Civil Engineering Development Department

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

Final Report – Rock Cavern Development Sites

REP/GEO/FIN/004 v7

Job number 217499

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由於有關報告於2014年完成，所以報告的部分內容或未反映現時的最新情況。
As the report was completed in 2014, some information of the report may not reflect the latest situation.

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1 Introduction

1.1 Project Background

On 30 June 2011, the Civil Engineering and Development Department (CEDD) commissioned Ove Arup and Partners HK Ltd. (Arup) as the Consultant 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. Owning 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 outside Victoria Harbour 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 rock cavern development sites. It should be noted that the site selection process for rock cavern development (RCD) covers both RCD-released site and RCD-receiving 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
SB	Security Bureau

Abbreviation	Full title
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

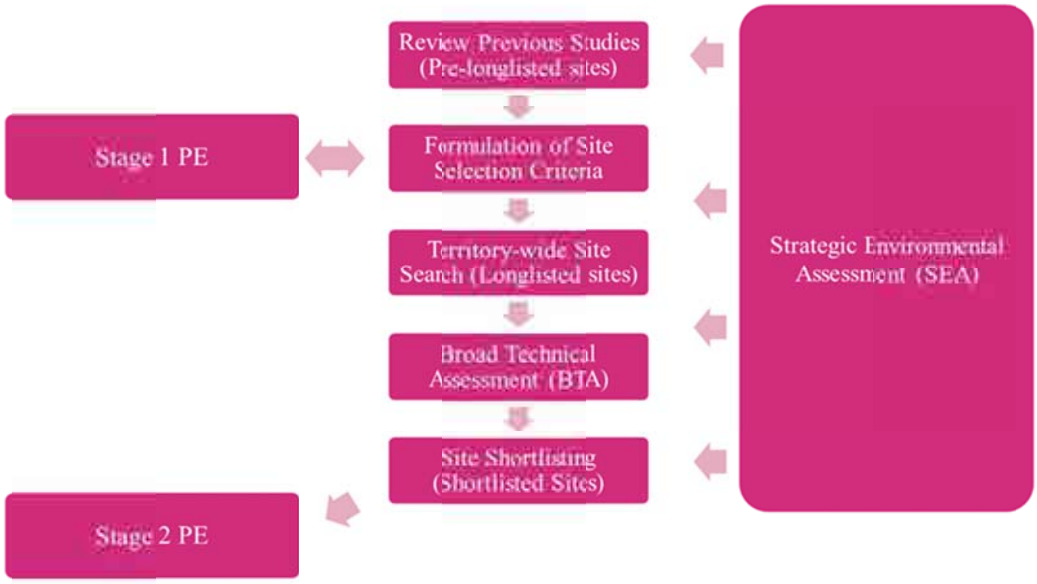
The following table lists out the meaning of words and expressions adopted in this Assignment:

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
PR sub-	Separate Public Relations Firm satisfying the qualification

Abbreviation	Full meaning
consultants	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:

a) review of previous studies and constraints for identification of pre-longlisted sites;

b) Stage 1 Public Engagement for formulation of initial site selection criteria (SSC);

c) selection of longlisted sites from the pre-longlisted sites based on the initial SSC;

d) refined Site Selection Criteria after Stage 1 PE;

e) broad technical assessment (BTA) for the longlisted sites;

f) 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; and

g) 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 Site Search Methodology, Constraints and Considerations

4.1 Overview

The site search methodologies employed for Rock Cavern Development are tailor-made to suit their different objectives, fundamental characteristics, constraints and considerations. Rock Cavern Development is essentially relocating Government facilities into caverns to free up lands currently occupied by the facilities for future development. The previous Enhanced Use of Underground Space Study (the previous Cavern Study) completed a territory-wide stock taking exercise to identify existing and future Government facilities that could be located in rock caverns. The facilities identified were assessed to highlight the development potentials and ranked to give a **Pre-Longlist** of RCD-released sites.

The following sections outline the site search methodologies, constraints and considerations for rock cavern development.

4.2 Rock Cavern Development

4.2.1 Methodology

This section outlines the methodology used in developing the pre-long list and how the long list sites were selected.

4.2.1.1 Working Paper on the Review of Previous Studies on Rock Cavern Development

A working paper on previous studies on rock cavern development was carried out as part of this study. There have been several previous studies on rock cavern development, most recently the Enhanced Use of Underground Space Study, also known as the “the previous Cavern Study” in 2011. The previous Cavern Study presented the potential advantages and opportunities of relocating government facilities to rock caverns. As part of this a Territory-Wide Cavern Suitability map was prepared and several RCD receiving and RCD-released sites were proposed.

The site selection criteria used in the previous study were:

- facility status,
- existing location,
- site area,
- multi-facility opportunities,
- precedent case,
- location requirements,
- ground condition, and
- environmental benefits.

The Cavern Study provides a very good foundation on which to further develop potential sites for the Land Supply. However, the current approach is considered to be simplified. For this territory-wide search it is proposed that the criteria proposed in the Cavern Study are updated to reflect the nature of the Land Supply study. Following the finalisation of the longlisted sites for rock cavern development, a broad technical assessment will be carried out.

4.2.1.2 Original Site Selection Criteria

The selection criteria used in the previous Cavern Study (Agreement No. CE 66/2009) were chosen to identify the type of facility and whether it needs to be replaced or upgraded, its size and whether there are examples in Hong Kong or overseas to demonstrate that it can be built underground. It also includes the general suitability of land nearby to house the original facility and whether there are good connections and perceived environmental benefits of transferring the facility underground.

Eight parameters were identified as listed in **Section 4.2.1.1** and are described below with their A, B, C Ranking.

1) Facility Status

The status of the facility was based upon that as reported by the various Government Departments in 2010. It was considered that there was greater merit in considering the facility for placement into a cavern if it was to be replaced / expanded or upgraded or if there were plans for a new facility.

Where the current facility was operating with no specific plans then there was less potential for it being placed underground and where the facility was being replaced with a new facility that was in an advanced stage of design or construction or had been recently completed then it would have the lowest facility grade.

Table 4.1 Facility Status

Grading	Description
A	Planned new facility/existing facility with expansion or upgrading plan
B	Existing facility with no planned expansion or upgrading
C	New surface scheme in an advanced stage

2) Existing Location

The existing location of the facility has been considered to be more relevant where it is located in urban areas. This generally relates to the demand for land and the overall benefit of transferring the facility underground thereby releasing the currently occupied land for other uses.

Table 4.2 Existing Location

Grading	Description
A	Urban or Urban fringe area at prime location with existing development pressure
B	Suburban area subject to less development pressure
C	Areas in rural setting

3) Site Area

The larger the area that the facility occupies then the greater the potential benefit of releasing the land for other uses.

In order to balance the cost and optimise the land availability with the additional cost of underground construction, it has been considered that where the existing facility is of limited size that the potential benefit is reduced.

It has been assumed that facilities that have rough dimensions of about 75 m by 100 m could release a significant space and pay for the underground development costs.

Sites that fall below 50 m by 50 m will tend to be small and less attractive to place underground and hence they have been set at the least grade for this parameter. In between there may be some beneficial uses and depending on the location it could have a higher or lower land value.

Table 4.3 Site Area

Grading	Description
A	> 0.75 ha (7,500 m2)
B	0.25 – 0.75 ha (2,500 – 7,500 m2)
C	< 0.25 ha (2,500 m2)

4) Multi-facility Opportunities

The potential for relocating multiple facilities that lie close together into an integrated facility has been considered. This is likely to release more land for other uses as well as potentially grouping facilities and land uses into multiple caverns into nearby suitable hillsides in an integrated manner, e.g. multiple NIMBY type facilities.

This approach could result in cost savings by integrating similar development and facilities together with potential cost savings in integrated external access roads, ventilation and portal structures.

Table 4.4 Multi-facility Opportunities

Grading	Description
A	Multiple government facilities lying close together with potential to be relocated/located underground
B	Multiple government/private facilities lying close together with potential to be relocated/located underground
C	No multiple facilities opportunity

5) Precedent Cases

Where local and overseas examples of underground development for this type of facility have been identified they have been given highest priority in this grading system. Obviously for those facilities already constructed and operating in Hong Kong there is precedent experience in continuing to promote and develop further similar facilities. All necessary technical and procedural aspects of the cavern development have been resolved to construct and operate those facilities and therefore it is deemed that they can be more easily implemented.

Overseas examples are considered to form the middle criteria and as they have not been implemented in Hong Kong previously then there is likely to be some issues that may need to be resolved before adopting them.

Table 4.5 Precedent Case

Grading	Description
A	Local
B	International only
C	None identified

6) Location Requirements

The location of the facility and how it might connect to existing networks such as transport connections and pipelines is an important criteria to consider. For facilities connected to existing networks such as sewage treatment works and service reservoirs, relocating these facilities would require rerouting of pipe networks and upgrading of pumping stations and may increase the cost of the relocation scheme. However, a newly planned facility will be more flexible as the network has not been formed and can be tailored to suit the specific facility requirements.

Various land uses and facilities have requirements for marine access such as refuse transfer stations where the principal mode of disposal of the waste to landfill is by barge. These issues can also be highlighted within this criteria.

Table 4.6 Location Requirements

Grading	Description
A	Flexible
B	Some constraints to overcome (e.g. required to link to existing network system such as pipe line and transport etc.)
C	Major constraints to overcome (e.g. location sensitive, require marine access)

7) Ground Condition

This criterion relates to the general suitability and ease of construction of the facility in a cavern relevant to the potential size of the rehoused facility. It relates to a general review of the topography that may be suitable for cavern development in the vicinity.

Table 4.7 Ground Condition

Grading	Description
A	Suitable ground adjacent to the facility (< 200 m)
B	Suitable ground in close proximity (200 m to 1 km)
C	No suitable ground in the vicinity (> 1 km)

8) Environmental Benefits

The environmental benefits of transferring the proposed scheme into caverns are considered in this criterion. Where it is recognised that there are already significant benefits to placing the facility underground they can be highlighted here. Facilities that form part of the NIMBY set of facilities (e.g. sewage treatment, refuse transfer facilities, slaughterhouses, oil storage) will usually be graded as A where they are currently located close to residential areas and can be moved further away into caverns thereby improving the environmental benefits to those nearby stakeholders.

Visual impact can also form part of this criterion if the facility is already in a valuable scenic area or the scenic quality of the area could be significantly improved if it was moved or transferred underground.

Table 4.8 Environmental Benefits

Grading	Description
A	Significant environmental benefits
B	Some environmental benefits
C	No obvious environmental benefits

4.2.1.3 Pre-Longlist

The ranked list of 445 sites developed in the previous Cavern Study is used as the starting point for the site search. These 445 sites were developed from the stocktaking exercise carried out in the Cavern Study and were ranked by the number of As, Bs then Cs based on the criteria mentioned in **Section 4.2.1.1** and summarised in **Section 4.2.1.3.** The stocktaking was undertaken with the aim to:

- identify existing and planned above-ground government facilities that have the potential for rock cavern development
- to collect information on these facilities including: location, site area, capacity and plans for expansion / re-provision.

The types of facilities that were part of the stocktaking are cited in the Table 1 Chapter 12 of the Hong Kong Planning Standards and Guidelines (HKPSG):

- Civic centre
- Columbarium / Mausoleum / Mortuary
- Incinerator
- Indoor games/Sports hall
- Refuse transfer facility
- Sewage/Water treatment plant
- Service reservoir
- Slaughterhouse
- Transport connections & networks
- Wholesale market

The top ranked facilities were carried forward for this study as a pre-long list, which is then to be re-ranked using the updated criteria which are described below. The top ranked facilities were defined as those sites which ranked with 4As or higher in the original study. This leads to a total of 131 no. of government facilities.

These 131 no. of government facilities were further eliminated with considerations, including extremely small site area; no appropriate receiving sites of reservoirs; facilities recently completed or will be upgraded/expanded; facilities connecting to HATS dropshaft; no suitable ground for rock cavern construction; and types of facilities not suitable for relocation, e.g. incinerators, slaughterhouses, military facilities, etc.. The selection criteria are summarized as below:

Minimum Site Area

As the purpose of this study with respect to rock caverns is to release land for redevelopment, the size of the released site is critical. A minimum size for site development is selected, below which it is considered that the relocation of the facility to a rock cavern is not economical. This critical site area is taken as 1,500m^2. Sites less than this critical area are excluded from further consideration except as part of a multiple facility opportunity which exceeds 3,000m^2 in total.

Reservoir Location

For the relocation of a reservoir it is required that the receiving site be located in close proximity to the original site and the level must be similar. This is to preserve the existing water pressure and service area of the reservoir. Many of Hong Kong's reservoirs are located on or near the top of a hill. Reservoirs at such location will not be considered further in this study.

Planned or Recently Completed Facilities

Planned or recently completed facilities are not included in the scope of this site search.

Fixed Location due to HATS dropshaft

The Harbour Area Treatment Scheme (HATS) connects several DSD facilities and these facilities are fixed by the location of the dropshafts. Therefore all such facilities will no longer be considered.

No suitable ground for Rock Cavern

Facilities that have no suitable ground for a cavern development within a reasonable distance for relocation will no longer be considered.

Incinerators

Incinerators will no longer be considered as there are significant safety concerns with placing an incinerator underground. In addition, there is no precedent case of an underground incinerator globally.

Slaughterhouses

Slaughterhouses will no longer be considered. After consultation with FEHD, they have stated that current slaughterhouse facilities are significantly underused. This leads to a lack of expansion or reprovisioning plan and therefore slaughterhouses have a much reduced potential for cavern development.

Coastal Location

Some facilities with coastal location and that require marine access for their operation may not be relocated easily. Such sites require more detailed review and will not be considered further in this study.

Military Facilities

If the only suitable location of RCD-released site is within military areas then the site will no longer be considered.

4.2.1.4 Facility Types

The following section describes the facility types considered and introduces the key issues related to each facility as well as outlining previous experience with relocating such facilities underground.

Wholesale market

Whilst the provision of underground wholesale market facilities could be considered, a number of issues would need to be resolved, namely access and movement for vehicles and pedestrians; fire safety and public perception.

The size of the required facility and the logistical operation of the markets with numerous truck deliveries are likely to create traffic impact problems, therefore

careful consideration would need to be given to where this use could potentially be located. There may be limited accessible areas where this facility type could be situated underground in the urban area.

Sewage / Water treatment works

There is a precedent case in Hong Kong of a sewage treatment works being located within an cavern development, therefore the possibility of relocating existing above-ground facilities within future cavern development, should be explored further.

This facility type would benefit from an underground location with reduced complaints and public objections about the visual impact of and the odour from the sewage treatment works.

Water treatment facilities need to be close to existing sources of water or major pipeline routes for water conveyance. This could limit the areas that could house these facilities underground although with appropriate diversions and pumping the facility could be rehoused in underground space.

For some DSD & WSD facilities, such as water treatment and sewage treatment works, alternative treatment technologies would need to be explored. This could have a bearing on the overall effectiveness of housing these facilities underground.

Civic Centres

Whilst there is no precedent case of relocating a civic centre underground in Hong Kong, there are international examples of this facility type being developed in caverns.

Good accessibility is crucial for a cultural facility. The potential to provide large underground space in Hong Kong is good, but there may be limited areas that have suitable ground conditions, in accessible locations that are well connected to public transport and nearby road networks.

Indoor games / Sports hall

Whilst there is no precedent case in Hong Kong, there are international examples of this facility type being developed in caverns. These facilities need to be located close to the areas of demand to maximise local population catchment, with large open spaces usually preferred. Cavern development can be altered to suit the end use of the sport for the relocation of indoor games/sports hall facilities underground. However, there may be limited areas where this could take place.

Refuse transfer facilities

There is a precedent case of a refuse transfer facility being located within a cavern in Hong Kong, therefore the possibility of relocating more existing above-ground refuse transfer facilities within future cavern developments, should be explored further.

By locating these NIMBY/industrial facilities within cavern development there would likely be a reduction in the number of complaints from nearby residential

areas. To relocate existing refuse transfer facilities underground, as was the case with Island West Transfer Station, will require a site with suitable ground conditions, and appropriate road and marine access to the facility, if required.

Service reservoir

There is a precedent for the relocation of a salt water service reservoir into a cavern development in Hong Kong, therefore the possibility of relocating both existing salt and fresh water service reservoirs in future cavern development should be explored further. Existing facilities do not need to be located close to urban areas and can be housed in remote areas, therefore maximising the potential areas that could house these facilities underground. However, some reservoirs will need to be relocated close to their existing location to minimise pipeline reconnection and maintain the current water pressure. Hydraulics play a significant role in location of new and existing facilities and where existing facilities need to be placed underground the existing water pressure needs to be maintained and this may limit some facilities being reprovisioned underground.

Given the issues raised by the WSD, there are a number of technical, operational and spatial considerations that will have to be addressed, especially to safeguard against contamination, if fresh water service reservoirs are to be relocated underground.

Columbarium/Mausoleum/Mortuary

There is a demand for columbaria and the FEHD are open to the suggestion of suitable underground space for new columbaria provided that the technical and spatial requirements can be met. New columbaria could also potentially be developed to incorporate underground niches.

Columbarium / mausoleum / mortuary is a potential land use that could be located in cavern development. However it will require careful consideration of fung shui aspects in addition to access and how this could be accommodated underground.

Storage / Ware Housing

Whilst the GLD have gone through a downsizing of their operations and there are no plans for the upgrade, expansion or re-provision of the existing Government Logistics Centre, this facility could be accommodated in a cavern development.

Any underground location would need to ensure emergency access in case of a public disaster, but there are advantages for the secure storage of some equipment underground, e.g. emergency materials and supplies.

4.3 Pre-Longlisted Sites

With reference to the abovementioned selection criteria, 78 sites for government facilities were identified as pre-longlisted sites for rock cavern development.

These 78 pre-longlisted sites are shown in **Figure 1** and listed in **Table 4.1**.

