (2013), Monitoring of Marine Mammals in Hong Kong Waters, Final Report (1 April 2012 - 31 March 2013)

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd

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Kowloon Tong, Kowloon
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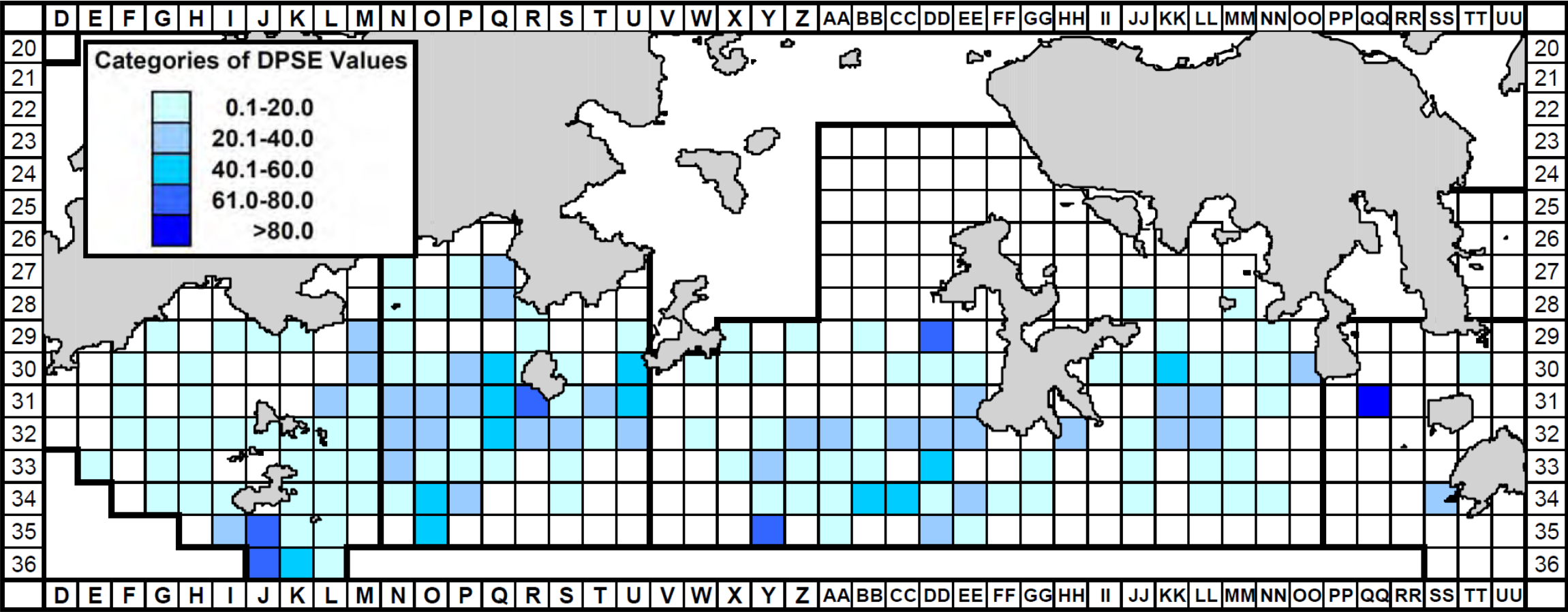
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Job Title
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Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

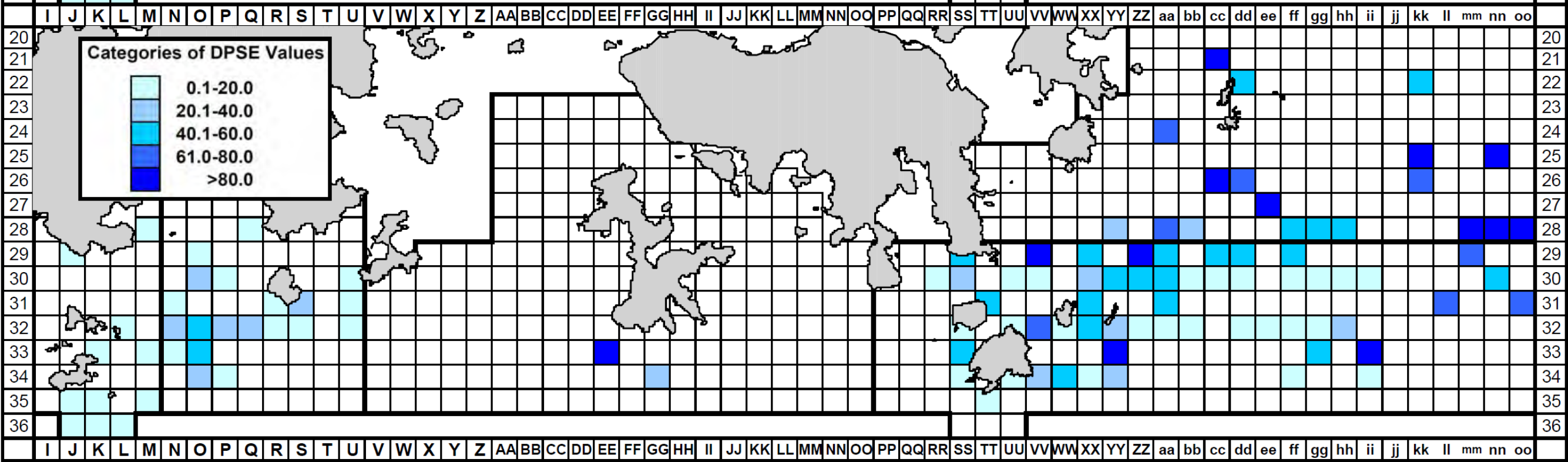
Drawing Title
Locations of Chinese White Dolphin Habitats

Scale of A3 As Shown	Job No. 217499	Drawing No. 18	Issue D3
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Dry Season (Dec. - May)



Wet Season (Jun. - Nov.)



Notes:
[1] Density of finless porpoises with corrected survey effort per km² in southern waters of Hong Kong during dry season (top) wet season (bottom) using data collected during 2004-12 (DPSE = no. of porpoises per 100 units of survey effort)
[2] Source: Samuel,Y.K. HUNG (2013), Monitoring of Marine Mammals in Hong Kong Waters, Final Report (1 April 2012 to 31 March 2013)

03	2013-09-04	SC	RL	ST
Issue	Date	By	Check	Appd

ARUP

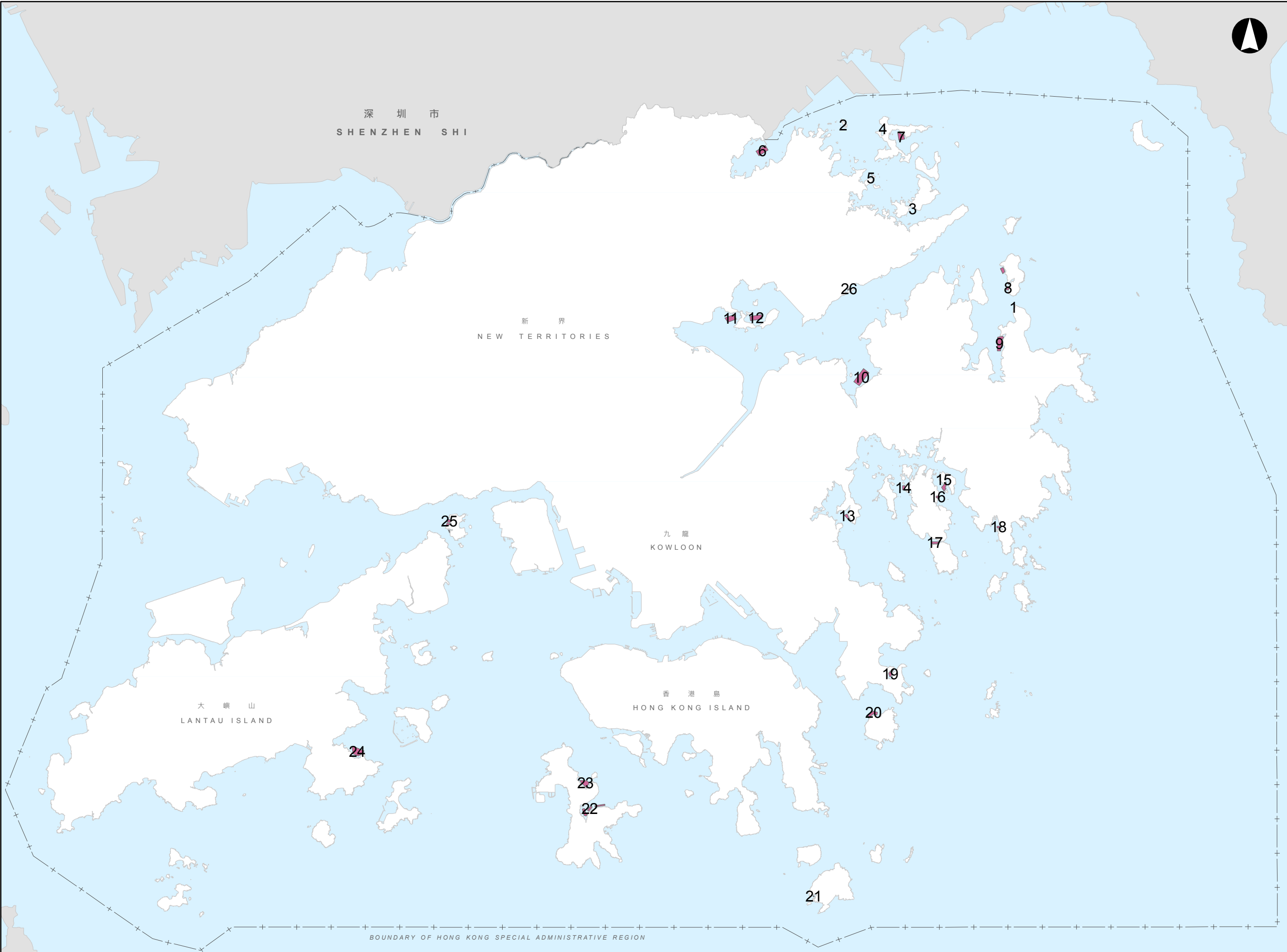
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
Hong Kong

Client
Civil Engineering and Development Department

Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Locations of Finless Porpoise Hotspots

Scale of A3 As Shown		
Drawing Status Draft		
Job No 217499	Drawing No 19	Issue D3



Legend

Fish Culture Zone

D3	2013-09-04	C	RL	ST
Issue	Date	By	Chd	Appd

012525Kilometers57.5

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Kowloon Tong, Kowloon
Hong Kong

