AECOM

Final Report (Final)

(Ref. 134-03)

土木工程拓展署
CEDD Civil Engineering and Development Department

規劃署
Planning Department

Agreement No. CE 2/2011 (CE)

Hung Shui Kiu New Development Area Planning and Engineering Study – Investigation

土木工程拓展署
New Territories West Development Office
Civil Engineering and Development Department

Agreement No. CE 2/2011 (CE)

Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Final Report (Final)

(Ref. 134-03)

April 2017

Reviewed: Vincent Au Yeung April 2017

Approved for Issue: Igor Ho April 2017

AECOM ASIA COMPANY LIMITED

Abbreviations	Description
A	Amenity
ACE	Advisory Council on the Environment
ADWF	Average Dry Weather Flow
AMO	Antiquities and Monuments Office
AOI	Area of Influence
APAs	Archaeological Potential Areas
AQOs	Air Quality Objectives
AR5	Fifth Assessment Report
ARCS	Automatic Refuse Collection System
ASRs	Air Sensitive Receivers
AVA	Air Ventilation Assessment
BEAM	Building Environmental Assessment Method
bgl	Below Ground Level
C	Commercial
C&D	Construction and Demolition
CAR	Contamination Assessment Report
CASET	Computer Aided Sustainability Evaluation Tool
CDG	Completely Decomposed Granite
CE	Community Engagement
CEDD	Civil Engineering and Development Department
CEPT	Chemical-Enhanced Preliminary Treatment
CLP	CLP Power Hong Kong Limited
CNT	Conventional New Town
COCs	Chemicals of concern
DCAs	Development Character Areas
DCSs	District Cooling Systems
DEP	Director of Environmental Protection
DIA	Drainage Impact Assessment
DM	Design Memorandum
DO	District Open Space
DP	Designated Project
DSD	Drainage Services Department
E	Education
EDB	Education Bureau
EFTS	Environmentally Friendly Transport Services
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EM&A	Environmental Monitoring Audit
EPD	Environmental Protection Department
ESS	Electricity Substation

Abbreviations	Description
EVs	Electric Vehicles
FLN	Fanling North
FLWSR	Flushing Water Service Reservoir
FMC	Fill Management Committee
FWPSR	Fresh Water Primary Service Reservoir
FWSR	Fresh Water Service Reservoir
FWT	Fresh Water Tanks
G	Government
GI	Ground Investigation
GIC	Government, Institution and Community
GB	Green Belt
GDP	Gross Domestic Product
GEO	Geotechnical Engineering Office
GFA	Gross Floor Area
GTC	Green Transit Corridor
HGWL	Highest Groundwater Level
HK2030 Study	Hong Kong 2030: Planning Vision and Strategy
HKCG	Hong Kong and China Gas Company
HKPSG	Hong Kong Planning Standards and Guidelines
HKSAR	Hong Kong Special Administrative Region
HOS	Home Ownership Scheme
HSK	Hung Shui Kiu
I	Industrial
IC	Institution or Community
ICT	Information and Communication Technology
I(D)	Industrial (Group D)
IT&T	Information Technology & Telecommunications
KSWH	Kong Sham Western Highway
KTN	Kwu Tung North
LandsD	Lands Department
LEED	Leadership in Energy and Environmental Design
LegCo	Legislative Council
LCAs	Landscape Character Areas
LGWL	Lowest Groundwater Level
LNRS	Low Noise Road Surface
LO	Local Open Space
LR	Light Rail
LRs	Landscape Resources
LRT	Light Rail Transit
MLP	Master Landscape Plan
MTR	Mass Transit Railway

Abbreviations	Description
MTRCL	MTR Corporation Limited
NBA	Non-building Area
NDA	New Development Area
NENT	North East New Territories
NSRs	Noise Sensitive Receivers
NTHS	Natural Terrain Hazards Study
NWNT	North West New Territories
NWNT Study	Planning and Development Study on North West New Territories
ODP	Outline Development Plan
OHL	Overhead Lines
OS	Open Storage
OU	Other Specified Uses
OU (PBU+STU)	Other Specified Uses (Port Back-up, Storage & Workshop Uses)
OVT	Old and Valuable Tree
OZP	Outline Zoning Plan
PBU	Port Back-up
PCR	Petroleum Carbon Range
PF	Peaking Factors
PIS	Project Implementation Schedule
PlanD	Planning Department
PME	Powered Mechanical Equipment
PODP	Preliminary Outline Development Plan
PR	Plot Ratio
PRD	Pearl River Delta
PRH	Public Rental Housing
PTI	Public Transport Interchange
PWWF	Peak Wet Weather Flow
R1	Residential Zone 1
R1(LR)	Residential Zone 1 (local Rehousing)
R2	Residential Zone 2
R2(SSF)	Residential Zone 2 (Subsidised Sales Flat)
R3	Residential Zone 3
R4	Residential Zone 4
RAP	Remediation Action Plan
RCHE	Residential Care Home for Elderly
RCP	Refuse Collection Point
RDO	Railway Development Office of Highways Department
RO	Regional Open Space
RODP	Recommended Outline Development Plan
RR	Remediation Report
RR4	Rural Residential Zone 4

Abbreviations	Description
RS	Special Residential
RTS	Refuse Transfer Station
RWSR	Reclaimed Water Service Reservoir
R(WUC)O	Roads (Works, Use and Compensation) Ordinance
SA	Sustainability Assessment
SAIs	Sites of Archaeological Interest
SAVR	Spatial Average Velocity Ratio
SBD	Sustainable Building Design
SDU	Sustainable Development Unit
SGA	Strategic Growth Area
SI	Site Investigation
SIA	Sewerage Impact Assessment
SPS	Sewage Pumping Station
SSF	Subsidised Sales Flat
STW	Sewage Treatment Works
SVR	Site Spatial Average Velocity Ratio
SVOC	Semi-Volatile Organic Chemical
SWPS	Salt Water Pumping Station
SWSR	Salt Water Service Reservoir
The Study	Hung Shui Kiu New Development Area Planning and Engineering Study
TMWB	Tuen Mun Western Bypass
TPB	Town Planning Board
TPDM	Transport Planning Design Manual
TPO	Town Planning Ordinance
TPUs	Tertiary Planning Units
TTIA	Traffic and Transport Impact Assessment
V	Village Type Development
VOC	Volatile Organic Chemical
VR	Velocity Ratio
VSRs	Visual Sensitive Receivers
WCZ	Water Control Zone
WPC(S)R	Water Pollution Control (Sewerage) Regulation
WR	West Rail
WSD	Water Supplies Department
WTW	Water Treatment Works
YLH	Yuen Long Highway

(REF. 134-03)

TABLE OF CONTENTS

FIGURES

This Page Left Blank Intentionally

1 INTRODUCTION

1.1 Background

1.1.1 The "Planning and Development Study on North West New Territories" (the NWNT Study), which was commissioned in October 1997 and completed in 2003, identified the Hung Shui Kiu (HSK) Strategic Growth Area (SGA) (with an area of about 450 ha) as a potential New Development Area (NDA) to cater for the long term development need of Hong Kong as projected by the Territorial Development Strategy Review in 1996. Under the NWNT Study, the HSK SGA was located in the Tuen Mun – Yuen Long Corridor. The SGA was partly bounded by strategic highways: Yuen Long Highway (YLH) in the eastern and southern sides and the Kong Sham Western Highway (KSWH) in the west. It was also bounded to the north and west by the foothill of Yuen Tau Shan, and to the east by a number of traditional villages including San Wai, Sik Kong Wai, Ha Tsuen Shi, San Uk Tsuen and Shek Po Tsuen. It was proposed to accommodate a population of about 160,000 (of which about 100,000 was strategic population) and to provide about 48,000 jobs upon full development.

1.1.2 The NWNT Study had put forward a Recommended Outline Development Plan (RODP), and a Recommended Layout Plan was formulated in 2002 taking into account comments received from the consultation exercise. The development proposal was confirmed to be feasible and acceptable based on the findings and recommendations from the technical assessments. However, in the light of a slower population growth and housing demand, the HSK SGA proposal was shelved in 2003.

1.1.3 Subsequently, the "Hong Kong 2030: Planning Vision and Strategy" (HK2030 Study), which was completed in 2007, revisited the need for NDAs in the New Territories and recommended the implementation of the NDAs at Fanling North (FLN), Kwu Tung North (KTN) and Ping Che/Ta Kwu Ling and at HSK, to address the long-term housing demand and provide employment opportunities. The Chief Executive announced in his 2007-08 Policy Address the planning for the NDAs in HSK and the North East New Territories (NENT) as one of the ten major infrastructure projects for economic growth. Through comprehensive planning, the NDAs will provide quality living space and convenience to both residents and users.

1.1.4 Since the completion of the NWNT Study in 2003, there have been changes in planning circumstances. One of the changes is the current alignment of the KSWH, which has encroached onto the western boundary of the HSK SGA under the former NWNT Study. To initiate the implementation of the HSK NDA, the Civil Engineering and Development Department (CEDD) and the Planning Department (PlanD) jointly commissioned the Hung Shui Kiu New Development Area Planning and Engineering Study (the Study) in August 2011 to formulate development proposals for the HSK NDA. AECOM Asia Co. Ltd was engaged to undertake this Assignment. The boundary of HSK NDA is shown in **Figure 1.1.1**.

1.2 Main Objectives

1.2.1 The purpose of this Study is to carry out planning, engineering and technical assessments with a view to formulating a comprehensive plan for the development and implementation of the HSK NDA. As part of the Study, the feasibility of implementing the development proposals for the HSK NDA to meet long-term housing, social, economic and environmental needs was assessed, and the implementation strategies and programme for the NDA were formulated.

1.2.2 The Study includes the following main objectives:

- to formulate development proposals for the HSK NDA to cater for the latest planning circumstances, community aspirations, long-term housing and development needs;
- to review, evaluate and establish the engineering feasibility of the developments and infrastructure for the NDA;
- to carry out Environmental Impact Assessment (EIA) to establish the environmental acceptability for the developments and infrastructure of the HSK NDA;
- to carry out site investigation and preliminary engineering designs on the engineering projects; and
- to formulate implementation mechanism and programme to facilitate the first population intake of the NDA by the year of 2024 or earlier.

1.3 Study Process

1.3.1 The Study could be divided into five stages:

Prior to Commencement of the Study

1.3.2 Prior to the commencement of the Study in August 2011, CEDD and PlanD convened the first round activities of Stage 1 Community Engagement (CE) in November 2010 to arouse public discussions on the key issues of the NDA including its vision, strategic role and planning principles. Various statutory and advisory organisations were briefed, and consultation pamphlets were distributed to the public.

Formulation of Guiding Principles

1.3.3 The Study was formally launched in August 2011. An inventory of baseline conditions of the Study Area was reviewed, and key issues and guiding principles were identified to facilitate the planning and engineering tasks, taking account of the public comments received in the first round of Stage 1 CE. The second round of Stage 1 CE was held between December 2011 and February 2012 to solicit public views on their visions and aspirations for the NDA and discuss key issues relating to the development of the NDA.

Formulation of Preliminary Outline Development Plan

1.3.4 The Preliminary Outline Development Plan (PODP) and Preliminary Master Urban Design and Landscape Plans for the HSK NDA were formulated taking into account the public comments received from the first and second rounds of Stage 1 CE and the guiding principles, accompanied by supporting technical assessments. Stage 2 CE was held between July and October 2013 to involve the public in discussing the PODP.

Formulation of Recommended Outline Development Plan

1.3.5 Based on the public comments received during the Stage 2 CE and findings of the technical assessments, the RODP and Recommended Master Urban Design and Landscape Plans for the HSK NDA were formulated. Stage 3 CE was held between June and September 2015 to gather public comments on the RODP.

Revision and Finalisation of Recommended Outline Development Plan

1.3.6 The RODP, Recommended Master Urban Design and Landscape Plans and Layout Plans for the HSK NDA were revised and finalised taking into account the public comments received in the Stage 3 CE and the completed planning and engineering assessments. Further technical assessments were carried out to confirm the technical feasibility of the Revised RODP, which was promulgated on 5 September 2016.

1.3.7 An EIA was conducted in parallel with other technical assessments. The findings and recommendations of the EIA served as inputs on various stages of the Study.

1.3.8 The Study also examined and recommended the implementation and costing strategy and development programme for implementing the proposed developments and infrastructures.

1.4 Purpose and Structure of Report

1.4.1 The purpose of the Final Report is to summarise the key findings, recommendations and conclusions of the Study. The development proposals and findings of various technical assessments including the EIA under Environmental Impact Assessment Ordinance (EIAO) are summarised in this report. The CE activities carried out and public comments received during the Study are also documented in this report.

1.4.2 Apart from this introductory section, the sections of this report are as follows:

- Section 2 presents the existing conditions of the HSK NDA;
- Section 3 overviews the planning context, opportunities, constraints and key issues of the HSK NDA;
- Section 4 provides a summary of the CE activities;
- Sections 5 and 6 present the vision and guiding principles, the PODP, RODP, Revised RODP and Final Master Urban Design and Landscape Plans for the HSK NDA;
- Section 7 provides a summary of findings and recommendations of various technical assessments for the HSK NDA;
- Section 8 provides a summary of findings and recommendations of the EIA under EIAO for the HSK NDA;
- Section 9 provides a summary of the implementation strategy and cost estimation of the HSK NDA;
- Section 10 briefly introduces the preliminary engineering layout and design memorandum; and
- Section 11 provides conclusions of the Final Report.

This Page Left Blank Intentionally

2 EXISTING CONDITIONS OF THE HSK NDA

2.1 Study Area

2.1.1 The HSK NDA is located in the north-western part of the New Territories, midway between the Tuen Mun and Tin Shui Wai New Towns. It is surrounded by the mountain ridge of Yuen Tau Shan to the west and northwest, low-rise rural environment at Lau Fau Shan to the north, high-dense built-up townscape at Tin Shui Wai New Town to the east, as well as low to medium-rise residential clusters at HSK to the south.

2.1.2 According to the Revised RODP promulgated in September 2016, the boundary of the HSK NDA is bounded by Tin Ying Road / Ping Ha Road / Kiu Hung Road to the east, Castle Peak Road to the south, knolls of Yuen Tau Shan and KSWH to the west, and Lau Fau Shan Road and hill slope along Deep Bay Road to the north. The area to the south-east of Castle Peak Road not affected by the HSK NDA works has been excluded from the NDA since the RODP promulgated in Stage 3 CE. The boundary of the HSK NDA is shown in **Figure 1.1.1**.

2.2 Existing Land Uses

2.2.1 The HSK NDA is characterised as a transitional area between the rural area and the urbanised new towns. Flat land in the northern part of the NDA has been cleared and is predominately occupied by port back-up and open storage (PBU & OS) uses. These uses proliferate in a significant proportion in the northern and central part of the NDA, creating several planning blights and are in conflict with traditional rural uses such as village developments. Meanwhile, land located in the southern part is mainly occupied by low to medium-density residential developments with industrial uses mainly concentrated at Kiu Tau Wai. Small amount of active farmland are also located in the south-west of the NDA with some pockets of farmland scattered near villages. Furthermore, the area is transversed by the Tin Shui Wai Main Channel (also known as the Tin Shui Wai River Channel) running across the area in a north-south direction. The southern part of the area is also dissected by the existing elevated West Rail (WR) Line.

Village Type Development and Rural Settlements

2.2.2 There are a total of 17 recognised villages, as shown on the list of recognised villages approved by the Director of Lands, located within the HSK NDA, namely Lei Uk Tsuen (including San Lee Uk Tsuen and Kau Lee Uk Tsuen), Shek Po Tsuen, Hung Uk Tsuen, Kiu Tau Wai, Tsing Chuen Wai, Tin Sam Tsuen, San Sang Tsuen, Tseung Kong Wai, Ha Tsuen Shi, San Uk Tsuen, Tung Tau Tsuen, Hong Mei Tsuen, Ha Tsuen San Wai, Lo Uk Tsuen, Sik Kong Tsuen, Sik Kong Wai and Fung Kong Tsuen. In addition, there is a small portion of “Village Type Development” (“V”) zone along Lau Fau Shan Road for Small House applications of San Hing Tsuen, Ngau Hom Tsuen and Sha Kong Wai, which fall outside the HSK NDA. A village resite area is also located at Sha Chau Lei which was for rehousing the villagers affected by previous government project. The location of the recognised villages is shown in **Figure 2.2.1**.

2.2.3 Some rural settlements could also be found in the southern part of the NDA, especially in San Sang San Tsuen, Tin Sam San Tsuen, Shek Po Lo Mei Tsuen, Yick Yuen Tsuen and Sha Chau Lei. Domestic structures in these areas are widely dispersed and some of them are impoverished temporary structures, intermingled with many non-domestic temporary structures. Some domestic structures are also converted from abandoned farm structures.

Residential Use

2.2.4 There are low to medium-density residential developments and land uses of various scales in the southern part of the HSK NDA, particularly to the north of Castle Peak Road. There is an existing public rental housing (PRH) estate within the HSK NDA, namely the Hung Fuk Estate, providing about 4,900 rental flats. There are also other low to medium-density residential developments, such as Aster Court and Parkview Garden, and their development intensity are relatively low as compared to those in the urban area and other new towns in the New Territories.

Brownfield Operations

2.2.5 An extensive area of the HSK NDA is currently being utilised for rural industries, recycling industry and PBU & OS uses. These uses are often referred as brownfield operations. They are mainly located at the central and northern parts of the HSK NDA, whereas some also scattered in the southern part of the NDA.