Table 4.1 Rock Cavern Releasing Pre-Longlisted sites

Site No.	District	Name	Site Area (m^2)
1	Tai Po	Tai Po Sewage Treatment Works	131,944
2	Sai Kung	Sai Kung Sewage Treatment Works	21,554
3	Sha Tin	Sha Tin Transfer Station	13,840
4	Southern	Aberdeen Fresh Water Service Reservoir	15,140
5	Wong Tai Sin	Lion Rock High Level Fresh Water Primary Service Reservoir	15,123
6	Tsuen Wan	Yau Kom Tau Fresh Water Primary Service Reservoir	13,339
7	Tsuen Wan	Yau Kom Tau No. 2 Fresh Water Primary Service Reservoir	12,967
8	Wan Chai	Eastern No. 2 Fresh Water Service Reservoir	10,965
9	Wong Tai Sin	Lion Rock Low Level Fresh Water Primary Service Reservoir	10,898
10	Wan Chai	Eastern Water Treatment Works	10,135
11	Kwai Tsing	Tsing Yi North Low Level Fresh Water Service Reservoir	8,772
12	Wong Tai Sin	Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir	13,744
13	Central And Western	Kennedy Town Fresh Water Service Reservoir	6,463
14	Islands	Siu Ho Wan Sewage Treatment Works	71,626
15	Tsuen Wan	Sham Tseng Sewage Treatment Works	10,964
16	Tuen Mun	North West New Territories Refuse Transfer Station (NWNTRTS)	10,896
17	Tsuen Wan	Yau Kom Tau Water Treatment Works	32,297
18	Sai Kung	Tseung Kwan O Fresh Water Primary Service Reservoir	28,166
19	Yuen Long	Tan Kwai Tsuen South Fresh Water Service Reservoir	16,886
20	Yuen Long	Tan Kwai Tsuen North Fresh Water Service Reservoir	16,422

Site No.	District	Name	Site Area (m^2)
21	Tuen Mun	Tuen Mun North Fresh Water Service Reservoir	14,863
22	Tsuen Wan	Tsuen Wan West Low Level Fresh Water Service Reservoir	12,695
23	Tuen Mun	Tuen Mun West Fresh Water Service Reservoir	12,443
24	Kwai Tsing	Kau Wa Keng Fresh Water Service Reservoir	11,282
25	Sha Tin	Tai Po Road Fresh Water Service Reservoir	10,893
26	Eastern	Shau Kei Wan Fresh Water Service Reservoir	9,532
27	Sham Shui Po	Shek Kip Mei No. 3 Fresh Water Service Reservoir	9,522
28	Sham Shui Po	Shek Kip Mei No. 2 Fresh Water Service Reservoir	9,401
29	Yuen Long	Au Tau Fresh Water Service Reservoir	8,013
30	Sha Tin	Ma On Shan Fresh Water Service Reservoir	7,450
31	Kwun Tong	Yau Tong Fresh Water Service Reservoir	5,997
32	Wan Chai	Bowen Road Fresh Water Service Reserfoir	5,801
33	Kwai Tsing	Tsing Yi East Fresh Water Service Reservoir	5,768
34	Wan Chai	Eastern Fresh Water Service Reservoir	5,009
35	Sha Tin	Ma On Shan No. 2 Fresh Water Service Reservoir	4,883
36	Kwun Tong	Choi Wan Road Fresh Water Service Reservoir	4,834
37	Kwai Tsing	Tsing Yi East Salt Water Service Reservoir	4,732
38	Southern	Ap Lei Chau Fresh Water Service Reservoir	4,614
39	Central And Western	Hatton Road Fresh Water Service Reservoir (New)	4,072
40	Sham Shui Po	Piper's Hill Salt Water Service Reservoir	3,932
41	Sha Tin	Sha Tin West Fresh Water Service Reservoir	3,833
42	Kwai Tsing	Tsing Yi North Low Level Salt Water Service Reservoir	3,760
43	Kwai Tsing	Tsing Yi East No. 2 Fresh Water Service Reservoir	3,576

Site No.	District	Name	Site Area (m^2)
44	Kowloon City	Beacon Hill Intermediate Level Fresh Water Service Reservoir	3,545
45	Southern	Wah Fu Fresh Water Service Reservoir	3,067
46	Kwun Tong	Choi Wan Road Salt Water Service Reservoir	2,992
47	Sha Tin	Sha Tin Water Treatment Works	109,273
48	Sham Shui Po	Shek Kip Mei Fresh Water Service Reservoir	33,818
49	Kwai Tsing	Tsing Yi Preliminary Treatment Works	19,012
50	Wong Tai Sin	Tsz Wan Shan Fresh Water Service Reservoir	18,086
51	Wong Tai Sin	Diamond Hill No. 2 Fresh Water Service Reservoir	14,131
52	Sha Tin	Shek Lei Pui Fresh Water Service Reservoir	10,562
53	Kowloon City	Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir	10,519
54	Kwun Tong	Yau Tong No. 2 Fresh Water Service Reservoir	9,611
55	Tai Po	Ma On Shan Fresh Water Primary Service Reservoir	7,704
56	Islands	Outlying Islands Transfer Facilities-Mui Wo Station (OITF-MuiWS)	4,414
57	Southern	Wah Fu Salt Water Service Reservoir	4,258
58	Kwun Tong	Jordan Valley Salt Water Service Reservoir	3,097
59	Central And Western	Western No.2 Fresh Water Service Reservoir	2,453
60	Central And Western	Magazine Gap Road No. 3 Fresh Water Service Reservoir	2,429
61	Southern	Aberdeen No. 2 Salt Water Service Reservoir	2,083
62	Southern	Ap Lei Chau Salt Water Service Reservoir	2,069
63	Wan Chai	Bowen Drive Salt Water Service Reserfoir	1,908
64	Kwun Tong	Yau Tong Salt Water Service Reservoir	1,874
65	Central And Western	Magazine Gap Road No. 2 Fresh Water Service Reservoir	1,806
66	Sha Tin	Sha Tin West Salt Water Service Reservoir	1,634

Site No.	District	Name	Site Area (m^2)
67	Southern	Aberdeen Salt Water Service Reservoir	1,152
68	Central And Western	Western Fresh Water Service Reservoir	1,109
69	Sha Tin	Ma On Shan No. 3 Salt Water Service Reservoir	1,078
70	Eastern	Shau Kei Wan East High Level Salt Water Service Reservoir	1,023
71	Sha Tin	Ma On Shan Salt Water Service Reservoir	754
72	Kowloon City	Beacon Hill Intermediate Level Salt Water Service Reservoir	706
73	Kwai Tsing	Tsing Yi North High Level Salt Water Service Reservoir	705
74	Central And Western	Hatton Road Fresh Water Service Reservoir	541
75	Central And Western	Hatton Road No. 2 Fresh Water Service Reservoir	521
76	Central And Western	Hatton Road No. 2 Fresh Water Service Reservoir (New)	490
77	Sha Tin	Ma On Shan No. 2 Salt Water Service Reservoir	342
78	North	Kwu Tung Fresh Water Service Reservoir	8,736

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 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	***Impact on local community***	Social benefits at the releasing site upon relocation of existing facilities
	Site location and accessibility	***Social impact at the cavern development site***
	Meeting local needs	
Enhanced Environmental Performance	***Environmental impacts***	***Environmental impacts at the cavern development site***
	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	***Engineering feasibility***
		Suitability of relocation based on existing facility status

Other major views, in particular for rock cavern development, 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;

e) There was broad support on rock cavern development, with some concerns on engineering feasibility and use of caverns.

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

In view of the large amount of pre-longlisted sites, a longlisting exercise was carried and is a screening process to select a smaller batch of sites from the pre-longlist for further study (shortlisting). 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/assessments. In this broad comparison of the sites, the more grade As that are identified for the site, 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 78 pre-longlisted rock cavern development (RCD) sites were identified for longlisting. Social Benefits at the releasing site upon relocation of existing facilities

This criterion considers the social benefits that could be brought to the area around the RCD-released site. Issues that are considered in the ranking exercise include the demand for space in the area surrounding the releasing site and the current land use of the releasing site. As an example areas that are perceived as having higher demand for land are considered more suitable for relocation. However, if the current land use has a social benefit, such as a sport or recreation facility (e.g. sports ground above a reservoir) the site is seen as less favourable for relocation from a social viewpoint.

Table 6.1 Grading Framework for RCD – Social Benefits at the releasing site upon relocation of existing facilities

Grading	Description
A	Site is located in an area that has a high demand for space
B	Site is located in an area that has a medium demand for space
C	Site is located in an area that has a low demand for space or site currently has a use that provides social benefit to the area.

6.1.1 Social Impact at the cavern development site

This criterion considers the social impact that could be brought to the RCD-receiving site. Issues that are considered in the ranking exercise are the facility type that will be relocated to the area and the population density. A graded approach was taken where the less desirable the facility the greater the social impact. The population density of the surrounding area was also considered.

Table 6.2 Grading Framework for RCD – Social Impact at the cavern development site

Grading	Description
A	Minor impact to the local population upon relocation of facility
B	Some impact to the local population upon relocation of facility
C	Significant Impact to the local population upon relocation of facility

6.1.2 Environmental Benefits in the vicinity of the releasing site upon relocation of existing facilities

This criterion considers the environmental benefits that could be brought to the area around the RCD-released site. Undesirable facilities (e.g. refuse transfer stations, sewage treatment works) that can be relocated to cavern developments will provide large environmental benefits to the area. Facilities that currently have little impact to the environment will provide less benefit by relocating them (e.g. freshwater service reservoirs, saltwater service reservoirs).

Table 6.3 Grading Framework for RCD – Environmental Benefits in the vicinity of the releasing site upon relocation of existing facilities

Grading	Description
A	Facility currently has a negative environmental impact and relocation will remove the impact
B	Facility currently has a slight negative environmental impact and relocation will remove the impact
C	Facility currently has no environmental impact

6.1.3 Environmental Impacts at the cavern development site

This criterion considers the environmental impacts that could be brought to the area around the RCD-receiving site. This is determined by the proximity of the site to environmentally sensitive areas such as country parks, SSSI and conservation areas.

Table 6.4 Grading Framework for RCD – Environmental Impacts at the cavern development site

Grading	Description
A	Relocated facility will have no environmental impact to the area
B	Relocated facility will likely have some environmental impact to the area

C	Relocated facility will likely have significant environmental impact to the area

6.1.4 Engineering Feasibility

This criterion considers the engineering aspects of the cavern construction and facilities relocation works. Issues that should be considered in the ranking exercise include ground condition and constraints of nearby connection.

Ground condition will affect the ease of cavern construction and hence the suitability of facilities relocation. It relates to a general review of the topography that may be suitable for cavern development in the vicinity. A territory-wide cavern suitability map, **Figure 2**, has been developed using Geographical Information Systems (GIS) methods. The cavern suitability map briefly summarizes areas with three different levels of suitability for rock cavern development based on different considerations of ground conditions. Details on method of developing the suitability map is presented in "Working Paper on the Review of Previous Studies on Rock Cavern Development".

Dependent on the size of the facility the search area varies (i.e. Larger facilities will need a larger underground space so they can be considered to move further from their current location). Reservoirs are required to be located as close as possible to their current position and elevation.

Table 6.5 Grading Framework for RCD – Engineering Feasibility

Grading	Description
A	Many locations with sizeable areas of suitable land for locating the facility underground.
B	Some locations with enough land to allow the facility to be housed underground but with some constraints.
C	There is limited or very constrained areas of suitable land to house the facility.

6.1.5 Cost Effectiveness

The larger the area that the existing facility occupies then the greater the potential cost benefit of releasing the land for other uses.

In order to balance the cost and optimise the land availability with the additional cost of cavern construction / relocation / infrastructure provision it has been considered that where the existing facility is of limited size that the potential benefit is reduced. Sites of less than 1,500m^2 are not considered to be cost effective and are no longer considered as part of this study except as part of a multi-facility opportunity.

Table 6.6 Grading Framework for RCD – Cost Effectiveness

Grading	Description
A	Relocating the facility will release a large amount of land and provide greater opportunity for future development
B	Relocating the facility will release a less amount of land but still provide opportunity for future development
C	Relocating the facility will release a small amount of land, limiting the opportunity for future development

Note: As stated in **Section 3.2.1.2** the minimum site area considered is 1,500m^2.

6.1.6 Facility Specific Requirements

This criterion considers any facility specific requirements such as operation and maintenance requirements that may require special space-saving and operational technology in addition to general engineering requirement. For sites selected for the longlist, the facility specific requirements will be discussed with the relevant government department.

Table 6.7 Grading Framework for RCD – Facility Specific Requirements

Grading	Description
A	Many examples, very few specific requirements or engineering challenges for the facility to be relocated underground
B	Some previous examples, some adaptation or engineering input required
C	Land use or facility with no underground examples that would require special expertise and engineering input to allow the facility to be placed underground

6.1.7 Suitability of Relocation based on existing facility status

The status of the facility is based upon that as reported by the various government departments in 2010. It was considered that there was greater merit in considering the facility for placement into a cavern if it was to be replaced / expanded or upgraded or if there were plans for a new facility.

Table 6.8 Grading Framework for RCD – Suitability of Relocation based on existing facility status

Grading	Description
A	Existing facility that requires expansion or upgrading
B	Existing facility with no planned expansion or upgrading
C	Recently completed or upgraded facility

6.2 Recommended Longlisted RCD Sites

The recommended longlist of 21 government facilities is shown in **Table 6.10**.

Table 6.10 Recommended Longlist of sites for Rock Cavern Development

No.	Facility Name	Location	Site Area (m^2)
1	Sai Kung Sewage Treatment Works	Sai Kung	21,554
2	Tsing Yi Preliminary Treatment Works	Kwai Tsing	19,012
3	Beacon Hill Intermediate Level Fresh Water Service Reservoir	Kowloon City	3,545
4	Tai Po Sewage Treatment Works	Tai Po	131,944
5	Sha Tin Transfer Station	Sha Tin	13,840
6	Sham Tseng Sewage Treatment Works	Tsuen Wan	10,964
7	Siu Ho Wan Sewage Treatment Works	Islands	71,626
8	Tuen Mun North Fresh Water Service Reservoir	Tuen Mun	14,863
9	Diamond Hill No. 2 Fresh Water Service Reservoir	Wong Tai Sin	14,131
10	Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir	Wong Tai Sin	13,744
11	Tsuen Wan West Low Level Fresh Water Service Reservoir	Tsuen Wan	12,695
12	Eastern No. 2 Fresh Water Service Reservoir	Wan Chai	10,965
13	North West New Territories Refuse Transfer Station (NWNTRTS)	Tuen Mun	10,896
14	Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir	Kowloon City	10,519
15	Tsing Yi North Low Level Fresh Water Service Reservoir	Kwai Tsing	8,772
16	Kwu Tung Fresh Water Service Reservoir	North	8,736
17	Piper's Hill Salt Water Service Reservoir	Sham Shui Po	3,932
18	Tsing Yi North Low Level Salt Water Service Reservoir	Kwai Tsing	3,760
19	Jordan Valley Salt Water Service Reservoir	Kwun Tong	3,097
20	Shau Kei Wan East High Level Salt Water Service Reservoir	Eastern	1,023

No.	Facility Name	Location	Site Area (m^2)
21	Kennedy Town Fresh Water Service Reservoir	Central And Western	6,463

A map showing the location of the above facilities is shown in **Figure 3**. Site plans for the longlisted sites can be found in **Figures 4 to 60**.

6.2.1 Receiving Sites

The receiving sites shown in **Figures 4 to 60** were placed on the following basis:

- As close to the current elevation as possible as the releasing site
- Avoiding any major constraints such as buildings, tunnels, waterways etc.
- Within a reasonable distance of the releasing site
- Portal access avoiding major roads and highways where possible

6.2.2 Key Issues of Recommended Longlisted Sites

The following section describes the major issues and features of each site. A detailed assessment of each site has been carried out in the Broad Technical Assessment as part of this study (**section 7**). General issues for all sites include:

- Portal Location
- Ventilation Structure (except for reservoirs)
- Reconnection of pipe work or other infrastructure with potential impact to community
- Switchover of old facility to new
- Reservoir elevation to be maintained where possible
- Traffic Issues at releasing and receiving sites
- Cost effectiveness

All of the issues will be addressed in the broad technical assessment. The list is non-exhaustive.

6.2.3 Sai Kung Sewage Treatment Works

Sai Kung Sewage Treatment Works is at approximately +6mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +46mPD. The following issues may affect the redevelopment of this site

- Near Tsiu Hang Special area

The site plans can be found in **Figures 4 to 6**

6.2.4 Tsing Yi Preliminary Treatment Works

Tsing Yi Preliminary Treatment Works is at approximately +9mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +49mPD. The following issues may affect the redevelopment of this site

- Proximity to the sea
- Connection with sewage network (HATS)
- Access from Tsing Chin Street
- Proximity to Cheung Tsing Tunnel
- Possible difficulty with portal access

The site plans can be found in **Figures 7 to 9**

6.2.4.1 Beacon Hill Intermediate Level Fresh Water Service Reservoir

Beacon Hill Intermediate Level Service Reservoir is at approximately +153mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +193mPD. The following issues may affect the redevelopment of this site

- Multiple facility option with Beacon Hill Intermediate Level Salt Water Reservoir
- Proximity to disused Rail Tunnel
- Proximity to MTR East Rail Tunnel
- Access from Ling Yan Road

The site plans can be found in **Figures 10 to 12**

6.2.4.2 Tai Po Sewage Treatment Works

Tai Po Sewage Treatment Works is at approximately +5mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +45mPD. The following issues may affect the redevelopment of this site:

- Multiple facility opportunity with Shatin Sewage Treatment Works, however it should be noted that Shatin STW is currently undergoing a separate study for cavern development and therefore this opportunity will not be considered further in this study
- Relocation will require pipe work and likely will require a pumping station at the releasing site location
- Releasing site ranges from +80mPD to 280mPD which means ventilation shaft could be very deep
- Pipe reconnection will have to cross Ting Kok Road
- Proximity to Hong Kong and China Gas
- Receiving site will encroach on Pat Sing Leng Country Park
- Access from Lo Fai Road, Lo Ping Road or existing access road to Tai Po East High Level Service Reservoir.

The site plans can be found in **Figures 13 to 15**

6.2.4.3 Sha Tin Transfer Station

Sha Tin Transfer Station is at approximately +10mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +50mPD. The following issues may affect the redevelopment of this site

- Close to Tate's Cairn Highway
- Access from On Hing Lane

The site plans can be found in **Figures 16 to 18**

6.2.4.4 Sham Tseng Sewage Treatment Works

Sham Tseng Sewage Treatment Works is at approximately +5mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +45mPD. The following issues may affect the redevelopment of this site

- Further opportunity for an integrated development with Sham Tseng Substation, a playground and basketball court located nearby which could give an opportunity for an integrated development
- Access from Castle Peak Rd beneath Tuen Mun Road

The site plans can be found in **Figures 19 to 21**

6.2.4.5 Siu Ho Wan Sewage Treatment Works

Siu Ho Wan Sewage Treatment Works is at approximately +6mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +46mPD. The following issues may affect the redevelopment of this site:

- Possible multiple facility opportunity with Siu Ho Wan Water Treatment Works
- Additional facilities may be relocated to cavern such as:
  - Siu Ho Wan Government Maintenance Depot
  - City Bus Depot
  - Vehicle Pound Examination Centre and Weigh Station
- Proximity to North Lantau Highway
- Access to site and cavern at Cheung Tung Road
- Proximity to Discovery Bay tunnel

The site plans can be found in **Figures 22 to 24**

6.2.4.6 Tuen Mun North Fresh Water Service Reservoir

Tuen Mun North Fresh Water Service Reservoir is at approximately +91mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +131mPD. The following issues may affect the redevelopment of this site:

- Multiple facility opportunity Tuen Mun North Salt Water Service Reservoir

The site plans can be found in **Figures 25 to 27**

6.2.4.7 Diamond Hill No. 2 Fresh Water Service Reservoir

Diamond Hill No. 2 Fresh Water Service Reservoir is at approximately +86mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +126mPD. The following issues may affect the redevelopment of the site:

- Access from Fung Shin Street

- Proximity to Tate's Cairn Tunnel
- Proximity to columbarium

The site plans can be found in **Figures 28 to 30**

6.2.4.8 Diamond Hill Fresh Water and Salt Water Service Reservoirs

Diamond Hill Fresh Water Service Reservoir is adjacent to the Diamond Hill Salt Water Reservoir. They are at approximately +89mPD elevation. To maintain this current elevation the receiving sites will need ground level at approximately +129mPD. The following issues may affect the redevelopment of the site(s):

- Access from Shatin Pass Road
- Proximity to Tsz Lok Estate
- Existing Leisure facilities on reservoir surface

The site plans can be found in **Figures 31 to 33**

6.2.4.9 Tsuen Wan West Low Level Fresh Water Service Reservoir

Tsuen Wan West Low Level Fresh Water Service Reservoir is at approximately +93mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +133mPD. The following issues may affect the redevelopment of the site:

- Access from Route Twisk
- Proximity to Graves
- Proximity to Kwong Pan Tin village

The site plans can be found in **Figures 34 to 36**

6.2.4.10 Eastern No. 2 Fresh Water Service Reservoir

Eastern No. 2 Fresh Water Service Reservoir is at approximately +95mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +135mPD. The following issues may affect the redevelopment of this site:

- Multiple facilities Easter Water Treatment Works and Easter Fresh Water Service Reservoir
- Receiving site at Mount Nicholson
- Access from Wong Nai Chung Gap Rd.

The site plans can be found in **Figures 37 to 39**

6.2.4.11 North West New Territories Refuse Transfer Station (NWNTRTS)

The North West New Territories Refuse Transfer Station is at approximately +19mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +60mPD. The following issues may affect the redevelopment of this site:

- Proximity to Yuen Long Highway
- Site access at Shun Tat Street
- Nearby stream can cause issues with groundwater drawdown and ecology
- Receiving site located beneath Yuen Long Fresh Water Service Reservoir

The site plans can be found in **Figures 40 to 42**

6.2.4.12 Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir

Lion Rock No. 2 Fresh Water Primary Service Reservoir is at approximately +115mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +155mPD. The following issues may affect the redevelopment of this site:

- Proximity to Lion Rock Tunnel
- Access from Lung Cheung Road
- Lion Rock Country Park
- Complex pipe arrangement

The site plans can be found in **Figures 10 to 12**

6.2.4.13 Tsing Yi North Low Level Fresh Water Service Reservoir

Tsing Yi North Low Level Fresh Water Service Reservoir is at approximately +70mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +110mPD. This can be taken in combination with Tsing Yi North Low Level Salt Water Reservoir. The following issues may affect the redevelopment of the site(s):

- Access from Liu To Road
- Proximity to Cheung Wan Estate

The site plans can be found in **Figures 43 to 45**

6.2.4.14 Kwu Tung Fresh Water Service Reservoir

Kwu Tung Fresh Water Service Reservoir is at approximately +95mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +135mPD. The following issues may affect the redevelopment of this site:

- Receiving site at Hadden Hill (Ki Lu Shan)
- Receiving site relatively far from releasing site may lead to difficult access

The site plans can be found in **Figure 46 to 48**

6.2.4.15 Kennedy Town Fresh Water Service Reservoir

Kennedy Town Fresh Water Service Reservoir is at approximately +91mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +131mPD. The following issues may affect the redevelopment of the site:

- Access to site from single lane road
- Proximity to cemetery

The site plans can be found in **Figures 58 to 60**

6.2.4.16 Piper's Hill Salt Water Service Reservoir

Piper's Hill Salt Water Service Reservoir is at approximately +122mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +162mPD. The following issues may affect the redevelopment of this site

- Multiple facility opportunity with Piper's Hill High Level Fresh Water Service Reservoir
- Close to Tsing Sha Highway & Eagle's Nest Tunnel
- Close to Kowloon Reception Reservoir and Kowloon Byewash Reservoir
- Access from Tai Po Road (Currently car park)
- Proximity to Lion Rock Country Park

The site plans can be found in **Figures 49 to 51**

6.2.4.17 Tsing Yi North Low Level Salt Water Service Reservoir

Refer to **Section 6.2.4.13**

6.2.4.18 Jordan Valley Salt Water Service Reservoir

Jordan Valley Salt Water Service Reservoir is at approximately +69mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +99mPD. The following issues may affect the redevelopment of the site:

- Proximity to rehabilitated landfill
- Access from Shun Lee Tsuen Road
- Valley location

The site plans can be found in **Figures 52 to 54**

6.2.4.19 Shau Kei Wan East High Level Salt Water Service Reservoir

Shau Kei Wan East High Level Salt Water Service Reservoir is at approximately +137mPD elevation. To maintain this current elevation the receiving site will need ground level at approximately +177mPD. The following issues may affect the redevelopment of this site

- This site is not cost effective as it is less than 1,500m^2 however if it is considered in combination with Shau Kei Wan East High Level Fresh Water Reservoir a greater land area can be released.
- Nearby catch water can affect groundwater
- Access from Tai Tam Road

The site plans can be found in **Figures 55 to 57**

7 Broad Technical Assessment (BTA)

7.1 Methodology

Broad technical assessment are carried out for the longlisted sites, which include the following key aspects:

a) land use, urban planning and design;

b) geotechnical assessment;

c) broad environmental assessment;

d) traffic impact assessment;

e) civil works(e.g. water, drainage, sewage, etc.);

f) sustainability assessment;

g) implementation, construction and costing.