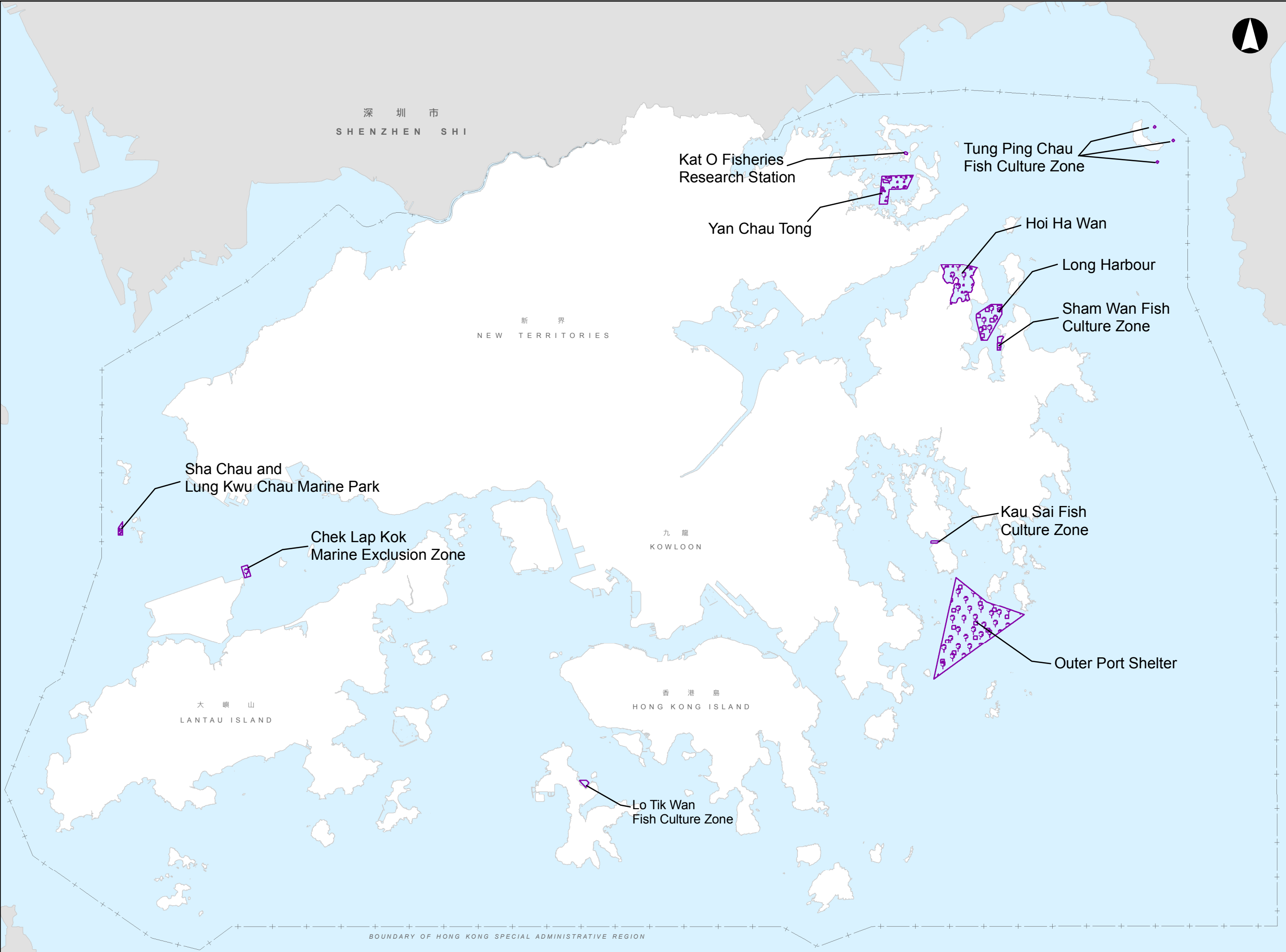
Client
Civil Engineering and Development Department

Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Locations of Fish Culture Zones

Scale of A3 1:200,000		
Drawing Status Draft		
Job No 217499	Drawing No 20	Issue D3

Source:
[1] AFCD Website (2014) Fish Culture Zones in Hong Kong



Legend

 Artificial Reef Deployment Area

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd

0 125 250 Kilometers

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Hong Kong

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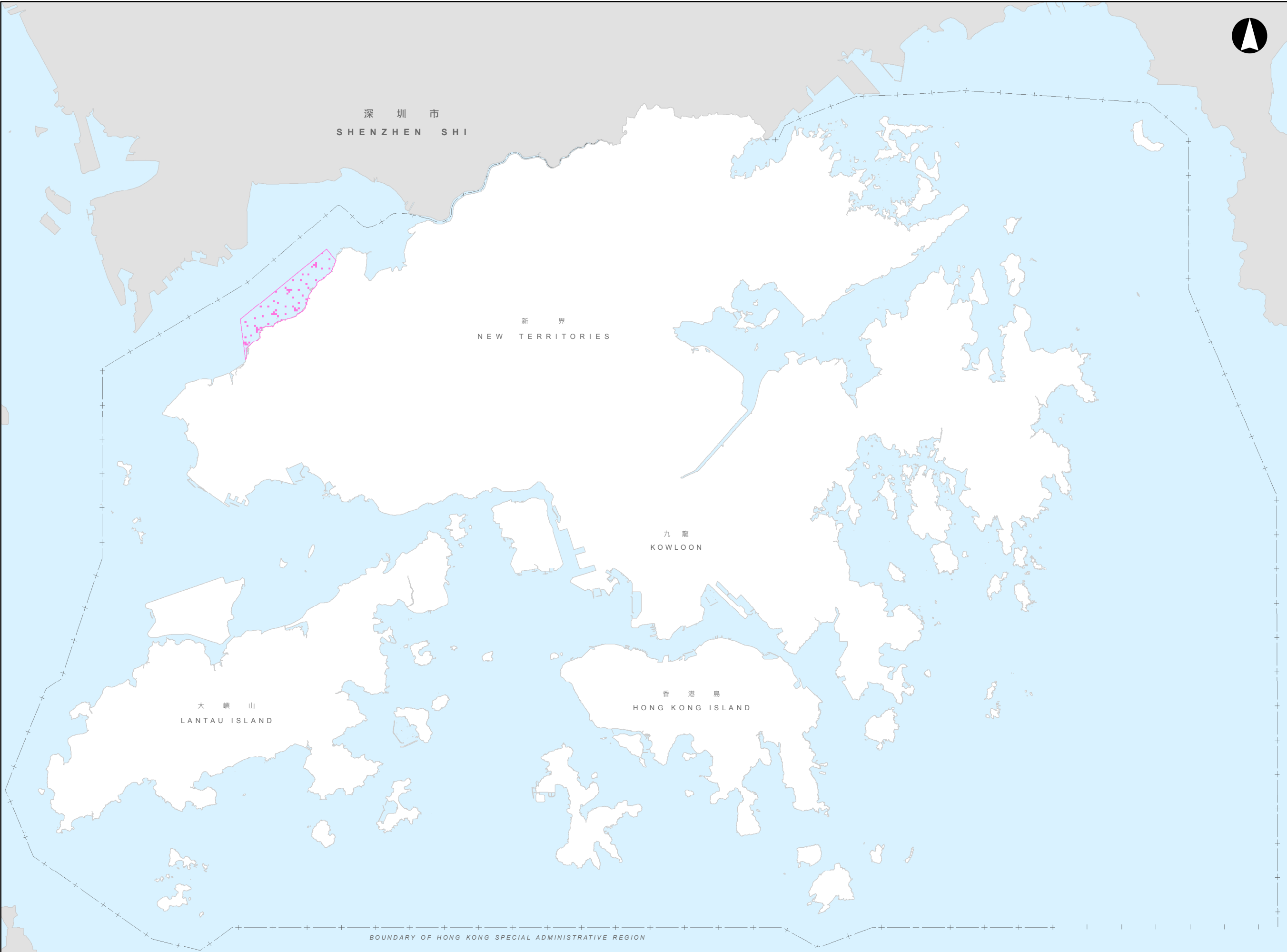
Job Title
**Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study**

Drawing Title
Locations of Artificial Reef Deployment Area

Scale of A3
1:200,000

Draft	Job No	Drawing No	Issue
	217499	21	D3

Source:
[1] AFCD Website (2014) Artificial Reef Project



Legend

 Area of Oyster Production

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
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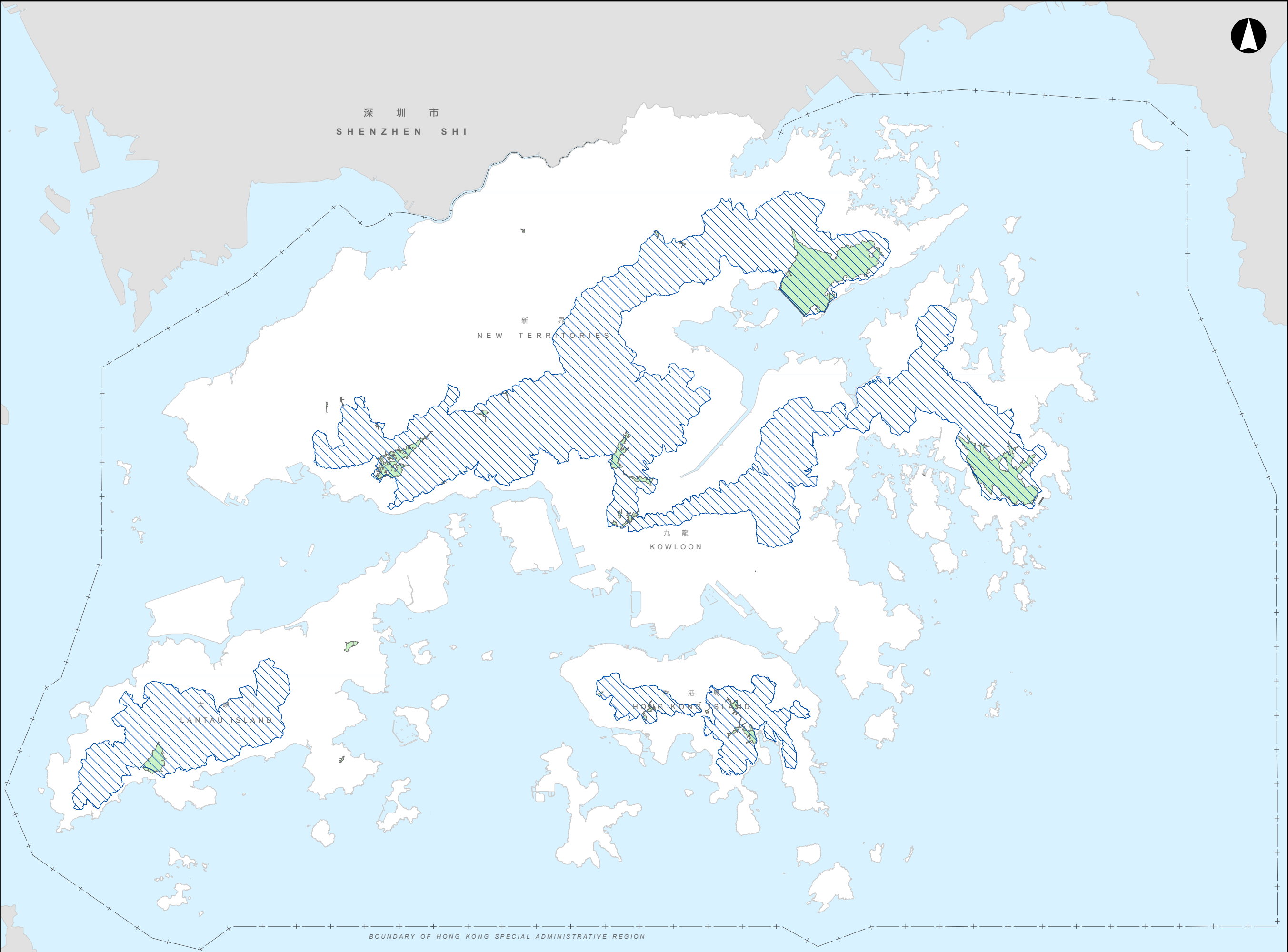
Drawing Title
Areas of Oyster Production in Hong Kong