2.2.6 To understand the nature and operation of these brownfield operations, a questionnaire survey was conducted with the brownfield operators from August to November 2015. Desktop study such as the review of available aerial photos and site inspections to the areas were also conducted. According to the survey, a total number of 368 brownfield sites with total area about 200 ha were identified within the HSK NDA boundary. Among them, about 190 ha would be affected by the works of the HSK NDA project. The brownfield operations identified within the HSK NDA boundary could be broadly classified into 9 main categories. In terms of number of operators, the most common operations were warehouses (29%), vehicle repair workshops (17%), OS (excluding container storage) (13%) and logistics operations (12%). In terms of area occupied, container storage occupied the largest area (26%), followed by warehouses (23%), logistics operations (15%) and OS (14%). The indicative location of these brownfield sites within the HSK NDA boundary are shown in **Figure 2.2.2**.

Industrial Uses

2.2.7 There is an existing area in Kiu Tau Wai, near the WR Tin Shui Wai Station, which is currently zoned “Industrial” (“I”) on the extant Ping Shan Outline Zoning Plan (OZP) with an area of approximately 10 ha. According to the “Report on 2014 Area Assessments of Industrial Land in the Territory”, the vacancy rate (based on Gross Floor Area (GFA)) of this area is about 4.5%. It is predominantly used for logistics use, vehicle testing, fabric manufacturing and canning. As observed and recorded during the site inspections conducted in October 2016, it was estimated that about 355 employees worked in the operating firms in this area.

2.2.8 Moreover, there are a number of rural industrial undertakings operating near Hung Uk Tsuen, currently zoned “Industrial (Group D)” (“I(D)”) on the extant Ping Shan OZP. Based on the information given by the Hung Uk Tsuen Industries Association in September 2013, there were about 359 number of employees in the area.

Agricultural Uses

2.2.9 Within the HSK NDA, there are some active agricultural land. Based on the field surveys conducted in 2016, it is observed that these active agricultural land are mainly found near San Sang San Tsuen, Ha Tsuen and the sides of WR Line, which are normally located next to existing village settlements as a backyard for growing crops. Meanwhile, some inactive agricultural land are also observed at San Sang San Tsuen and the northern part of the HSK NDA.

2.2.10 There is a licensed chicken farm within the HSK NDA situated in Kai Pak Leng, which falls outside the development area of the NDA. The licensed area is approximately 4,604 m^2. According to the site inspection conducted in 2016, the livestock farm was observed to be in full operation.

2.2.11 There are also some ponds in the northern part of the HSK NDA directly to the south of Deep Bay Road, and in the south-southeast area located between KSWH and Castle Peak Road.

Government, Institution and Community (GIC) Uses

2.2.12 **Figures 2.2.3** and **2.2.4** present the existing GIC and recreational facilities, and open space within and around the HSK NDA. Major GIC facilities currently found within the HSK NDA include the San Wai Sewage Treatment Works (STW), Ha Tsuen Sewage Pumping Station (SPS), recreational uses such as Ping Ha Road Garden, Tin Ha Road Playground, as well as community facilities such as Pok Oi Hospital Yeung Chun Pui Care and Attention Home, Ching Chung Care and Attention Home for the Aged and Shung Ming Home for Aged. Pok Oi Hospital Yeung Chun Pui Care and Attention Home and Ching Chung Care and Attention Home for the Aged are both located in Sha Chau Lei providing subsidised places for elders with capacity of 143 persons and 120 persons respectively, whereas Shung Ming Home for Aged is a licensed private residential care home with 53 places located along Castle Peak Road.

2.2.13 Due to the currently low population density in the HSK NDA, residents mainly rely on the GIC facilities in Tuen Mun and Tin Shui Wai New Towns such as police and fire stations, sports complex, schools, community halls, elderly centres, libraries, child care centres, etc. to meet their needs. On the other hand, as part of the enhancement of GIC facilities in Tin Shui Wai, a new Ping Shan Tin Shui Wai library was opened in March 2013 which is the second largest library in Hong Kong. A new hospital in Tin Shui Wai providing 300 beds in-patient and day-patient services has also commenced service by phases in early 2017.

Burial Grounds and Graves

2.2.14 Within the HSK NDA, there are considerable amount of graves, “Urns (Kam Taps)” and shrines especially at the western part of the HSK NDA. Most of them are located within the existing “Green Belt” (“GB”) zones on the extant OZPs, such as at Hung Uk Tsuen and San Sang San Tsuen.

2.3 Existing Socio-Economic Characteristics

Population Structure

2.3.1 The existing socio-economic conditions of the HSK NDA are analysed based on the corresponding Tertiary Planning Units (TPUs) according to the 2011 Population Census.

2.3.2 Based on the 2011 Population Census, it is estimated that the existing population within the HSK NDA is about 16,100, among which about 10,000 reside within existing recognised villages which will be retained under the Revised RODP.

Age Structure

2.3.3 Based on the 2011 Population Census, the distribution pattern of population by age groups showed a larger proportion of the population in the 25 - 44 age group, accounting around 37% of the population within the HSK NDA. Over 60% of the population within the HSK NDA was found to be below the age of 44, which was slightly higher than the territory level of about 55%.

Household Size and Income

2.3.4 Based on the 2011 Population Census, the average household size within the HSK NDA stood at 2.8 persons, which was slightly lower than the territory average of 3.0. Meanwhile, the average household size of Tuen Mun, Yuen Long and Tin Shui Wai New Towns were close to the territory average at 3.1, 2.9 and 3.2 respectively.

2.3.5 The median of monthly household income for the HSK NDA is approximately HK$19,000, which was slightly lower than the territory level of about HK$20,500. Meanwhile, the median of monthly household income for Tuen Mun, Yuen Long and Tin Shui Wai New Towns were HK$18,000, HK$20,000 and HK$16,000 respectively.

Characteristics of Local Economic Activities

2.3.6 PBU & OS activities are the major economic activities currently undertaken in the HSK NDA. These activities are mainly located at the central and northern part of the HSK NDA, whereas some are also scattering in the southern part of the NDA. A total of 368 brownfield sites with a total area of about 200 ha were identified within the HSK NDA boundary according to the questionnaire survey conducted from August to November 2015.

2.4 Land Ownership

2.4.1 According to the Revised RODP, the total development area is about 441 ha, out of which about 73% is private land. The Government land mainly covers roads and railways, such as land along the existing Tin Ying Road and WR Line.

2.5 Existing Traffic and Transport Network

Key Roads

2.5.1 The existing road network within the Area of Influence (AOI) is shown in **Figure 2.5.1**. The connections between the HSK NDA and other districts are currently served by strategic roads / expressways as YLH and KSWH, rural trunk roads as Castle Peak Road, district distributors as Hung Tin Road, Tin Ying Road, Tin Tsz Road, Long Tin Road, Tin Wah Road, and Tin Fuk Road.

2.5.2 Currently, there is no comprehensive internal road system within the HSK NDA. The major internal roads are Ping Ha Road, Tin Ha Road, Ha Tsuen Road, Hung Yuen Road, Hung Shui Kiu Tim Sam Road and Hung Chi Road. Other existing roads are in general narrow or are village roads.

Existing Port Back-up and Open Storage Uses and Heavy Goods Vehicle Routings

2.5.3 Heavy goods vehicles are making use of some local roads, such as Ping Ha Road, Tin Ha Road and Ha Tsuen Road, for accessing these PBU & OS sites, and have imposed considerable traffic loading onto the local road network within the area. The location of the existing PBU & OS sites are shown in **Figure 2.2.2** and the existing inbound and outbound of heavy goods vehicles routings are shown in **Figure 2.5.2**.

Existing Railway Network

2.5.4 Currently, the WR Line is the only Mass Transit Railway (MTR) serving the AOI. It provides railway service between Tuen Mun and Kowloon (i.e. Nam Cheong Station) since 2003. Starting from 2009, the WR Line was extended to Tsim Sha Tsui East Station and Hung Hom Station. Currently, the WR Line has 12 stations including Tuen Mun, Siu Hong, Tin Shui Wai, Long Ping, Yuen Long, Kam Sheung Road, Tsuen Wan West, Mei Foo, Nam Cheong, Austin, Tsim Sha Tsui East and Hung Hom. The overall journey times from Tuen Mun station to Hung Hom station would take about 37 minutes.

2.5.5 The Tin Shui Wai Station is now the nearest existing WR station for the HSK NDA and partly located within the NDA at the eastern edge. Most of the area in the HSK NDA is not within the 500m catchment area of the station and thus the current residents and workers in the area would need to travel by MTR feeder bus (i.e. Route No. K75 and K75P) or other transport modes to access Tin Shui Wai Station for using the WR service.

2.5.6 Another existing WR station, Siu Hong Station, is located at the south-western end of the AOI but outside the HSK NDA. Since Siu Hong Station is further away from the HSK NDA, it is relatively less attractive to the current residents and workers in the area comparing with Tin Shui Wai Station.

2.5.7 Apart from WR Line, the existing Light Rail Transit (LRT) also provides both intra and inter district public transport services for Tuen Mun, HSK NDA, Tin Shui Wai and Yuen Long districts. However, its catchment only covers small part of the area in the HSK NDA at its eastern and southern ends whereas most of the area is outside the catchment of the existing LRT. The existing railway network and its coverage within the AOI are shown in **Figure 2.5.3**.

Existing Road-Based Public Transport

2.5.8 The existing road-based public transport services are mainly in the form of franchised buses, MTR feeder buses, green minibuses and red minibuses. These public transport services for the HSK NDA are mainly available along Castle Peak Road, Lau Fau Shan Road, Hung Tin Road, Ping Ha Road and Tin Ha Road.

2.6 Existing Utilities Network

Fresh Water and Flushing Water Supply Network

2.6.1 The HSK NDA is located within the fresh water supply zones of Tan Kwai Tsuen North Fresh Water Service Reservoir (FWSR), Tan Kwai Tsuen South FWSR, Yuen Long FWSR and Fung Kong Tsuen Fresh Water Tanks (FWT). Currently, Yuen Long FWSR is supplied by Tuen Mun Water Treatment Works (WTW). Tan Kwai Tsuen North FWSR is supplied by Ngau Tam Mei WTW. Tan Kwai Tsuen South FWSR is supplied by Ngau Tam Mei WTW, Tuen Mun WTW and Au Tau WTW. Fung Kong Tsuen FWT is supplied by Ngau Tam Mei WTW. The fresh water network is shown in **Figure 2.6.1**.

2.6.2 Currently, there is no comprehensive salt water supply in the HSK NDA for flushing purpose. The current salt water network is shown in **Figure 2.6.2**. Even though the North West New Territories (NWNT) Salt Water Supply System comprising the Tan Kwai Tsuen Salt Water Service Reservoir (SWSR) (with a capacity of 18,100 m^3/d), the Lok On Pai Salt Water Pumping Station (SWPS) (with a pumping capacity of 83,000 m^3/d), the upgraded intermediate booster chlorination plant at Tuen Mun WTW and the associated salt water mains was completed, it aims to supply salt water to the Tuen Mun East areas, Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai, Yuen Long Town and part of the existing HSK area only. The supply zone does not cover the whole development area of the HSK NDA according to the latest planning data.

Drainage Network

2.6.3 The HSK NDA lies in three different drainage basins, namely Tin Shui Wai Basin, Tuen Mun Basin and Lau Fau Shan Basin. Among the three basins, Tin Shui Wai Basin covers the majority of the planning area. The extent of the HSK NDA and the three drainage basins are shown in **Figure 2.6.3**.

2.6.4 Runoff of the Tin Shui Wai Basin is discharged to Tin Shui Wai Main Channel via Ha Tsuen Channel, Tin Sam Channel and HSK Main Channel and eventually to the Deep Bay. Runoffs from Lau Fau Shan Basin and Tuen Mun Basin within the HSK NDA are conveyed to Hang Hau Tsuen Channel and Upper Tuen Mun River Channel respectively. The existing drainage networks and rivers/channels within the HSK NDA are shown in **Figure 2.6.4**.

2.6.5 Currently, majority of the area within the HSK NDA is occupied by villages, PBU & OS uses and residential developments where the runoff coefficients are high. Agricultural land, woodland and grassed areas, with lower runoff coefficients are found spreading over in areas to the eastern side of KSWH, Shek Po Tsuen, Tung Tau Tsuen and junction of Tin Wah Road and Tin Ying Road.

2.6.6 There was one recorded flooding blackspot near the Study Area at Tuen Mun San Tsuen. However, according to the findings of the “Review of Drainage Master Plan Study in Yuen Long and North Districts – Feasibility Study”, additional local low-lying areas within the HSK NDA were identified as flood prone area and were reported having flooding incidents in the past, e.g. San Uk Tsuen.

2.6.7 The drainage systems along existing roads are mainly serving the more recently built residential areas. In general, the village areas are lack of proper recorded drainage systems. Some of the villages are located in lowland areas with minimum ground level at about 3.7mPD and are prone to flooding when the downstream water levels are high. To protect these low-lying villages from flooding, polder village flood protection schemes have been implemented at Kiu Tau Wai, Lo Uk Tsuen, Sik Kong Tsuen and Sik Kong Wai with floodwater pumps installed.

Sewerage Network

2.6.8 At present, the sewerage system in the NWNT serves the major urban developments in Tin Shui Wai, Tuen Mun - Yuen Long Corridor and small developments at the periphery of Yuen Long. It is delineated into two sewage catchments, namely Yuen Long Sewage Catchment and San Wai Sewage Catchment, which correspond to two of the Drainage Services Department (DSD) STW, Yuen Long STW and San Wai STW respectively.

2.6.9 San Wai STW was planned to serve major developments in Yuen Long Town, Au Tau, Tin Shui Wai, Ping Shan, Lau Fau Shan, Shap Pat Heung and covered part of the area within the HSK NDA including the existing developments in HSK and Ha Tsuen. The remaining areas within the HSK NDA are unsewered areas. Yuen Long STW serves the eastern part of the NWNT.

2.6.10 The existing sewerage system has been reviewed under the "Design and Construction of Yuen Long and Kam Tin Sewerage and Sewage Disposal" and the "Feasibility Study for Provision of Sewerage to Unsewered Areas/ Villages in North West New Territories". The upgrading of San Wai STW by DSD has been planned for completion in year 2020.

2.6.11 In order to cater for the forecast sewage flow due to population growth in the NWNT, DSD has further commenced the works contract No. DC/2013/10 "Upgrading of San Wai sewage treatment works – phase 1" in May 2016 to upgrade the San Wai STW from preliminary treatment to chemically enhanced primary treatment plus disinfections facilities.

2.6.12 The effluent of the upgraded San Wai STW will be discharged to the existing junction chamber of the 9 km long NWNT tunnel (with a capacity of 11.6m^3/s in terms of Peak Wet Weather Flow (PWWF) and eventually discharged to the existing Urmston Road Outfall.

2.7 Existing Cultural Heritage and Ecological Interest

Cultural Heritage

2.7.1 According to the "List of the Historic Buildings in Building Assessment" published by the Antiquities and Monuments Office (AMO), two Declared Monuments and seven Graded Historic Buildings (including two Grade 2 Historic Buildings and five Grade 3 Historic Buildings) were identified within the HSK NDA. The declared monuments and graded historic buildings are listed in **Table 2.7.1**. The location of these declared monuments and graded historic buildings is shown in **Figure 2.7.1.**

Table 2.7.1 List of Declared Monuments and Graded Buildings within the HSK NDA

Code	Description
Declared Monuments	
A1	Tang Ancestral Hall (Ha Tsuen)
A2	Yeung Hau Temple (Ha Tsuen)
Grade 2 Historic Buildings	
C1	Gate Tower (Ha Tsuen Shi)
C2	Kwan Tai Temple (Ha Tsuen Shi)
Grade 3 Historic Buildings	
C3	Shi Wang Study Hall (Ha Tsuen)
C4	Shrine (Tin Sam Tsuen)
C5	Entrance Gate of Shek Po Wai (Shek Po Tsuen)
C6	Old Village School (Tung Tau Tsuen)
C7	Nos. 76-77 Hung Uk Tsuen

2.7.2 There are a total of five Sites of Archaeological Interest (SAIs) located within the HSK NDA, namely Ngau Hom Shek, Hang Hau Tsuen, Sha Kong Miu (North), Tung Tau Tsuen and Tseung Kong Wai. Four Archaeological Potential Areas (APAs) containing unknown archaeological significance, were also identified in Lau Fau Shan, Kiu Tau Wai, Hung Uk Tsuen (North) and Hung Uk Tsuen (South). They are shown in **Figure 2.7.1**.

Ecological Interest

2.7.3 The San Sang San Tsuen egretry was identified within the HSK NDA. Various habitats were also identified within the HSK NDA, including developed area/wasteland, village/orchard, agricultural area (dry), agricultural area (wet), plantation, woodland, shrubland, grassland, marsh, fishponds and mitigation ponds, storm water drain/recreational pond, natural watercourse and modified watercourse. Details of these ecological resources are provided in **Section 8** of this report.

3 PLANNING CONTEXT, OPPORTUNITIES AND CONSTRAINTS AND KEY ISSUES

3.1 Overview of Planning Context

A Regional Perspective

3.1.1 One of the key features of the recent Policy Addresses announced by the Chief Executives has been emphasised on the closer economic co-operation and partnership with the Mainland. In his 2011-12 Policy Address, the Chief Executive stated that *"in the National 12th Five Year Plan, our country has expressed her support for Hong Kong to reinforce and enhance our status as an international centre for financial services, trade and shipping and to develop industries where the HKSAR enjoys competitive advantages*". In the 2013 Policy Address, the Chief Executive also stated that "Hong Kong will serve as an international financial centre and a business hub of our country" and "Hong Kong will foster its cooperation with provinces and municipalities in the Mainland".