7.2 Land Use, Urban Planning and Design

7.2.1 Site Characteristics

The main characteristic of the RCD-released and RCD-receiving site were described such as the topography, adjoining developments, facility description, the development constraints, the existing and future land use in the vicinity and listing the relevant stakeholders.

Based on the characteristics of the RCD-released and RCD-receiving sites identified, standards prescribed in Hong Kong Planning Standards and Guidelines (HKPSG) and together with the statutory plan, Outline Zoning Plans (OZPs), the land use pattern for the RCD-released and RCD-receiving sites were considered. Residential development, additional Government/ Institution or Community (G/ IC) and Open Space Provision at the RCD-released site were also considered.

The specific planning requirements of the rock cavern development were listed with respect to ventilation, drainage, storage, potential hazards and access requirements in the assessment.

7.2.2 Assumed Land Use / Hypothetical Land Use

Land use options discussed in the assessment are only illustrative and hypothetical, and will subject to detailed study and assessment in future stage of the project. The assumed land use is investigated and suggestions are given based on the site characteristics, development opportunities and constraints in the vicinity of the proposed RCD site. Infrastructural developments are also suggested according to the existing and future needs of the community.

7.3 Geotechnical Appraisal

Geotechnical aspect is critical in rock cavern development in order to achieve a successful and economical cavern. As part of the Board Technical Assessment, a

geotechnical appraisal was undertaken on both RCD-released and RCD-receiving sites. This comprised a study of the available desk based information and site reconnaissance.

7.3.1 Ground Conditions

The geology of the site has 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 Cad'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 RCD-released and RCD-receiving sites.

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. The expected ground conditions and potential adverse features are also identified for further consideration.

Site reconnaissance was carried out for all selected long-listed sites as part of assessment. The existing condition in the vicinity are observed and listed in the BTA sheets, such as streams, slopes, rock joints and public facilities etc. The location of proposed RCD-receiving sites and the access admit are also reviewed during site reconnaissance. The site visit plate for each long-listed site can be found in BTA sheets as attachment.

7.3.2 Site History

A number of aerial photographs, dating from 1963 to 2010 were obtained via Aerial Photograph Library of the Geotechnical Engineering Office. Aerial Photograph Interpretation (API) was carried out to give a brief account of site development history of the RCD-released and RCD-receiving sites, as well as any regional geological features that may require considerations for the proposed development, such as soil erosion, landslides and stream flow etc.

7.3.3 Geotechnical Constraint

With the desk study information and site reconnaissance, the geotechnical constraints were identified on both RCD-released and RCD-receiving sites.

<u>RCD-Released Site</u>

The existing land may give rise to land contamination subject to the historical land uses. In addition, potentially insufficient founding level and uncertain groundwater level are other constraints for future development. Further investigations, such as groundwater level monitoring, comprehensive site investigation and site specific ground investigation, were recommended to determining the exact ground conditions for future development.

<u>RCD-Receiving Site</u>

Uncertain underground condition and vibration due to blasting activities are the major concern for the rock cavern development. Recommended further investigation, such as field mapping, exploratory holes and laboratory testing, were recommended if necessary.

7.4 Facility Related Issues

Relocating a facility to within a cavern means that any specific requirements of that facility will need to be met to enable the facility to operate underground.

7.5 Environmental Assessment

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

However, the environmental acceptability of the future recommended development options and/or shortlisted potential sites and the practicability and effectiveness of the recommended environmental mitigation options in the Study 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 Study's recommendations.

7.5.1 Air Quality

All key potential Air Sensitive Receivers (ASRs) within the 500m assessment boundary of each RCD-released and RCD-receiving sites, i.e. residential buildings, schools and hospitals etc., were identified.

RCD-Released Site

The potential air qualities impacts may arise from fugitive dust emission during decommission and construction activities in construction phase. Strategic mitigation measures, such as good site practice, were recommended when required.

During operational phase, potential air pollution sources, i.e. industrial emission in the vicinity and vehicular emission from road networks etc., were identified. The potential impact on existing, planned and proposed future ASRs were identified through desk-top study. Strategic mitigation measures, such as provision of sufficient setback distance, building height restrictions, were recommended to minimize the impact. Some relocation works will benefit nearby ASRs by releasing them from potential odour impacts, such as NWNTRTS and Tai Po Sewage Treatment Works.

RCD-Receiving Site

The potential air quality impacts may arise from fugitive dust emission during construction activities, such as excavation and blasting, in construction phase.

Strategic mitigation measures, such as blasting doors, were recommended when required.

During operational phase, potential pollution sources, i.e. ventilation shafts and portal of the cavern and off-site traffic emission etc., were identified. Strategic mitigation measures, such as the height and orientation of the ventilation shafts, were recommended to minimize the impact.

7.5.2 Noise

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

RCD-Released Site

Airborne construction noise generated by the use of Powered Mechanical Equipment (PME) during decommission and land-based construction works in construction phase was identified. Potential adverse impacts on nearby NSRs were identified and strategic mitigation measures, such as use of noise barriers, were recommended.

The relocation of the facilities will benefit nearby NSRs from the original noise nuisance during operational phase. Potential noise impact on future NSRs on RCD-released site from pollution sources were identified and strategic mitigation measures, such as provision of sufficient setback distance or optimization of building layout etc., were recommended if necessary.

RCD-Receiving Site

During construction phase, airborne construction noise and groundborne noise will be generated from dill and blasting activities. Potential adverse impacts on nearby NSRs were identified and strategic mitigation measures, such as use of noise barriers and detailed groundborne noise assessment, were recommended.

During operation phase, potential pollution sources, i.e. fixed plants operation and off-site traffic noise etc., were identified. Strategic mitigation measures, such as the use of noise barrier and installation of acoustic attenuators, were recommended to minimize the impact.

7.5.3 Water Quality

All key potential water sensitive receivers (WSRs) within the 500m assessment boundary of each RCD-released and receiving-sites, i.e. watercourses, seawater intake point, beach, fish culture zone etc., were identified.

RCD-Released Site

During construction phase of RCD-released sites, the potential impact will involve construction site runoff, groundwater seepage and sewage from on-site construction. Temporary drainage system and temporary sanitary facilities, will be adopted to avoid or minimize the water impacts.

During operational phase, the potential pollution sources in RCD-released sites, i.e. sewage from future residents and surface runoff during rainfall events, were

identified subject to the future land use. Proper drainage system and utilize the existing public sewer system were recommended. More detailed information about sewerage and drainage systems were provided in separate studies.

RCD-Receiving Site

During the formation of the cavern, the potential impact, such as sewage generation, accidental spillage of chemical substances, will be arisen. Groundwater pollution is also a possible issue for consideration. Mitigation measures such as grouting and recharging were recommended.

The potential pollution sources, leachate and effluent discharge, are anticipated in operation phase subject to the type of operational facilities. The potential water quality impacts were identified at strategic level and mitigation measures were recommended to minimize the impact.

Water quality impact is a common environmental concern if the RCD-receiving sites are located closely to the Country Parks or Water Gathering Ground. There would also be potential impact on water quality for the relocated sewage treatment works' new discharge outfalls affecting efficiency of pollutant dispersion.

7.5.4 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.

RCD-Released Site

During the construction phase, waste generating activities during decommission and land-based construction works were identified. Wastes generated would generally include construction and demolition wastes, 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

RCD-Receiving Site

The major wastes include large quantities of rock material during excavated and C&D materials during site formation and construction activities. Subject to the content and quality of the rock materials, proper reuse (such as on-site backfilling, public filling materials) shall be identified.

Different kinds of wastes generated from the operation of relocated facilities, i.e. sewage sludge and chemical waste, subjected to the type of facilities were identified during operational phase. The storage and handling of the wastes were recommended.

7.5.5 Ecological Impact

Ecological resources and sensitive receivers within the vicinity of potential RCD-released and RCD-receiving sites, i.e. important terrestrial, marine and intertidal habitats, sites of conservation of importance etc., were identified. Direct and

indirect impacts 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.

7.5.6 Fisheries Impact

No fisheries impact will be arisen from rock cavern development as there are no fisheries resources on land and no fish pond inside or in the vicinity.

7.5.7 Cultural Heritage

Cultural heritage resources within the vicinity of both RCD-released and RCD-receiving sites, i.e. Bulit Heritages, Declared Monument, Graded or Proposed Graded Historic Buildings. Site of Archaeological Interest and Government Historic Sites identified by AMO etc., were identified. Potential direct (i.e. encroachment of Sites of Archaeological Interest etc.) and indirect impacts (i.e. vibration and construction dust from construction works etc.) were identified. Mitigation measures were recommended.

7.5.8 Landscape and Visual

Landscape resources (LRs), landscape character areas (LCAs) and visually sensitive receivers (VSRs) within the vicinity of RCD-released sites were identified. Potential direct and indirect impacts on LRs, LCAs and VSRs during both construction and operational phases were assessed. Mitigation measures, such as stripping and storing topsoil, minimize the construction area, reduce the construction period, transplanting of affected trees etc., were recommended.

No landscape and visual issue will be arisen from RCD-receiving sites as the relocated facilities are placed inside the rock cavern. Some facilities may have a small impact due to portal and ventilation structures.

7.5.9 Hazard to Life

For the RCD-released and RCD-receiving sites falling within the Consultation Zone of PHIs, potential hazard to life issue were identified. Quantitative hazard assessments for the relevant shortlisted sites are required.

7.5.10 Landfill Gas Hazard

For the RCD-released and RCD-receiving sites falling within the 250m Consultation Zones of the landfills, landfill gas hazard assessments shall be conducted according to the Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97) and the Landfill Gas Hazard Assessment for Development Adjacent to Landfills (ProPECC PN 3/96). Certain engineering design and mitigation measures shall be adopted to developments within the consultation zones to address the landfill gas hazard issues.

7.5.11 Land Contamination Assessment

RCD-Released Site

The existing land uses of RCD-released sites may give rise to land contamination. Such land uses include sewage treatment and refuse transfer works. The historical land uses shall be reviewed to identify any potentially contaminated sites at the RCD-released sites. Site investigation including soil sampling and laboratory testing shall be conducted if necessary. Subject to the investigation, soil remediation may be required before any further developments.

RCD-Receiving Site

Caverns are constructed within rock layer and hence the possibility of soil contamination is unlikely subject to assessment of each receiving site. Any issues on contamination materials for cavern construction would only limited to the construction of the portals and other associated above ground infrastructures such as access roads using cut-&-cover method on potential contaminated hotspot sites.

7.5.12 Air Quality and Noise Issues inside Rock Cavern

Air quality inside rock cavern is another concern for the RCD-receiving sites due to the accumulation of explosive gas (if the site is used as STW), radon gas, and emission of foul air (if the site is used as STW, refuse transfer station, etc). Ventilation system of the cavern will be well designed to maintain better air quality inside cavern.

There may be noise issues if there are pollution uses and sensitive uses under different ownerships/tenancies coexisted adjacent to each other inside the same caverns. Proper mitigation measures are required to address the potential noise issues for the circumstances of multiple land uses developed inside the same caverns.

7.6 Traffic Impact Assessment

The main characteristic of the existing traffic conditions in the vicinity of the RCD-released site were described such as the existing road network, locality and accessibility, existing traffic condition and public transport facilities.

The area of influence adopted for each study area was site specific, and the assessment mainly covered the major road networks at this stage of the Study. It is assumed that the full population intake will be in year 2021. The traffic forecast and future traffic condition in 2021 are estimated based on proposed land use with reference to the in-house developed traffic model and the traffic impact imposed on the nearest major junction. The assessment results for each RCD-released site are presented in the respective BTA sheet.

The internal & public transport facilities and pedestrian circulation design criteria prescribed in the Building Ordinance, Cap 123 and Building (Private Streets and Access Roads) Regulations were also listed and recommended.

7.7 Civil Works

The infrastructure requirements for RCD include the followings:

- Drainage
- Sewage

- Water supplies and Utilities

Depending on the RCD-receiving facility to be located within the cavern, the requirements listed above will vary significantly. Key end user requirements are considered on a site by site basis and ensure the end use recommendations are feasible. For water supplies and utilities, the connection to the existing distribution network is recommended.

7.8 Sustainability Assessment

The nature of this project requires sustainability to be of the highest consideration in all aspects of this assessment. As such, the sustainability assessment was integrated into each disciplines individual input, which continues to be an ongoing process.

Although no standalone CASET analysis has been provided with the BTAs for each site, the analysis has been implemented through the site selection criteria and guiding principles of the assessments of each site.

7.9 Implementation, Construction and Costing

7.9.1 Implementation

The implementation programme for each site is site specific with different constraints and considerations. The general implementation strategy is to seek approval from EPD/ DSD/ WSD or other relevant government departments as well as all relevant stakeholders relating to the relocation of facilities to a cavern development. Detailed study on feasibility of cavern development with a site specific ground investigation is also recommended.

7.9.2 Construction Method

The most appropriate and cost-effective construction method and the sequence of works are suggested for each RCD-receiving site. The ground condition and constraints of the sites are taking into consideration.

7.9.3 Costing

Cost estimation consists of four main costs, capital works cost, engineering and infrastructure works cost, housing development cost and recurrent expenditure by using ‘Estimating Using Risk Analysis (ERS)’ approach.

The cost of construction of a Rock Cavern facility is generally higher when compared to above-ground facilities. However, the cost of the RCD-released site should be considered as the land value could exceed the cost difference. Any potential RCD development should take this into consideration when comparing costs.

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. The detailed feasibility of any of these sites will need to eventually go through separate feasibility study, statutory processes including EIAO (underground rock caverns are Designated Projects under the EIAO), TPO, etc. and public consultation.

A qualitative review of the sites was undertaken which summarise the potential constraints and issues for each site. Mitigation measures are also suggested.

With reference to the feedback from PE1, the shortlisting exercise initially considered the environmental and local community constraints as well as the engineering feasibility associated with each site as these are considered by the public to be the three crucial criteria.

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 adjacent planning/developments.

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.

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

Priority is given to relocation of those NIMBY facilities near urban or developed areas, thus creating synergy with the surrounding areas. It avoids selecting those facilities already with recreational or leisure uses as far as possible. Owing to technical constraints or unavailability of suitable cavern sites, the feasibility of relocating some large facilitates such as water treatment works should be subject to further studies.

8.2 Summary of Qualitative Review for Longlisted Sites

The following section provides a qualitative description of each of the longlisted sites, summarising the potential constraints and issues with reference to PE1 and Broad Technical Assessments undertaken for each site.

8.2.1 Beacon Hill Intermediate Level Fresh Water Service Reservoir

RCD-released site:

- An area of 15,970m^2 with the potential for residential development when combined with the adjacent salt water reservoir and WSD workshop. The reservoir is proposed to be relocated north of the RCD-released site.

- WSD advises that this reservoir can be considered for relocation to within a cavern.
- There is the potential to combine this site with the adjacent WSD workshop.
- The WSD workshop currently is used by up to 1,000 workers and the relocation of this facility would require a suitable replacement site.
- The RCD-released site is accessible only from the eastbound traffic on Lung Cheung road however turnaround locations are located on either side of the site access.
- Impacts of road traffic noise and vehicular emissions are the key potential environmental concerns. Detailed and appropriate mitigation works should be assessed and recommended in future study.

RCD-receiving site:

- The receiving site is located in the general area of the east Rail tunnel and the old railway tunnel. This includes a gas main that runs through the old tunnel, however the clear distant is around 100m and no major impact is anticipated.
- The receiving site is located within Lion Rock Country Park but the cavern site should not have any impact on the surface.

8.2.2 Tsing Yi Preliminary Treatment Works

RCD-released site:

- The RCD-released site will provide an area of 24,460m^2 with the potential for residential development when combined with the adjacent site, subject to the on-going container port development and satisfactory resolution of the environmental and traffic impacts caused by the logistics and port uses in the surrounding areas. The preliminary treatment works is proposed to be relocated west of the RCD-released site.
- The RCD-released site is likely to be contaminated ground on the site due to the heavy industrial use and the potentially polluting activities of the sewage treatment works on the RCD-released site.
- The RCD-released site is close to CT9 and Kwai Tsing Bridge. This will provide noise and light pollution.
- The residents in adjacent areas will likely have strong objections to any new development as traffic and public transport is already very congested.
- There are three logistic centres proposed in the area which will have a heavy traffic impact on the area and potentially impact any future residents.
- The HATS dropshaft that is on the RCD-released site will have to be maintained.
- Impacts of road traffic noise and vehicular emission from Tsing Yi Road and Tsing Yi Interchange are the key potential environmental concerns. Another concern is the fixed operational noise from the nearby Container Terminal 9 (CT9). Detailed and appropriate mitigation works should be assessed and recommended in future study.
- The pollutant dispersion efficiency would be affected due to the relocated sewage outfall discharge of the relocated preliminary treatment works. Therefore, potential water quality impact is anticipated.

RCD-receiving site:

- The RCD–Receiving Site encroaches upon the modified watercourses. The potential water quality impacts caused by groundwater contamination during rock cavern formation should be assessed and mitigated if it is located inside contaminated lands.

8.2.3 Tai Po Sewage Treatment Works

RCD-released site:

- The RCD-released site will provide an area of 131,944m^2 with the potential for a high technology enterprise. The sewage treatment works is proposed to be relocated to a cavern to the north of the RCD-released site.
- The RCD-released site is located within the 250m Consultation Zone of the restored Shuen Wan Landfill and within the 1,000m Consultation Zone of Potentially Hazardous Installation, Tai Po Gas Production Plant with potential landfill gas and hazard to life issues. The ground at the released site may be contaminated and remediation may have to take place prior to a new development.
- The pollutant dispersion efficiency would be affected due to the relocated sewage outfall discharge of the relocated sewage treatment works. Therefore, potential water quality impact is anticipated.

RCD-receiving site:

- Due to the large volume of sewage there may be an odour issue at the ventilation shaft location.
- The ventilation shaft may impact local villages and graves.

8.2.4 Sai Kung Sewage Treatment Works

RCD-released site:

- The RCD-released site will provide an area of 41,460m^2 with the potential for residential and GIC facilities development when combined with the adjacent marine police HQ and industrial areas. The sewage treatment works is proposed to be relocated west of the RCD-released site.
- The site is located close to village houses which could cause potential objection to a new development
- The adjacent helipad of the Marine Police Headquarters will pose severe development constraints due to potential helicopter noise impact. The noise impact would affect the proposed residential and other sensitive uses on the RCD-released site, and thus relocation of the marine police headquarter and its helipad for comprehensive planning of the area is recommended.
- The future development would need to consider and address the interface issue with the adjacent industrial land use (vehicular workshop and warehouse). This can likely be resolved by proper planning of the development and road layout.
- The site is accessed by Hiram’s Highway which can become severely congested during the weekend, even prior to the new development.

- Potential land contamination issue for the RCD-released site due to the potentially polluting activities of the sewage treatment works on the RCD-released site.
- The pollutant dispersion efficiency would be affected due to the reclamation option and relocated sewage outfall discharge of the relocated sewage treatment works. Therefore, potential water quality impact is anticipated.
- There is an opportunity to combine the site with minor reclamation as part of the proposed relocation of the breakwater. This opportunity would enhance the synergy of the proposed development and provide additional waterfront open space for public enjoyment. The reclamation option will also provide additional anchorage spots, which would help satisfy local demand.