Scale of A3
1:200,000



Draft

Job No 217499	Drawing No 22	Issue D3
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Source:
[1] AFCD Website (2014) Oyster Production Area



Legend

-  Impounding Reservoir
-  Water Gathering Ground

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chd	Appd

012525Kilometers57.5

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Hong Kong

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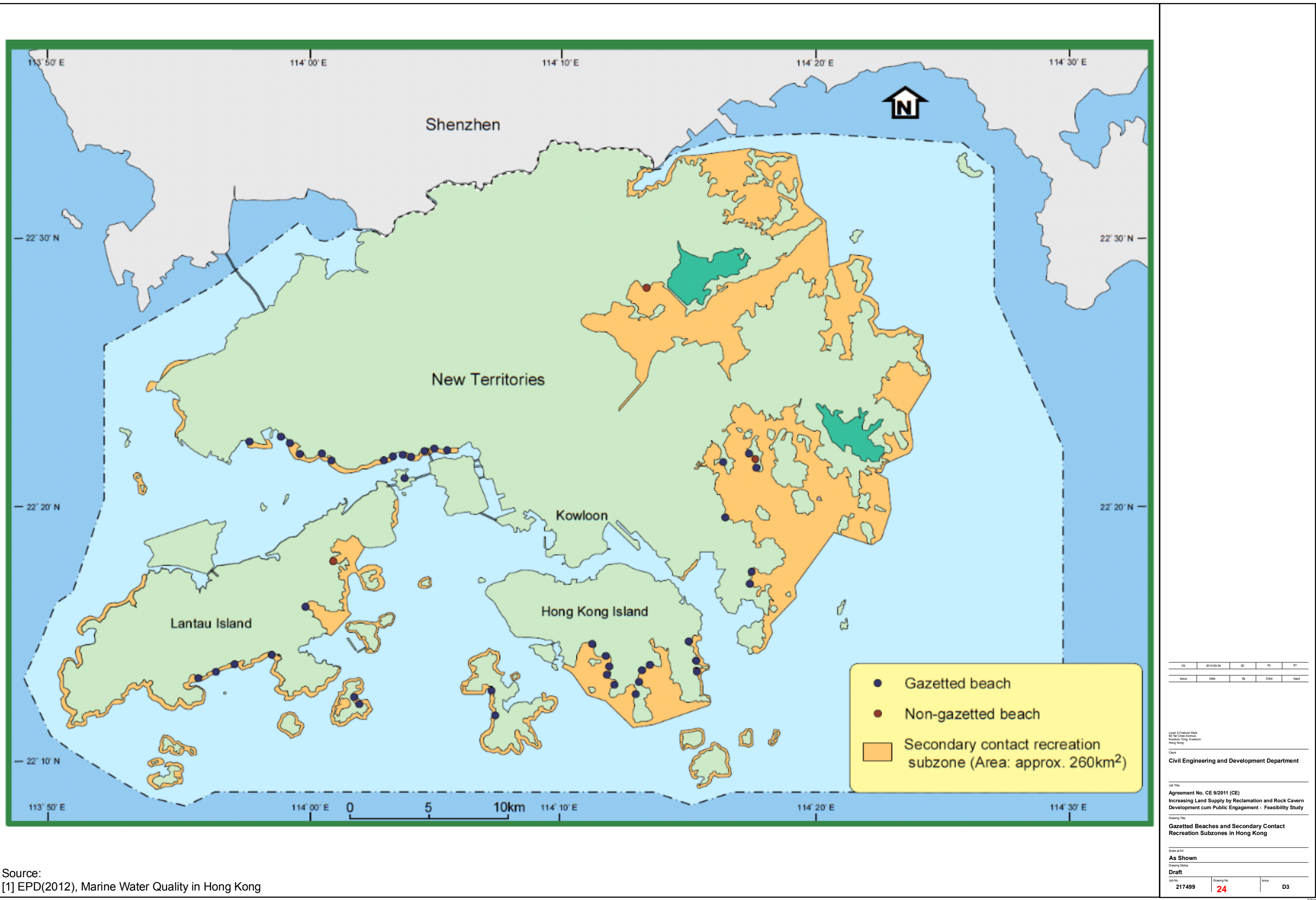
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**Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study**

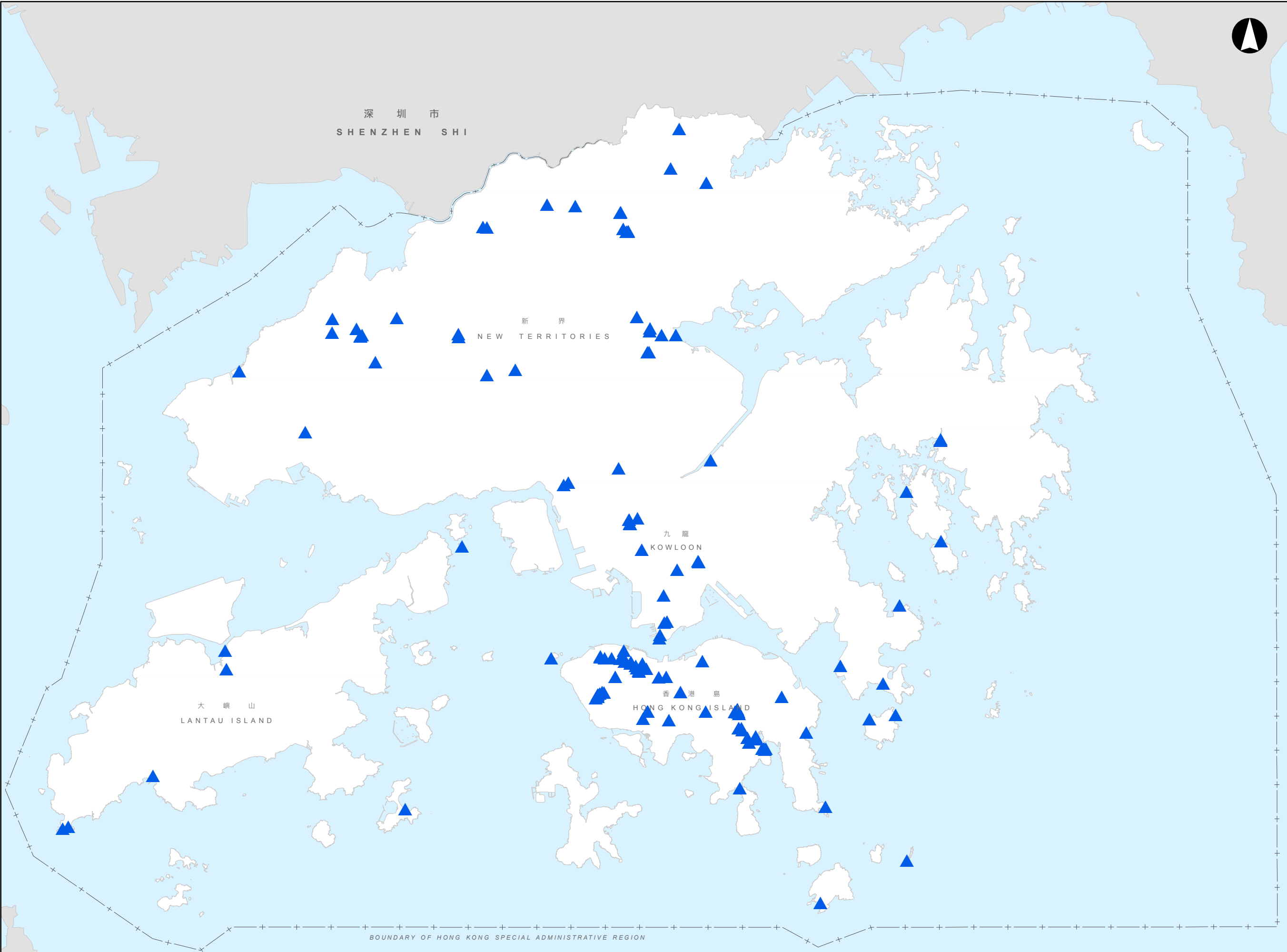
Drawing Title
**Water Gathering Grounds and Reservoirs
in Hong Kong**

Scale of A3
1:200,000

Draft		
Job No 217499	Drawing No 23	Issue D3

Source:
[1] WSD (2008), Total Water Management in Hong Kong





Legend

▲ Declared Monument

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chk	Appd



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Job Title
**Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study**