3.1.2 Meanwhile, the Shenzhen Government announced the development of the Qianhai Shenzhen-Hong Kong Modern Service Industry Cooperation Zone in 2007, which is intended to become a regional centre for modern service industries such as finance, modern logistics, information services, etc. The area is strategically well located at the core of a one-hour traveling distance with Guangdong, Hong Kong and Macau. With future developments in transport, it is expected that it will take 20 minutes to travel from Qianhai to Shenzhen and Hong Kong airports and some 30 minutes to reach Central on Hong Kong Island, offering potential operational interaction for mutual advantages.

Territorial Planning Context

Planning and Development Study on North West New Territories

3.1.3 The NWNT Study, which was commissioned in 1997 and completed in 2003, was one of the several studies commissioned in response to projections of housing demand for Hong Kong arising from the Territory Development Strategy Review in 1996. The NWNT Study examined the scope and feasibility of accommodating strategic growth development needs in terms of population and employment.

3.1.4 The NWNT Study identified the HSK SGA with an area of about 450 ha as a suitable NDA to cater for the long-term development needs of Hong Kong. It was proposed to accommodate a population of about 160,000 (of which about 100,000 was strategic population) and to provide about 48,000 employment upon full development.

3.1.5 The RODP of the HSK SGA under the NWNT Study and the priority and non-priority action areas are shown in **Figure 3.1.1**. The proposed land use consisted of residential uses with commercial / retail developments supported by GIC and open space provision. The north-western fringe of the area was designated for business estate and container backup.

3.1.6 The most fundamental land use planning principle underlying the RODP was the concentration of residential development around the existing and proposed railway stations. The NWNT Study envisaged to provide rail-based residential development based on environmentally friendly design principles. High-density development was located within 500 m walking distance catchment of the planned WR HSK Station. Residential density was proposed to decrease concentrically around the rail station as the distance from each station increases. The existing HSK centre along Castle Peak Road presented a secondary higher density node, served by the LRT rather than directly by WR. Residential density increased incrementally in proportion to the proximity to each station. In short, the principal tenets of the planning approach adopted by the NWNT Study included the following:

- Provide residential development within walking catchment of proposed WR HSK station;
- Adopt a stepped-density concept with the highest density at the core areas;
- Create a balanced community mix with residential development and GIC and recreational facilities, and a Green Transit System to allow safe and efficient pedestrianisation, cycling and the use of travelators;
- Provide opportunities for business and office uses;
- Retention of existing "V" zones; and
- Achieve green and safe neighbourhoods.

3.1.7 The major development parameters of the HSK SGA under the NWNT Study are summarised in **Table 3.1.1** below.

Table 3.1.1 Major Development Parameters of the HSK SGA under the NWNT Study

	SGA Priority Action Area	**SGA Non-priority Action Area**
Population	About 102,246	About 59,695 including village clusters
Max. Plot Ratio (PR)	The PR for private sites and public housing within 500 m catchment of rail station was 6.5 and outside 500m catchment was 5.0	-
Housing Mix	57* (public) : 43 (private) *The distribution of flats among public housing categories PRH, Home Ownership Scheme (HOS) and Private Sector Participation Scheme was 44%, 35% and 21% respectively.	-
Employment	About 48,000 • PR 5 was proposed for commercial zone with a total of about 350,000 m^2 of office floor space which is well above the critical mass of 0.2 million m^2 considered the minimum necessary to support a minor office node in the Office Land Development Strategy. • The Business Estate (renamed as Business Use towards the end of the NWNT Study) was proposed based on the recommendation of the Business Estate Study at that time. A PR of 2.5 was proposed. • A total of about 127,000 m^2 retail floor space at a provision level of some 0.81m^2 per person was provided. 0.5 and 0.15 non-domestic PRs were proposed for private and public residential sites. • The NWNT Study has also allocated land for container back-up (45 ha) in the HSK SGA with the consideration of strategic locational requirement of being close to existing or future border crossings.	

3.1.8 However, in the light of a slower population growth of population and housing demand at that time, the HSK SGA proposal was shelved. In fact, since the completion of the NWNT Study, the provision of new transport infrastructure have also militated against the realisation of the land use proposals put forward in the NWNT Study. In particular, the WR had yet came into operation at the time of the NWNT Study was prepared. The implication of this fast and convenient rail connection between the urban core areas and the NWNT warrants careful re-consideration of the land use proposals for the HSK area. The KSWH which provides a strategic road transport link to Shenzhen was also constructed with the final layout and alignment different from the one shown on the RODP of the NWNT Study.

Hong Kong 2030: Planning Vision and Strategy Study

3.1.9 The HK2030 Study, completed in October 2007, was tasked to update the Territorial Development Strategy for Hong Kong recommending how Hong Kong's spatial environment should respond to various social, economic and environmental needs in the next 20 to 30 years. The HK2030 Study proposed that the planning strategy should focus on three planning directions, which are providing a quality living environment, enhancing economic competitiveness, and strengthening links with the Mainland.

3.1.10 The HK2030 Study has confirmed the need for NDAs development in the longer term to meet the needs of the population, providing not only a mixture of public and private housing land, but to meet other land use requirements as well. The NDAs would offer an alternative choice of living through the development of a quality living environment with convenient access to mass transportation and community facilities. The shifting of some of the population from the dense urban areas to the New Territories would also achieve a more balanced territorial development pattern. Of the NDAs in the New Territories identified in past studies, the HK2030 Study has recommended the HSK NDA as one of the NDAs for priority consideration. Apart from providing housing land, it is anticipated that part of the HSK NDA could be considered for the provision of land reserves for special industries to meet longer-term needs.

Latest Planning Circumstances

3.1.11 Moreover, there have been changes in the public aspirations for better living environment in recent years. There are also new planning requirements requiring careful consideration in the planning of NDAs:

- **Introduction of New Legislation and Guidelines on Sustainable Built Environment:** There have been rising public concerns over the quality and sustainability of the built environment, including issues regarding building bulk and height, air ventilation, greening and energy efficiency in buildings. In 2009, the Council for Sustainable Development launched a public engagement process entitled "Building Design to Foster a Quality and Sustainable Built Environment" in collaboration with the Government to promote good quality living environment. The exercise pointed out a need to put in place new measures to encourage quality and sustainability in built environment. To this end, 15 other practice notes including Practice Notes for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers Part B – Application of the Buildings Ordinance and Regulations APP151 and APP152 were promulgated in January 2011 to set out detailed requirements and guidelines, covering the following major elements, to promote a quality and sustainable built environment.

- **Amendment of the Air Quality Ordinance**: The amendment of the Air Pollution Control Ordinance took place in 2012-13 and the new Air Quality Objectives (AQOs) has been in effect since early 2014. The new AQOs have tightened the requirements. The HSK NDA will need to take account of such in the EIA Study.

- **Experience from the NENT NDAs Study:** There are a number of lessons to be learnt from the NENT NDAs Study including the bottom up design approach adopted. In addition, the NENT NDAs Study recognised the need to provide a sustainable community for the people of Hong Kong in a timely fashion and the need to provide an appropriate housing mix and development density, both of which are important considerations that can be adopted under this Study. The introduction of community facilities in tandem with the population build up was also an important element of the NENT NDAs Study. The proposed implementation strategy is also important considerations that could be made reference to in the HSK NDA Study.

Local Planning Context

3.1.12 According to the Revised RODP, the HSK NDA falls within the planning scheme areas previously covered mostly by the Ha Tsuen OZP and Ping Shan OZP, with a piece of land near Lau Fau Shan roundabout covered by the Lau Fau Shan & Tsim Bei Tsui OZP, the existing Tin Shui Wai Main Channel covered by the Tin Shui Wai OZP, a piece of land to the south-east covered by the Tong Yan San Tsuen OZP, and an area in the south-west of the HSK NDA covered by the Lam Tei & Yick Yuen OZP. The existing land use zonings under the extant OZPs are shown in **Figure 3.1.2**.

3.2 Development Opportunities

Provides a Strategic Residential Solution Space

3.2.1 The HSK NDA of a flat terrain can form an extension to the Tin Shui Wai New Town in the northeast, and is apparently the only flat and plain area relatively underdeveloped when compared with other parts of Hong Kong. Providing residential developments within the HSK NDA will assist in creating additional housing stock for Hong Kong to meet with the Government's annual housing targets, which (according to the 2011/12 Policy address) aimed to supply a total of 40,000 residential units per annum on average, including the resumption of HOS with the production of 5,000 flats a year, 20,000 private residential flats each year and an average of 15,000 PRH units per year. These targets have been modified and reduced under the 2013 Policy Address, but, nevertheless, remain challenging.

Acts as a Gateway to the North West New Territories

3.2.2 Situated in the NWNT in close proximity to the Mainland, the HSK NDA also occupies a strategic location in the territory. At present, it is easily conveniently accessible by strategic transport infrastructure including the existing KWSH and WR Line, which will be further enhanced by the realisation of planned new transport infrastructure including the proposed Tuen Mun Western Bypass (TMWB), as well as the Tuen Mun-Chek Lap Kok Link and the Hong Kong-Zhuhai-Macao Bridge under construction. These transport infrastructures will enhance the accessibility of the NWNT including the HSK NDA, which could be developed with residential, commercial and community facilities serving the immediate population as well as the wider region. This hub of activities could help to create a vibrant community with a clear sense of identity and the HSK NDA could become an economic driver of growth in the region. It is envisaged that the HSK NDA could be developed as the "west gate" to the NWNT to seize the opportunity for further regional economic cooperation.

3.2.3 In a wider context, the proposed HSK NDA is strategically located in close proximity to the border of the Mainland, and efficiently linked with the new development nodes at Lantau and the Greater Pearl River Delta (PRD) region. The HSK NDA will serve as a transport gateway, providing cross boundary transport to and from Shenzhen and Hong Kong Airport. For examples, the opening of Shenzhen Bay Port in 2007, together with the Lok Ma Chau Boundary Crossing (road and railway) has allowed easy access from western part of New Territories to western part of Shenzhen, which is also in line with the shift of focus to the western part of Shenzhen brought by the forthcoming development of Qianhai as a major commercial and service centre. Given that it will be the first place that many visitors will see when arriving in Hong Kong, it will also serve as a visual gateway and a strong welcoming design should be implemented at the entrance to engender a positive image of Hong Kong at its boundary with the Mainland.

Fosters Closer Cooperation with Qianhai Development

3.2.4 Given its proximity to Shenzhen, the HSK NDA has the potential to capitalise on its locational advantage to explore economic and development opportunities between the two areas through appropriate land use and transport planning as well as co-operation in cross-boundary infrastructure planning. The HSK NDA could act as a gateway for economic integration with Qianhai in Shenzhen which would likely strengthen and increase the flow of goods and services between these two areas, resulting in economic benefits for Hong Kong. In particular, trading and exportation between the two administrations could be facilitated by the provision of logistics related services within the NDA. The port of Hong Kong and its airport provide exporters with major advantages (e.g. security, speed of processing and delivery and insurance) thus the NDA could offer sites for the processing and transport.

3.3 Development Constraints

Traffic Constraints

3.3.1 Within the boundary of the HSK NDA, YLH is a major strategic east-west traffic corridor in the area providing connection to the urban areas via Route 2, Route 3 and Route 9, as well as to the Mainland via Shenzhen Bay Port. Castle Peak Road operates to serve the local traffic movements generated by the developments in the area. The traffic from the HSK NDA will make use of Tuen Mun Road and YLH at Lam Tei Interchange and Long Tin Road Interchange via Castle Peak Road and will likely increase the traffic loading of it, which is also a key public transport corridor in the area with several franchised bus, green minibus, public light bus and LRT routes travelling on it. Meanwhile, Hung Tin Road and Tin Ying Road currently provide local traffic connection between HSK / Tin Shui Wai and YLH. As such, Tin Tsz Road and Long Tin Road might be affected by the HSK NDA development as the generated traffic may use these roads as an alternative route to access YLH via Tong Yan San Tsuen Interchange. In gist, the existing major road links will likely be affected by the increase of road traffic due to the HSK NDA development. The traffic impacts to the road network has to be taken into account when considering the planning of the HSK NDA, and possible adverse impact due to traffic flow diversion in the existing strategic roads should be observed.

3.3.2 On top of the existing road networks discussed, new strategic roads (committed or under planning) within or in the vicinity of the AOI, such as Tuen Mun-Chek Lap Kok Link and the TMWB and Route 11 under planning, would be essential to support the development at the HSK before the full in-take of the HSK NDA.

3.3.3 The Tin Shui Wai Station is now the nearest existing WR station to the HSK area and locates at the eastern edge of the HSK NDA. Most of the HSK area is not within the 500 m catchment area of the station and thus the current residents and workers in the HSK area would need to travel by MTR feeder bus or other transport modes to access Tin Shui Wai Station for using WR Line service. Similarly, most of the HSK NDA is also not within the catchment area of the LRT along Castle Peak Road. As such, an effective public transport network system including rail services has to be considered to facilitate inter and intra district movement of the future residents and workers.

Environmental Constraints

3.3.4 A number of environmental constraints posed by the existing transport infrastructures require careful consideration in the planning of the HSK NDA. In particular, the existing WR Line and LRT fall within the HSK NDA from the southwest to the east fragment much of the land and are expected to pose constraints to the nearby developments in terms of environmental and visual impacts. The existing major distributors including KSWH, Castle Peak Road and Hung Tin Road are also potential air pollution and noise source and will likely generate environmental impacts to the nearby developments within the NDA.

3.3.5 Moreover, the HSK NDA falls within the Deep Bay catchment area and is subject to the requirement that no additional pollution load should be discharged into the Deep Bay as a result of any new proposed development. For new developments within the NDA, apart from the provision of proper sewage treatment facilities, sewerage measures are required to ensure no net increase of pollution load to the sensitive Deep Bay Area.

Physical Constraints

3.3.6 Apart from imposing environmental constraints, many of these existing/planned infrastructures poses constraints to efficient land use planning in the NDA. In particular, the southern extent of the HSK NDA is currently traversed by the WR Line, which the alignment of the running tracks are located on viaduct at an elevation that is generally around and in excess of 20mPD. The WR Line has fragmented much of the land parcels and would pose environmental constraints, requiring careful planning of development sites along the alignment.

3.3.7 Apart from the WR Line, the existing Tin Shui Wai Main Channel also traverses the area in a north-south direction and segregate land parcels within the NDA. The existing Tin Ying Road along Tin Shui Wai Main Channel further hinders connection between the HSK NDA and Tin Shui Wai New Town. Careful planning and urban design is required to transform this constraint into merit by revitalising the river channel and capitalising the promenade for a better pedestrian environment. Connection between both sides of the river channel is also of high importance to minimise blockage caused by the river channel. In particular, the re-planning of Tin Ying Road would help releasing land along the river channel for more efficient uses and enhancing connectivity with Tin Shui Wai New Town.

3.3.8 In addition, the 400kV overhead power lines (with pylons), extending from Black Point to Sha Tin, traverse the southwest of the HSK NDA. The future developments within or near the 50 m wayleave corridor of the 400kV overhead power lines should observe relevant requirements, if any, in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG).

Flooding Risk

3.3.9 Areas adjoining Tin Shui Wai New Town along Ping Ha Road are located in the flood plain and flooding is evident. Site formation and the drainage system should be designed to minimise flooding risk to the planned developments and the nearby existing settlements.

3.4 Key Issues

Recognised Villages, Rural Settlements and Permitted Burial Grounds

3.4.1 A number of well-clustered recognised villages are found within the HSK NDA. Potential interface issues between these villages and the proposed developments should be carefully addressed. For example, as the site formation level of the proposed development would likely be higher than the ground level of the existing villages, the drainage impact and risk of flooding to existing villages should be properly considered and mitigated. Compatibility between existing villages and new development should also be addressed by proper planning and urban design.

3.4.2 Meanwhile, there are also other rural settlements scattered in the HSK NDA. While the planning of the HSK NDA has minimised impact on the existing developments as far as possible, impact on some existing structures is unavoidable due to their locations.

3.4.3 Permitted burial grounds are also found at the hillslopes / knolls lying immediately in the southeast, southwest and northwest of the NDA. They should be retained as far as possible unless infrastructure development for the NDA is required.

Proliferation of Port Back-up and Open Storage Uses

3.4.4 Large portions of the HSK NDA are currently being utilised for PBU & OS uses. They are largely temporary and low-rise in nature, and have degraded the rural landscape and resulted in negative environmental and visual impacts. However, it is recognised that some of these brownfield operations are still contributing to our local economy. There may be opportunities to accommodate these uses in more land efficient manner, such as multi-storey buildings and thereby releasing land for other optimal uses. Nonetheless, given this is likely to be an incremental process, concerns pertaining to the interface of new developments with retained/remaining PBU & OS uses during the construction stage need to be addressed.

Redresses Imbalanced Communities

3.4.5 Given the preponderance of PRH in the nearby Tin Shui Wai New Town (of which about 80% of the total housing stock is public housing) and the perceived socio-economic impacts that arise from such a living situation, the ratio of public-to-private housing for the HSK NDA should be carefully considered to ensure a balanced economic and social environment. Adequate GIC facilities and utilities could also be provided in the HSK NDA while serving the surrounding neighbourhood. It is desirable that through the development of the HSK NDA, certain improvement can be brought to Tin Shui Wai New Town by redressing the imbalance housing mix and facilities provision.