RCD-receiving site:

- The receiving site is encroached upon the Ma On Shan Country Park and Tsiu Hang Special Area. Ecological impact on these ecological sensitive area is anticipated.

8.2.5 Sha Tin Transfer Station

RCD-released site:

- As the site is located adjacent to CICTA training facility, the released site will provide an area of 13,840m^2 with the potential for a GI/C or Community Use (Tertiary Education or Vocational Training Facility). The refuse transfer station is proposed to be relocated north-east of the RCD-released site.
- If the CICTA training facility can be relocated then there is an opportunity for a residential development of 21,287m^2.
- Under a study for new columbaria, there is a potential new columbarium that could be developed adjacent to the site. This would have a negative impact on any future development as it would present a compatibility issue.
- The proximity of Tate's Cairn Highway may have traffic noise and air impact on the proposed development.
- A proposed columbarium in the vicinity of the site is being explored by the government. There may be potential odour / air quality problem which needs to be assessed in future study if the columbarium is confirmed to be built.
- The future development would need to consider and address the interface issue with adjacent industrial zone (Construction Industry Council Training Academy) if the future development is for residential or sensitive use.
- Potential land contamination issue for the RCD-released site due to the potentially polluting activities of the refuse transfer station on the RCD-released site.
- The pollutant dispersion efficiency would be affected due to the relocated sewage outfall discharge of the relocated refuse transfer station. Therefore, potential water quality impact is anticipated.

RCD-receiving site:

- The main access is from On Hing Lane, which would have to be shared with the trucks transporting waste to the relocated refuse transfer facility.Potential adverse traffic conditions as the access at On Hing Lane is used by trucks.

8.2.6 Sham Tseng Sewage Treatment Works

RCD-released site:

- The RCD-released site will provide an area of 10,964m^2 with the potential for residential and GIC facilities development. The sewage treatment works is proposed to be relocated east of the RCD-released site.
- The residential developments in the surrounding are subject to building height restrictions under the OZP, hence the proposed development should be compatible with the building profile of the locality.
- The site is adjacent to Garden Bakery. Future planning of the development should address and mitigate the impact of odour generated.
- A pumping station and screening station may have to be maintained on the released site and will need to be considered in the design.
- There may be impact of road traffic noise from Castle Peak Road, which can likely be mitigated by appropriate measures given the presence of various existing residential development to the west of the facilities built along Castle Peak Road. Nevertheless, this need to be assessed in detailed in future study.
- There exist some industrial uses (Garden Co. Ltd.) to the west of the facilities which may have interface issue between industrial and residential uses and also noise impact due to fixed plant noise from electricity sub-station nearby. This can likely be mitigated by appropriate measures given the presence of various existing residential development next to this industry uses. Nevertheless, this need to be assessed in detailed in future study.
- The air quality impact associated with the marine emission would need to be assessed in detailed in the future study. This is unlikely to be a problem given the presence of various existing residential development to the west which share the same concern. Nevertheless, this need to be assessed in detailed in future study.
- Road traffic noise and vehicular emission from Castle Peak Road and Tuen Mun Road for the RCD-released site is anticipated.
- Potential land contamination issue for the RCD-released site due to the potentially polluting activities of the sewage treatment works on the RCD-released site.
- The pollutant dispersion efficiency would be affected due to the relocated sewage outfall discharge of the relocated sewage treatment works. Therefore, potential water quality impact is anticipated.

RCD-receiving site:

- The receiving site is located within a green belt and close to some village developments.

8.2.7 Siu Ho Wan Sewage Treatment Works

RCD-released site:

- The RCD-released site will provide an area of 141,560m^2 with the potential for residential development. The sewage treatment works is proposed to be relocated south-west of the RCD-released site.

- A proposed organic waste treatment facility is proposed for a site adjacent to the RCD-released site.
- Cheung Tung Road is the only access to the site and is located 6km from the nearest interchange to North Lantau Highway.
- Road traffic noise and vehicular emission from Trunk Road – North Lantau Highway is anticipated.
- The RCD-released site is located close to various NIMBY/industrial facilities, such as Siu Ho Wan Water Treatment Works, different waste facilities, various bus depots, etc., North Lantau Highway, Airport Express & Tung Chung Line. Different land use interface issues with these adjacent NIMBY/industrial facilities, road and railway noise sources are anticipated.
- Potential land contamination issue for the RCD-released site due to the potentially polluting activities of the sewage treatment works on the RCD-released site.
- The pollutant dispersion efficiency would be affected due to the relocated sewage outfall discharge of the relocated sewage treatment works. Therefore, potential water quality impact is anticipated.

RCD-receiving site:

- The RCD-receiving site is within the PHI consultation zone of Siu Ho Wan Water Treatment Works. This could severely impact any proposed development.
- The ventilation shaft will be located in a remote area and access would have to be provided.

8.2.8 Tuen Mun North Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 14,863m^2 with the potential for residential development. The reservoir is proposed to be relocated west of the RCD-released site.
- The area is close to many graves and a designated burial area. This could have a large negative impact on any future development.
- The extents of the PLA military firing range is close to the site.
- The access road is a single lane road with takeover bays. This road would have to be upgraded.
- The nearby villagers would likely object to any development.
- Located in a remote area with poor accessibility.

8.2.9 Diamond Hill No. 2 Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 14,131m^2 with the potential for residential development. The reservoir is proposed to be relocated east of the RCD-released site.

- The site is close to Tate's Cairn tunnel. The development will have to ensure there is no adverse impact to this tunnel.
- The site is close to a columbarium and cemetery. There will likely be a large negative impact to any future residents.
- Traffic noise and vehicular emission from the district distributor – Po Kong Village Road nearby is anticipated.

RCD-receiving site:

- There is currently no back up service for this reservoir provided by nearby reservoir.

8.2.10 Diamond Hill Salt Water Service Reservoir and Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 29,660m^2 with the potential for residential and GIC facilities development when combined with the adjacent areas. The reservoirs are proposed to be relocated west of the RCD-released site.
- The sports facilities that are currently located on the surface of salt water reservoir will have to be reprovided.
- Future planning of the site should address the concern on ventilation in the area.
- A pumping station may have to be maintained on the released site.
- The future would need to assess in detailed the impact due to chimney emission from nearby hospitals.
- There may be noise impact and vehicular emission from local distributor – Shatin Pass Road. Also, noise impact is anticipated from nearby fixed plant. Detailed and appropriate mitigation works shall be assessed and proposed in the future study.

RCD-receiving site:

- The receiving site is located within a green area but there should not be a significant impact to the area as the facility is located underground.
- Potential ecological impact as the RCD-receiving site falls on the Lion Rock Country Park.

8.2.11 Tsuen Wan West Low Level Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 15,700m^2 with the potential for residential development when combined with the adjacent salt water reservoir and pump house. The reservoir is proposed to be relocated south-east of the RCD-released site.
- The site is adjacent to some graves. This may give rise to local objection to a new development.

- The nearby Kwong Pan Tin village may have significant objection to a new development.

8.2.12 Eastern No. 2 Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 26,108m^2 with the potential for residential development. The reservoir is proposed to be relocated south of the RCD-released site.
- WSD have strong objections to the relocation of this site as there is no alternative supply to the service area.
- The site is located adjacent to Eastern Water Treatment Works which uses Chlorine treatment and may provide a potential hazard to future residents.
- The site is leased to LCSD as a running track and sitting out area. Development of the site would have to reprovide these facilities which may limit the development opportunities.
- Access to the site is via Stubbs Road which can become congested during the peak hours.
- It is anticipated that there would be strong local objection to any development of this site.
- Traffic noise and vehicular emission from district distributor – Wong Nai Chung Gap Road is anticipated.

RCD-receiving site:

- The relocation of the WTW to a cavern can be considered but the use of chlorine underground will need to fully explored to ensure the safety of the workers and the public.

8.2.13 North West New Territories Refuse Transfer Station

RCD-released site:

- The RCD-released site will provide an area of 10,896m^2 with the potential for residential development. The refuse transfer station is proposed to be relocated to a cavern to the south of the RCD-released site.
- The site is heavily constrained by an overhead power line which crosses over the site. This would have to be relocated prior to any residential development.
- There are many graves in the area that would constrain the receiving site as the portal and adit would have to avoid any adverse impact to the graves.
- Located in a remote area with poor accessibility.
- The trucks transporting the waste would still have to access the relocated transfer station via Shun Tat Street, which would have a negative impact on any future residents.
- Traffic noise and vehicular emission from Yuen Long Highway is anticipated.
- The proximity of Yuen Long highway to the site will provide a noise constraint to any future residents.

- Potential land contamination issue for the RCD-released site due to the potentially polluting activities of the refuse transfer station on the RCD-released site.

8.2.14 Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 24,500m^2 with the potential for residential development when combined with the adjacent area. The reservoir is proposed to be relocated north-west of the RCD-released site.
- WSD have strong objections to the relocation of this site as there is no alternative supply to the service area.
- Lion Rock High level No. 2 Fresh Water Primary Service Reservoir is located at a key area in WSD's trunk transfer from Shatin to Kowloon and Hong Kong island and feeds numerous reservoirs further down the network.
- The site is accessible only from the eastbound traffic on Lung Cheung road as well as being limited by the slip road for Lion Rock tunnel.
- Traffic noise and vehicular emission from Trunk Road – Lung Cheung Road is anticipated.

RCD-receiving site:

- The proposed receiving site is within Lion Rock Country Park and in close proximity to Lion Rock tunnel.

8.2.15 Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Service Reservoir

RCD-released site:

- The combined site of Tsing Yi North Low Level Salt and Fresh Water Reservoirs will provide an area of 14,760m^2 with the potential for residential development. The reservoirs are proposed to be relocated west of the released site.
- The site may have to be relevelled to provide the maximum development opportunity.
- The nearby residents may object to the visual impact from a new development.
- The current access to site is from a single lane access road which will have to be upgraded.
- There are several graves located close to the receiving site.
- Traffic noise and vehicular emission from district distributor – Tsing Yi Road West is anticipated.

RCD-receiving site:

- The proposed receiving site is located to the west of the released site. The access is proposed to be at the released site to allow convenient connection to the existing water network.

8.2.16 Kwu Tung Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 8,736m^2 with the potential for residential development. The reservoir is proposed to be relocated west of the released site.
- The access to the site is by single track road with overtake bays. This road will have to be upgraded for any future development.
- Located in a remote area with poor accessibility

RCD-receiving site:

- The receiving site is located in a green area and close to some graves.

8.2.17 Kennedy Town Fresh Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 6,463m^2 with the potential for residential development. The reservoir is proposed to be relocated south-west of the released site within Mount Davis.
- The site is located uphill to Kwun Lung Lau Estate on Mount Davis.
- The access road will have to be upgraded, although it is constrained by a cemetery and slopes.
- There should be further assessment on traffic impacts in Pok Fu Lam and Kennedy Town areas.
- There may be noise impact from upgraded road and new bridge to nearby sensitive uses. This needs to be assessed in detailed and appropriate mitigation works be proposed in the future study.

RCD-receiving site:

- The only feasible location of the receiving site would be on Mount Davis, the portal is proposed to be located adjacent to the existing site to allow for connection to the existing water networks.

8.2.18 Piper's Hill Salt Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 3,932m^2 with the potential for residential development. The reservoir is proposed to be relocated north-east of the released site.
- WSD advises that this reservoir can be considered for relocation to a cavern.
- There is a potential social impact to the nearby residents of the Caldecott and the adjacent sports ground.
- The site is located close to a Catholic cemetery.
- The site is located within the 1,000m consultation zone of a PHI (Shek Lei Pui Water Treatment Works). Hazard to life is a potential issue, and quantitative hazard assessment is needed.
- The access road is very difficult and steep.

- Potential chimney emission from factory and industrial buildings in Lai Chi Kok, and Caritas Medical Centre is anticipated.

RCD-receiving site:

- The receiving site is relatively far away from the released site and may provide difficulty reconnecting the pipework.

8.2.19 Jordan Valley Salt Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 8,960m^2 with the potential for residential development when combined with the adjacent site offices and water tanks. The reservoir is proposed to be relocated south of the released site.
- The site is located adjacent to the restored Jordan Valley landfill. There is potential for harmful gas and leachate to impact future residents. For development falling within the 250 Consultation Zone of a restored landfill, a landfill gas hazard assessment should be carried out to assess and address landfill gas hazard issue.
- The area is isolated as it is located in a valley.
- The access road will have to be upgraded.

RCD-receiving site

- The proposed receiving site is located immediately south of the existing reservoir and therefore reservoirs level could be maintained.

8.2.20 Shau Kei Wan East High Level Salt Water Service Reservoir

RCD-released site:

- The RCD-released site will provide an area of 3,700m^2 with the potential for residential development when combined with the adjacent fresh water service reservoir. The reservoir is proposed to be relocated south-west of the released site.
- There are overhead power cables above the released site which provide a significant constraint on any development. The cables would likely have to be relocated or redirected to allow any development.
- The existing access road will have to be upgraded.
- The development of the combined site could require a relevelling of the whole area which may provide a significant amount of spoil
- The site is small and may not be cost-effective for rock cavern development. However there is an opportunity to combine with the adjacent industrial area to enhance the cost effectiveness.

RCD-receiving site:

- The receiving site is located in a green area and there may be damage to vegetation.

8.3 Summary of Site Shortlisting

Based upon the site shortlisting exercise, three Rock Cavern Development sites are shortlisted and their key issues and opportunities are briefly discussed below:

1. **Sai Kung Sewage Treatment Works**: approximately 41,460m^2 of land could be redeveloped for residential development. The potential development must be sympathetic to its surrounding land use and its building height should be compatible with surrounding development. An extension of the existing waterfront promenade will enhance public accessibility to the waterfront and promote a coherent open space framework along the waterfront. An option for this development is to combine the relocation of facility with a proposed reclamation and breakwater relocation. The relocation of the breakwater would allow additional anchorage spots within the Marina, which would help satisfy local demand. The additional land from reclamation would be combined with the development to enhance the synergy of the development as well as providing additional waterfront space. However, the adjacent helipad of the Marine Police Headquarters will pose severe development constraint due to potential helicopter noise impact. The noise impact would affect the proposed residential and other sensitive uses on the RCD-released site, and thus relocation of the marine police headquarters and its helipad for comprehensive planning of the area is recommended. Also, the future development would need to consider and address the interface issue with the adjacent industrial land use (vehicular workshop and warehouse). This can likely be resolved by suitable mitigation measures including site planning and exploring relocation of industrial uses. Potential land contamination issue for the RCD-released site due to the polluting activities of the sewage treatment works on the RCD-released site is anticipated. Also, the pollutant dispersion efficiency would be affected due to the reclamation option and relocated sewage outfall discharge of the relocated sewage treatment works. Therefore, potential water quality impact is anticipated. Ecological impact on the RCD-receiving site is anticipated since the receiving site is encroached upon the Ma On Shan Country Park and Tsui Hang Special Area.

2. **Sham Tseng Sewage Treatment Works:** the sewage treatment works is proposed to be relocated east of the released site. The RCD-released site will provide an area of 10,964m^2 with the potential for residential development. The residential developments in the surrounding are subject to building height restrictions under the OZP, hence the proposed development should be compatible with the building profile of the locality. There may be impact of road traffic noise and vehicular emission from Castle Peak Road and Tuen Mun Road. Air quality impact associated with the marine emissions would also need to be assessed in future detailed study. Some existing industrial uses (Garden Co. Ltd.) to the west of the facilities which may have interface issue between industrial and residential uses and also noise impact due to fixed plant noise from electricity sub-station nearby. Detailed assessment and mitigation shall be undertaken to alleviate the noise and air impacts. Besides, potential land contamination issue for the RCD-released site due to the potentially polluting activities of the sewage treatment works on the RCD-released site. The pollutant dispersion efficiency would be affected due to the relocated sewage outfall

discharge of the relocated sewage treatment works, potential water quality impact is anticipated. Assessments of these impacts need to be assessed in future detailed study.

3. **Diamond Hill Salt Water Service Reservoir and Fresh Water Service Reservoir:** an area of 29,660m^2 will be released when combined with the adjacent areas. The reservoirs are proposed to be relocated west of the released site with the potential for residential development. There may be noise impact and vehicular emission from nearby traffic roads and fixed plants, detailed and appropriate mitigation works shall be assessed and proposed in the future study. Impact due to chimney emission from nearby hospitals would need to be assessed in the future. Also, the RCD-receiving site falls on the Lion Rock Country Park and detailed assessment of ecological impact on the RCD-receiving site is needed.

These shortlisted sites 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.

Public views on initiatives of rock cavern development was expressed under PE1 and mentioned in the **Section 5**. Key findings from PE2 include:

a) As for the three shortlisted sites for rock cavern development, residential development (in particular medium density housing development), public parks, and recreational or leisure facilities were three possible land use that received the most support. Major concerns about the pilot schemes were mainly related to the environment, transportation and safety.

10 Conclusion

Three rock cavern development sites have been selected under this Study through a site selection process, which include:

a) identification of pre-longlisted sites based on review of previous studies and constraints;

b) selection of 21 longlisted sites from the pre-longlisted sites based on the initial SSC consulted in Stage 1 Public Engagement;

c) broad technical assessments (BTA) for the 21 longlisted sites;

d) site shortlisting to shortlist 3 potential rock cavern development sites from the 21 longlisted sites based on the refined SSC and the findings of BTA for further detailed study;

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

The three shortlisted rock cavern development sites are:

(1) Sai Kung Sewage Treatment Works;

(2) Sham Tseng Sewage Treatment Works;

(3) Diamond Hill Fresh Water and Salt Water Service Reservoirs.

These shortlisted rock cavern development sites were taken forward for consultation in PE2, while the remaining sites may be studied further when opportunities arise in the future.

It is worth to highlight that throughout the site selection process, the Study has identified that all the sites assessed, including the shortlisted sites, possess different environmental and planning issues. It is important that the shortlisted sites are required to go through feasibility studies, statutory processes under the EIAO (underground rock caverns and sewage treatment works as specified in Schedule 2 are Designated Projects under the EIAO), the Town Planning Ordinance, etc. and public consultations in future to confirm their feasibility/acceptability and address different key issues including:

RCD Site	Remarks
Sai Kung Sewage Treatment Works	If the Marine Police East Divisional Headquarters can be relocated, synergy effect can be achieved through combined development. This can be explored further. Issues: Industrial/residential interface problems and helicopter noise; congestion of Hiram's Highway; ecological impact on Ma On Shan Country Park and Tsiu Hang Special Area, land contamination issue; water quality impact for reclamation option and due to relocated sewage outfall discharge. Follow up: Relocation of industrial uses/workshops and helipad for comprehensive development of the RCD-released site with industrial uses/workshops and helipad; traffic impact assessment; ecological impact assessment; land contamination assessment; and water quality impact assessment.

RCD Site	Remarks
Sham Tseng Sewage Treatment Works	Issues: Odour emission from Garden Bakery Factory; industrial/residential interface problems; road traffic noise and vehicular emission from Castle Peak Road and Tuen Mun Road; fixed plant noise impact; air quality impact from marine emission; land contamination issue; water quality impact due to relocated sewage outfall discharge. Follow-up: Air quality, noise impact assessments to address the air quality/odour emission and noise impacts; land contamination assessment; and water quality impact assessment.
Diamond Hill Fresh Water Service Reservoir and Salt Water Service Reservoir	Issues: Chimney emission from hospitals; noise impact from nearby road traffic and fixed plant; vehicular emission; and ecological impact on Lion Rock Country Park. Follow-up: Air quality and noise impact assessments to address the air quality/chimney emission and noise impacts; and ecological impact assessment.

The government may carry out further detailed studies, statutory processes including EIAO, TPO, etc. and public consultations for the shortlisted rock cavern development sites, during which the development parameters, RCD-receiving site locations, mitigation measures, etc. will be developed and further discussed with the public.