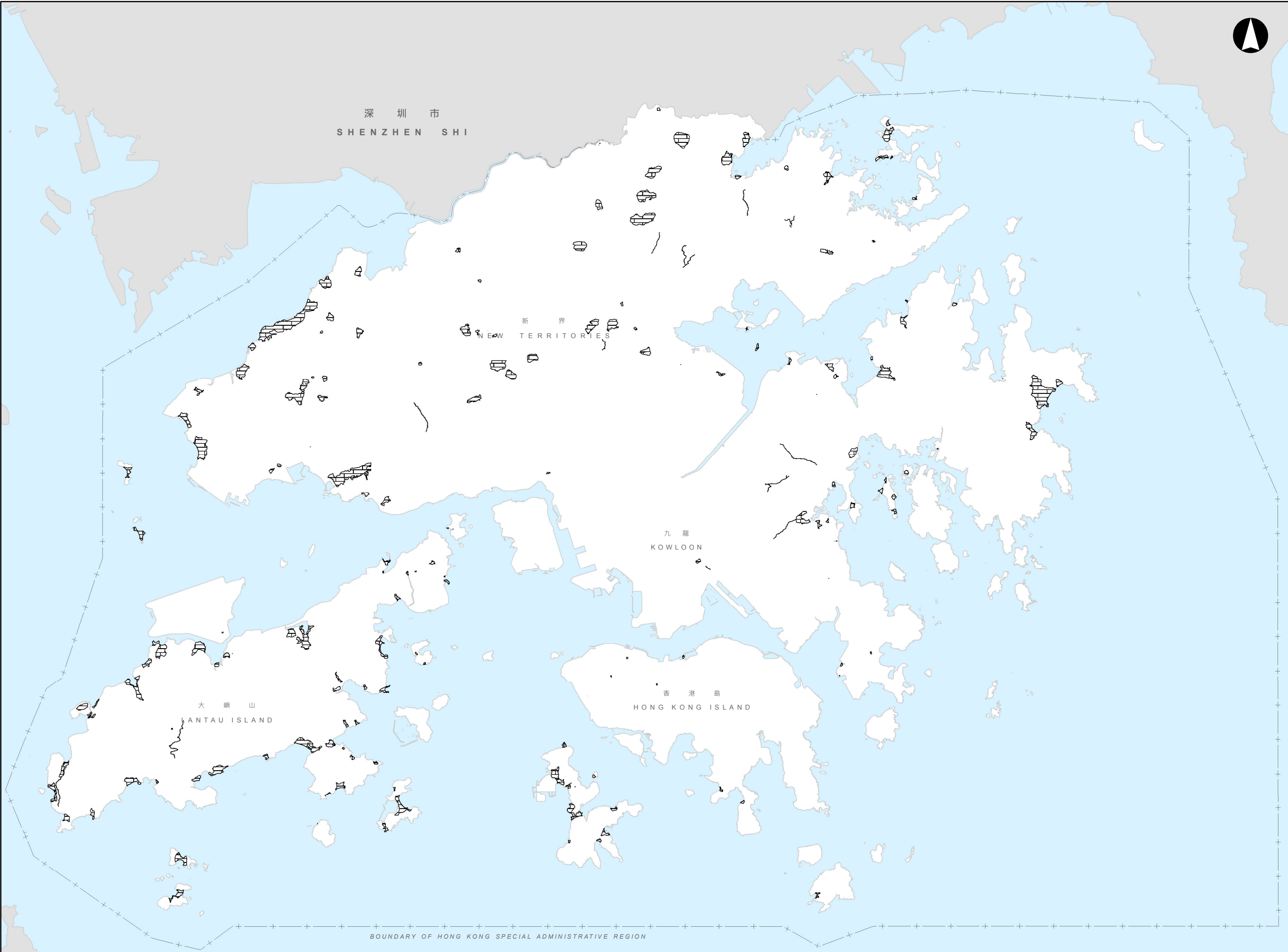
Drawing Title
Locations of Declared Monuments

Scale of A3
1:200,000


Draft

Job No 217499	Drawing No 25	Issue D3
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Source:
[1] AMO Website (2013) Location Map of Declared Monuments



Legend

 Sites of Archaeological Interest

D3	2013-09-04	SC	KL	ST
Issue	Date	By	Check	Appr



Level 8 Festival Walk
80 Tai Chee Avenue
Kowloon Tong, Kowloon
Hong Kong

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Job Title

Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title

Locations of Sites of Archaeological Interest

Scale of A3

1:200,000

Drawing Status

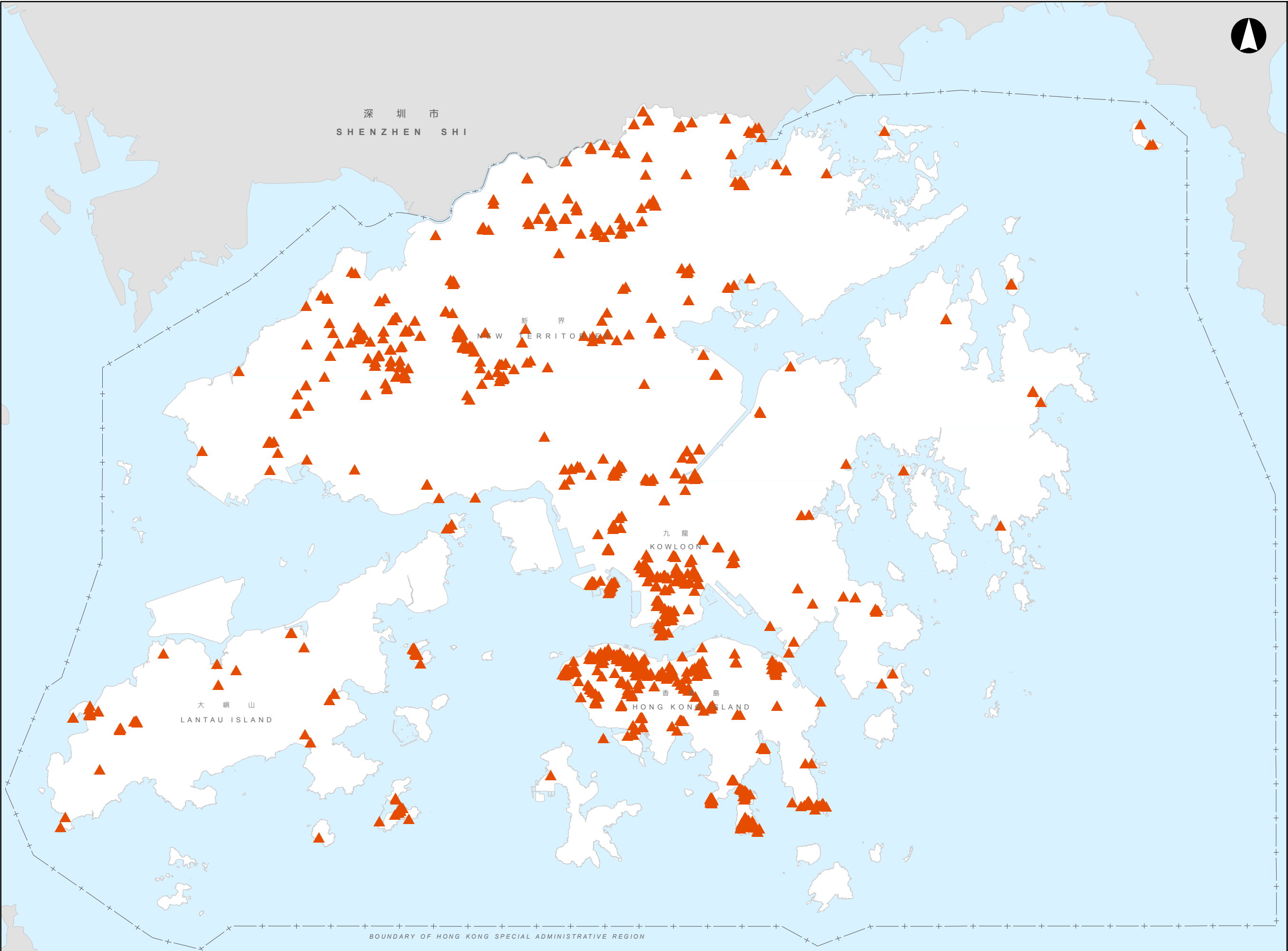
Draft

Job No
217499

Drawing No
26

Issue
D3

Source:
[1] AMO Website (2013) List of Sites of Archaeological Interest in Hong Kong



Legend

▲ Graded/ Proposed Built Heritage

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Check	Appd



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Hong Kong

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Job Title
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Development cum Public Engagement - Feasibility Study

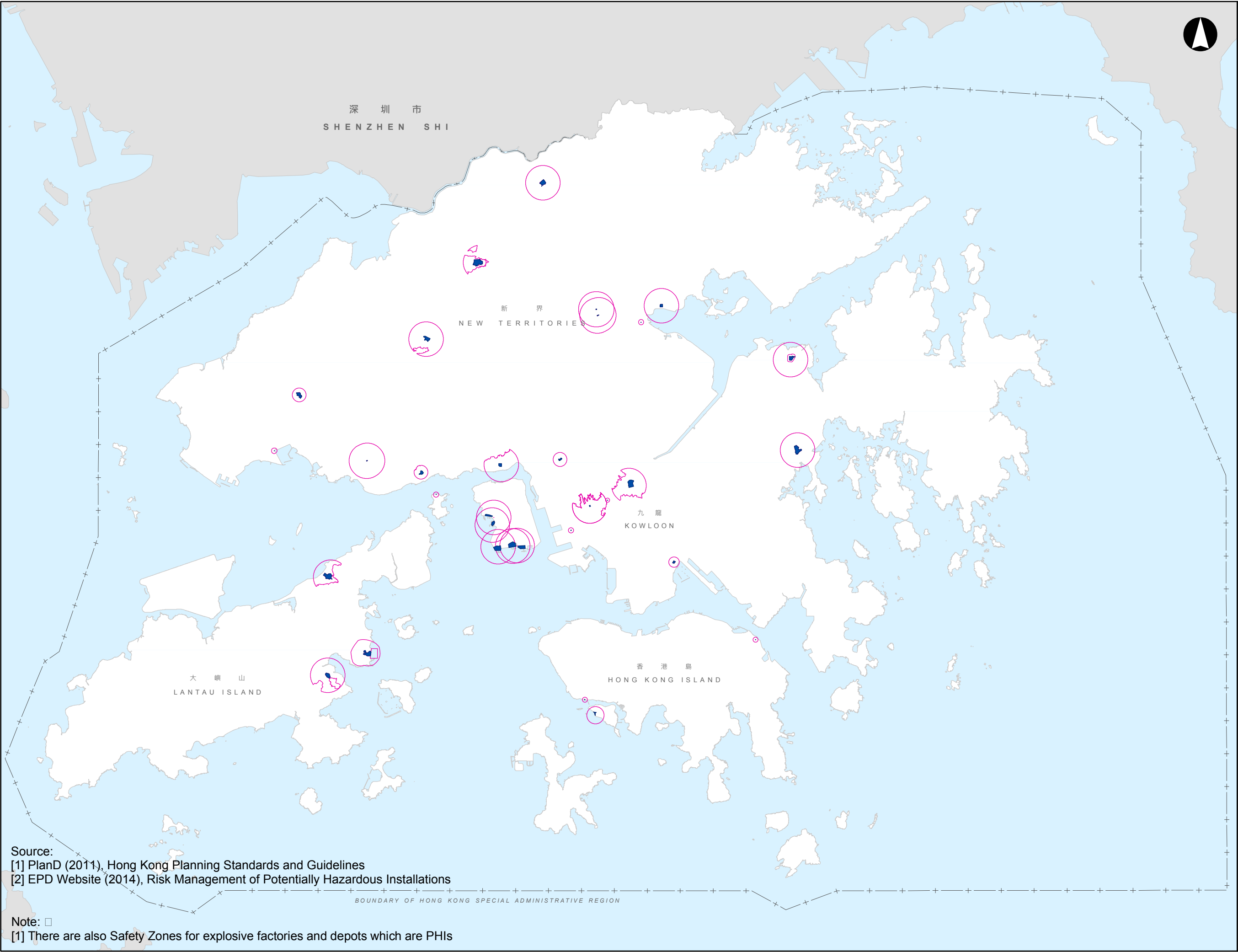
Drawing Title
Locations of Graded/Proposed Built Heritage