3.4.6 Moreover, there is also opportunity for the HSK NDA to become an employment hub for the NWNT capitalising its strategic location. This will also bring jobs closer to residents not only in HSK but also Tin Shui Wai, Tuen Mun and Yuen Long. The development of the NDA will also help reduce the imbalance in the spatial distribution of population and jobs in the territory. Together with Tin Shui Wai, Yuen Long and Tuen Mun New Towns, and the Yuen Long South development under planning, it will form a major new town development cluster in the western part of the territory, further promoting agglomeration of economies and efficiency in facility and infrastructure provision.

Preservation of Natural and Landscape Features

3.4.7 A number of ecological and landscape features within and in the surroundings of the HSK NDA could be leveraged to create a green living environment, they include uplands and lowlands, knolls, ridgeline/mountain backdrops of Yuen Tau Shan, woodlands, the San Sang San Tsuen Egretry and associated flight path of ardeids, floral species of conservation interest such as Aquilaica sinensis (土沉香) at the woodland near Tung Tau Tsuen and mitigation ponds for the Deep Bay Link project. During the stage of implementation, due considerations should be given to these features to avoid/minimise adverse impacts of the future developments on the ecological and aesthetic value and natural habitats. Proper planning and land use zoning designation could also help conserve the ecological value of these features and establish an integrated green network for the HSK NDA.

Rich Cultural Heritage

3.4.8 The HSK NDA boasts significant cultural heritage resources including two declared monuments, seven graded historic buildings, and five SAIs. Appropriate planning and land use zoning designation could help incorporate these valuable resources into the planning of the HSK NDA.

4 COMMUNITY ENGAGEMENT

4.1 Introduction

4.1.1 Public consultation is an important part of every study and CE can often lead to new, more creative and more cost effective solutions to development planning. Effective engagement can uncover evidence to inform policy-making and service design, as well as providing an insight into how things will work in practice and help to identify any unintended consequences. Therefore, this Study has taken a proactive approach to collate comments and opinions from the public on the proposed HSK NDA development.

4.2 Community Engagement Programme

4.2.1 To foster community support and general consensus on the key issues, a series of CE activities has been built into the study process. A 3-stage CE exercise has been formulated.

- Stage 1 Community Engagement – First Round (November 2010 – January 2011): to present to various statutory and advisory organisations the key issues of the NDA, including its vision, strategic role and guiding principles.
- Stage 1 Community Engagement – Second Round (December 2011 – February 2012): to meet with the major stakeholders, discuss and exchange views with the public on the development of HSK NDA.
- Stage 2 Community Engagement (July 2013 – October 2013): to consult the public on the PODP and to facilitate formulation of the RODP.
- Stage 3 Community Engagement (June 2015 – September 2015): to brief the public on how the Government had taken into consideration the comments received during Stage 2 CE in formulating the RODP and to obtain feedback to facilitate formulation of the recommended development proposals.

4.3 Stage 1 Community Engagement (Rounds 1 & 2)

4.3.1 The Stage 1 CE (Round 1) was commenced in November 2010 prior to the commencement of the Study to engage the community in the beginning of the Study process to help building the community visions for the HSK NDA and to facilitate the preparation of development concepts for further discussion in the community.

4.3.2 To foster more in-depth discussions and exchange of views on the development of the NDA, the Stage 1 CE (Round 2) was commenced on 9 December 2011 to elicit comments and suggestions from members of the public and local stakeholders. A public forum and community workshops were held on 7 January 2012 at S.K.H. Tin Shui Wai Ling Oi Primary School and over 200 participants were recorded at this event. A series of briefing sessions to relevant boards/committees were arranged, such as the Town Planning Board (TPB), Yuen Long and Tuen Mun District Councils, relevant Rural Committees, as well as local concern groups and representatives of PBU & OS operators. We have also received 2,119 nos. of written public opinions. The public comments and responses were set out in the Stage 1 CE Report and were uploaded onto the Study Website. The major comments received and our responses are summarised in the following paragraphs.

Strategic Roles of the NDA

4.3.3 Members of the public considered that the HSK NDA has to cope with the fast growing development of Shenzhen and the PRD Region. The HSK NDA could be a gateway in the NWNT and Qianhai in Shenzhen and developed as a business and leisure centre with housing development. The NDA could also integrate with the developments in Tuen Mun, Yuen Long and Tin Shui Wai and provide sites for development of industries in the sectors of professional, medical, education and logistics services, innovation & technology and Government offices, and be developed the HSK NDA as a second town centre of Hong Kong, a new centre business district in the NWNT and an international entertainment city. In addition, the future development of HSK could offer a catalytic complementing/remedial role for the re-gentrification of Tin Shui Wai.

Responses

4.3.4 We appreciate the general public support to the development in the NDA with strategic roles and functions taking into account the specific site locations and characteristics. We agree that the trend of further social and economic integration between Hong Kong and the PRD in particular the fast growing Qianhai is inevitable. As such, we have proposed to have business developments including hotels, office, retail as well as residential developments above and in the vicinity of the proposed HSK Station and the existing WR Tin Shui Wai Station. We have also allocated land to the northwest of the NDA next to KSWH for "Special Industry" uses, generating about 100,000 job opportunities in total for the NWNT. We have also purposely designed the road networks within the NDA for better connection with Tin Shui Wai New Town to facilitate residents in Tin Shui Wai to work in the industrial and commercial areas of the HSK NDA to alleviate the insufficient job opportunities in Tin Shui Wai.

Port Back-up and Open Storage Uses

4.3.5 There were comments that in order to meet with the strategic, regional and local needs, the PBU & OS sites should be consolidated and relocated to a more remote area to convert land for development in particular for housing development. It was suggested that the possibility of consolidating container storage in multi-storey facilities to economise on land utilisation as well as developing a high-valued logistics centre in the HSK NDA should be explored. Some advised the Government to adopt flexible approaches for the operators to sustain their living in order to strike for social stability.

Responses

4.3.6 We have investigated the possibility to consolidate the PBU & OS uses within the region to enhance physical and social integration. We have proposed to allocate the land to the northwest part of the NDA as "Special Industry" for PBU & OS uses as the area is close to KSWH, which can easily be connected to Hong Kong International Airport and the Mainland. This would minimise potential environmental impacts and disruption to the residents in the NDA as well as maintaining the operation of the business.

Sustainable Development

4.3.7 There is a consensus that the NDA should be developed following the sustainability principles in planning for an environmentally friendly, people oriented and balanced community and building a model region of quality living environment and harmonious community. There were suggestions on various aspects including building height, development density, low carbon living, use of renewable energy, waste management facilities, grey water re-use, landscape provision and rehabilitation of the existing drainage channels to enhance landscape and ecological values. Others also suggested lowering the ratio of public to private housing, providing GIC facilities, enhancing social integration between existing villages and new developments, promoting environmentally friendly transport means, preserving the existing rural environ and sites with significant ecological values, improving of sewerage system of villages, offering green lifestyle such as urban farming, etc.

Responses

4.3.8 It is our mission to develop the HSK NDA into a sustainable community. We have made reference to the records in the Government for all declared monuments, graded historic buildings and SAIs within the HSK NDA. We have identified features with significant ecological values within and in the vicinity of the NDA. When formulating the land use proposal, we have made special efforts in integrating the existing villages and the surrounding natural environment with the new developments. To create a harmony community with balanced population profile, we proposed to have 51% of public housing and 49% of private buildings, and we have planned lands for community facilities to serve residents in the HSK NDA and other parts in the NWNT. In terms of transport, railway connection are proposed to be the backbone of public transport for the HSK NDA. We have also reserved land along main roads within the HSK NDA for environmentally friendly transport system and will consider promoting walking and cycling a cycle tracks to promote an alternative means of transport. We will also consider introducing energy saving measures at different levels, and exploring ways to achieve energy-efficient objectives, as well as promoting a low carbon economy. In addition, we will study on the provision of the infrastructure within the HSK NDA such as improving the existing sewerage and drainage systems to build a better environment.

Implementation Mechanism

4.3.9 Representatives and residents from Tan Kwai Tsuen and Wo Ping San Tsuen expressed strong views to retain their villages. Some villagers as well as Yuen Long District Council and Heung Yee Kuk said that the new development should not be at the expenses of the village development rights. Local residents requested the Government not to freeze the land for village expansion and Small House applications prior to the implementation of the NDA. Meanwhile, some residents would accept the resettlement and re-housing approach. However, they considered that the prevailing compensation rates were outdated and should be reviewed to reflect the current market situation. Meanwhile, some recommended early and phased implementation of the development. There were comments suggesting resumption of land only for public housing and infrastructure and the early implementation of infrastructure can facilitate private sectors to develop their private land. However, some objected to the development of the NDA by private developers.

Responses

4.3.10 We appreciate the comments from the public and the implementation mechanism and approach of the HSK NDA must be fair and equitable, in the public interest and in line with the legislative framework and the overall planning concept of the NDA. Different views will need to be carefully considered in the next stage. Since the development of the HSK NDA is still in its early planning stage, the detailed development option and the extent of affected areas are still subject to further studies. The Government has not yet commenced any land resumption process for public uses. In the next stage, the Study will assess and recommend a development programme for various project items of the NDA development. We also agree that landowners' rights must be respected and reasonable compensation should be given to affected persons. We understand that the implementation of the NDA will certainly affected local residents and business operators in the area and land resumption and clearance are inevitable. We will investigate the arrangements on land resumption, compensation and re-housing with relevant Government departments; and take into account the comments raised by the members of the public.

4.4 Stage 2 Community Engagement

4.4.1 The Stage 2 CE was held from 15 July to 22 October 2013 for approximately three months. The main purpose of the Stage 2 CE was to collect comments from the public on the PODP through an open exchange of views, and seek consensus on the land use planning and development framework for the NDA so as to facilitate the preparation of the RODP in the next stage. A public forum and various briefing sessions to relevant boards/committees, concern groups and local stakeholders were held. A total of 1,401 written comments were also received. The public comments received were set out in the Stage 2 CE Report and were uploaded onto the Study Website. The following paragraphs summarise the key comments received during the Stage 2 CE and our responses.

Need and Positioning of the NDA

4.4.2 Some of the supporting comments pointed out that the NDA would help meeting the housing and development needs of Hong Kong, bringing more job opportunities and enhancing the general environment for Tin Shui Wai. Those public and organisations supporting the development considered that taking into account the strategic location of the HSK NDA, the positioning of the HSK NDA as the regional hub of the NWNT was welcomed. However, some comments alleged that the infrastructure and job opportunities within the NDA were not planned for people of Hong Kong but rather for those from the Mainland. The Government should review the population and immigration policy to control the increase of population of Hong Kong so as to reduce the need of land and development of the NDA.

Responses

4.4.3 Commanding a strategic location in the NWNT with existing and planned railways and highways linking the Hong Kong International Airport, different districts of Hong Kong and Shenzhen, the HSK NDA will be developed into a new generation new town to support the social and economic growth of our territory. Adhering to the planning principles for creating a sustainable, people-oriented and balanced community, the HSK NDA is planned and built for the Hong Kong people as a place for living, work, learn and play. The HSK NDA will be a major source of land supply to meet the housing needs of Hong Kong in the medium to long term. More important, it will be a regional commercial and civic hub of the NWNT fostering Hong Kong's economy, providing employment opportunities and supporting services, not only for the future population in the NDA but also the residents in Tin Shui Wai, Tuen Mun and Yuen Long New Towns as well as the planned Yuen Long South development. The development of the HSK NDA will help balancing the territorial spatial distribution of population and employment, and at the same time optimising effective sharing of infrastructure and GIC facilities. Allegations of the NDA being meant to serve Mainlanders are largely due to misconception.

Economic Development

4.4.4 Some members of the public commented that the commercial element around the railway stations was inadequate. The Government should capitalise the opportunity to provide in the vicinity of the proposed HSK station for reaching a critical mass for commercial activities to flourish by providing a large hotel-cum-shopping complex. Some comments suggested flea markets around the railway stations with retail elements integrated with the open space. Some also recommended exploring connection from the proposed HSK Station to and from Qianhai Airport in order to develop the HSK NDA as a hub for cross-border tourism. On the other hand, some commenters opposed the development of mega shopping facilities as it would not be conducive to nurturing local small- and medium-sized businesses. Shops with local characteristics should be planned in local district to enhance street vibrancy. There were also views to promote tourism in Lau Fau Shan by providing new tourist attraction and hence creating job opportunities in the area.

Responses

4.4.5 To further capitalise the strategic location of the proposed HSK Station, areas around the station have been restructured and intensified for commercial uses on the RODP. The commercial node function will be complemented by civic elements and public services, including a magistracy, Government offices and community hall in close proximity. Similarly, areas around WR Tin Shui Wai station have also been restructured and rezoned under the RODP to provide a district commercial node. Shopping streets are also introduced at various locations to promote street vibrancy to provide an alternative shopping experience and choice for residents. In response to the public request to boost the local economy in Lau Fau Shan and enhance tourism in the area, a new "Commercial" ("C") zone with public carpark is introduced on the RODP in this area with the newly proposed Environmentally Friendly Transport Services (EFTS) extended to this northern part of the NDA for better accessibility.

Reserving Land for Logistics and Information Technology & Telecommunication (IT&T) Development

4.4.6 The Hong Kong Logistics Association showed full support on the provision of land reserved for logistics use in HSK NDA. Supporting comments were also received on the location of the logistics quarter beside KSWH which could avoid additional traffic flow generated in other areas of the NDA. To allow sustainable development of the Hong Kong logistics industry, the rental cost should be kept at a reasonable level to support the small and medium enterprises. There were also comments urging the Government to put forward relevant policies to facilitate the development of the logistics industry in the HSK NDA. However, there were comments pointing out that HSK was not the best location for logistics facilities, which should be located in Lantau, near Hong Kong Zhuhai Macao Bridge and airport.

4.4.7 With regard to the proposed "Special Industry" quarter for accommodating information technology & telecommunication industries, some public commented that it would duplicate with the Hong Kong Science Park and Cyberport. On the other hand, some comments suggested increasing the area reserved for these uses and developed the area as an Enterprise Park through introducing a wider range of industries.

Responses

4.4.8 The plan for the proposed HSK NDA is to provide land to support the logistics and technology industries to sustain the economic competitiveness of Hong Kong. The proposed Logistics, Enterprise & Technology Quarter on the RODP is meant to achieve this planning intention. About 37 ha of land has been reserved for Logistics Park, while the Government will continue to explore the feasibility to earmark some of the land in other parts of the New Territories for logistics developments as well. Within this quarter, about 24 ha of land has also been reserved for PBU, storage and workshop uses to consolidate the existing brownfield operations. The reservation of land for logistics developments has gained the support from the relevant bureaux/departments, and concerted effort would be made to implement the developments.

4.4.9 To allow flexibility for accommodating other related producer services uses and to enable a wider scope of possible industries, the original "OU (SI - IT&T, Testing & Certification, Business Uses)" zone on the PODP was modified to "OU (Enterprise and Technology Park)" under the RODP with a zoned area of around 9 ha. To enhance accessibility of the Enterprise and Technology Park, this zone has also been shifted southward to locate closer to the "Regional Economic and Civic Hub" around the proposed HSK Station.

Employment

4.4.10 There were comments advocating for more job opportunities in different skillsets such that residents could save from working cross district and avoid potential problems of incurring huge amount of travelling time and expenses. Some comments considered that there should be adequate job opportunities in the NDA to relieve the shortage of jobs in Tin Shui Wai. Some also commented that there was no detail of an economic development policy to justify the estimated jobs and policies should be provided for materialising the proposed special industries. Meanwhile, some commenters expressed concern on the loss of jobs in the NDA, especially those involving in the business operations in HSK who worried that employment opportunities generated from the development in the NDA might not match with the skillsets of residents.

Responses

4.4.11 To capture the development opportunities given by its strategic location on major freight and passenger routes between Hong Kong and Shenzhen, the HSK NDA is planned to accommodate different economic activities. Areas around the HSK Station are structured to become a regional economic and civic hub for commercial and civic uses. A district commercial node with an integrated development area is planned around the WR Tin Shui Wai Station. Two areas with direct access to the KSWH are designated as Logistics, Enterprise & Technology Quarter and "I" zone to provide development spaces for accommodating a wide range of industrial/special industrial uses. All these economic land uses will create jobs of different nature and profiles, allowing more choices for the residents to match with the different skill sets. The number of employment opportunities has been increased from 100,000 under the PODP to 150,000 on the RODP. With the abundant supply of job opportunities, the HSK NDA will become an employment node in the NWNT. It would help addressing the over-concentration of employment in the main urban areas, boosting the vibrancy of local communities, meeting the shortfall of jobs in Tin Shui Wai, as well as easing congestion at the commuting corridors from the New Territories to the urban areas.

Social Mix

4.4.12 There were comments suggesting that the total amount of housing in the NDA should be further increased to meet the keen housing demand in Hong Kong with comprehensive planning for future housing development in Yuen Long, including HSK and Yuen Long South. Furthermore, there is a general support of the public-private housing mix to help redressing the dominance of public housing in Tin Shui Wai New Town. On the other hand, there were comments opined that the proposed housing mix did not follow the recommendation in the Long Term Housing Strategy (i.e. public to private of 60:40). Some suggested that the proposed public housing ratio of 51% was relatively low, yet, some comments suggested that the public housing ratio of 51% was too high and should be reduced to avoid social problems like Tin Shui Wai. There were also different opinions on the proposed locations of public housing development in the NDA. Some comments suggested that public housing development should be located in proximity to the railway stations, but others suggested that the proposed public housing development near the railway stations should be relocated northwards, and free up the land for high density private residential and commercial developments around the stations.