Figures

39.	Eastern No. 2 Fresh Water Service Reservoir Outline Zoning Plan
40.	North West New Territories Refuse Transfer Station (NWNTRTS) Cavern Suitability Map
41.	North West New Territories Refuse Transfer Station (NWNTRTS) Ortho Photo
42.	North West New Territories Refuse Transfer Station (NWNTRTS) Outline Zoning Plan
43.	Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Cavern Suitability Map
44.	Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Ortho Photo
45.	Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Outline Zoning Plan
46.	Kwu Tung Fresh Water Service Reservoir Cavern Suitability Map
47.	Kwu Tung Fresh Water Service Reservoir Ortho Photo
48.	Kwu Tung Fresh Water Service Reservoir Outline Zoning Plan
49.	Piper's Hill Salt Water Service Reservoir Cavern Suitability Map
50.	Piper's Hill Salt Water Service Reservoir Ortho Photo
51.	Piper's Hill Salt Water Service Reservoir Outline Zoning Plan
52.	Jordan Valley Salt Water Service Reservoir Cavern Suitability Map
53.	Jordan Valley Salt Water Service Reservoir Ortho Photo
54.	Jordan Valley Salt Water Service Reservoir Outline Zoning Plan
55.	Shau Kei Wan East High Level Salt Water Service Reservoir Cavern Suitability Map
56.	Shau Kei Wan East High Level Salt Water Service Reservoir Ortho Photo
57.	Shau Kei Wan East High Level Salt Water Service Reservoir Outline Zoning Plan
58.	Kennedy Town Fresh Water Service Reservoir Cavern Suitability Map
59.	Kennedy Town Fresh Water Service Reservoir Ortho Photo
60.	Kennedy Town Fresh Water Service Reservoir Outline Zoning Plan

深　圳
SHENZHEN

新　界
NEW TERRITORIES

九　龍
KOWLOON

大　嶼　山
LANTAU ISLAND

香　港
HONG KONG ISLAND

Legend

Pre-longlisted sites

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

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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

Pre-Longlisted Rock Cavern Sites

Scale at A3

1:200,000

Drawing Status

Draft

Job No	Drawing No	Issue
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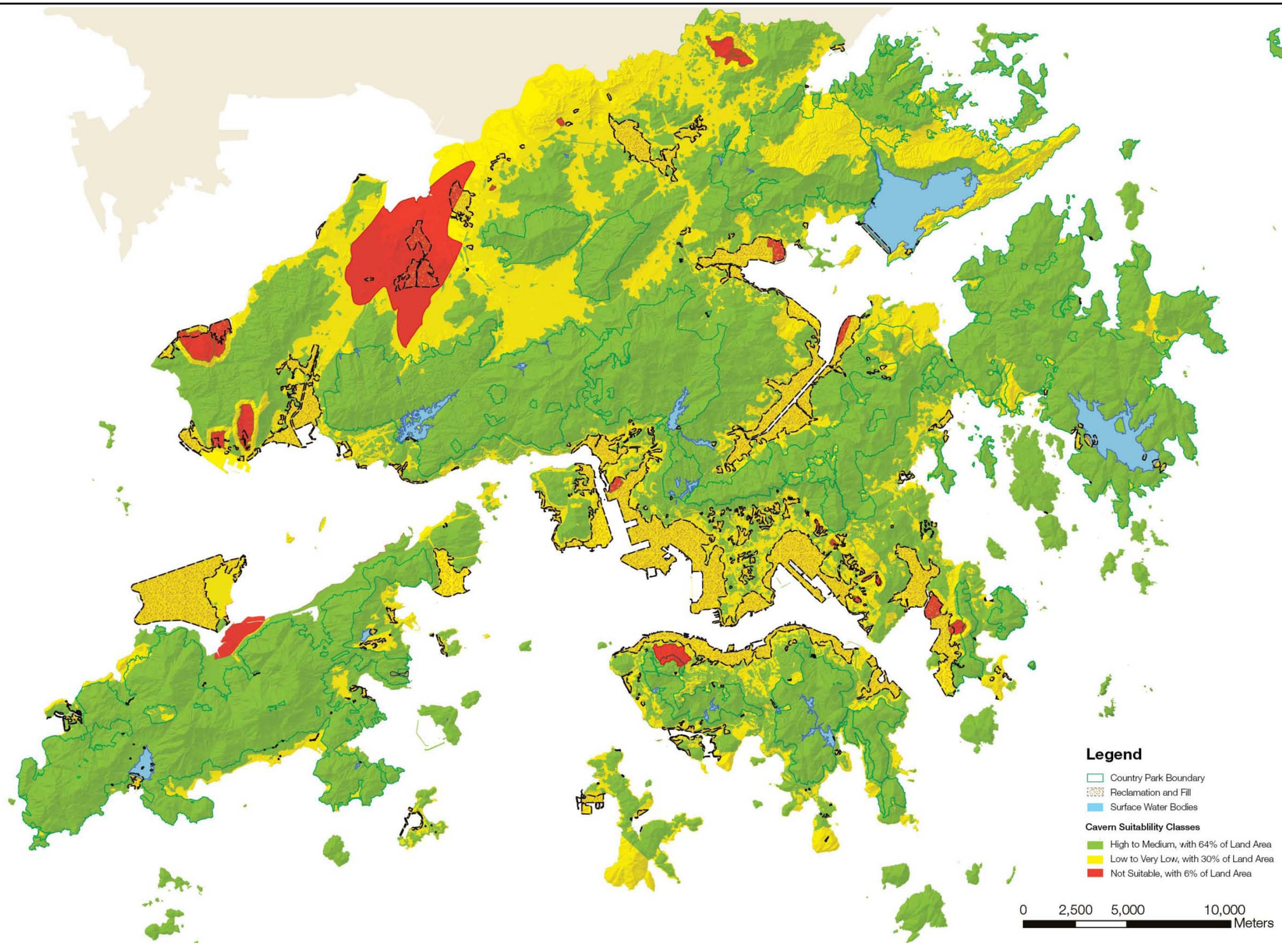

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Metres

ARUP

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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

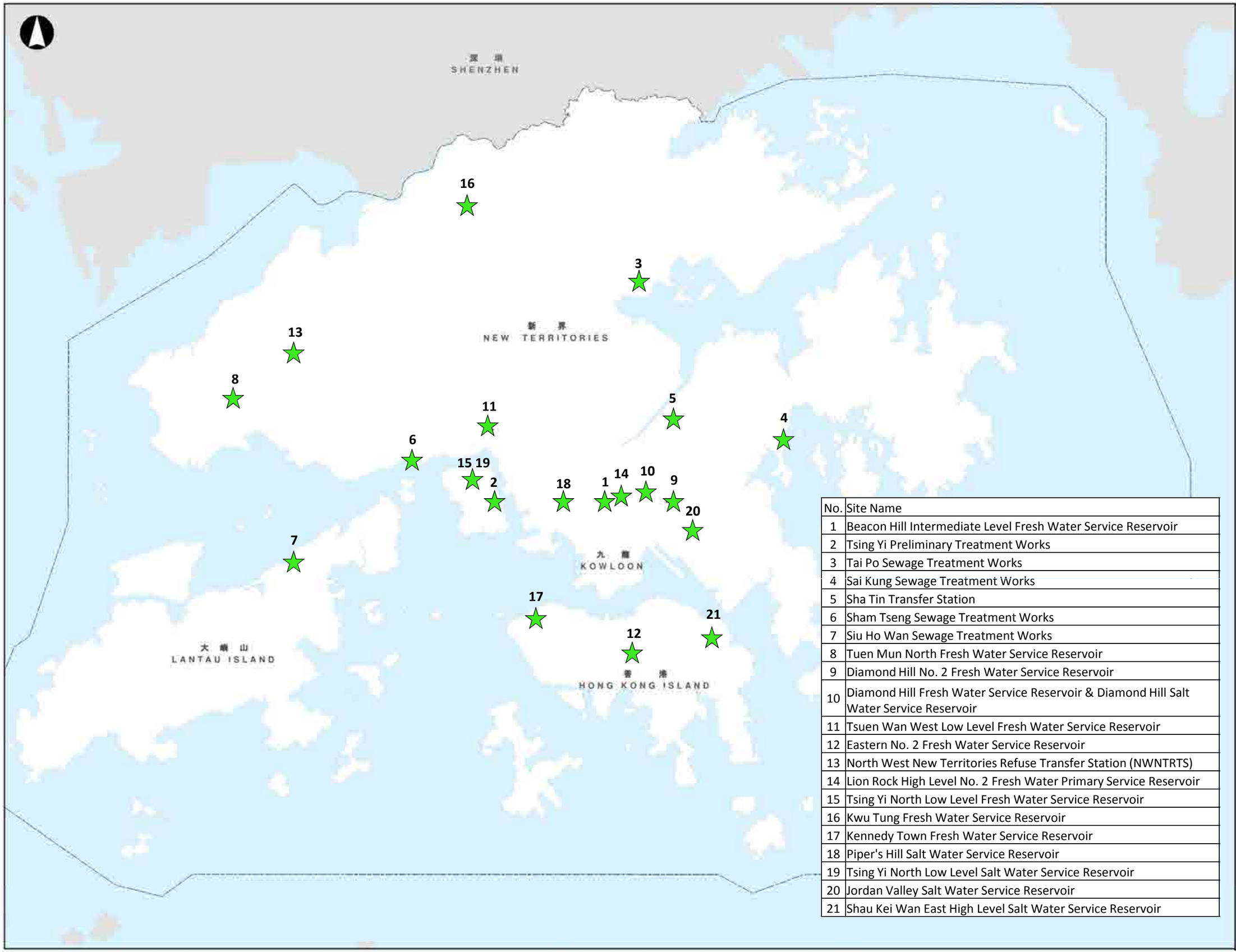
Territory-wide Cavern Suitability Map

Scale at A3

Drawing Status

Draft

Job No	Drawing No	Issue
217499	2	**P1**



No.	Site Name
1	Beacon Hill Intermediate Level Fresh Water Service Reservoir
2	Tsing Yi Preliminary Treatment Works
3	Tai Po Sewage Treatment Works
4	Sai Kung Sewage Treatment Works
5	Sha Tin Transfer Station
6	Sham Tseng Sewage Treatment Works
7	Siu Ho Wan Sewage Treatment Works
8	Tuen Mun North Fresh Water Service Reservoir
9	Diamond Hill No. 2 Fresh Water Service Reservoir
10	Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir
11	Tsuen Wan West Low Level Fresh Water Service Reservoir
12	Eastern No. 2 Fresh Water Service Reservoir
13	North West New Territories Refuse Transfer Station (NWNTRTS)
14	Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir
15	Tsing Yi North Low Level Fresh Water Service Reservoir
16	Kwu Tung Fresh Water Service Reservoir
17	Kennedy Town Fresh Water Service Reservoir
18	Piper's Hill Salt Water Service Reservoir
19	Tsing Yi North Low Level Salt Water Service Reservoir
20	Jordan Valley Salt Water Service Reservoir
21	Shau Kei Wan East High Level Salt Water Service Reservoir

Legend

Longlisted RCD Sites

Metric

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Civil Engineering and Development Department

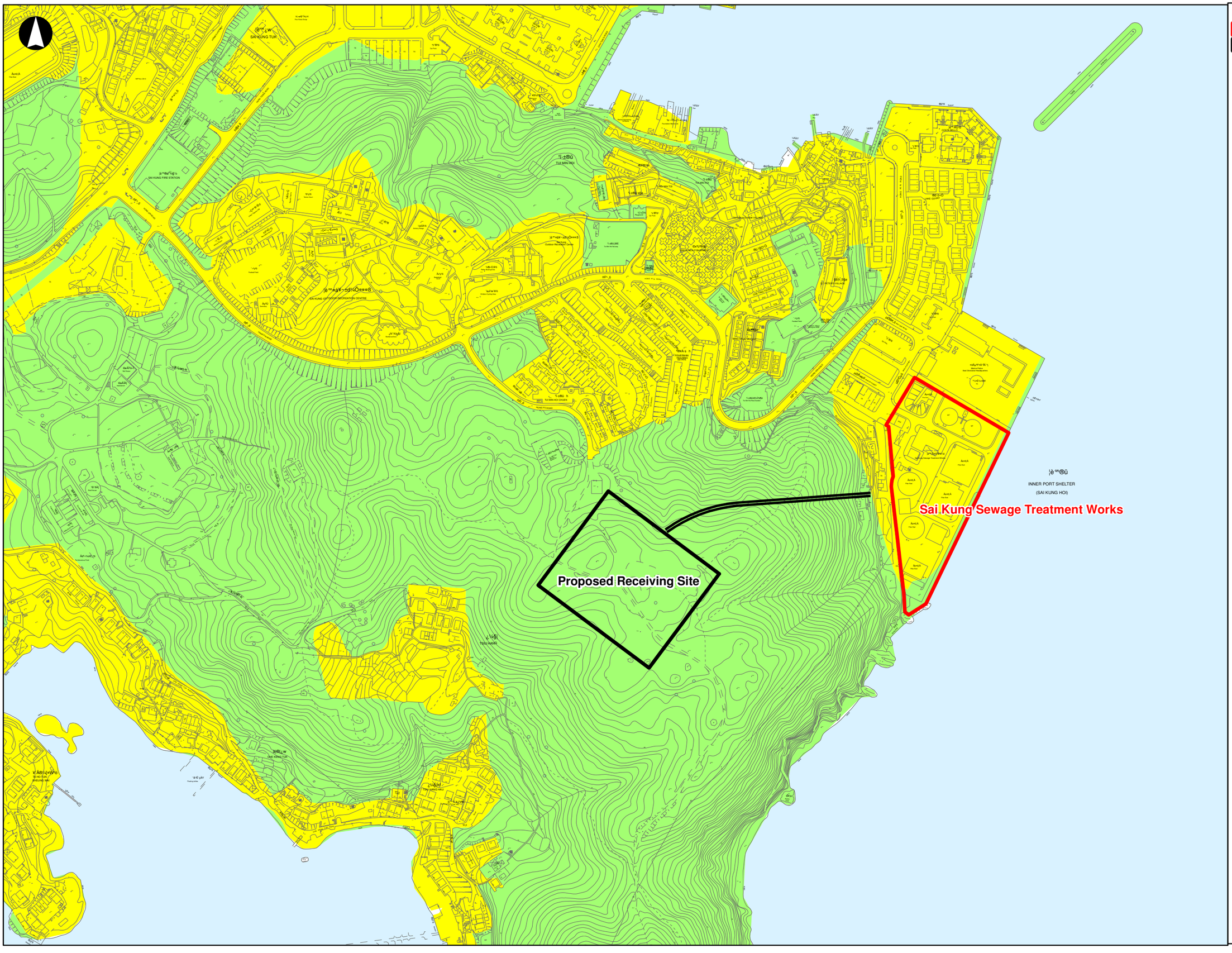
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Recommended Longlisted Sites for Rock Cavern Development

1:200,000

Preliminary

217499 | 3 | P0



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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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

Sai Kung Sewage Treatment Works Cavern Suitability Map

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	4	D1

Proposed Receiving Site

Sai Kung Sewage Treatment Works

INNER PORT SHELTER
(SAI KUNG HOI)

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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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

Sai Kung Sewage Treatment Works Ortho Photo

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	5	D1

Sai Kung Sewage Treatment Works

Proposed Receiving Site

INNER PORT SHELTER
(SAI KUNG HOI)

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

ARUP
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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
Sai Kung Sewage Treatment Works Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
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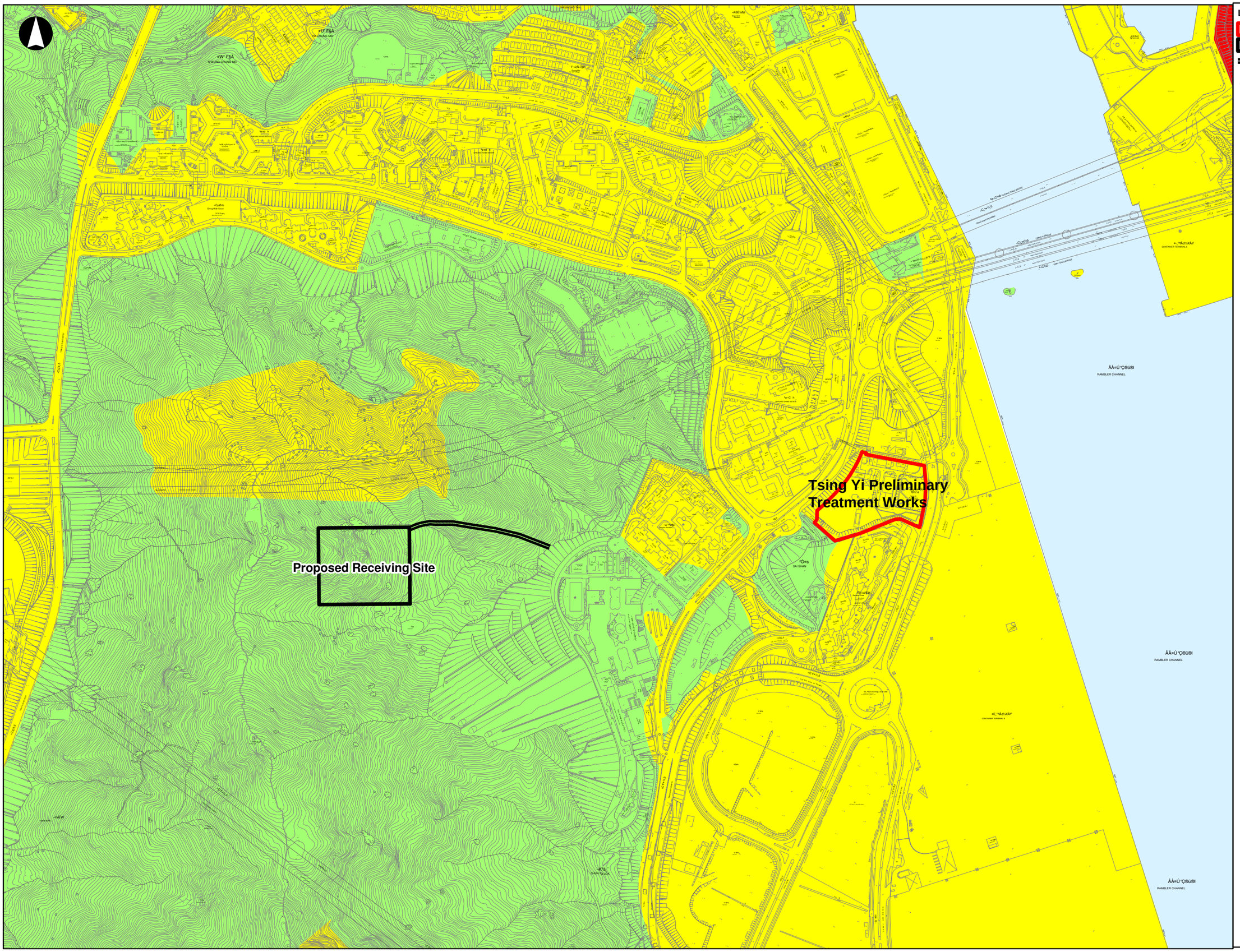

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

ARUP

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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

Tsing Yi Preliminary Treatment Works Cavern Suitability Map

Scale at A3

1:6,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	7	D1

Tsing Yi Preliminary Treatment Works

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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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
Tsing Yi Preliminary Treatment Works Ortho Photo

Scale at A3
1:6,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	8	D1

Tsing Yi Preliminary Treatment Works

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

ARUP
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
Tsing Yi Preliminary Treatment Works
Outline Zoning Plan

Scale at A3
1:6,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	9	D1

Proposed Receiving Site (313)

Proposed Receiving Site (308)

Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir

Beacon Hill Intermediate Level Fresh Water Service Reservoir

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

ARUP
Level 5 Festival Walk
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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

Beacon Hill Intermediate Level Fresh Water Service Reservoir & Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir Cavern Suitability Map

Drawing Status

Draft

Job No	Drawing No	Issue
217499	10	D1

5/7/2012 17:07:24

D1	2012-06-20	JL	WT	MIW
Issue	Date	By	Chkd	Appd

ARUP

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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

Beacon Hill Intermediate Level Fresh Water Service Reservoir & Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir Ortho Photo

Scale at A3

1:4,287

Drawing Status

Draft

Job No	Drawing No	Issue
217499	11	**D1**

C:\Users\jennifer.lee\Documents\217499 Land supply\SiuHoWanWTW.mxd

Proposed Receiving Site (313)

Proposed Receiving Site (308)

Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir

Beacon Hill Intermediate Level Fresh Water Service Reservoir

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Beacon Hill Intermediate Level Fresh Water Service Reservoir & Lion Rock High Level No. 2 Fresh Water Primary Service Reservoir Outline Zoning Plan