Scale of A3
1:200,000

Draft

Job No 217499	Drawing No 27	Issue D3
------------------	------------------	-------------

Source:
[1] AMO Website (2011) List of the Historic Buildings in Building Assessment



Legend

PHI
(Safety Zones for Explosive
Factories and Depots)

PHI Consultation
Zone

Source:
[1] PlanD (2011), Hong Kong Planning Standards and Guidelines
[2] EPD Website (2014), Risk Management of Potentially Hazardous Installations

Note: ☐
[1] There are also Safety Zones for explosive factories and depots which are PHIs

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd

0 125 250 500 750 Meters

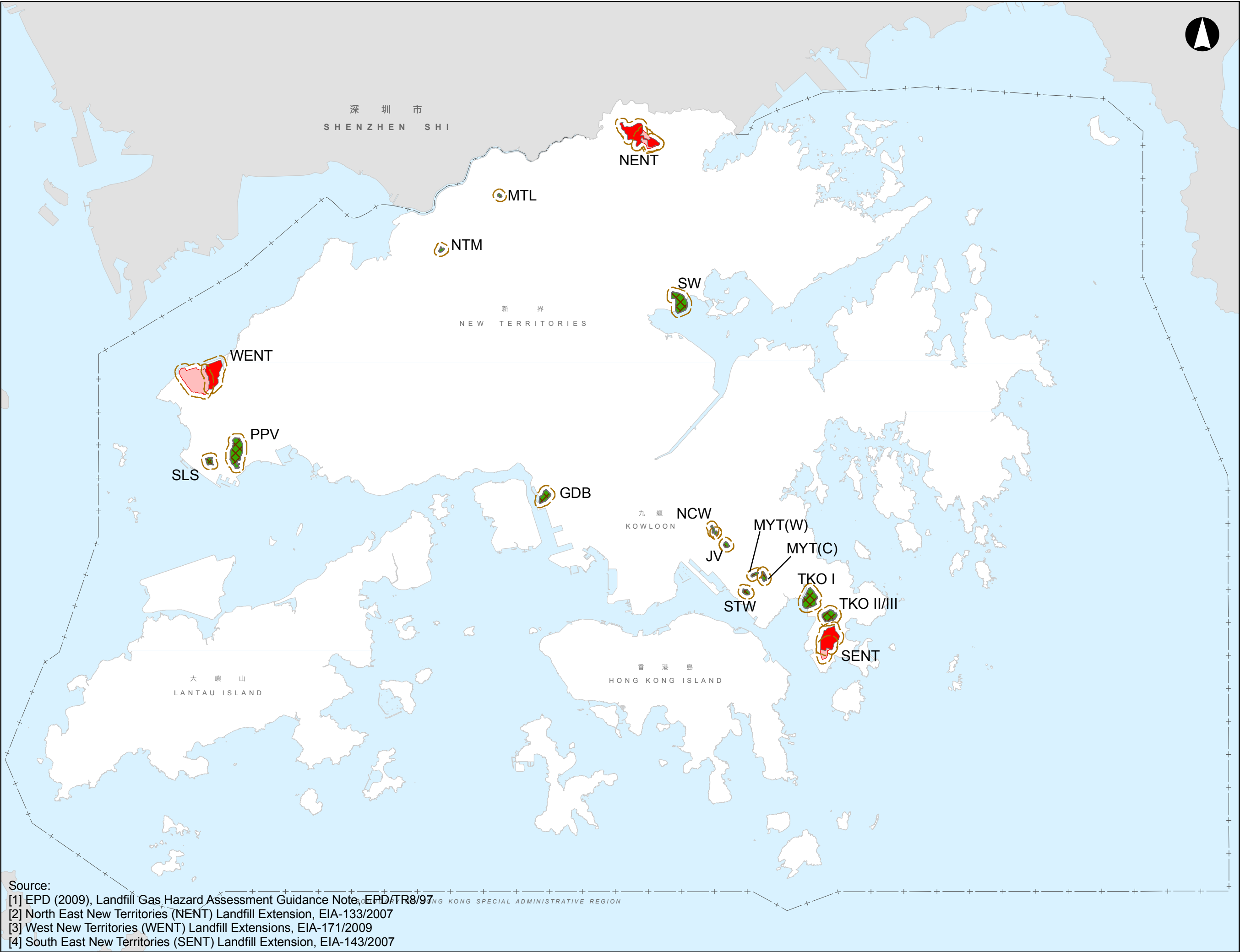
Level 5 Festival Walk
80 Tai Chee Avenue
Kowloon Tong, Kowloon
Hong Kong

Client
Civil Engineering and Development Department

Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Consultation Zones of Potentially Hazardous
Installations in Hong Kong

Scale of A3 1:200,000	Drawing Status Draft	Job No 217499	Drawing No 28	Issue D3
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Legend

- 250m Landfill Consultation Zone
- Existing Landfill Site
- Restored Landfill Site
- Landfill Extension Site

D3	2013-09-04	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

Drawing Title
Existing Landfill Sites (with Extension) and
Restored Landfill Sites in Hong Kong

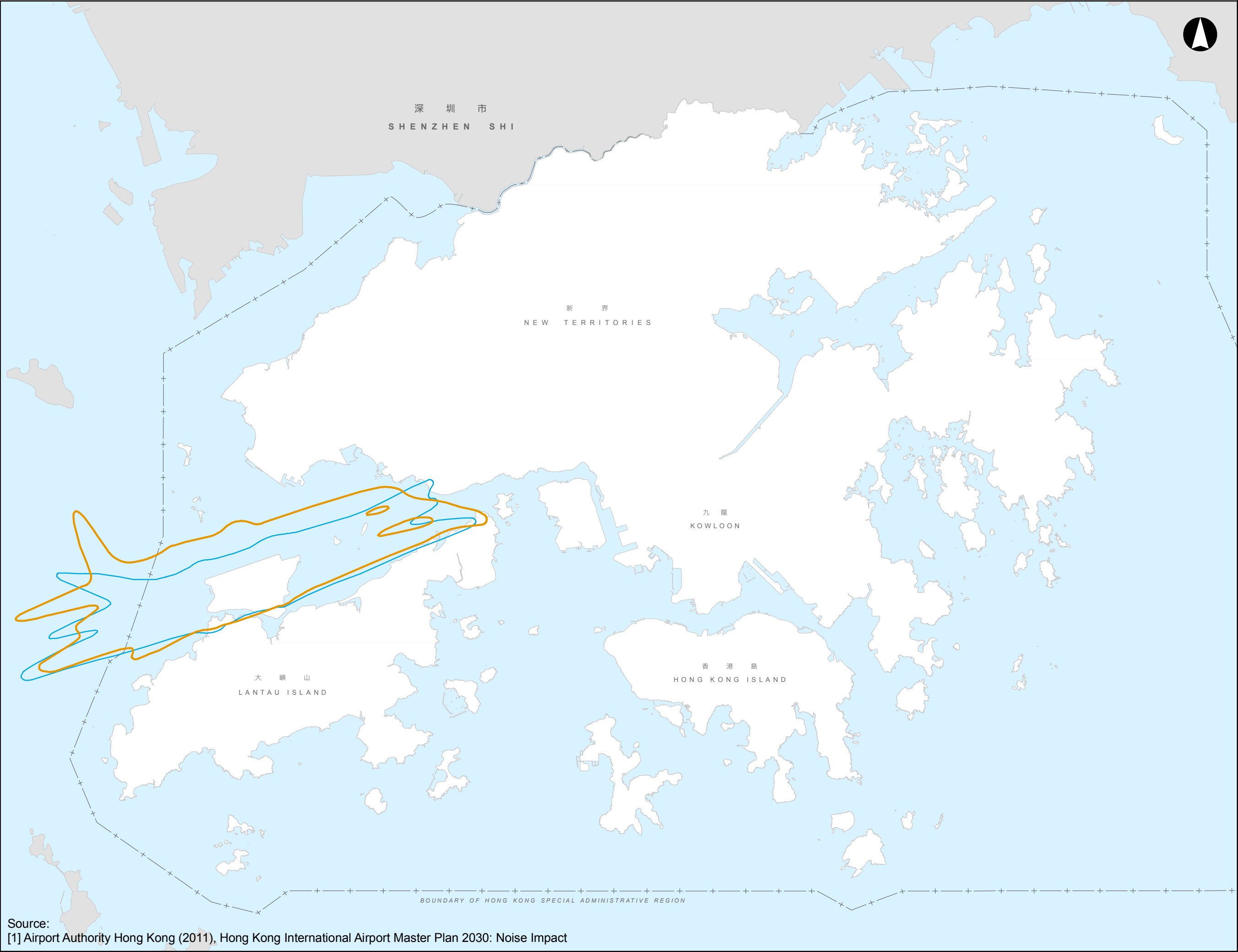
Scale of A3 1:200,000			
Drawing Status Draft			
Job No 217499	Drawing No 29	Issue	D3

Source:
[1] EPD (2009), Landfill Gas Hazard Assessment Guidance Note, EPD/TR8/97

[2] North East New Territories (NENT) Landfill Extension, EIA-133/2007

[3] West New Territories (WENT) Landfill Extensions, EIA-171/2009

[4] South East New Territories (SENT) Landfill Extension, EIA-143/2007



Legend

NEF 25 Contours

Two-Runway Option

Three-Runway Option
(Tentative, and subject to revision)