Responses

4.4.13 While there were comments calling for further increase in housing supply, we have to point out that the HSK NDA has been planned with a balanced housing and employment mix with a view to achieving self-containment such that local residents could save from travelling across districts for jobs. Apart from reserving land for housing development, within the NDA, land has to be reserved for economic land uses and GIC facilities as well.

4.4.14 To develop a harmonious community, different types of residential developments meeting different needs, aspirations and affordability have been planned in the NDA. One of the planning objectives of the NDA is to achieve a balanced community and avoid creating a homogenous residential character dominated by public housing like Tin Shui Wai. This concept has been carried forward from the PODP to RODP, a ratio of 51:49 public to private housing units is proposed under the RODP of the NDA, the overall public private ratio is about 69:31 when the housing of Tin Shui Wai is taken into account. The arrangement is targeted to achieving a proper balance in the regional context. To address the public comment of avoiding the clustering public housing developments in one location, the disposition of the public housing sites have been reviewed when formulating the RODP.

Government, Institute and Community Facilities

4.4.15 There were comments calling for adequate GIC facilities and open spaces within the NDA, which should also be commissioned in conjunction with the population build up in the NDA. Some suggested that more elderly services, schools, pet parks and infrastructure should be developed in the NDA. Specific proposals were also received on request to retain privately owned church, aged home and school.

4.4.16 The public comments in general welcomed the proposals of developing clinic and hospital in the NDA. Comments on the location for medical services were diverse. Villagers of Shek Po Tsuen and Hung Uk Tsuen considered the proposed hospital site on the PODP too near to their villages and proposed to relocate it to an area further away from the residential neighbourhood. On the other hand, there was comment opined that the hospital should be provided at accessible location with proper road connection and comprehensive traffic arrangement. There were also comments opposing the site proposed for "Education" ("E") in Kiu Wong Street and Kiu Shing Street, as the site was located in a prime area close to WR Tin Shui Wai Station and should rather be used for residential, commercial or hotel developments.

Responses

4.4.17 In planning for the GIC facilities of the HSK NDA, we have reviewed the site constraints and environment. The planning of these facilities has been carried out with reference to the HKPSG, while the requirements from the surrounding developments including the Tin Shui Wai New Town and the proposed Yuen Long South development have also been taken into account. In drawing up the development schedule, attention will be paid to ensure timely provision of various community facilities in tandem with the population intake of the NDA.

4.4.18 The proposed location of the hospital in the centre of the HSK NDA within walking distance from the WR Tin Shui Wai Station is considered suitable which could facilitate easy access by all residents within and outside the NDA. Moreover, taking into account the public comments received on the Kiu Wong Street and Kiu Shing Street areas, the land uses in the area have been restructured on the RODP by introduction of commercial and mixed use sites, to reinforce the area as a secondary hub of the NDA.

Transport Infrastructure

4.4.19 Many commenters opined that the existing WR and Light Rail (LR) services were saturated especially in the peak hours. They pointed out that most parts of the NDA were not served by public transport. The existing public transport facilities could not cope with the future population of the NDA. There were suggestions that sufficient feeder services should be provided in the NDA for connection to WR and LR Stations. The idea of EFTS within the HSK NDA were also supported to cater for the increase in population and job opportunities, and the proposed EFTS should connect to WR and LR stations. Some people suggested extending the LR to the NDA while some people said that the LR occupied large amount of land and there were accidents occurred at road junctions. Other suggestions include building railway connecting from Tuen Mun and Tsuen Wan, providing another WR station at Tin Shui Wai, and increasing the frequency of the WR and LR services.

4.4.20 In terms of road network, some people expressed concerns to the re-planning of Tin Ying Road as it would increase traffic demand on Ping Ha Road and affecting bus route connecting residents in the northern part of Tin Shui Wai with WR Tin Shui Wai Station. On the other hand, some commenters supported the proposal as it could facilitate integration with Tin Shui Wai and eliminate the noise problems. The whole transport network should be carefully planned to deal with the impacts brought by the re-planning of Tin Ying Road. Some comments suggested widening of Kiu Hung Road and Lau Fau Shan Road. Other suggestions received including reviewing the previous proposal on Route 10, purchasing off Tai Lam Tunnel, widening Castle Peak Road, YLH and KSWH, developing the Northern Link with railway linking Lok Ma Chau and Lo Wu, etc. Some comments suggested that a sustainable transport strategy should be adopted in the NDA, with comprehensive public transport, cycle tracks and footpaths connecting different land parcels.

Responses

4.4.21 A comprehensive road network is proposed in the NDA through modification of the existing roads and provisions of new roads. The proposed road network will thoroughly link up all the areas within the NDA as well as providing convenient linkage with nearby area such as Tin Shui Wai and the strategic highways. A number of Public Transport Interchanges (PTIs) are also proposed for facilitating the provision of new public transport. The existing cycle tracks in HSK are to be strengthened with new cycle tracks to form a complete cycle track network within the NDA. A designated corridor for Green Transit Corridor (GTC) going through the developments in the NDA and connecting to the existing WR Tin Shui Wai Station and proposed HSK Station have been reserved in the RODP, which will include a rail-based or road-based EFTS, pedestrian walkways and cycle tracks. By providing this designated corridor, a fast, convenient and obstacle-free feeder service can be provided for people travelling within the NDA as well as to the nearby WR Stations. Meanwhile, the re-planning of Tin Ying Road will provide a leisure riverside development along river channel and will facilitate a better connectivity between Tin Shui Wai and the NDA.

4.4.22 We understand that some of the existing strategic highway infrastructures may become very congested as new developments in the NWNT are implemented. The Government will timely provide new strategic highway infrastructure connecting to Tuen Mun and the urban areas to cope with the increased traffic demand arising from the implementation of the proposed developments in the NWNT.

Displacement of Domestic Dwellings / Compensation and Rehousing

4.4.23 Most of the comments received from villages of Yick Yuen Tsuen, Tin Sam Sang Tsuen, Shek Po Road Mei Tsuen, San Sang San Tsuen, and Sha Chau Lei (II), expressed their strong view of “no removal and no demolition”. They opined that the development was unfair and would destroy their community and living environment established in the past few decades. Some expressed discontent that the Government had not provided clear response on the rehousing and compensation arrangements and requested for proper compensation and re-settlement arrangement. They also urged for early announcement of the compensation and rehousing arrangements.

4.4.24 There were also opinions from other members of public putting emphasis that the Government should properly deal with the compensation and rehousing arrangement for those existing residents affected by the NDA project. They urged the Government to review the prevailing policies on compensation and resettlement as they have been used for many years and could not benefit the affected residents. Some considered that the Government should apply the same compensation arrangement for resuming land in Tsoi Yuen Tsuen for the Guangzhou-Shenzhen-Hong Kong Express Rail Link and that recently announced for the NENT NDAs projects.

Responses

4.4.25 The planning of the HSK NDA has minimised impact on existing residents as far as possible. Nevertheless, it is inevitable that some existing domestic structures would be affected to cope with the comprehensive plan for the NDA as they were located either at or in close proximity of the future town centre of the NDA, the proposed HSK Station or the sites required for transport infrastructure and public facilities. We will devise suitable arrangement for all those affected by the NDA development. In this connection, we plan to provide local rehousing to the eligible affected households and suitable sites would be reserved for this purpose. The Government is fully aware of the public's concern on clearance and will consider a special compensation and rehousing arrangements for the eligible clearees, making reference to the compensation and rehousing package for the KTN and FLN NDAs. Taking into account public's further views in the Stage 3 CE, the Government will look into details of the compensation and rehousing arrangement.

4.4.26 In any case, the Government will ensure that the affected households, which fulfill the eligibility criteria under prevailing policy, will have applicable compensation or rehousing arrangement.

Implementation Mechanism and Programme

4.4.27 Diverse comments were received on the implementation mechanism of the NDA. Some commenters supported the Government to adopt the Conventional New Town (CNT) approach as the primary mode for implementation for developing the NDA while some objected as they believed that it would deprive the rights of land owner and developers, and recommended to implement the proposal according to market force or private-public partnership approach. In terms of compensation, some comments alleged that ex-gratia compensation for land resumption should adopt the rate for Zone A. Issuance of land exchange entitlements to the affected landowners should also be considered. Some commented that vegetations and trees grown by local residents should also be compensated. Some commenters also urged the Administration to compress the project timeframe and consider implementing the proposed development in phases.

Responses

4.4.28 With a view to achieving a comprehensive planning and well-coordinated implementation programme for timely provision of housing, infrastructure and community facilities to meet our various needs, the Government will adopt the CNT approach as the primary mode for implementation for developing the HSK NDA. The Government will resume land required for the NDA while allowing the processing of land owner's applications for land exchange over individual sites planned for private developments, subject to meeting specified criteria and conditions. Taking into account the views suggested collected in the Stage 3 CE, further details of the above implementation arrangement for the HSK NDA project will be worked out in the next stage.

4.4.29 The HSK NDA will be developed in stages. To meet the current target for first population intake by 2024, site formation and engineering infrastructure works would commence in 2020. We shall formulate detailed development timetable and staging plan at the next stage, in light of the public views and suggestions collected in Stage 3 CE. In drawing up the development schedule, attention will be paid to ensure timely provision of various community facilities and infrastructure in tandem with the population intake of the NDA.

4.5 Stage 3 Community Engagement

4.5.1 The Stage 3 CE was held from 17 June to 16 September 2015 for three months. Taking into account public comments received in the Stage 2 CE, the planning and engineering considerations and the results of technical assessments, the RODP was formulated and the public was consulted on the RODP through the Stage 3 CE. Public views on the RODP were gathered through public forum and meetings with various statutory/advisory bodies, professional institutes, relevant stakeholders, local residents' concern groups, and business operators and owners. We have also received a total of 1,224 written comments including both supportive and opposing comments. A summary of the major comments collected during the Stage 3 CE and our responses are set out below.

Need and Positioning of the NDA

4.5.2 Given the strategic location, the HSK NDA could complement Qianhai's development, bringing out Hong Kong's advantages in producer services and creating synergy with the enterprises in Qianhai. Some comments raised that Hong Kong should provide more land for economic development to seize the opportunity brought by the "One Belt, One Road" initiatives of Mainland. On the other hand, some were of the view that the NDA development should be solely for the Hong Kong people but not for assisting the economic growth of Shenzhen. Some comments stated that there were not enough land designated for residential development on the RODP, and that half of which were designated for private housing development and were unable to meet the housing demand of local residents. Some comments stated that the HSK NDA was not planned with sufficient civic facilities, and its positioning as the "Regional Economic and Civic Hub" for the NWNT could hardly be achieved.

Responses

4.5.3 The HSK NDA, being strategically located in the NWNT and well connected to the Hong Kong International Airport and areas of Hong Kong and Shenzhen, is positioned to serve as a "Regional Economic and Civic Hub" for the NWNT. It will be developed as a new generation new town for supporting the social and economic development of Hong Kong. Adhering to the planning principles for creating a sustainable, people-oriented and balanced community, the HSK NDA will be a desirable place to live, work, learn and play for the Hong Kong people. It will also offer development spaces for various residential, commercial, GIC, logistics and industrial facilities. The wide range of land uses will help the HSK NDA to be developed as a "Regional Economic and Civic Hub", and create new employment opportunities of different types and nature for the residents in HSK as well as the neighbouring areas.

4.5.4 Allegations of the NDA being meant to serve Mainlanders are largely due to misconception. The HSK NDA is positioned as a new generation new town for Hong Kong people providing new housing and development spaces for various commercial and special industrial uses and GIC facilities to serve Hong Kong in the medium to long term. According to the Revised RODP, the NDA will have a population of approximately 218,000 and approximately 61,000 new residential units. The public-private housing mix of the Revised RODP would be 51:49, or an overall ratio of 69:31 with the Tin Shui Wai New Town included, contributing to a balance in residential development in the region.

Economic Development

4.5.5 Some comments opined that there should be more mixed developments near the proposed HSK Station to foster economic activities in the NDA. However, as the commercial facilities and employment would be centred around the south of the HSK NDA, some opined that residents from Tin Shui Wai would not be benefited and more commercial and Government facilities should be developed in the northern part of the NDA. Some commenters concerned that the development of hotels and mega shopping malls would turn the HSK NDA into a tourist area, leading to increase in rent and cost of living, and in turn affecting the livelihood of local residents. Some expressed concern over the mode/type of operation of the shopping streets.

Responses

4.5.6 To further capitalise on the strategic location of the proposed HSK Station, the land uses surrounding the station has been re-arranged to enhance the scale of commercial uses and to facilitate connection between the residential and commercial developments. In response to public comments requesting for more commercial and community facilities in the northern part of the NDA, we have also adjusted some of the land uses in the northern part of the NDA to form a "Local Service Core", including a Government site located to the south of Tin Wah Road, for the provision of various facilities including community hall, clinic, Refuse Collection Point (RCP), and other community facilities. Moreover, a site near Sha Kong Wai originally planned for an open-air PTI is now rezoned to "Other Specified Uses" ("OU") annotated "Commercial cum PTI and Public Carpark" to better utilise land resources and provide more commercial and GIC facilities for both HSK and Tin Shui Wai residents. Shopping streets are also introduced at various locations to promote street vibrancy to provide alternative business operations and to provide an alternative shopping experience and choice for residents.

Logistics Facilities and Enterprise and Technology Development

4.5.7 The Hong Kong Logistics Association supported the development of the HSK NDA in providing more spaces for the development of Hong Kong's logistics industry. On the contrary, some opined that the land area reserved for logistics facilities were too much as there were already similar developments near the Hong Kong International Airport, and that the logistics industry in Shenzhen Futian and Qianhai was developing rapidly. In addition, comments from the logistics industry generally considered that the size of the land parcels for logistics facilities on the RODP, which was about 2 ha each, was undesirable. Since the requirement of land size for different operations varied, it was suggested to combine some of the logistics sites to about 5 ha and use shared ramp to enhance operational efficiency. Some also expressed concern over the implementation mode of the HSK NDA as there was no mention about timetable for the construction of the logistics facilities.

4.5.8 A comment stated that there was already a Science Park in Hong Kong, and expressed doubt on the proposed Enterprise and Technology Park in the HSK NDA. Furthermore, the industry was concerned about the implementation of the proposed Enterprise and Technology Park, such as whether it would be rented out by the Government or would be developed through land sale.

Responses

4.5.9 The HSK NDA is close to Shenzhen and efficiently linked with the Greater PRD regions. Moreover, the TMWB under planning will connect the HSK NDA to Tuen Mun-Chek Lap Kok Link, the Hong Kong International Airport, the Hong Kong-Zhuhai-Macao Bridge, and its Boundary Crossing Facilities. Given such strategic location, sufficient spaces will be provided in the NDA for accommodating economic uses including modern logistics to maintain Hong Kong's economic competitiveness. The proposal of reserving about 37 ha of land for logistics uses has received the support from relevant bureaux/departments, and the Government will endeavour to implement the development and the implementation mechanism will be worked out in the next stage. Moreover, in responses to operators' concerns, sites zoned as "OU (Logistics Facility)" have been reconfigured and enlarged (ranging from 3.5 ha to 4.8 ha) under the Revised RODP. We are also aware that more flexibility should be reserved in the detailed design in order to accommodate the ever-changing mode of operation of the logistics industry in relation to technological advancement.

4.5.10 The Enterprise and Technology Park will also be a major source of employment opportunities within the HSK NDA, and will help broaden the economic base of Hong Kong. The proposal of reserving about 9 ha of land for Enterprise and Technology Park has gained support from relevant bureaux and departments, and the implementation mechanism will be worked out in the next stage.

Employment Opportunities

4.5.11 A number of comments raised concerns about cross-district employment issues and there were suggestions to broaden the types of employments in the NDA to better match with the skill sets of local residents. Nevertheless, there were comments stating that the ratios of cross-district employment would not decrease because of the increase in local employment opportunities. There were also queries on the estimation of the 150,000 new employment opportunities brought by the HSK NDA project and urged the Government to provide more concrete data to explain the estimation methods. An economic consultant suggested further increasing the planned population especially private housing to attract more businesses and labour force to the HSK NDA.

Responses

4.5.12 Through the provision of a basket of suitable and diversified commercial, industrial, community and Government land uses, the HSK NDA will offer spaces for accommodating various economic and social activities. The employment opportunities figure on the Revised RODP is about 150,000, among which 75,000 in commercial sector, 61,000 in special industry, and 14,000 in community services sector. This would help addressing the problem of over-concentration of employment opportunities in the urban areas, boosting the vibrancy of local communities, meeting the shortfall of jobs in Tin Shui Wai, as well as easing traffic congestion at the commuting corridors between the New Territories and the urban areas. The above-mentioned employment opportunities span across a wide spectrum of sectors, requiring high to general skill sets from workers with different educational background.

Housing Mix

4.5.13 Some comments supported the proposed housing mix of the HSK NDA and opined that the public-private housing ratio was better than the Tin Shui Wai New Town. However, some questioned the half-and-half ratio proposed for the HSK NDA and opined that the proportion of public housing should be higher than that of the private housing, and some raised that there should be more private housing in the HSK NDA such that the public-private housing ratio (including Tin Shui Wai) could reach 60:40. Furthermore, some comments pointed out that the target group for PRH and HOS were different and these should be planned separately, with higher ratio for HOS such that aspired home buyers could be benefited from the scheme. There were also comments suggesting a further increase in the overall provision of residential flats in the HSK NDA with a view to increase population and labour force in the area.

Responses

4.5.14 While there were comments calling for further increase in housing supply, we have to point out that the HSK NDA has been planned with a balanced housing and employment mix with a view to enhance self-containment such that local residents could save time from travelling cross districts to work. Apart from reserving land for housing development in the NDA, sufficient land has to be reserved for economic land uses and GIC facilities as well.