Scale at A3
1:4,287

Drawing Status
Draft

Job No.	Drawing No	Issue
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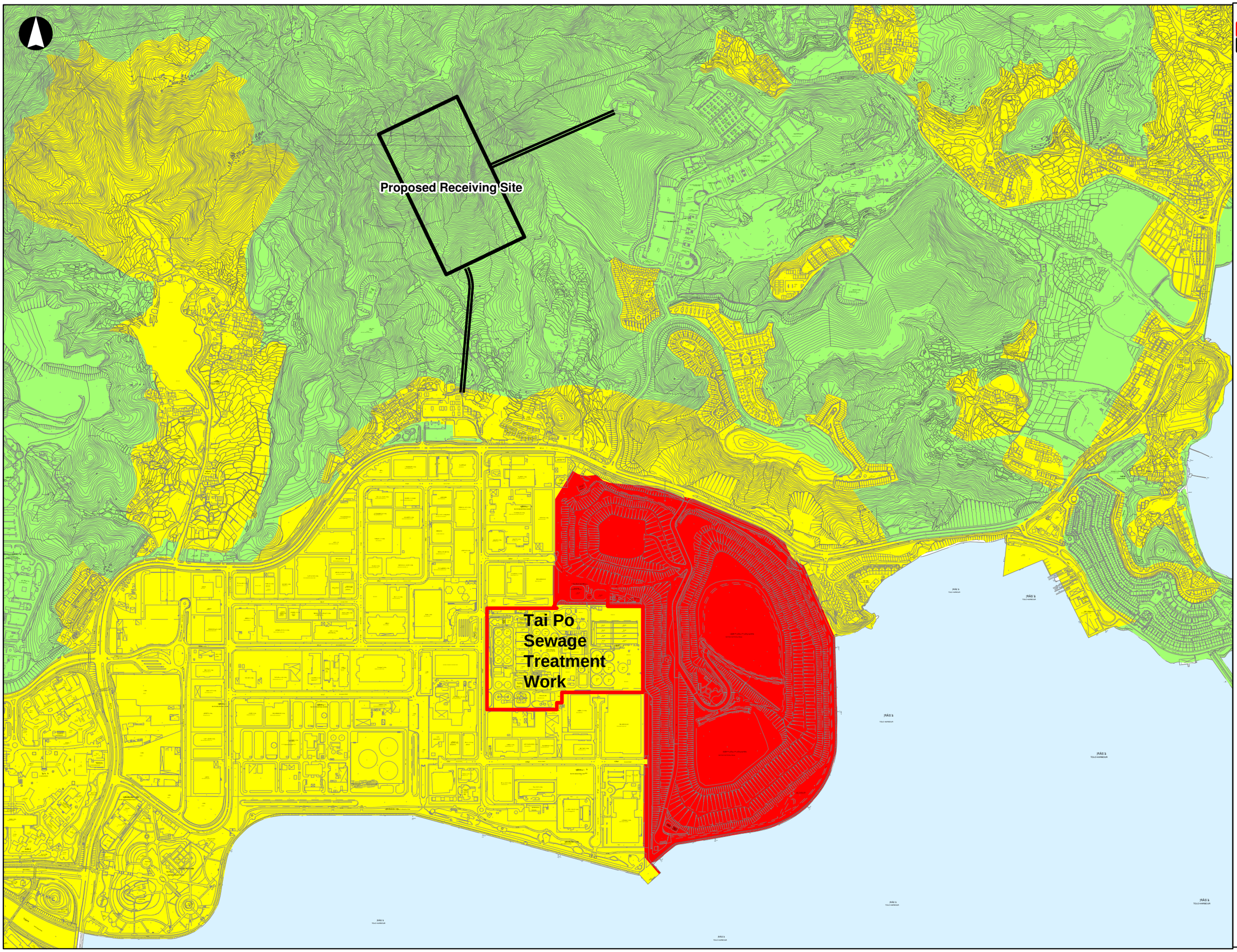

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Tai Po Sewage Treatment Works Cavern Suitability Map

Scale at A3
1:10,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	13	**D1**

Proposed Receiving Site

Tai Po Sewage Treatment Work

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

ARUP
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
Tai Po Sewage Treatment Works Ortho Photo

Scale at A3
1:10,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	14	D1

Proposed Receiving Site

Tai Po Sewage Treatment Work

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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
Tai Po Sewage Treatment Works Outline Zoning Plan

Scale at A3
1:10,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	15	D1

Proposed Receiving Site

Sha Tin Transfer Station

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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

Sha Tin Transfer Station Cavern Suitability Map

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	16	D1

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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

Sha Tin Transfer Station Ortho Photo

Scale at A3

1:4,000

Drawing Status

Draft

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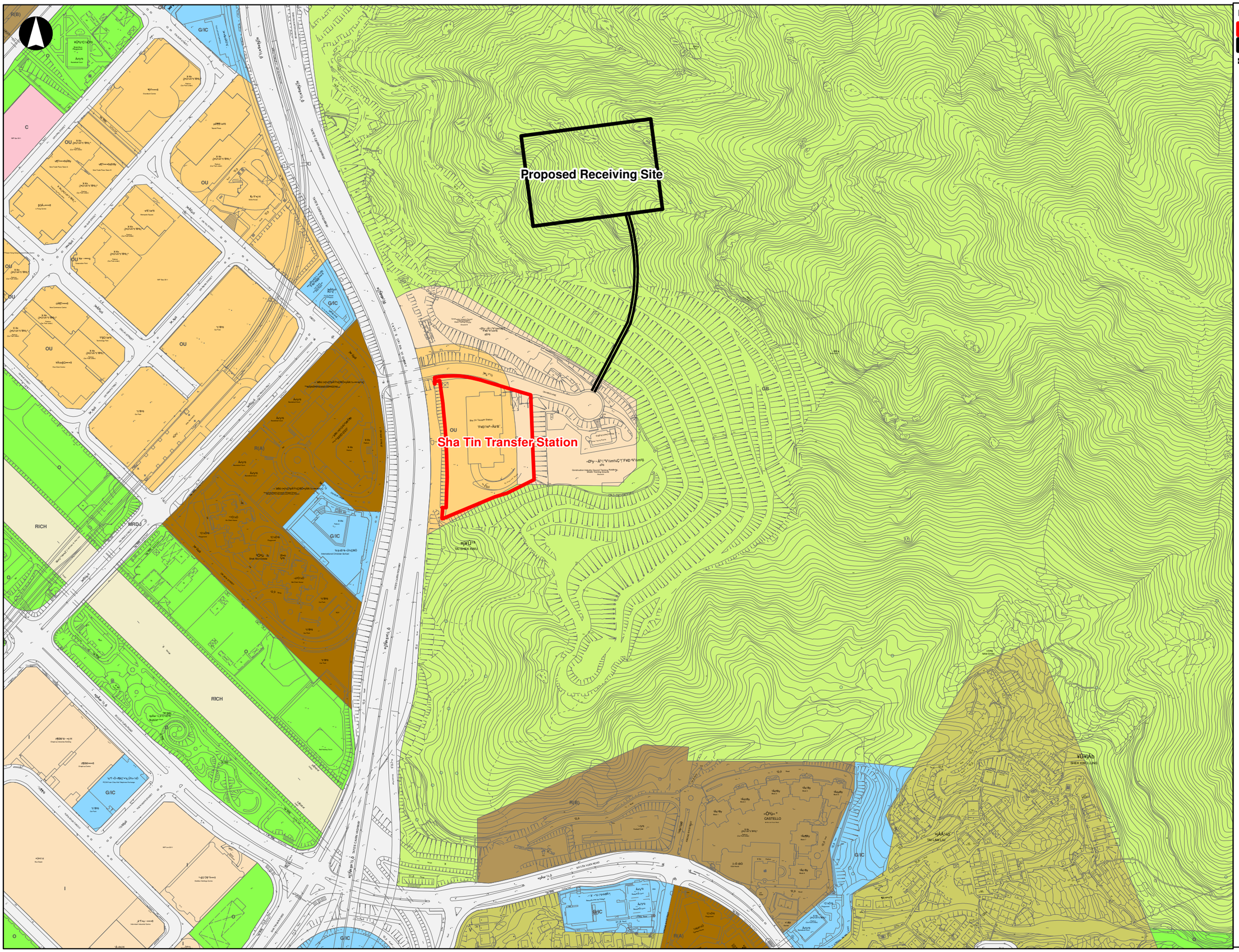


Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Sha Tin Transfer Station Outline Zoning Plan

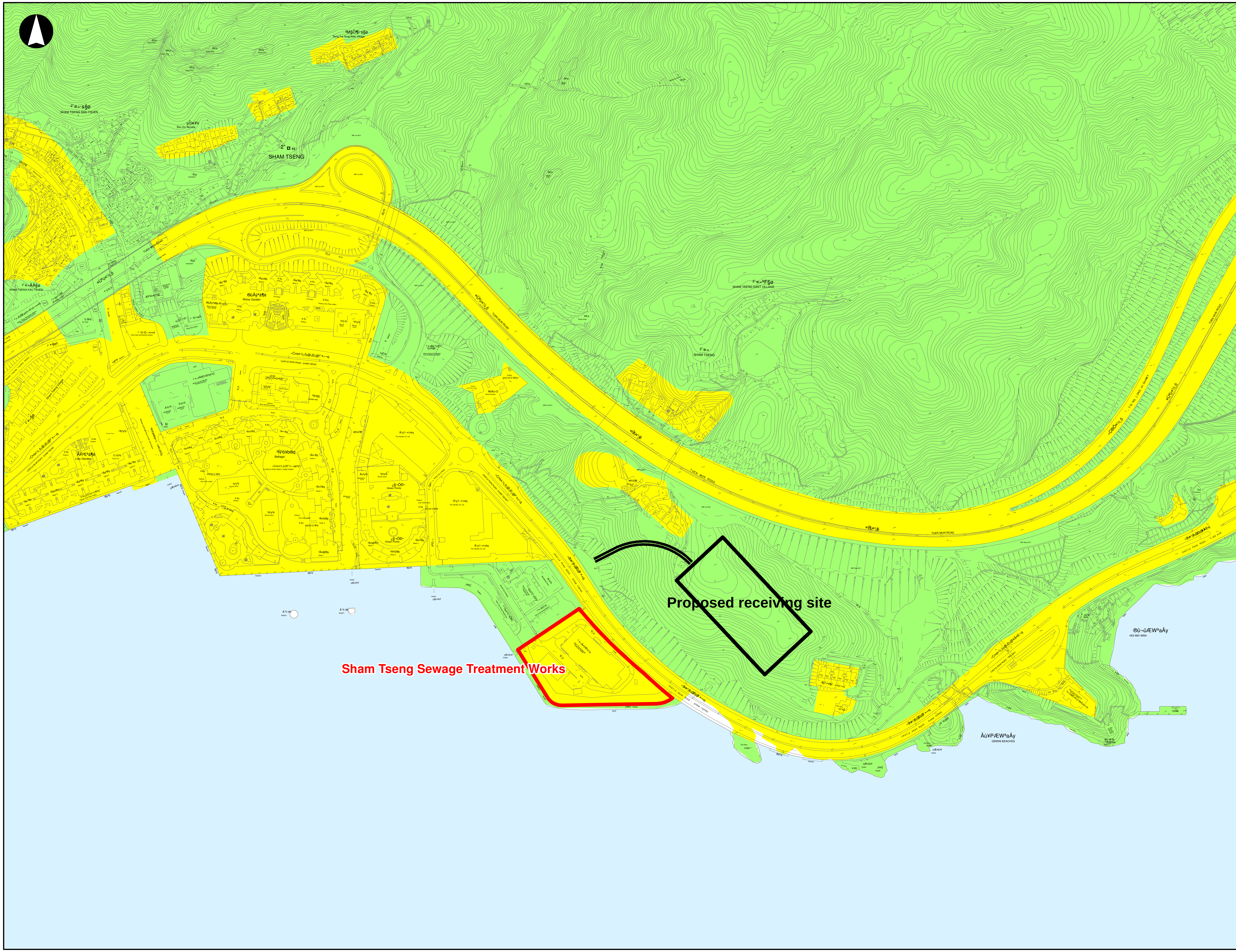
Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	18	D1



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MIW

Meters 0 25 50

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
Sham Tseng Sewage Treatment Works
Cavern Suitability Map

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	19	D1

C:\Users\jennifer.lee\Documents\217499 Land supply\SiuHoWanWTW.mxd

Proposed receiving site

Sham Tseng Sewage Treatment Works

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Sham Tseng Sewage Treatment Works
Ortho Photo

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	20	D1

Proposed receiving site

Sham Tseng Sewage Treatment Works

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Client
Civil Engineering and Development Department

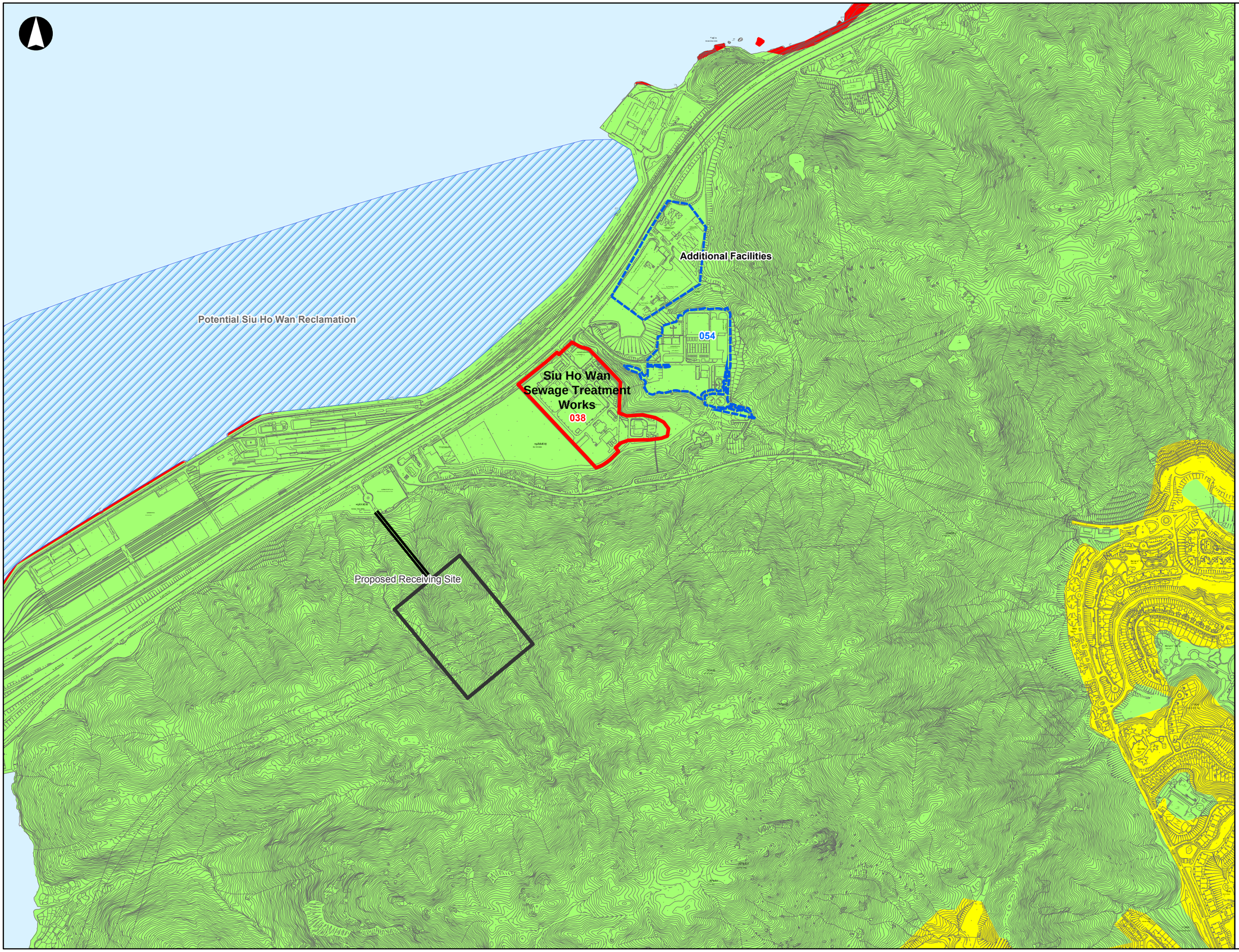
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title
Sham Tseng Sewage Treatment Works
Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	21	D1



Legend

Selected RCD Site

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters
0 25 50 100 150

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
Siu Ho Wan Sewage Treatment Works
Cavern Suitability Map

Scale at A3
1:10,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	22	**P1**

Legend

Selected RCD Site

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters
0 25 50 100 150

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

Siu Ho Wan Sewage Treatment Works
Ortho Photo

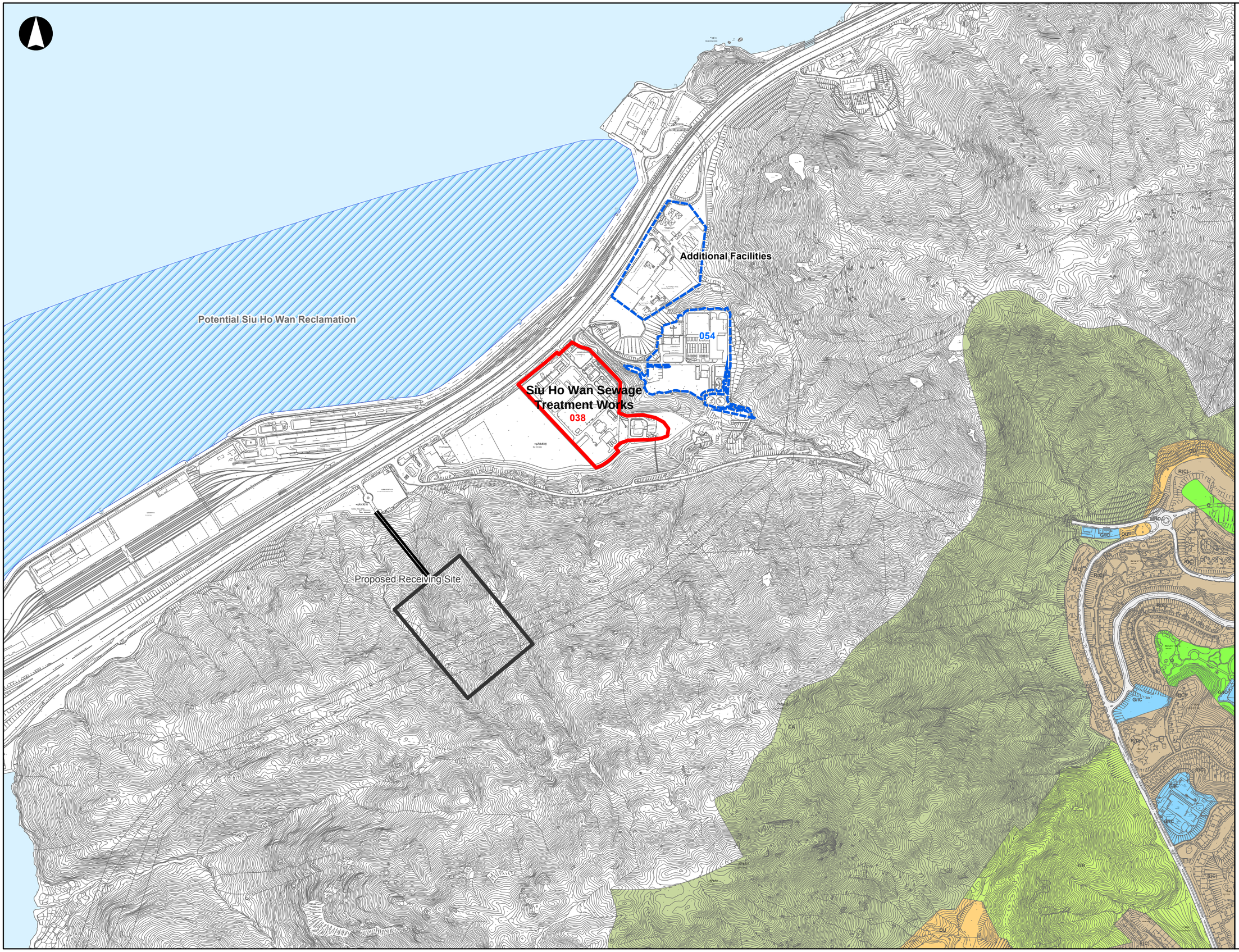
Scale at A3

1:10,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	23	**P1**



Legend

Selected RCD Site

Issue	Date	By	Chkd	Apprd
P1	14-10-11	XX		

Metres
0 25 50 100 150

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
Siu Ho Wan Sewage Treatment Works
Outline Zoning Plan

Scale at A3
1:10,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	24	P1

Tuen Mun North Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Tuen Mun North Fresh Water Service Reservoir Cavern Suitability Map