D3	2013-08-28	SC	KL	ST
Issue	Date	By	Chk'd	App'd

01252557.5

Kilometers

Level 5 Festival Walk
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Client
Civil Engineering and Development Department

Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

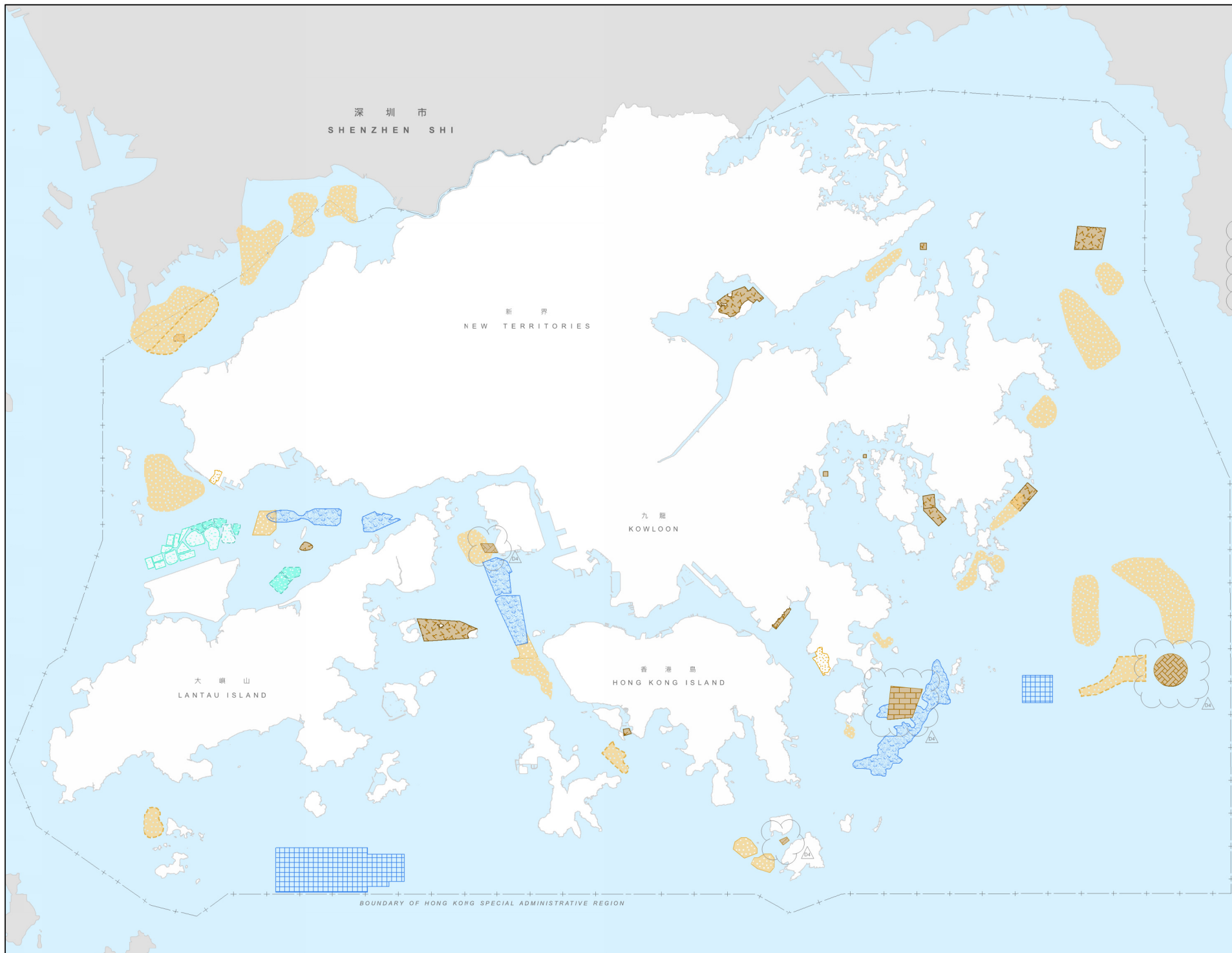
Drawing Title
Hong Kong International Airport (Aircraft)
Noise Exposure Forecast (NEF) 25 Contours

Scale of A3
1:200,000

Draft

Job No 217499	Drawing No 30	Issue D3
------------------	------------------	-------------

Source:
[1] Airport Authority Hong Kong (2011), Hong Kong International Airport Master Plan 2030: Noise Impact



Legend

- Public Fill Bank
- Exhausted Sand Borrow Pit for Disposal of Uncontaminated Sediment
- Open Sea Disposal Area for Disposal of Uncontaminated Sediment
- Sand Deposit - Exempt Prior to Dredging
- Sand Deposit - With Constraints on Dredging (e.g. environmental limitations, thick overburden, etc)
- Sand Deposit - Not Being Used on Environmental or Other Grounds
- Spoil Ground (Disused)
- Dumping Ground
- Explosive Dumping Ground
- Explosive Dumping Ground (Disused)
- Active CPDCS (Contained Pit for Disposal of Contaminated Sediment)
- Filled & Already Fully Capped CPDCS
- Planned CPDCS
- Proposed Mud Pit

Addendum No.1 incorporated.

DA	2019-10-05	JS	TS	AC
GP	2019-10-11	SC	HL	ST
Index	Date	By	Check	Appr



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Land & Environment
30 Tai Oon Avenue
Kowloon, Hong Kong
T +852 2469 2000

Civil Engineering and Development Department

Job Title

Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title

Material Disposal and Storage Area Constraints

Scale of A3

1:200,000

Drawing Status

Draft

Job No.

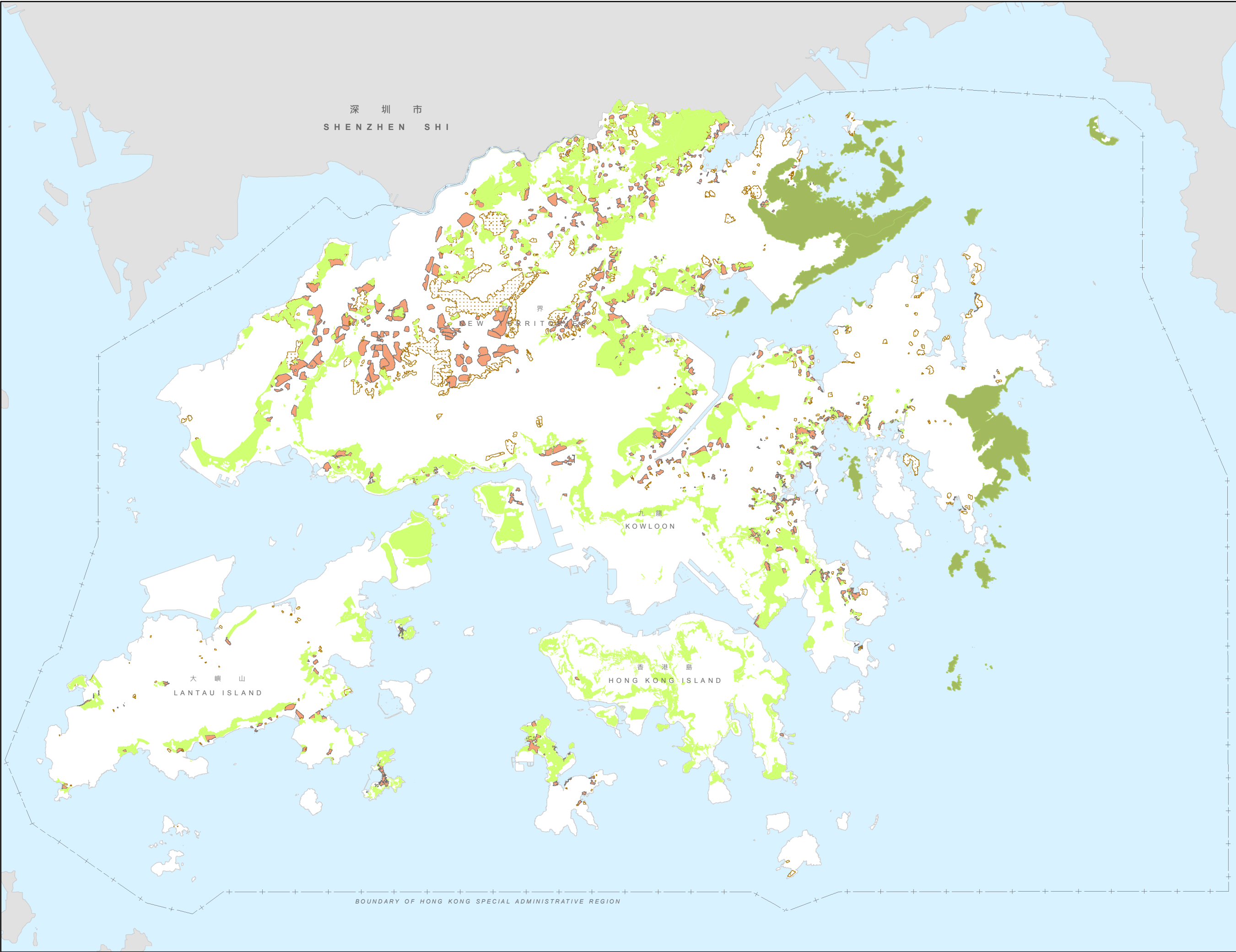
217459

Drawing No.