4.5.15 To develop a harmonious community, different types of residential developments meeting different needs, aspirations and affordability have been planned in the NDA. One of the planning objectives of the NDA is to achieve a balanced community and avoid creating a homogenous residential character dominated by public housing like Tin Shui Wai. This concept has been carried forward from the PODP to the Revised RODP. We have maintained the ratio of public to private housing units as 51:49 (together with Tin Shui Wai New Town, the ratio would be 69:31). This arrangement is to achieve a proper balance in the regional context.

Government, Institute and Community Facilities

4.5.16 Several Legislative Council (LegCo) members and District Council members suggested the Government to develop a Government complex in the northern part of the NDA to serve both the residents of Tin Shui Wai and the HSK NDA. Other commenters also urged the Government to take into consideration the interest of Tin Shui Wai and Ping Shan Heung when planning the NDA.

4.5.17 The public generally supported the provision of hospital and clinic facilities in the HSK NDA. However, villagers of Shek Po Tsuen and Hung Uk Tsuen expressed objections towards the hospital near their villages. The villagers of Shek Po Tsuen and residents of Hung Fuk Estate also objected to various RCPs as these facilities were obnoxious and would affect the living environment. While there was a comment considering that the Government should designate some “Government” (“G”) zones as buffer areas to allow flexibility to accommodate future development needs, some opined that in view of the shortage of land in Hong Kong, the “G(Reserve)” sites should be re-planned for residential and commercial uses.

4.5.18 Some commenters also urged the Government to ensure timely provision of various community facilities and infrastructure in tandem with the population intake of the NDA, and to encourage provision of community facilities from the private sector.

Responses

4.5.19 The HSK NDA will be developed in stages. We will ensure timely land provision for various community facilities and infrastructure in tandem with the population intake of the NDA. When planning for GIC facilities, we have reviewed the existing site environment and constraints, and is planned with reference to the HKPSG and comments from relevant bureaux/departments. We have allocated land at various locations for GIC uses, which will not only serve the future population of the HSK NDA, but also the residents of Tin Shui Wai, Tuen Mun, and Yuen Long New Towns, as well as the Yuen Long South development under planning. During Stage 3 CE, we have received public comments pointing out the shortage of community facilities in Tin Shui Wai. In this regard, we have adjusted some of the land uses in the northern part of the NDA on the Revised RODP to form a "Local Service Core".

4.5.20 With regard to the comments on the proposed hospital, we have adjusted its boundary as well as the layout of its surrounding land uses. The southwestern part of the original hospital site is rezoned for "E" and "G" uses which will further separate the hospital and the villages. Additional amenity strips and open spaces are planned along Hung Tin Road and west of Hung Uk Tsuen and Kiu Tau Wai in order to increase the buffer distance between the villages and the hospital. Besides, a new local road is introduced to the west of Hung Uk Tsuen and Kiu Tau Wai to connect with Hung Tin Road so as to further separate the hospital from Hung Uk Estate and Kiu Tau Wai as well as to provide additional vehicular access points for the hospital and the nearby villages. As for the proposed RCPs, they will adopt the latest enclosed design, which will meet the relevant hygiene standards. As most refuse collection vehicles have already adopted fully enclosed design, the nuisance caused by the operation of the RCP should be minimised.

4.5.21 We have reserved sufficient Government land in the Revised RODP to allow flexibility to cater for the needs arise in the future. We will continue to liaise with different bureaux/departments to explore possible land uses for these Government sites.

Transport Infrastructure

4.5.22 Some residents expressed concern over the traffic impact brought by the population growth in the HSK NDA and considered that there was lack of concrete proposal with regard to internal and external traffic arrangements. Some commented that the current WR Line was reaching its capacity, and the proposed HSK Station would increase the loading on the WR Line. Some opined that the planning of the HSK NDA should not rely on the WR Line as the major mode for external transportation. There were also doubts over the proposed increase of train frequency per hour and number of train compartment could effectively alleviate the current overcrowding situation of the WR Line. Besides, while some suggested that the transport network of the HSK NDA be connected with the existing LR, some opinions suggested the Government should reduce the reliance on LR as the major transport facility in the NWNT.

4.5.23 In terms of road network, there were a number of comments made in light of the re-planning of Tin Ying Road as this road was vital for the existing traffic. Ha Tsuen Rural Committee also expressed concern about the transport infrastructure in the HSK NDA, suggested retaining Tin Ying Road, and widening Lau Fau Shan Road. A concern was expressed over the connections and transport infrastructure between Tin Shui Wai and HSK, and suggested that appropriate road networks should be planned to improve the traffic in the area and strengthen the connectivity between HSK and Tin Shui Wai. Some also stated that Tin Shui Wai had been experiencing serious traffic problems during peak hours and other transport infrastructures connecting Tin Shui Wai and urban areas.

Responses

4.5.24 Traffic and Transport Impact Assessment (TTIA) has been carried out under the Study to assess the need and traffic impacts of the proposed developments. It has recommended the required transport infrastructure to meet the needs of the NDA and proposed public transport infrastructures, including comprehensive road network, cycle track network, PTIs, etc. It has also confirmed that the public road infrastructure, upon completion of the proposed road improvement works, can accommodate the traffic demand from the NDA. The planning of the NDA has also allowed flexibility for the provision of EFTS. It is concluded that the NDA development is technically feasible from the traffic and transportation point of view and will not cause unacceptable traffic impacts.

4.5.25 Regarding railway infrastructure, referring to the paper submitted by the Transport and Housing Bureau to the LegCo Panel on Transport on 17 July 2015 regarding the "Planning of Transport Infrastructure in Northwest New Territories", the construction of Sha Tin to Central Link will bring opportunities for service improvement forming a "East West Corridor" from Tai Wai through Hung Hom to Tuen Mun direct. To alleviate the existing crowdedness of the WR Line, the number of train compartments of the WR Line has been gradually increased from 7-car to 8-car starting from January 2016. The passenger carrying capacity will be increased by about 14% after all WR trains are operated with 8-car. With consideration of the facilities along the "East-West Corridor" (comprises Ma On Shan Line, Sha Tin to Central Link (Tai Wai to Hung Hom Section) and WR Line), we currently estimate that the "East-West Corridor" can ultimately reach an hourly frequency of 28 at each direction, with 8-car trains. On this basis, the carrying capacity of the WR Line will increase by 60% over the 7-car trains operating in 2015 at an hourly frequency of about 20. In the long term, the Government will timely commence studies on improving the carrying capacity of the railways in the NWNT beyond 2031, to cope with the traffic demands. Even though the HSK NDA will bring about increase in population and traffic demand, there will be provision of related road infrastructure and transportation facilities, increase in the operating capacity of the WR Line, and provision of large amount of employment opportunities within the HSK NDA so that many local residents and those from the New Territories could work in the NDA and reduce the need to commute to the urban areas for work. The TTIA for the HSK NDA estimated that the WR Service would be able to cope with the traffic requirements in the HSK NDA. Other transportation facilities, such as long haul bus routes, will be reviewed in due course.

4.5.26 In terms of road network, to cope with the future development and to improve integration of the surrounding areas, there will be reorganisation of the local transportation network to increase its efficiency and capacity, including the construction of new roads, improvements of existing roads and addition of pedestrian footbridges across the Tin Shui Wai Main Channel. Tin Ying Road will be re-planned while its function would be supplemented by the widening of Ping Ha Road and by other newly planned roads to ensure an efficient connection between the NDA and neighbouring areas. After the re-planning of Tin Ying Road, existing buses could re-route to travel via Ping Ha Road or Tin Tsz Road to reach Tin Heng Estate and the existing Tin Shui Wai Station, and does not require to route through roads within the Tin Shui Wai area. Furthermore, future residents could choose to utilise the proposed EFTS to reach the northern part of Tin Shui Wai, the existing Tin Shui Wai Station and the proposed HSK Station. The TTIA for HSK NDA has demonstrated the proposal is acceptable in traffic term as alternative routes would be provided.

4.5.27 In fact, the existing Tin Ying Road is built next to the Tin Shui Wai Main Channel on the elevated embankments and close to the neighbouring residential developments in Tin Shui Wai, leading to a certain degree of noise and air pollution. The embankment design separates Tin Shui Wai from developments to the west, thus will become an obstacle between the residents on both sides of the river channel in future. Tin Ying Road will be re-planned under the proposed traffic network in the NDA, thus releasing land resources for more efficient land uses, including the provision of a riverside promenade, and to introduce an EFTS near Tin Shui Wai, such that Tin Shui Wai could be integrated with the nearby NDA as an overall new town development. The noise and air pollution impacts to neighbouring residents will be relieved after the re-planning of Tin Ying Road. River revitalisation will be adopted in the design of the HSK NDA, a riverside promenade with pedestrian walkways and cycling tracks will be constructed, and it will become a natural resource that could be accessed by the future residents of the NDA as well as those in Tin Shui Wai.

4.5.28 In response to long waiting time at some junctions in Tin Shui Wai during rush hours, we have proposed the construction of a new road at Hung Uk Tsuen and west of Kiu Tau Wai connecting Hung Tin Road on the Revised RODP to provide easy and direct access to the existing Tin Shui Wai Station and neighbouring villages. This road will also act as an alternate path to the proposed HSK hospital and provide an additional connection to the nearby villages.

4.5.29 We also noticed that there are concerns regarding the strategic transport infrastructure after the implementation of the future developments in the NWNT. The Government is planning the TMWB which will connect Tuen Mun – Chek Lap Kok Link and KSWH, with a mid-connection to Tsing Tin Road in Tuen Mun North, to cope with the increasing traffic volume in the NWNT region. With a view to enhancing the connectivity of NWNT with other districts, the Government will conduct a feasibility study for Route 11 which links up Northern Lantau and Yuen Long.

Brownfield Operations

4.5.30 The public generally supported utilising brownfield sites for development and some suggested that only brownfield sites should be used for development to minimise impact on current residents and farmers. Meanwhile, current brownfield operators were generally concerned with relocation and compensation arrangements. Some green groups also expressed concerns towards the implementation mode of the HSK NDA and stated that some brownfield operations might relocate to other greenfield sites in adjacent areas, which would damage the environment and ecology of those areas.

Responses

4.5.31 Within the NDA, it is estimated that some 190 ha brownfield sites will be affected. Currently, these brownfield operations have created considerable environmental impacts. Consolidating the existing brownfield sites and accommodating them into multi-storey building will help reducing the current environmental impacts created by the operations and improve habitat quality.

4.5.32 One of the main objectives of the HSK NDA is to better utilise the chaotic and damaged rural lands to more suitable uses through comprehensive planning and enhanced infrastructure. Many of these brownfield sites involve economic activities providing necessary services and job opportunities to local residents that are still needed in Hong Kong. To develop these areas where the brownfield sites are concentrated into new towns, full-range infrastructural and community facilities have to be provided. Land resumption and clearance, compensation and relocation arrangements will also be involved. Without overall planning and supporting infrastructural facilities, individual developments of brownfield sites in a piecemeal manner would be difficult to support high-density developments including public housing.

4.5.33 To avoid further proliferation of brownfield developments, the clearance of the affected brownfield operations will be carried out in phases during the implementation of the HSK NDA. About 24 ha of land has been reserved for PBU, storage and workshop uses, the Government will actively explore to accommodate some of the affected brownfield operations into the proposed multi-storey buildings in a land-efficient manner. The Government has already commenced the feasibility studies on multi-storey buildings for brownfield operations in mid-2016. The scope of the studies includes conceptual design of multi-storey building, planning, engineering, environmental and financial assessments, and possible mode of operation and management.

Ecological and Environmental Conservation and Revitalisation of River Channel

4.5.34 Some green groups stated that according to the RODP, the egretry was surrounded by logistics facilities and Enterprise and Technology Park. It was suggested that the surrounding area should be rezoned to "GB" and connected with the two "GB" zones next to KSWH, or at least further expanding the "Local Open Space" ("LO") adjacent to the egretry to the same size of the egretry. Some green groups also stated that the egretry was very young and opined that the Government should improve the living environment in order to increase their numbers and to attract egrets in the neighbouring areas to the egretry. Access to the "GB" zone of the egretry should be restricted especially during breeding season. Some green groups also welcomed the idea of revitalising Tin Shui Wai Main Channel, whereas members of the Advisory Council on the Environment (ACE) and some villagers of Tin Sam Tsuen further suggested connecting the riverside promenade near San Lee Uk Tsuen and Tin Sam Tsuen for a continuous promenade.

Responses

4.5.35 An EIA has been conducted for the HSK NDA Study to assess the potential environmental impacts associated with the construction and operation of the project. The assessment has carefully considered the potential impact of the proposed development on various aspects including ecology aspect and formulated suitable mitigation measures to avoid impacts to the ecology and species. The San Sang San Tsuen egretry is one of the areas with higher ecological value. According to the Egretry Counts in Hong Kong Report submitted by the Hong Kong Bird Watching Society to Agriculture, Fisheries and Conservation Department in 2015, there were 4 nests recorded in the San Sang San Tsuen colony. In accordance to the survey conducted by the Consultant in 2012, it was suggested that almost all of the ardeids were recorded flying northeast of the egretry. To offer further protection to the egretry, the adjacent land uses have been re-planned, including relocating the proposed electricity substation (ESS) and enlargement of the "LO" sites adjacent to the egretry on the Revised RODP. The "LO" site is also proposed for passive uses only. Major construction works will be carried out outside the breeding season of ardeids to minimise potential impacts and visual disturbance, and screening should also be provided.

4.5.36 We fully agree that the existing river channels should not only be regenerated and beautified, they should also be used for the enjoyment of the public. The proposed riverside promenade along the regenerated river channel will include pedestrian walkway, cycle track, EFTS, shopping streets and restaurants for convenient access and enjoyment by the public. The pedestrian walkways and cycle tracks will continue along other river channels such that people can travel through the NDA along these scenic routes. In response to the comments from villagers of Tin Sam Tsuen and the ACE, we have examined the alignment of the revitalised river channel and proposed to realigned the section near Tin Sam Tsuen with corresponding adjustments to the "V" zone boundary of Tin Sam Tsuen and expansion of the adjacent "LO" in order to provide a continuous promenade in north-south direction from Tin Shui Wai to the south of the NDA.

Cultural Heritage

4.5.37 Heung Yee Kuk N.T. stated that village traditions and cultural heritage must be preserved. A Village Representative of Ha Tsuen Rural Committee said the planning of HSK NDA should take into account the fung shui lanes of Ha Tsuen and must respect the traditions and history of the villages. There were also comments requesting the Government to preserve heritage items, including historic buildings with distinguished features and cultural heritage within villages. Some villagers stated that there were quite a number of old houses within the affected villages with over a hundred years of history and bore witness to the development of the New Territories, thus they wished to be preserved.

Responses

4.5.38 We fully agree that cultural and historical resources of HSK should be respected. One of the key planning principles of the NDA is to seek balance between development and heritage conservation. Declared monuments and graded historic buildings will not be affected by the HSK NDA project. The proposed heritage trail in the Revised RODP which is connected to Ha Tsuen will allow the public to appreciate the valuable cultural relics by walking, which will pass through two declared monuments and four graded historic buildings. There are also other historic buildings and culturally significant areas scattered in the HSK NDA. Visitors could make use of the comprehensive cycle track and pedestrian network to travel around the NDA and visit these attractions.

4.5.39 In response to the comments by villagers, the "LO" planned in front of declared monument Tang's Ancestral Hall and along the fung shui lanes is enlarged to enhance protection to the fung shui lanes and provide a larger public space for organising various village rituals and festive events and cultural activities. As regard to the ancestral houses raised by a villager, according to the built heritage assessment conducted by Consultant, the concerned buildings are nil grade built heritage located in Tin Sam San Tsuen, which are assessed to possess no significant heritage value and are commonly found in New Territories. Furthermore, as the buildings are situated at a central location of the NDA, it is inevitable that the buildings will be affected by the NDA project.

Urban Design and Development Intensity

4.5.40 Some groups opined that the maximum building height restriction should be lifted to avoid limiting the flexibility for better building design and visual effects. In particular, due to the significant role of the regional hub, there should be provision for development of approximate 50 to 60-storey commercial buildings as landmark. The density, building height and mixed-use developments for the "Commercial" sites and in the "Regional Economic and Civic Hub" should also be reconsidered to provide more development space. There were also comments concerning the scale of the Regional Plaza and considered that it should be reduced to a more appropriate size.

4.5.41 There were also comments suggesting the Government to increase the domestic PR of the NDA as appropriate to provide more housing. Some comments from professional institutes stated that the eastern part of the HSK NDA could be seen as an extension of the Tin Shui Wai New Town, and the proposed residential development along the Tin Shui Wai Main Channel would form a gradated height profile from the high-density developments in Tin Shui Wai to the low-lying villages. Yet, there were comments suggested lowering the development density along the river channel and providing additional breezeways to avoid "wall effect" and improve air ventilation in the area. Some ACE members also remarked on the visual impact on the clusters of existing villages which would be encircled by high-rise residential blocks. Meanwhile, other concrete proposals on specific land plots were also received from individual landowners or their representatives.

Responses

4.5.42 A gradated building height and development intensity profile has been adopted for the HSK NDA, with the developments of the highest intensity concentrated at the commercial nodes and descending towards the north. This will bring positive impact on natural lighting, air ventilation and visual aspects. The urban design for the NDA has taken into account the prevailing wind direction in designating breezeway/air paths and road alignments, and the building heights have been proposed with reference to Air Ventilation Assessment (AVA), HKPSG and Urban Design Guidelines for Hong Kong. Moreover, the NDA has adopted various measures to enhance air ventilation. For examples, a 5m set back requirements from Road D2 have been introduced to increase the separation of the new residential towers from the existing villages. Additional amenity strips have also been incorporated to serve as buffers from the adjacent uses. The AVA concluded that with implementation of the proposed measures, the overall ventilation performance of the NDA will not be seriously affected.