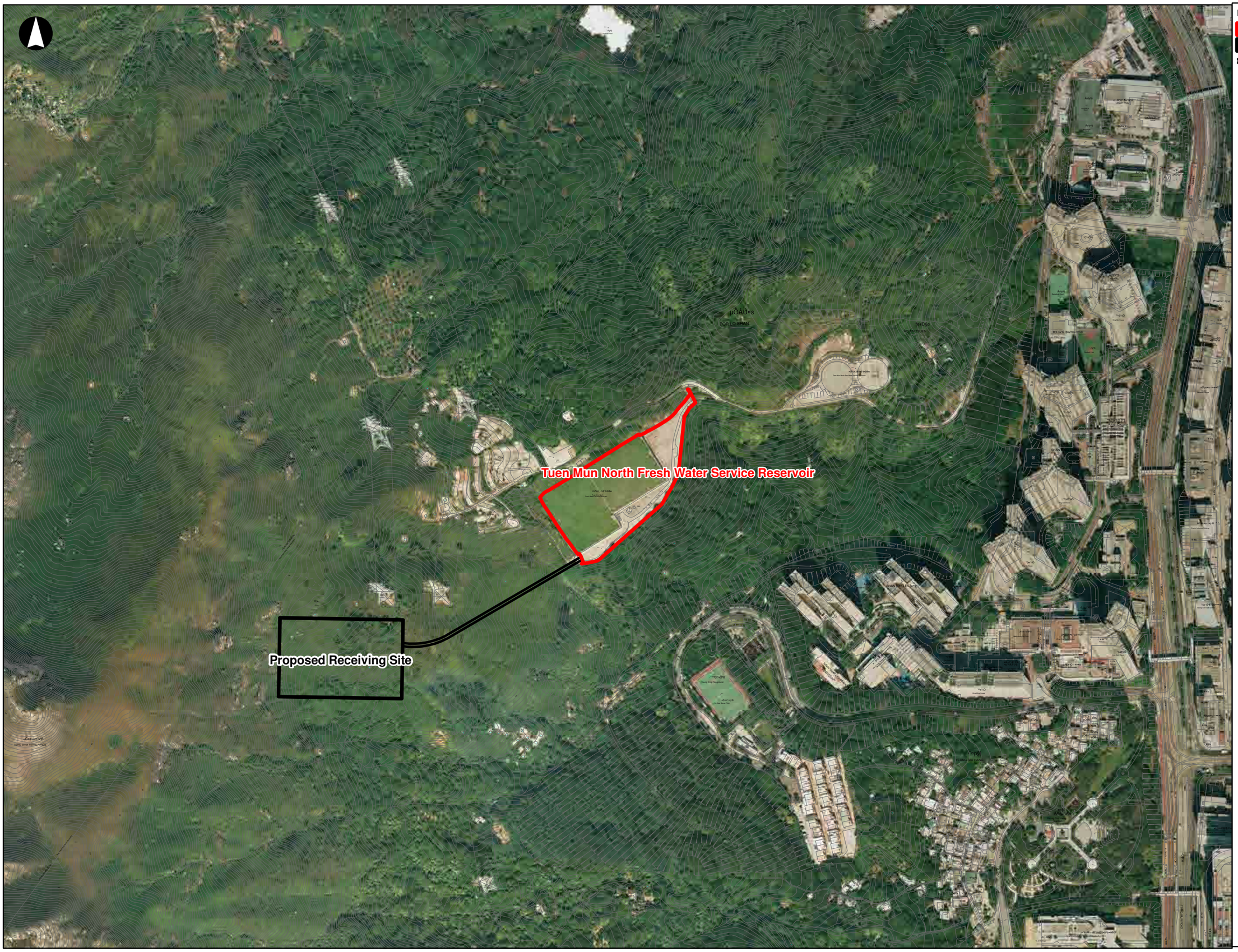
Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	25	D1



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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
Tuen Mun North Fresh Water Service Reservoir Ortho Photo

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	26	**D1**

Tuen Mun North Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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
Tuen Mun North Fresh Water Service Reservoir Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	27	D1

Diamond Hill No. 2 Fresh Water Service Reservoir

Proposed Receiving Site

DIAMOND HILL

DIAMOND HILL URN CEMETERY

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Diamond Hill No. 2 Fresh Water Service Reservoir Cavern Suitability Map

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	28	D1

Diamond Hill

Diamond Hill No. 2 Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Diamond Hill No. 2 Fresh Water Service Reservoir Ortho Photo

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	29	**D1**

Diamond Hill No. 2 Fresh Water Service Reservoir

Proposed Receiving Site

DIAMOND HILL

MRDJ

CDA

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

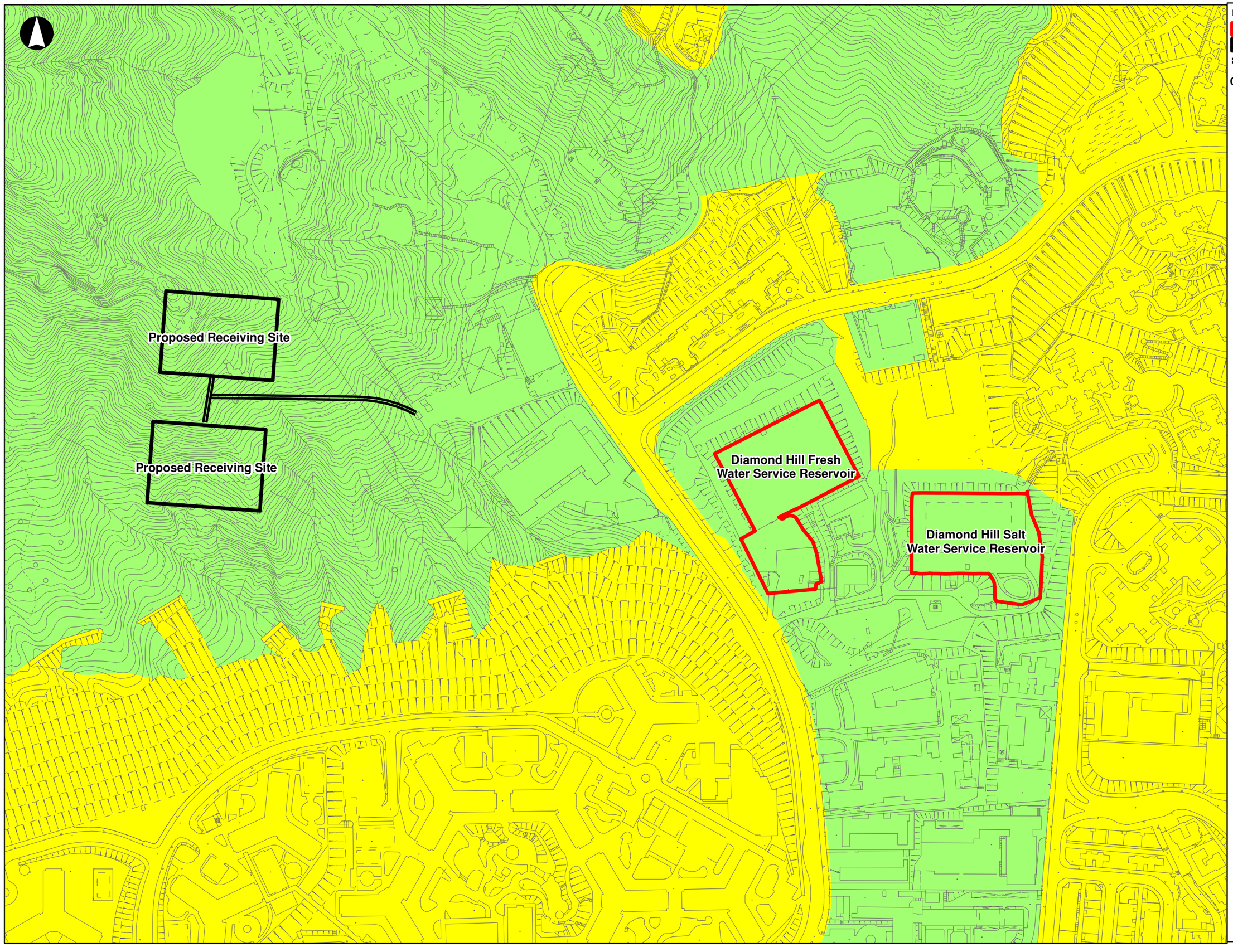
Drawing Title

Diamond Hill No. 2 Fresh Water Service Reservoir Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	30	D1



Legend

- Proposed Released Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir Cavern Suitability Map

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	31	D1

Legend

- Proposed Released Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir Ortho Photo

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	32	**D1**

Proposed Receiving Site

Proposed Receiving Site

Diamond Hill Fresh Water Service Reservoir

Diamond Hill Salt Water Service Reservoir

G/IC

R(A)

O

GB

MRDJ

Legend

- Proposed Released Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Diamond Hill Fresh Water Service Reservoir & Diamond Hill Salt Water Service Reservoir Outline Zoning Plan

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	33	D1

Tsuen Wan West
Low Level Fresh
Water Service
Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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

Tsuen Wan West Low Level Fresh Water Service Reservoir Cavern Suitability Map

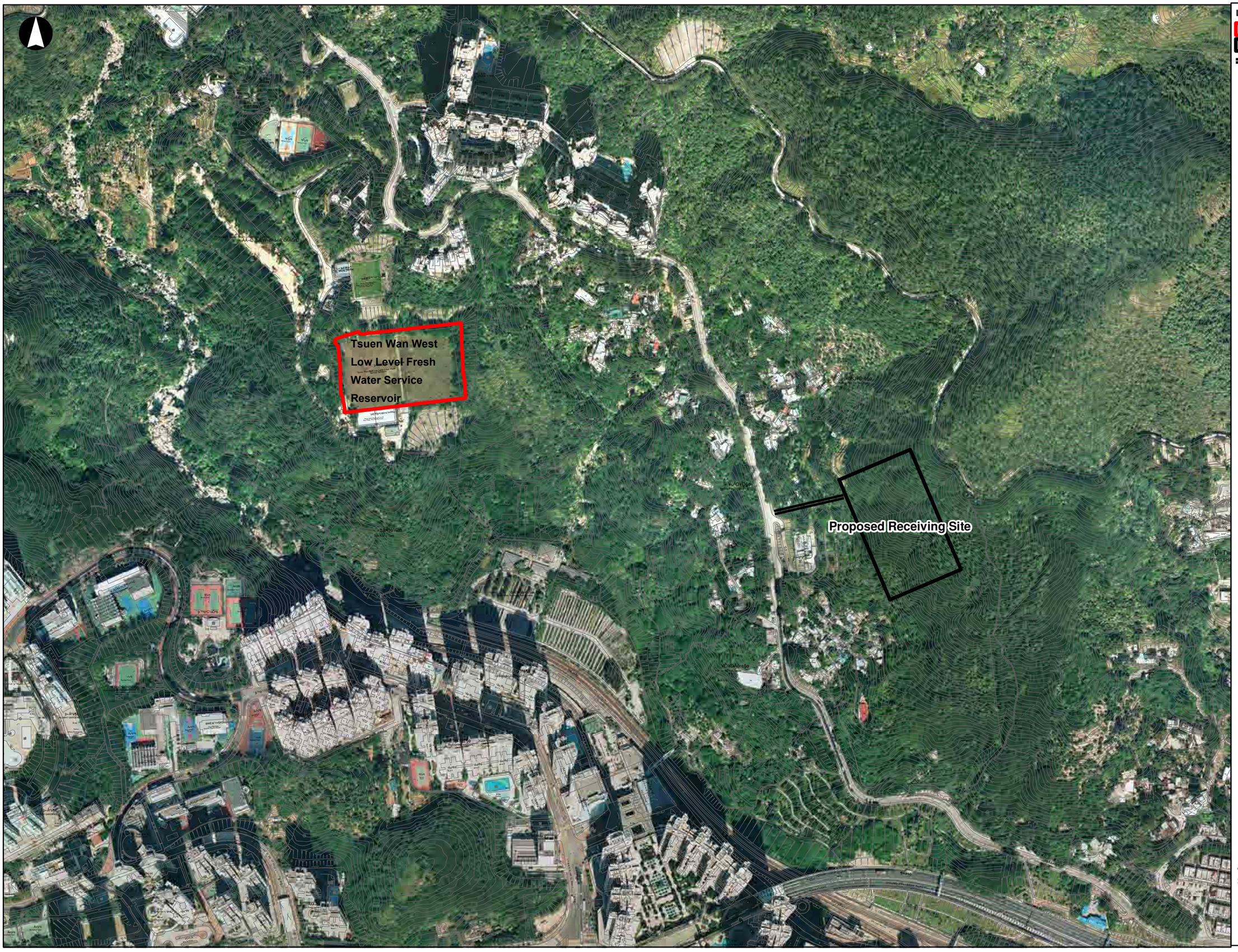
Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	34	D1



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Tsuen Wan West Low Level Fresh Water Service Reservoir Ortho Photo

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	35	D1

Tsuen Wan West
Low Level Fresh
Water Service
Reservoir

Proposed Receiving Site

Legend

Proposed RCD Site

Receiving Sites

Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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
Tsuen Wan West Low Level Fresh Water Service Reservoir Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	36	D1

Eastern No. 2 Fresh Water Service Reservoir

Proposed Receiving Site

MOUNT NICHOLSON

ABERDEEN COUNTRY PARK

香港仔郊野公園

Legend

Selected RCD Site

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters

0 25 50 100 150

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

Eastern No. 2 Fresh Water Service Reservoir Cavern Suitability Map

Scale at A3

1:5,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	37	**P1**

Legend

Selected RCD Site

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters
0 25 50 100 150

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

Eastern No. 2 Fresh Water Service Reservoir Ortho Photo

Scale at A3
1:5,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	38	P1

Eastern No. 2 Fresh Water Service Reservoir

Proposed Receiving Site

Legend

Selected RCD Site

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters

0 25 50 100 150

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

Eastern No. 2 Fresh Water Service Reservoir Outline Zoning Plan

Scale at A3

1:5,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	39	P1

North West New Territories
Refuse Transfer Station

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

North West New Territories Refuse Transfer Station (NWNTRTS) Cavern Suitability Map

Scale at A3
1:3,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	40	**D1**

North West New Territories
Refuse Transfer Station

Proposed Receiving Site

Legend

Proposed RCD Site

Receiving Sites

Acess adits

Cavern Land Classes

High to Medium

Low to Very Low

Not Suitable

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters

0 25 50

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

North West New Territories Refuse Transfer Station (NWNTRTS) Ortho Photo

Scale at A3

1:3,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	41	**D1**

North West New Territories
Refuse Transfer Station

Proposed Receiving Site

Legend

Proposed RCD Site

Receiving Sites

Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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
North West New Territories Refuse Transfer Station (NWNTRTS) Outline Zoning Plan

Scale at A3
1:3,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	42	D1

Proposed Receiving Site (403 & 404)

Tsing Yi North Low Level Salt Water Service Reservoir

Tsing Yi North Low Level Fresh Water Service Reservoir

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Cavern Suitability Map

Scale at A3

1:3,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	43	D1

Proposed Receiving Site (403 & 404)

Tsing Yi North Low Level Salt Water Service Reservoir

Tsing Yi North Low Level Fresh Water Service Reservoir

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Ortho Photo

Scale at A3

1:3,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	44	D1

Proposed Receiving Site((403 & 404)

Tsing Yi North Low Level Salt Water Service Reservoir

Tsing Yi North Low Level Fresh Water Service Reservoir

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Tsing Yi North Low Level Fresh Water Service Reservoir & Tsing Yi North Low Level Salt Water Reservoir Outline Zoning Plan

Scale at A3

1:3,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	45	D1

Kwu Tung Fresh Water Service Reservoir

Proposed Receiving Site

HADDEN HILL
KU LUN SHAN

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters
0 25 50

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
Kwu Tung Fresh Water Service Reservoir
Cavern Suitability Map

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	46	D1

Kwu Tung Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Kwu Tung Fresh Water Service Reservoir
Ortho Photo

Scale at A3

1:4,000

Drawing Status

Draft

Job No	Drawing No	Issue
217499	47	D1

Kwu Tung Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

Client
Civil Engineering and Development Department

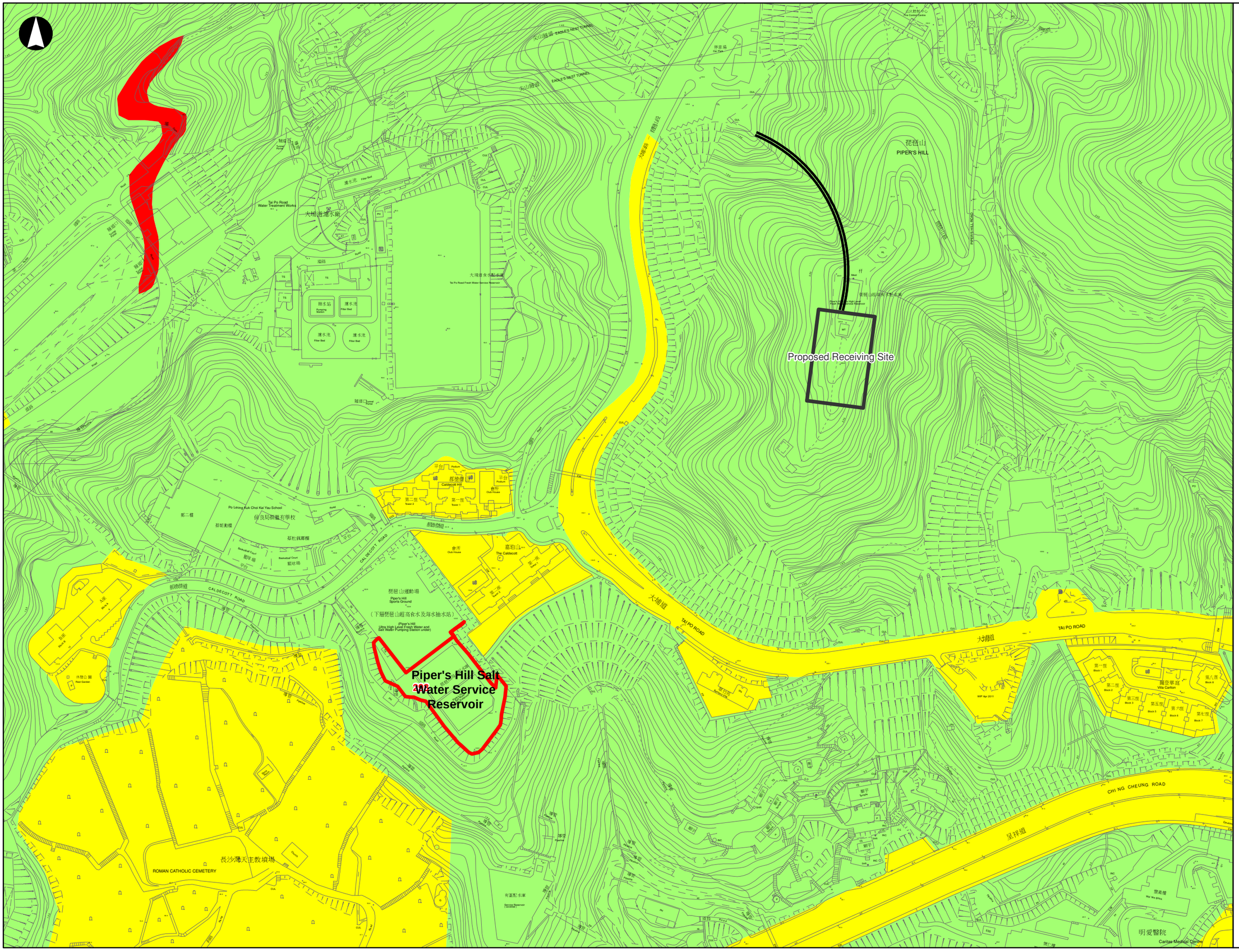
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title
Kwu Tung Fresh Water Service Reservoir
Outline Zoning Plan

Scale at A3
1:4,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	48	D1



Legend

- Selected RCD Site

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters: 0 25 50 100

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

Piper's Hill Salt Water Service Reservoir Cavern Suitability Map

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	49	P1

Legend

Selected RCD Site

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Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Metres

0 25 50 100

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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