31

Scale

D4



Legend

- Green Belt
- Geopark
- Traditional Burial Ground
- Village Type Development

D3	2013-05-11	SC	RL	ST
Issue	Date	By	Chd	Appd



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Level 5 Festival Walk
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Hong Kong

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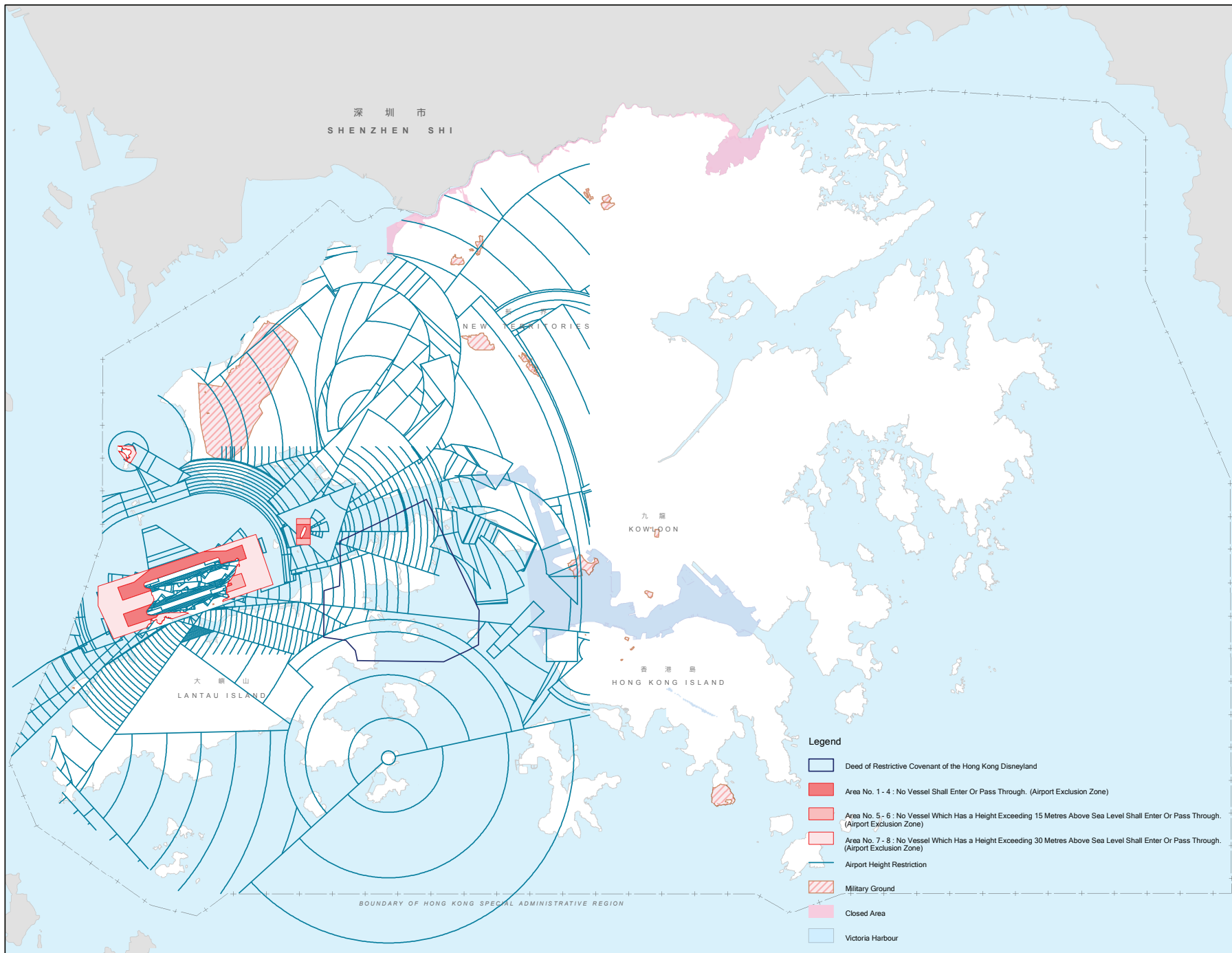
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Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study

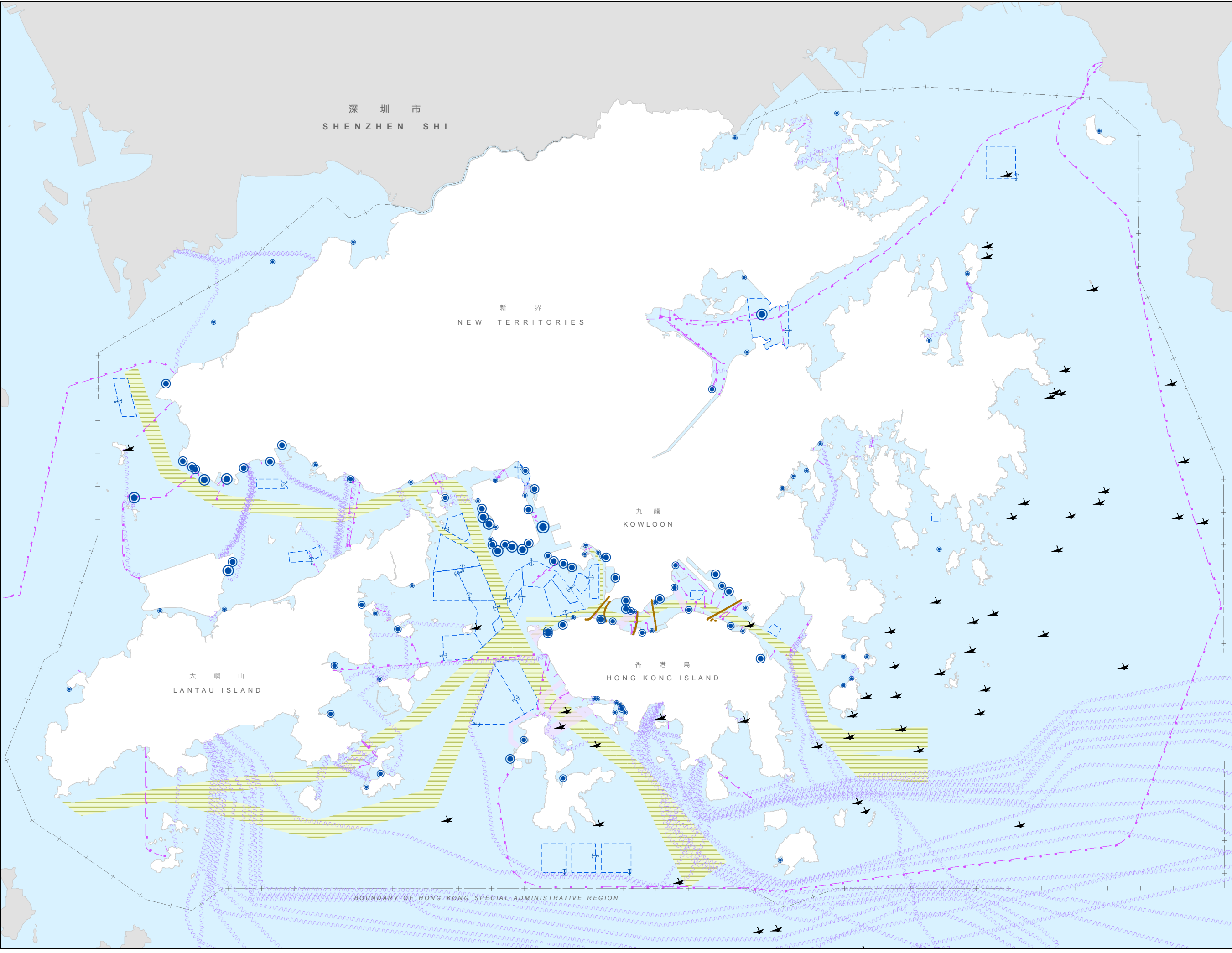
Drawing Title
Planning & Landscape Constraints

Scale of A3
1:200,000

Drawing Status
Draft

Job No 217499	Drawing No 32	Issue D3
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- Legend
- Marine Facility
 - Ship Wreck
 - Submarine Cable
 - Submarine Pipeline
 - Utility Area
 - Tunnel
 - Anchorage
 - Fairway

D3	2013-05-11	SC	RL	ST
Issue	Date	By	Chk	Appd



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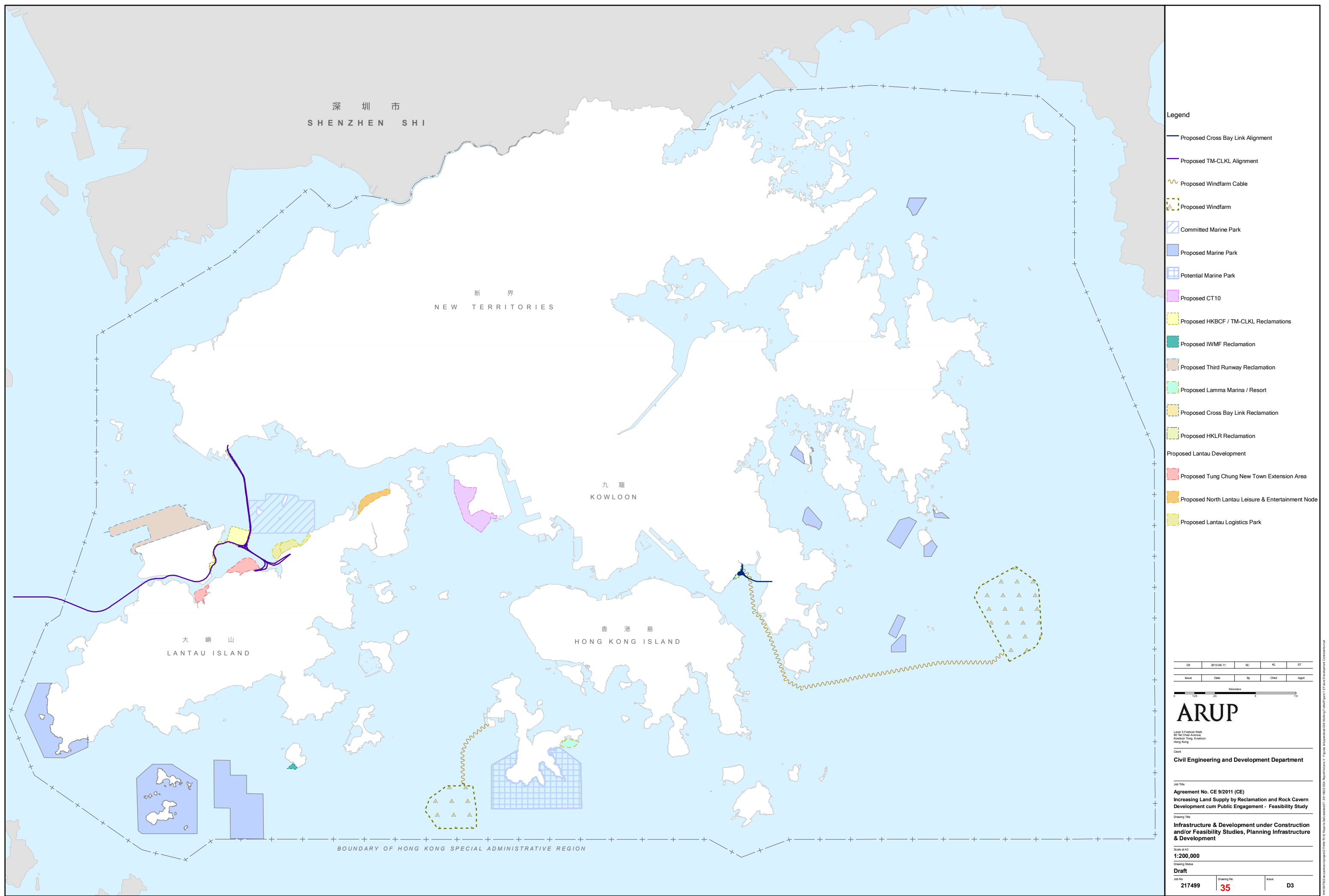
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Civil Engineering and Development Department