4.5.43 With regard to suggestion on increasing the density of commercial developments, after balancing various considerations and relevant technical assessments, we have retained the PR of 9.5 for "C" sites near the proposed HSK Station on the Revised RODP, which is higher than the PR of other new town in general, to support the positioning of the area as a "Regional Economic and Civic Hub". We have also reconfigured the "C" sites and reviewed the building height restrictions near the proposed HSK Station to further enhance economic vibrancy of the area. With regard to development density of residential sites, we have also retained the maximum PR of 6.5 (domestic PR of 6 and non-domestic PR of 0.5). To enable the HSK NDA to develop in a sustainable manner, the proposed commercial floor area, number of new housing flats, and employment/population in the Revised RODP are considered suitable. Further increase the commercial and residential PR of the NDA may overload the capacity of the planned infrastructure.

4.5.44 In response to a comment about the size of the Regional Plaza being too big, we have revisited the alignment of the GTC near the Regional Plaza in the Revised RODP, and the area of the Regional Plaza has been reduced to 4.7 ha.

Integration with Existing Villages

4.5.45 There were comments that the Government should take into consideration the position and interests of recognised villagers when developing NDAs, and should not infringe upon and limit the future development rights of villages. Strong requests were received to reserve land near villages as village expansion areas or expanding village boundary for future village type development. Some also requested the Government to carry out village improvement works on traffic, lighting, and drainage etc. to improve the community facilities near the villages. There were also concerns on the potential interface issue and visual impact between existing villages and the surrounding high-rise development. Measures should be proposed to integrate these villages with the HSK NDA such as planning of cycle tracks.

Responses

4.5.46 The planning of the HSK NDA has minimised impact on the existing residents by retaining the existing villages within the NDA as far as possible. In formulating the planning proposals for the NDA, all existing "V" zones falling within the HSK NDA, except for some slight adjustment of various "V" zone boundaries to incorporate the existing houses that fall marginally outside the "V" zone and the adjustment to the "V" zone of Tin Sam Tsuen due to realigning a section of river channel, are retained in-situ in accordance to the existing OZP and reflected in the Revised RODP. These "V" zones generally encompass their respective village environs, and there is still land within the "V" zones for Small House developments.

4.5.47 We have also incorporated buffer areas between the existing villages and development zones for minimise interface issue. However, during Stage 3 CE, there were still concerns expressed by villagers. In this regard, we have re-arranged some of the land uses near existing villages with additional "Amenity" ("A") to serve as buffers from the adjacent uses, in addition to those originally planned. Non-building area (NBA) has also been added near Ha Tsuen and Kiu Tau Wai to make sure there would be sufficient buffer and to minimise impact on the nearby residents. Taking into account the comments of Ha Tsuen residents concerning the residential developments along the Tin Shui Wai Main Channel, an additional open space was incorporated to enhance the air ventilation performance and visual porosity.

4.5.48 Furthermore, to enhance integration between the NDA and existing villages, the current fung shui lanes were retained in the area. The "LO" planned in front of the Declared Monument of Tang's Ancestral Hall was further expanded to protect the fung shui lanes from being blocked, and also to provide more public spaces to allow festive and cultural activities to take place. There will also be cycle tracks and pedestrian walkways along the riverside promenade to enhance integration between existing villages and the surrounding developments in the NDA.

4.5.49 In addition, we have conducted Drainage Impact Assessment (DIA) and will improve the drainage system in the area. Flood protection measures in the form of retention lake, and underground storage tank for retaining the storm water during storm surge are proposed to support the need of the NDA. The proposals under the HSK NDA will help improve the environment. Furthermore, we have proposed community facilities in the vicinity of existing villages to serve the nearby villagers.

Community Farming, Rehabilitation, and Compensation

4.5.50 Some farmers and local groups urged the Government to retain the active farmland in-situ, such that the farmers can continue their farming practices. Furthermore, some villagers requested "land for land, house for house" compensation so that they could continue their farming practices. Factors like current living standard, inflation and individual site assessment should be considered to increase the ex-gratia compensation for relocation of farm structures. They also suggested the Government to allocate the narrow strip of land near the hillside of Lam Tei and Ha Tsuen for agricultural rehabilitation, and to re-build all license houses. Some of the farmers complained that they were being evicted by land owners and disturbed after the announcement of the NDA project. Some casted doubt on the special agricultural land rehabilitation scheme proposed by the Government as there were no details of the potential farmland for rehabilitation. Based on past experience, the outcome of the special agricultural land rehabilitation scheme was not desirable.

4.5.51 A green group opined that using "A" for community farming was not sufficient and suggested opening up part of the Regional Park to promote community farming. More land should be allocated for agricultural use to retain existing farming activities. A comment also suggested integrating agricultural rehabilitation with the NDA development by reserving land near some recognised villages for farming and related activities as well as promoting creative industry by the youth to achieve rural-urban integration.

Responses

4.5.52 The planning of the HSK NDA has minimised impact on the existing land users as far as possible. Nevertheless, it is inevitable that some 7 ha of active agricultural land will be affected, which are mainly situated near the existing Yick Yuen Tsuen and San Sang San Tsuen area, in proximity to the proposed HSK Station, which will be the future town centre of the HSK NDA. To actively assist the farmers affected by the NDA project, the Government will adopt the special agricultural land rehabilitation scheme to assist farmers affected by the NDA project. The Government will announce the details of the arrangements under the scheme in due course.

4.5.53 Under the prevailing policy, the Government will provide technical support to assist the affected farmers to re-establish their farming activities. Affected farmers whose domestic structures are affected by Government clearance can apply to the Lands Department (LandsD) for agricultural resite upon relocation. When processing such application, the LandsD will consult relevant departments for issuing a short term waiver to the landowner, allowing him to construct a domestic structure in certain specification at the acquired agricultural land. Upon formal commencement of the land resumption and clearance procedures in the future, we will conduct field assessment and record the crops and their conditions on the affected land. Applications for various ex-gratia allowances will be processed according to the established mechanisms.

4.5.54 Furthermore, the Chief Executive announced in the 2016 Policy Address the implementation of the New Agriculture Policy to promote the modernisation and sustainable development of local agriculture. Key elements of the New Agriculture Policy include setting up an Agricultural Park (Agri-Park), to examine the feasibility of identifying and designating Agriculture Priority Areas that have higher value for agricultural activities for agricultural activities, setting up a $500 million Sustainable Agricultural Development Fund etc. It is also proposed to strengthen the support that is being provided to help farmers move up the value chain, including the marketing of their products and brand building, and to promote other auxiliary activities related to agriculture such as leisure farming and educational activities. These initiatives will help farmers improve their productivity and preserve farmland for agricultural purposes. Regarding the narrow strip of Government land near the hillside of Lam Tei and Ha Tsuen suggested for agricultural rehabilitation, we understand that it refers to the area west of KSWH. The proposed land is mainly private land, and is designated for industrial use in the overall planning of the NDA, which may not be suitable for agricultural rehabilitation.

4.5.55 During Stage 3 CE, we received public comments expressing their aspiration for experiencing farming activities. In this regard, on the Revised RODP, some areas in the Regional Park and “A” have been designated for community farming and farmers’ markets. These facilities will help the promotion of community farming by providing spaces to the public to experience farming and for local farmers to sell their produce.

4.5.56 As regard to the comment that some farmers are being evicted by land owners, the relationship between a private landowner and an occupier and their respective interests are governed by the private agreements they have entered into. Generally speaking, matters concerning their relationship have to be dealt with in accordance with the agreement between them and the relevant ordinances. The Government is not in a position to interfere. If residents are evicted unlawfully, they should report this to the Police immediately.

Impacts on Residents and Compensation and Rehousing

4.5.57 There were comments received accusing the Government for discriminating against non-recognised villages. Residents of the affected village stated that the clearance of villages was involuntary and the residents did not wish to be relocated. Some of them commented that the criteria for rehousing set by the Government was very stringent and should be relaxed, including waiving the means test for rehousing to PRH and the requirement that the structure in which they were living has to be a domestic structure covered by 1982 Squatter Structure Survey, allowing villagers to rent larger public housing flats at higher rents or purchasing HOS as one of the options, as well as providing tailor-made compensation and rehousing arrangements that suit the needs of each villagers. They also requested a concrete development timetable and detailed compensation and rehousing arrangement, and early start of conducting freezing survey to protect them from being evicted by land owners. There were also comments that the Government should rehouse the affected villagers within the same "Heung" such that they could continue their existing way of living. In particular, villages of Yick Yuen Tsuen urged the Government to reserve a site to relocate the entire village and rehouse the villagers.

4.5.58 Several affected households abutting Castle Peak Road also opposed the HSK NDA development. There was request to allow affected villagers to rebuild their licensed domestic structures on agricultural lots outside the NDA. Some residents complained that they were being evicted by private land owners after the announcement of the HSK NDA project.

Responses

4.5.59 Noting the concerns of the villagers, further examination has been undertaken to assess if all the existing houses within the area could be retained. The assessment indicates that impact on certain domestic structures is unavoidable due to their locations. Tin Sam San Tsuen, San Sang San Tsuen and Yick Yuen Tsuen are located within 500m of the proposed HSK Station which would be the future "Regional Economic and Civic Hub" for high density development. Shek Po Road Mei Tsuen and Sha Chau Lei (II) are also located in the central areas of the NDA and would be developed into the future Regional Park and sports facilities for serving the entire NWNT. As the affected structures are rather dispersed, it is difficult to preserve them in any consistent manner without adversely affecting the coherence of the plan for the project. The area along the Castle Peak Road where the several affected lots of Sun Fung Wai are located is designated for public housing development. Therefore, it will inevitably be affected by the HSK NDA development.

4.5.60 During Stage 2 CE, we received strong request from the residents for local rehousing. In this regard, we have reserved a site near Hung Fuk Estate on the RODP for eligible clearees to help maintain the social fabric of the existing communities. On the Revised RODP, we have expanded the site for local rehousing. The Government is working on the details of local rehousing arrangement for the HSK NDA. Details will be announced in due course.

4.5.61 In general, the Government will provide various cash allowances and compensation, or provide appropriate rehousing arrangement to eligible persons affected by the implementation of public works in accordance with the relevant prevailing compensation and rehousing policies. As for the HSK NDA project, the Government will consider special compensation and rehousing arrangements for the affected clearees, making reference to the measures adopted for the KTN and FLN NDAs. The Government is working on the details for the compensation and rehousing arrangements for the HSK NDA project. Details will be announced in due course.

4.5.62 As regard to the comment that some residents are being evicted by land owners, the relationship between a private landowner and an occupier and their respective interests are governed by the private agreement they have entered into. Generally speaking, matters concerning their relationship have to be dealt with in accordance with the agreement between them and the relevant ordinances. The Government is not in a position to interfere. If residents are evicted unlawfully, they should report this to the police immediately.

Impact on Business / Brownfield Operators and Compensation and Relocation

4.5.63 The Hung Uk Tsuen Merchants Association concerned that relocation to multi-storey buildings would require large amount of investments and that applications for relevant licenses and permits would require a long period of time. There were also requests from the affected operators for proper relocation. The Association of the New Territories Open Storage Operators was of the view that the proposed 24 ha of land designated for PBU, storage and workshop uses would not be sufficient, and that multi-storey buildings would not be able to handle heavy machinery. There were also many problems associated with relocation to multi-storey buildings, such as reduced operational efficiency, increased transport time, and reduced operational space. They also suggested the Government to provide multi-storey buildings with cheaper rent and to give priority to affected operators in relocation. They hoped the Government could provide concrete proposals and explore the issues on relocation arrangement, compensation, license applications, and mode of operation.

4.5.64 Kiu Tau Wai industrial operators requested for more details about land resumption and implementation arrangement, and hoped that the Government could announce the development timetable as soon as possible. They also urged the Government to provide reasonable land resumption compensation and relocation arrangement so that they could continue their operations.

4.5.65 An existing Residential Care Home for Elderly (RCHE), Shung Ming Home for Aged, requested for “no removal and no demolition”. The operator expressed their wish to stay and continue their operation.

Responses

4.5.66 The brownfield operations affected by the HSK NDA are still active with certain degree of contribution to the local economy and employment generation, but their proliferation has also created considerable environmental, traffic, visual, flooding and other problems. As stated in the 2014-15 Budget, the Government is exploring feasible improvement measures, including accommodating some of these operations in suitable multi-storey buildings. Also, as stated in the 2015 and 2016 Policy Address, the Government is studying feasible measures, including accommodating some brownfield operations into the multi-storey buildings and the brownfield operations in the HSK NDA has been taken as a pilot scheme, with a view to taking forward the development of the NDA.

4.5.67 A major objective of the HSK NDA is to convert these brownfield sites to more suitable uses through comprehensive planning and enhanced infrastructure, while retaining suitable land to consolidate these operations to enhance efficient use of land resources and improve the environment. About 24 ha of land has been reserved for PBU, storage and workshop uses, and part of the land has been designated on the Revised RODP for open storage use of large construction machinery and materials which could not be accommodated in multi-storey buildings. The Government has commenced in mid-2016 detailed feasibility studies on proposed multi-storey buildings for brownfield operations. The scope of the study includes conceptual design, planning, technical and financial assessments, and possible mode of operation and management of the proposed multi-storey buildings. Meanwhile, to tie in with the HSK NDA Study, the Government has commissioned a questionnaire survey on existing brownfield operations in HSK NDA to seek better understanding on their modes of operation and conditions. The survey was conducted from August to November in 2015, during which more than 250 brownfield operators in the NDA had been interviewed successfully. The on-going feasibility studies will provide a comprehensive analysis of the survey findings as well as formulate recommendations.

4.5.68 Separately, the Government will look for measures to address the impacts on the existing industrial operators. About 13 ha of land to the west of the KSWH has been designated for general industrial use with direct access to KSWH.

4.5.69 As regard to Shung Ming Home for Aged, since it is located within the central location of the NDA and in a site planned for PRH development, it would be inevitably affected by the NDA project.

4.5.70 The Government is working on the details for the implementation arrangement including compensation and rehousing and will announce the details in due course.

Implementation Arrangement and Programme

4.5.71 There were comments supporting and opposing the Enhanced CNT approach in implementing the HSK NDA. For those who opposed the approach, they considered that it would easily lead to collusion between the Government and the private developers. For those who supported the approach, they considered that the participation of private developers could speed up the land resumption process and reduce conflicts. Considering the land within the HSK NDA were largely under private ownership, some comments stated that participation by private sector was important, and supported making reference to the NENT NDAs and using the Enhanced CNT approach. However, the Government should not impose minimum site area requirement for land exchange, allow application for sites straddling over two different land use zonings, provide flexible application time for land exchange, and entrust developers to construct certain infrastructural facilities.

4.5.72 Some District Council Members stressed that the Government should ensure timely provision of various community facilities and infrastructure in tandem with the population intake of the NDA. Some village representatives would like to have the land resumption done in one go instead of by phases. Most of the villagers and business operators would like the Government to announce the detailed implementation mechanism and timetable as soon as possible, and to provide adequate time for relocation and future development.

Responses

4.5.73 The Government has been adopting the CNT approach in developing new towns in the past and there were in fact individual cases where modification of lease including in-situ land exchange applications was allowed, in particular to those development sites that involve private land but has yet been resumed under the NDA development scheme, or those sites that are planned for private development. To ensure timely and orderly implementation of the HSK NDA, the Government will consider adopting the Enhanced CNT approach as the implementation mode for the HSK NDA, drawing reference to that adopted for the KTN and FLN NDAs. Under the Enhanced CNT approach, the CNT approach will be the basis for the implementation of the NDA with the Government to resume and clear the private land planned for public works projects, public housing and private developments, carry out site formation works, and provide infrastructure before allocating land for various purposes, including disposal of land planned for private developments in the market. However, modification of lease, including in-situ land exchange applications meeting specified criteria and conditions will also be allowed.

4.5.74 As the total development area of the NDA is very large, it will be implemented in stages. Our current target is to have the first population intake by 2024 and completion of all infrastructure and public housing developments by 2037/2038. In drawing up the detailed implementation programme with phasing and packaging of works for the NDA, we will liaise with relevant Government departments to ensure timely provision of various community facilities and infrastructure in tandem with the population intake of the NDA.

4.6 Subsequent Comments Received on the Revised RODP

4.6.1 On 5 September 2016, the Revised RODP was promulgated with an Information Digest. The Information Digest, together with the Stage 3 CE Report has been uploaded to the study website for public information. Briefings to the TPB, Tuen Mun and Yuen Long District Councils, Ha Tsuen, Ping Shan and Tuen Mun Rural Committees, Panel on Development of Legislative Council and other stakeholders were made in September to November 2016. During the briefings, members of these board and committees mainly reiterated their previous comments raised during Stage 3 CE with the common concerns covering the transport capacity, impacts on existing residents and impacts on the affected brownfield operations. The Yuen Long District Council has expressed concerns about the HSK NDA project and formed a working group to follow-up on the project. There were particular concerns about the re-planning of Tin Ying Road. In response, it was clarified that the re-planning of the road will have insignificant impact on the travelling time of Tin Shui Wai residents and improvement to the connection to Tin Shui Wai north will be further explored.