Piper's Hill Salt Water Service Reservoir
Ortho Photo

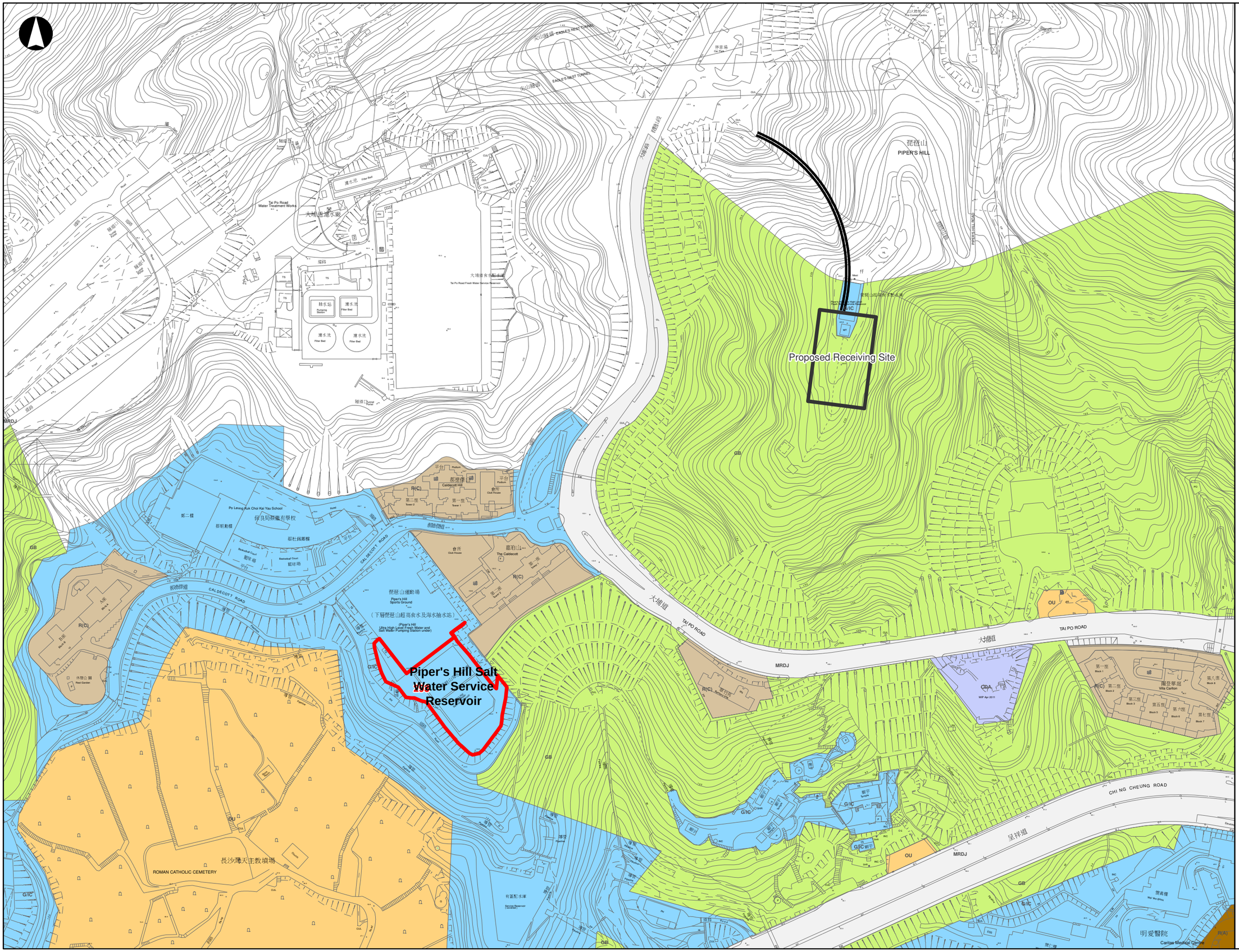
Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	50	P1



Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters: 0 25 50 100

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

Piper's Hill Salt Water Service Reservoir
Outline Zoning Plan

Scale at A3
1:2,500

Drawing Status
Draft

Job No	Drawing No	Issue
217499	51	P1

Jordan Valley Salt Water Service Reservoir

Proposed receiving site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Jordan Valley Salt Water Service Reservoir Cavern Suitability Map

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	52	D1

Jordan Valley Salt Water Service Reservoir

Proposed receiving site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

D1	2012-06-20	JL	WT	MW
Issue	Date	By	Chkd	Appd

Meters

0 25 50

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

Jordan Valley Salt Water Service Reservoir Ortho Photo

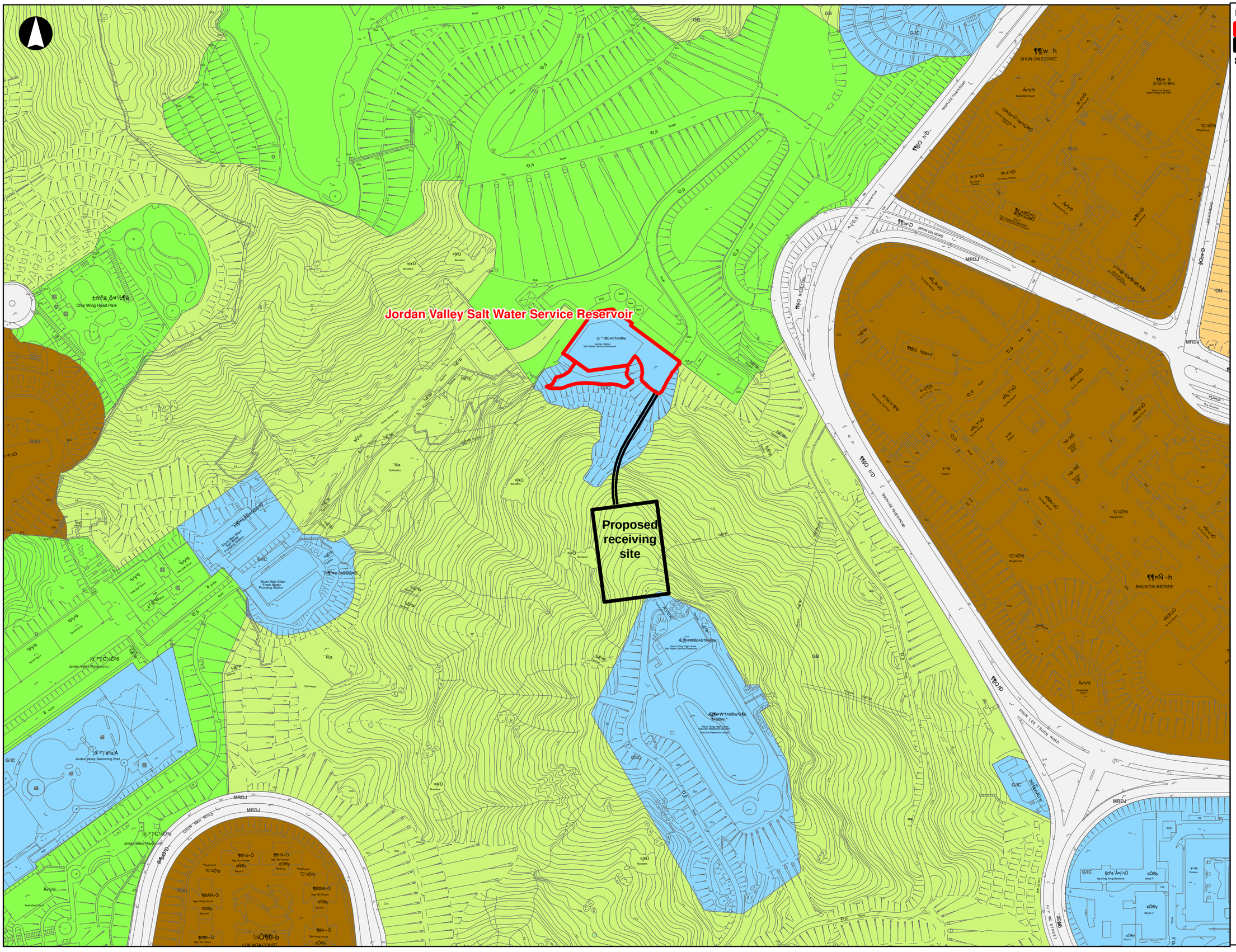
Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	53	D1



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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

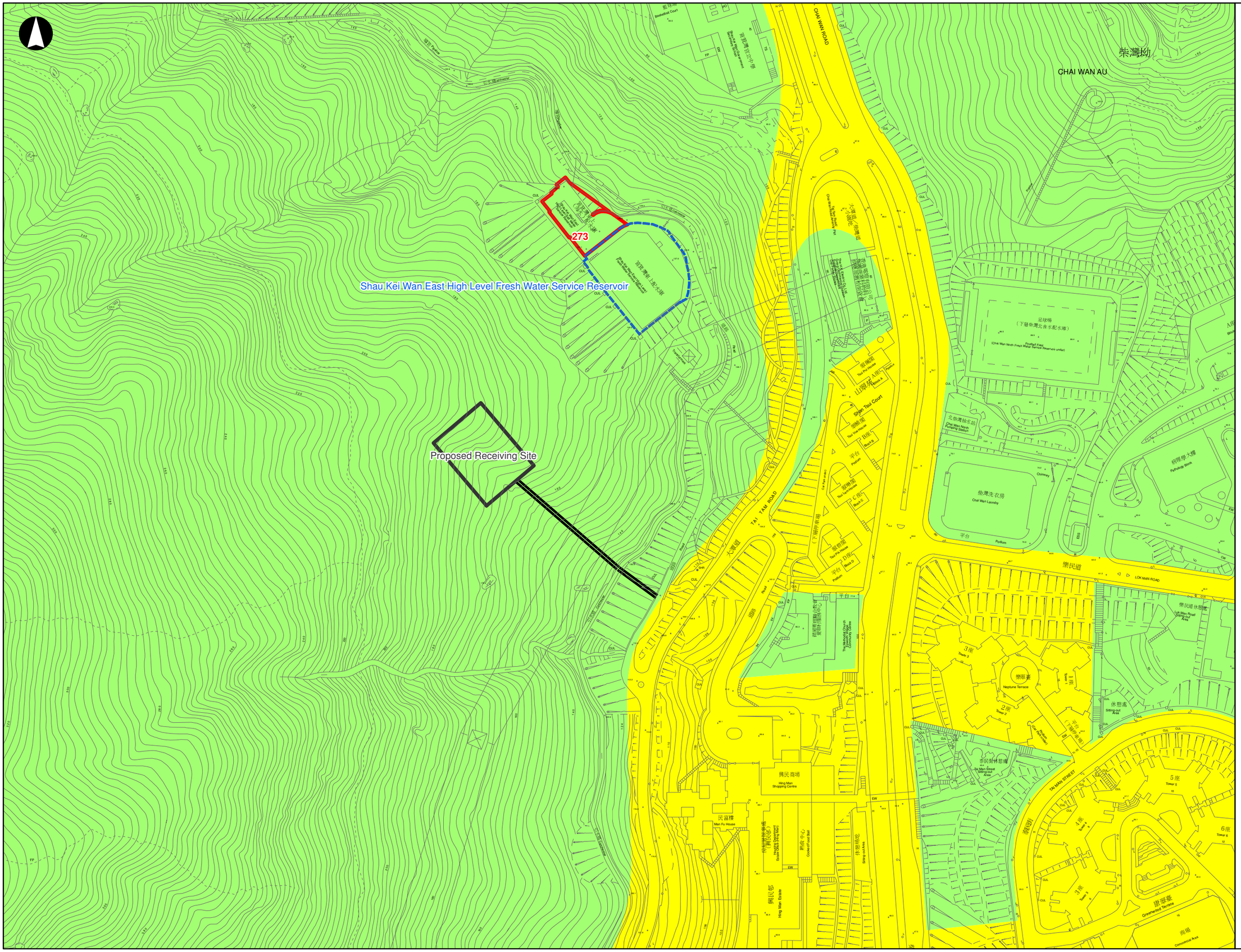
Drawing Title

Jordan Valley Salt Water Service Reservoir
Outline Zoning Plan

Scale at A3
1:2,500

Drawing Status
Draft

Job No	Drawing No	Issue
217499	54	D1



Legend

- Selected RCD Site

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Metres: 0 25 50 100

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
Shau Kei Wan East High Level Salt Water Service Reservoir Cavern Suitability Map

Scale at A3
1:2,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	55	P1

Legend

- 🟥 Selected RCD Site

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Meters
0 25 50 100

ARUP

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

Client
Civil Engineering and Development Department

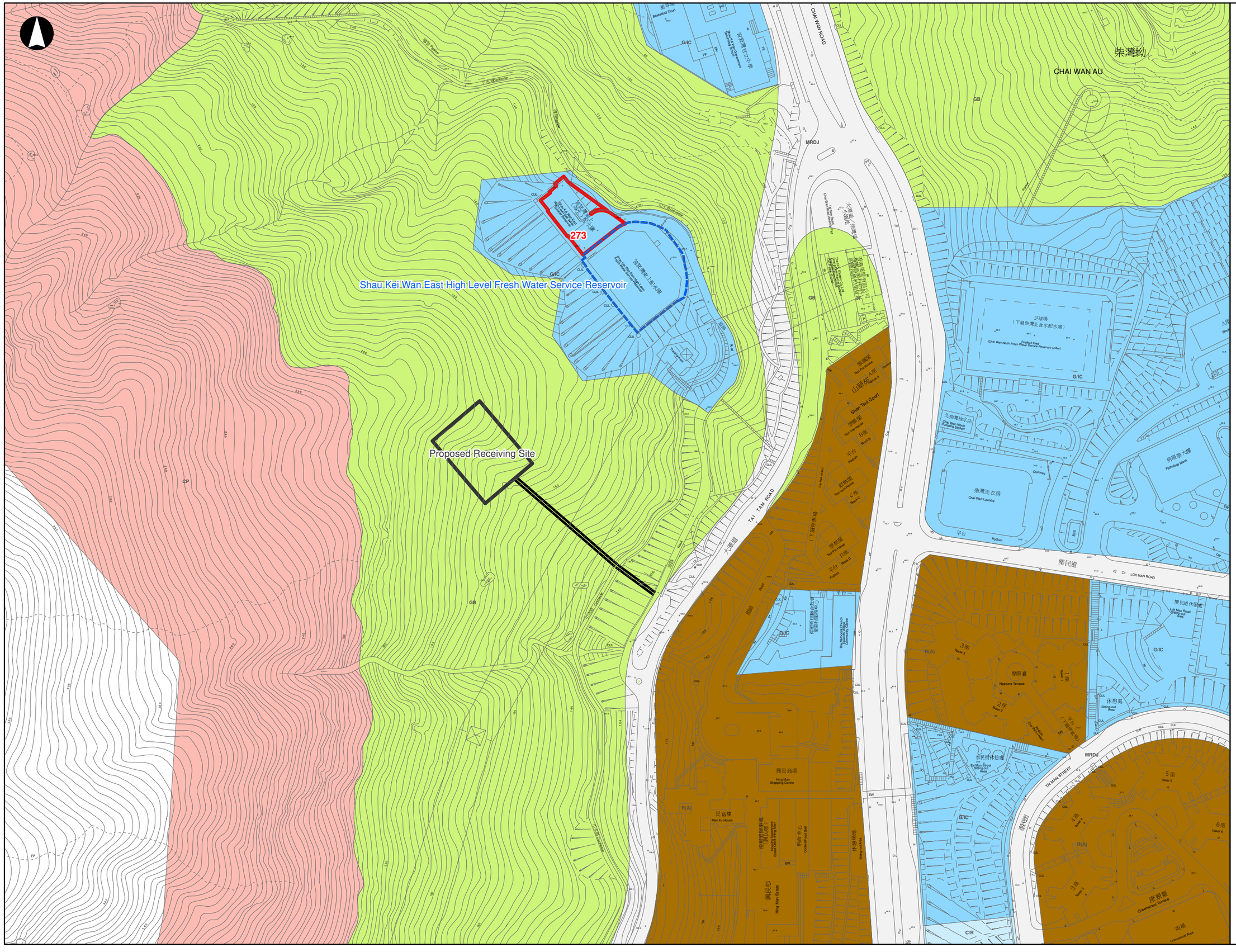
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title
Shau Kei Wan East High Level Salt Water Service Reservoir Ortho Photo

Scale at A3
1:2,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	56	**P1**



Legend

Selected RCD Site

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
P1	14-10-11	XX		

Metres: 0 25 50 100

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

Client
Civil Engineering and Development Department

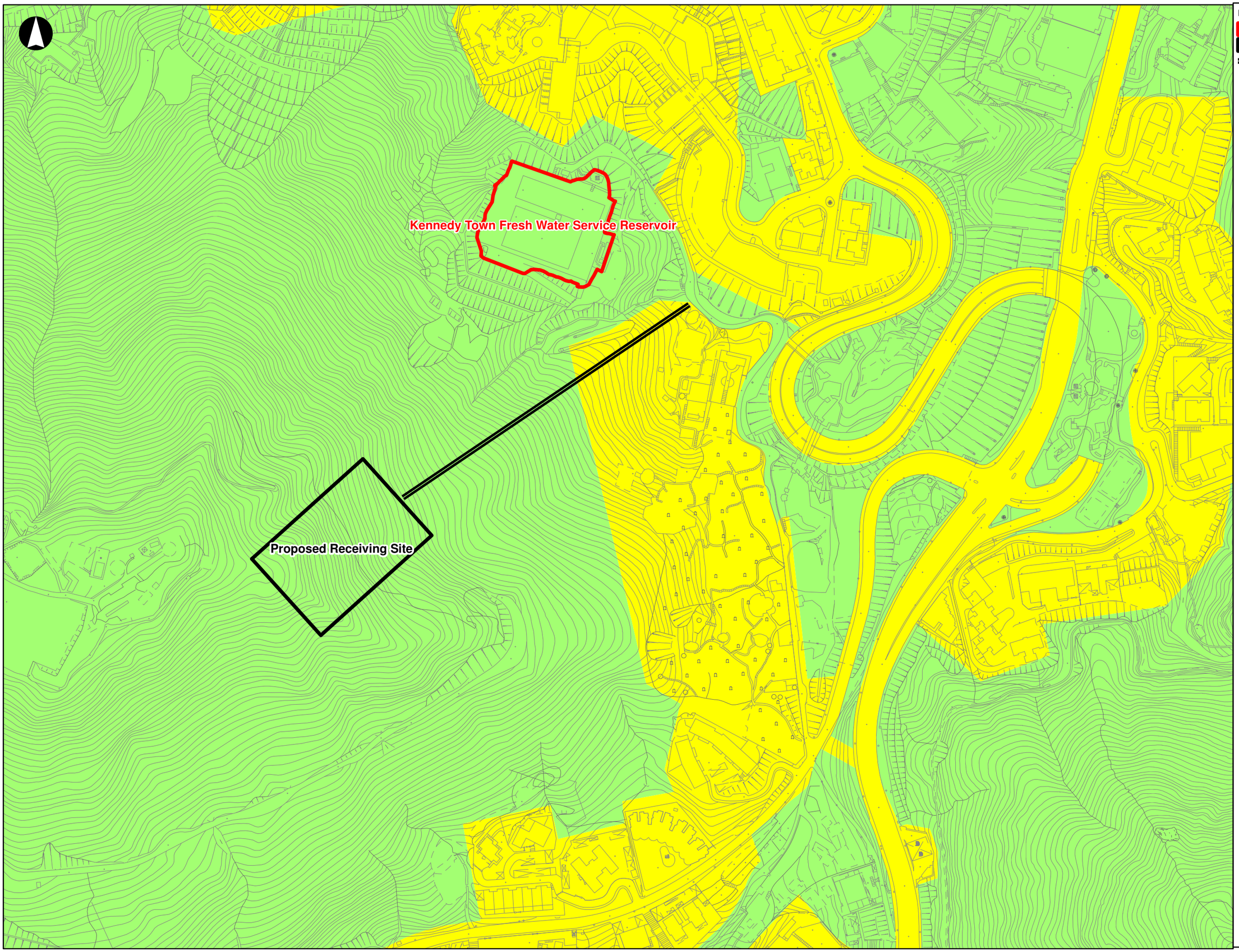
Job Title
Agreement No. CE 9/2011 (CE)
Increasing Land Supply by Reclamation and Rock Cavern Development cum Public Engagement - Feasibility Study

Drawing Title
Shau Kei Wan East High Level Salt Water Service Reservoir Outline Zoning Plan

Scale at A3
1:2,000

Drawing Status
Draft

Job No	Drawing No	Issue
217499	57	P1



Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Cavern Land Classes

- High to Medium
- Low to Very Low
- Not Suitable

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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
Kennedy Town Fresh Water Service Reservoir Cavern Suitability Map

Scale at A3
1:2,500

Drawing Status
Draft

Job No	Drawing No	Issue
217499	58	D1

Kennedy Town Fresh Water Service Reservoir

Proposed Receiving Site

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters

0 25 50

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

Kennedy Town Fresh Water Service Reservoir Ortho Photo

Scale at A3

1:2,500

Drawing Status

Draft

Job No	Drawing No	Issue
217499	59	D1

Kennedy Town Fresh Water Service Reservoir

Proposed Receiving Site

R(A)
R(B)
R(C)
G/IC
GB
MRDJ
OU
O
CP

Legend

- Proposed RCD Site
- Receiving Sites
- Acess adits

Outline Zoning Plan

- Agriculture
- Commercial
- Commercial/Residential
- Conservation Area
- Comprehensive Development Area
- Country Park
- Coastal Protection Area
- Government/ Institution/ Community
- Green Belt
- Industrial
- Industrial (Group D)
- Open Space
- Open Storage
- Other Specified Uses
- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Residential (Group D)
- Residential (Group E)
- Rail
- Recreation
- Site of Special Scientific Interest
- Undetermined
- Village Type Development

Issue	Date	By	Chkd	Appd
D1	2012-06-20	JL	WT	MW

Meters
0 25 50

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
Kennedy Town Fresh Water Service Reservoir Outline Zoning Plan

Scale at A3
1:2,500

Drawing Status
Draft

Job No	Drawing No	Issue
217499	60	D1