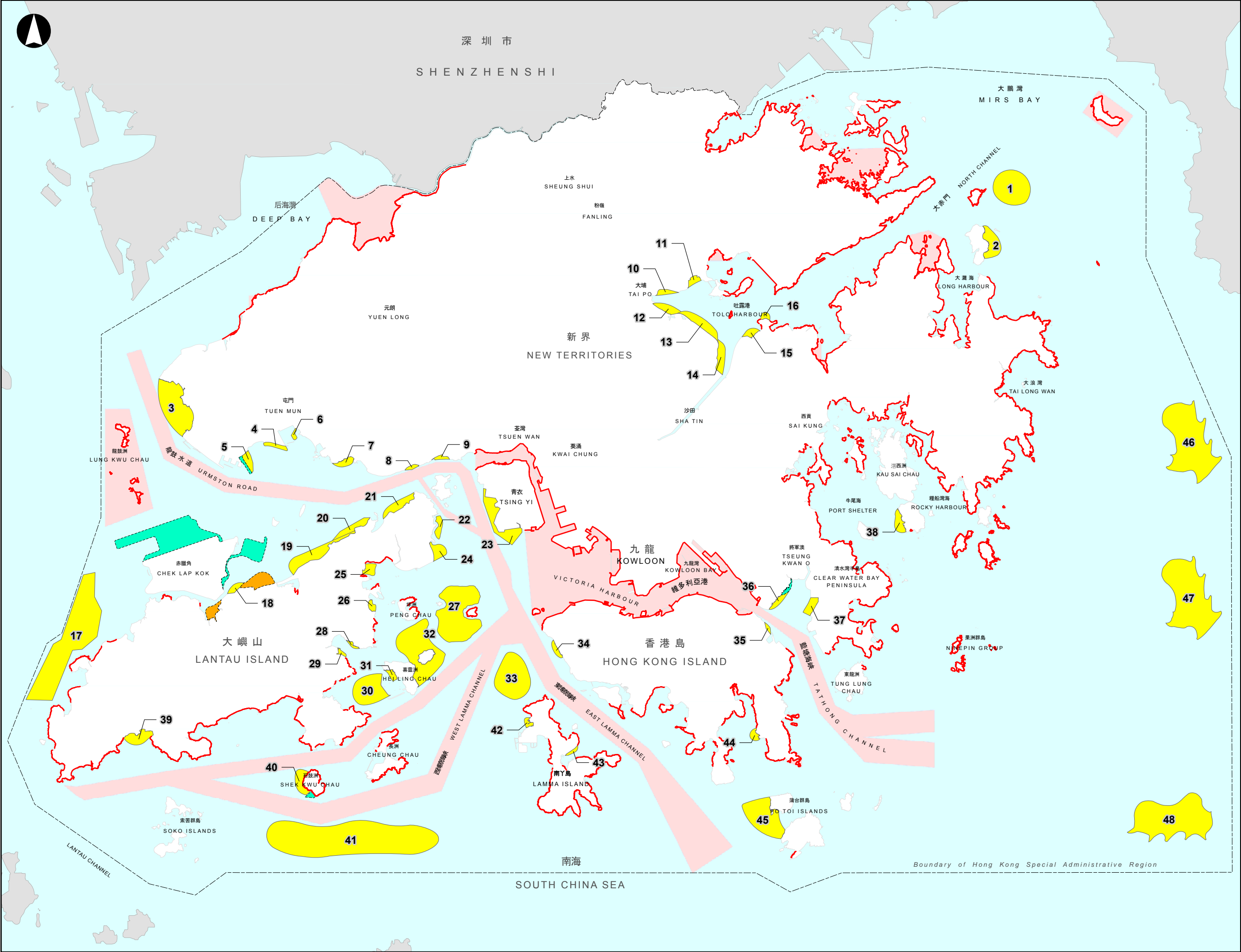
Job Title
**Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern
Development cum Public Engagement - Feasibility Study**

Drawing Title
Marine & Submarine Constraints

Scale of A3
1:200,000
Drawing Status
Draft

Job No 217499	Drawing No 34	Issue D3
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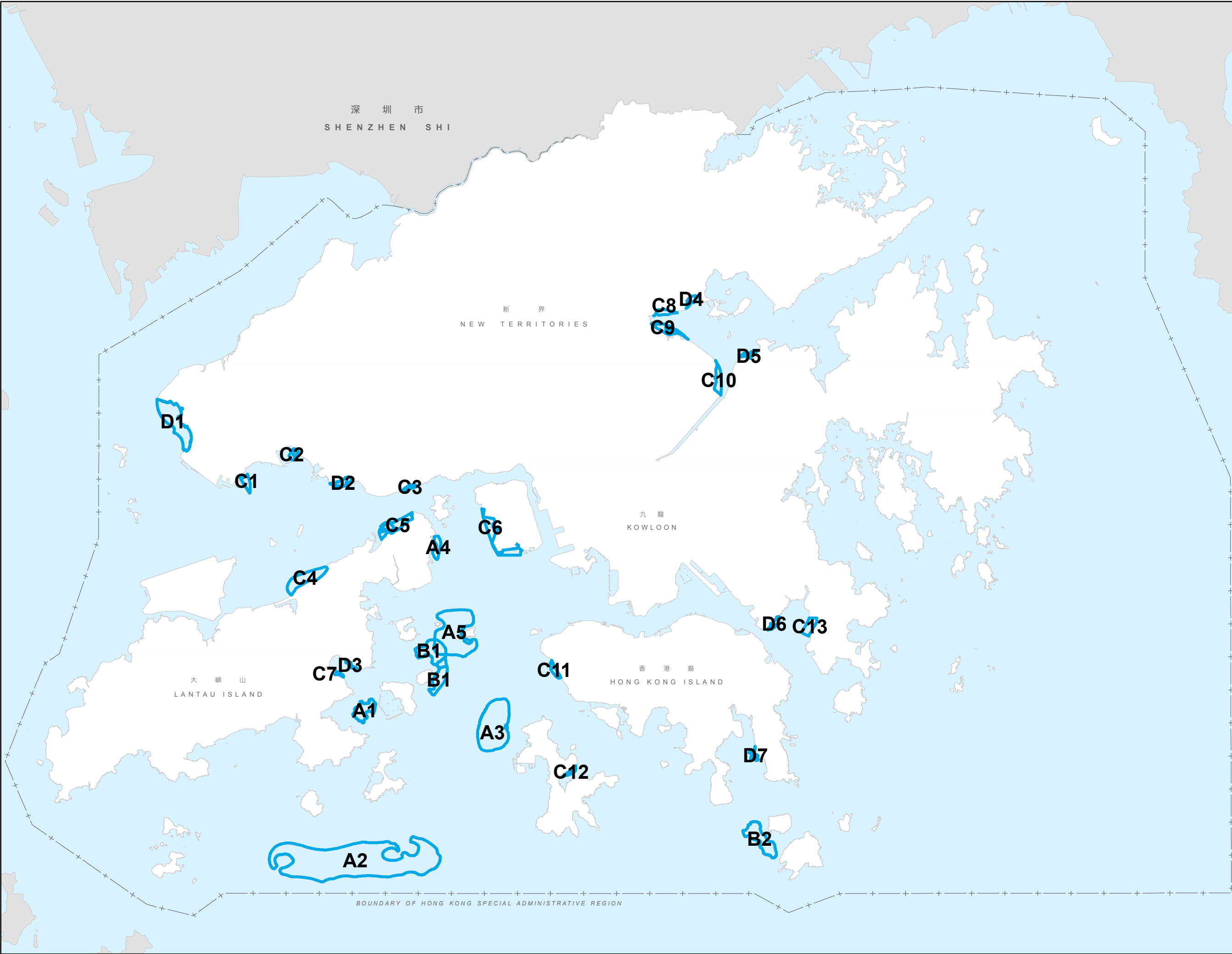




- LEGEND
- Reclamation Site under Investigation / Study (by CEDD)
 - Reclamation Site under Investigation / Study (by Others)
 - Pre-Longlisted Reclamation
 - Marine Stop Area
 - Sensitive Shoreline

Note:
The size and shape of reclamation sites shown on this plan are hypothetical assumptions for the purpose of BTA carried out at the corresponding stage of site selection process only. They do not represent any future design to be implemented.

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P9	19-01-12	JT			
Issue	Date	By	Chd	Appd	
Scale					
1:200,000					
Drawing Title					
PRE-LONGLISTED RECLAMATION SITES					
Scale					
1:200,000					
Drawing Status					
Issue					
Job No					
217499		36		P9	



Legend

Recommended Longlisted Reclamation Site

Site No.	Location	Area (ha)
A1	Hei Ling Chau West	93.6
A2	South Cheung Chau	Over 1500, first phase will be 500
A3	Lamma North	432
A4	Tsing Chau Tsai East	38
A5	Kau Yi Chau West	475
B1	Peng Chau-Hei Ling Chau	Northern island 150 Southern island 79
B2	Beaufort Island	155.5
C1	Tuen Mun Area 40	29
C2	Tuen Mun Area 27	13.8
C3	Tsing Lung Tau	11.7
C4	Siu Ho Wan	133
C5	Sunny Bay	75
C6	Southwest Tsing Yi	106
C7	Silver Mine Bay South	5.6
C8	Tai Po Industrial Estate	26
C9	Tai Po Kau	45
C10	Ma Liu Shui	47
C11	Sandy Bay	22.7
C12	Lamma Quarry	11.4
C13	TKO East	49
D1	Lung Kwu Tan	237
D2	Tai Lam Chung	32.7
D3	Silver Mine Bay North	6.5
D4	Shuen Wan	18.7
D5	Wu Kai Sha	14.9
D6	TKO 131	19.3
D7	Shek O Quarry	14

Note:
Size and shape of reclamation sites shown on this plan are hypothetical assumptions for the purpose of BTA carried out at the corresponding stage of site selection process only. They do not represent any actual design to be implemented.

D3	2013-05-11	SC	RL	ST
Issue	Date	By	Chkd	Appd



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Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title
Recommended longlisted reclamation sites

Scale of A3 1:200,000			
Drawing Status Draft			
Job No. 217499	Drawing No. 37	Issue D3	