5 OUTLINE DEVELOPMENT PLANS

5.1 Vision and Guiding Principles

Vision

5.1.1 The HSK NDA commands a strategic location in the NWNT with existing and planned railway and highways linking the Hong Kong International Airport, different districts of Hong Kong and Shenzhen. This geographically favourable location enables development of the area in promoting economic activities which build upon interaction with the Mainland. These include support to airport and port services, and in turn the logistics industry, which accounts for a significant share in Hong Kong's economy.

5.1.2 The HSK NDA will be a major source of land supply to meet the housing needs of Hong Kong in the medium to long term. It should integrate well with the existing neighbouring urban development clusters including Tin Shui Wai, Yuen Long and Tuen Mun to enable effective sharing of infrastructure, GIC facilities and job opportunities, and to improve the housing mix.

5.1.3 In line with sustainable development principles, the development potential of the NDA should be maximised within the infrastructure capacity limits without compromising urban design principles, while minimising impacts on existing communities, cultural heritage resources, as well as the natural environment.

Guiding Principles

5.1.4 Under the overall vision, the following guiding principles have been formulated to facilitate planning of the HSK NDA.

<u>Enhancing the Strategic Role of the HSK NDA</u>

- develop the HSK NDA into a multi-functional development node with a variety of housing types, business and employment opportunities; and
- given its strategic location on major freight and passenger routes between Hong Kong and Shenzhen, main economic activities could include commercial uses such as offices and hotels, special industries as well as logistics facilities.

<u>Building a People-Oriented Community</u>

- create a balanced community through a mix of housing and employment uses;
- provide local facilities and services within close proximity to residential developments;
- maximise the provision of residential land to meet housing needs while meeting prevailing planning and development guidelines;
- ensure a rational distribution of land uses and housing developments that relate to the surrounding context;
- avoid disturbance of villages and other local settlements wherever possible; and
- preserve cultural heritage within the NDA and ensure the areas around the heritage features are planned in a complementary and coherent manner.

Creating a Green Living and Working Environment

- plan major developments around public transport nodes to encourage use of mass public transport;
- create efficient, safe and pedestrian friendly walkway and cycling networks;
- plan major trunk roads at the periphery of the NDA to avoid penetration of excessive vehicular traffic into the residential neighbourhoods;
- capitalise on existing landscape resources (LRs) such as river channels and green mountain backdrops to create a townscape of character;
- provide environmentally friendly transport modes;
- promote sustainable waste and water management and use of renewable energy; and
- promote green building environmentally friendly technologies.

Integrating with Development of Tuen Mun, Tin Shui Wai and Yuen Long

- improve transport connection; and
- improve housing mix and provide GIC facilities and job opportunities.

5.2 Preliminary Outline Development Plan

Major Development Parameters

5.2.1 Taking into account the public views received in Stage 1 CE, the analysis of baseline information and results of various initial technical assessments, the PODP for the HSK NDA was formulated based on the vision and guiding principles stated in **Section 5.1** above. Under the PODP, the total population and employment upon full development is about 218,000 persons and about 100,000 jobs respectively. **Figure 5.2.1** shows the PODP of the HSK NDA and the major development parameters of the PODP are summarised in **Table 5.2.1** below.

Table 5.2.1 Major Development Parameters of the PODP for the HSK NDA

Total NDA Area	826 ha
Total Population	About 218,000 (including existing population and base growth of 43,000)
New Housing Units	About 60,000
Housing mix	Public 51% : Private 49% (Together with Tin Shui Wai New Town, the overall housing mix is about Public 69% : Private 31%)
New Employment Opportunities	About 100,000

Land Use Budget

5.2.2 A variety of land uses are proposed for the HSK NDA, mainly in the area north of Castle Peak Road. The approximate distribution of various land uses and their site areas are as follows.

Table 5.2.2 Land Use Budget of the PODP

Land Use Budget*		**ha**	**%****
"R"	Residential	227	27.5
"GIC"	Government, Institution and Community	27	3.2
"E"	Education	21	2.6
"GB"	Green Belt	75	9.1
"DO"	District Open Space	51	6.2
"LO"	Local Open Space	20	2.4
"V"	Village Type Development	162	19.6
"A"	Amenity	17	2
"OU"	Other Specified Uses***	124	15
"CDA"	Comprehensive Development Area	3	0.4
"AGR"	Agriculture	11	1.3
-	Road, Junctions, etc.	88	10.7
TOTAL		**826**	**100**

Remarks
* Includes all existing development where applicable.
** The percentage is simplified into 1 decimal place.
*** Includes sites planned for mixed use development, commercial, special industry, education & related uses and other public utilities

5.3 Recommended Outline Development Plan

Major Amendments from PODP to RODP

5.3.1 Taking into account the public views collected in Stage 2 CE on the PODP and findings and recommendations of various technical assessments, appropriate amendments to the land uses in the HSK NDA have been made when formulating the RODP. The major changes incorporated in the RODP are outlined below and shown in **Figure 5.3.1**:

Overall Amendments

- **Rationalise the HSK NDA Boundary:** The boundary of the HSK NDA was rationalised. In particular, the area to the west of the KSWH was included in the NDA for industrial development. In addition, given the presence of well-established communities with existing clustered villages and private developments, and limited available land for further major developments, the area to the south of the Castle Peak Road was excluded from the NDA. Hence, the total land area was reduced from 826 ha to 714 ha.

- **Subdivision of Land Parcels:** Development sites were further sub-divided into smaller land parcels. A finer street grid system will facilitate externally oriented commercial activities, more efficient pedestrian movements, more human scale development and a more vibrant new community.

Reinforcing Commercial Nodes

- **Reinforce the Commercial Function around Railway Stations:** The development intensity of the commercial sites in the NDA has been increased to reinforce the HSK "Regional Economic and Civic Hub" and Tin Shui Wai "District Commercial Node" functions. It would help address the over-concentration of commercial floor space and employment in the main urban areas, boost the vibrancy of local communities, meet the shortfall of jobs in Tin Shui Wai, as well as ease congestion at the commuting corridors between the New Territories and the urban areas. The number of employment opportunities has been increased from 100,000 under the PODP to about 150,000 on the RODP.

- **HSK Regional Economic and Civic Hub:** Addressing the public comment to further capitalise on the strategic location of the proposed HSK Station, areas around the station have been restructured to reinforce the commercial mass of the regional node for office, hotel, retail and other commercial uses with increased non-domestic PR. The commercial node function will be complemented by a regional civic hub, including Government offices, a community hall and a magistracy for the NDA and the NWNT. To reinforce the identity of the "Regional Economic and Civic Hub", a regional plaza was proposed around the proposed HSK Station.

- **Tin Shui Wai District Commercial Node:** Similarly, areas around the WR Tin Shui Wai Station have been restructured under the RODP to enhance the commercial mass and to provide a district centre serving also the neighbouring Tin Shui Wai New Town.

- **Lau Fau Shan Commercial Zone**: On the RODP, a new "C" zone and an EFTS station was introduced at the northern edge of the HSK NDA along Lau Fau Shan Road for a small commercial development with public carpark complementing the tourism and recreation proposal under the Lau Fau Shan Study. The EFTS linking from WR Tin Shui Wai Station will terminate at this point.

Restructuring Special Industry Quarter

- **Incorporate "Industrial" Zone:** An area of land of about 13 ha to the west of KSWH was designated as "I" zone, which will not only provide land for general industrial development, but also help redistribute industrial activities to free up land at more central location within the HSK NDA.

- **Refine the Logistics, Enterprise and Technology Quarter:** In view of the grave public concern raised during the Stage 2 CE on the need for relocation of PBU & OS uses, recycling and rural industrial workshops, the Special Industry Quarter under the PODP has been restructured under the RODP. About 24 ha of land at the northern part of the NDA is designated for "OU" annotated "Port Back-up, Storage and Workshop Uses" ("OU (PBU+SWU)"). The intention is to construct multi-storey buildings for accommodating some of the affected brownfield operations including the PBU & OS operations in a land-efficient manner. The reserved land in this zone also allows those industries requiring open-air operations. Taking the advantage of proximity to the port, airport and Mainland, and to allow flexibility for accommodating other related producer services uses, technology uses, modern industries and non-polluting industries, the original zoning on the PODP is re-titled to "OU (Enterprise and Technology Park)" (about 9 ha) under the RODP. To enhance accessibility of the Enterprise and Technology Park, this zone has also been shifted south to locate closer to the "Regional Economic and Civic Hub" around the proposed HSK Station. The remaining land, about 37ha, is designated for "OU (Logistics Facility)" under the RODP. This land is dedicated for the modern logistics facilities close to the airport, port and the Mainland.

Integrating with Existing Developments

- **Respect Existing Environment:** To address public comment on respecting the existing village setting and ensuring compatibility with the surrounding low-rise, low-density developments in Lau Fau Shan, the PR of the proposed residential developments along Lau Fau Shan Road at the northern end of the HSK NDA has been reduced from 3.5 to 2.5.

- **Minimise Interface with Existing Villages:** To address villagers' concerns received from Stage 2 CE on the potential impacts from new developments, continuous amenity and open space strips were planned to serve as buffer between the "V" zones and other developments on the RODP. A 5 m NBA was also proposed for the private residential developments facing Lo Uk Tsuen, Ha Tsuen and San Uk Tsuen to increase the separation of tall buildings from the villages.

- **Rationalise Village Zone Boundary:** Sha Chau Lei (I) is a resite area for recognised villagers from Shui Chiu San Tsuen of Shap Pat Heung (十八鄉水蕉新村) and Wang Toi Shan Lo Uk Tsuen of Pat Heung (八鄉橫台山羅屋村). Under the RODP, the "V" zone was expanded to include another 6 houses at the south of the site having the same status. Further adjustments to other "V" zone boundaries were also proposed at (1) Ngau Hom Village and Fung Kong Tsuen; (2) Hong Mei Tsuen, San Wai, Tseung Kong Wai, Sik Kong Wai and (3) San Lee Uk Tsuen, Hung Uk Tsuen and Tin Sam Village to include some existing houses covered by building licences or on New Grant Lots with Small House Grants falling marginally outside the "V" zone boundaries.

- **Designate Land for Village Resite and Local Rehousing**: Three sites of 2.2 ha were zoned "Residential Zone 4" ("R4") within the NDA near the existing recognised village of Fung Kong Tsuen for re-provisioning the affected building lots eligible for compensation under the Village Removal Policy, and/or low-density village type residential development. A local rehousing site was also reserved near Hung Fuk Estate for eligible affected households.

- **Retain an Existing Chicken Farm**: Proposals on the PODP will affect a licensed chicken farm on private land located to the south of Fung Kong Tsuen, which is of a very large scale with a capacity up to 102,000 chickens. It is proposed to be retained within the "GB" zone on the RODP. As this chicken farm is situated at the fringe of the NDA, its retention would not adversely affect the layout of the NDA.

Improving Connectivity and Accessibility

- **Reserve Land for Green Transit Corridor:** Although the proposed HSK Station and existing WR Tin Shui Wai Station will serve as the public transport backbone of the NDA, by considering the proposed large number of population and employment as envisaged in the RODP, and that the Logistics, Enterprise and Technology Quarter which are key employment generating uses are located outside the railway station catchment, a highly efficient and environmental-friendly feeder system caters for internal movement which will be necessary to encourage the use of the rail to reduce the reliance on road-base public transport mode and hence reduce the adverse road traffic and environmental impact. As such, a designated area has been reserved on the RODP for the GTC for the possible provision of an EFTS in the HSK NDA. The reserved area allocated to the EFTS line will be abutted by cycling tracks and pedestrian routes.

- **Refine the Pedestrian, Cycle Track and Open Space Network:** A comprehensive pedestrian, cycle track and open space network has been planned for the HSK NDA. On the RODP, the coherence is reinforced through designating an artery cycleway along the river channel and connecting to the "Regional Economic and Civic Hub" to provide a direct transport link to and from Tin Shui Wai New Town and Tuen Mun New Town.

- Moreover, several designated pedestrian streets are proposed in the RODP, including a pedestrian cum Fung Shui corridor connecting the HSK NDA all the way to the Tin Shui Wai Town Park, a pedestrian street to the east of the proposed HSK Station connecting the major commercial hub and the station with the villages and residential developments across the Castle Peak Road and a pedestrian street connecting the residential neighbourhood to the community facilities in the northern part of the HSK NDA.

- To promote walkability and street vibrancy, retail frontages near the "Regional Economic and Civic Hub" and at the residential sites along the promenade of Tin Shui Wai Main Channel were also recommended. To enhance visual amenity and air circulation, terrace design requiring a setback of the first floor of developments along these corridors was provided by restricting a maximum height of 5m on the edges of 10m in width to those developments along these corridors.

Ameliorating Provision of GIC Facilities

- **Planning for Regional Government, Institution and Community Facilities:** Apart from the regional civic hub mentioned above, the hospital to be developed in the HSK NDA will also address the requirement of the planned Yuen Long South development. The site area and maximum building height of the hospital site has been adjusted to serve the local residents and neighbouring communities. Moreover, the proposed sports ground and sports centre are shifted from the southern fringe to a central location next to the Regional Park to create synergy.

- **Reserve Sites for Public Infrastructures:** Land for an additional PTI to facilitate the residential and employment population was reserved at the northern part of HSK NDA. A flushing water service reservoir (FLWSR) at Fung Kong Tsuen and a FWSR and FLWSR at Tan Kwai Tsuen have also been planned under the RODP.

Enhancing Ecology and Creating Sustainable Environment

- **Introduce Green Corridor:** Two sites located adjacent to the egretry in San Sang San Tsuen was designated as "LO" which will provide passive recreational facilities serving the working population in the Enterprise and Technology Park. These two sites, together with the adjacent "GB" site, will also form a landscape link to the Regional Park and enhance coherence of the flight path for the San Sang San Tsuen egretry.

- **Introduce a Retention Lake:** A retention lake was proposed within the Regional Park for regulating storm water, which could also serve as an important landscape feature.

- **Reserve Land for Green Initiatives**: A new STW will be provided to cater for additional sewage flows arising from the HSK NDA. Part of the sewage will be treated at tertiary level for possible reuse in toilet flushing, and irrigation within the HSK NDA. On the other hand, two sites have also been reserved in the vicinity of the proposed HSK Station and the existing WR Tin Shui Wai Station for developing District Cooling Systems (DCSs).

- **Provide Continuous Amenity Strip along KSWH:** A continuous amenity strip that joining up with existing "GB" sites is proposed along KSWH in order to formulate a comprehensive green network as well as a noise mitigation buffer.

Major Development Parameters

5.3.2 Under the RODP, a population of 215,000 and employment opportunities of 150,000 were proposed. **Figure 5.3.2** shows the RODP of the HSK NDA and the major development parameters of the RODP are summarised in **Table 5.3.1** below.

Table 5.3.1 Major Development Parameters of the RODP for the HSK NDA

Total NDA Area	714 ha
Development Area	442 ha
Total Population	About 215,000 (including new population of 173,000 and population of about 42,000 from existing and committed developments)
New Housing Units	About 60,100
Housing mix	Public 51% : Private 49% (Together with Tin Shui Wai New Town, the overall housing mix is Public 69% : Private 31%)
New Employment Opportunities	About 150,000

5.3.3 The overall land use budge to HSK NDA for the RODP is as follows:

Table 5.3.2 Land Use Budget of the RODP

%	Land Use	Area (ha)
20%	***Residential***	***87***
	Residential and Commercial /Residential	87
24%	***Economic***	***107***
	Commercial (offices, hotels and retail)	24
	Logistics Facilities	37
	Port Back-up, Storage and Workshop Uses	24
	Enterprise and Technology Park	9
	Industrial	13
20%	***Public Facilities***	***89***
	Government, Institution or Community (other than Education)	30
	Education and Related Uses	26
	Public Utilities, Petrol Filling Station, Electric Bus and EFTS Depot, etc.	33
14%	***Open Space***	***62***
	Regional Open Space (RO)	17
	District Open Space (DO)	26
	Local Open Space (LO)	19
22%	***New Roads and Amenity***	***97***
	New Roads	82
	Amenity Area	15
100%	**Sub Total of Development Area**	***442***
	Remaining Areas	
	Existing Roads and River Channels	63
	Green Belt (Preserved Knolls & Hillslopes)	58
	Retained Existing/Committed Developments (including villages)	151
	Sub-Total of Remaining Areas	***272***
	Total NDA Area	***714***

5.4 Revised Recommended Outline Development Plan

Major Amendments from RODP to Revised RODP

5.4.1 Taking account of the public views received during Stage 3 CE and findings of various technical assessments, some amendments to the land uses/layout in the HSK NDA have been made to the RODP and are outlined below and shown in **Figure 5.4.1**.

Improving Planning Layout

- **Reconfigure the HSK Regional Economic and Civic Hub:** In view of the public comments on further capitalising the strategic location of the proposed HSK Station and with a view to creating a more vibrant town centre there, the original "OU (Education & Related Uses)" site is slightly shifted southward to cater for additional "C" sites. In this connection, a site is changed from "C" to "OU (Commercial and Residential)". In response to comments requesting for more civic elements, the "G" site near the proposed HSK Station has also been slightly enlarged to accommodate possible performance venue to cater for such need in the long run, in addition to the planned Government offices, community hall, magistrates' court for the NDA and the NWNT, post office and delivery office as proposed under the RODP. A site near KSWH is also zoned "G" to cater for youth facilities to foster youth excellence in the New Territories.
- **Introduce Additional Ventilation Corridor:** To enhance the air ventilation performance for residential developments along the Tin Shui Wai Main Channel, additional ventilation corridors in the form of NBAs, open space and road are proposed on the Revised RODP. The NBAs and open space correspond to the spatial layout across the river channel in Tin Shui Wai New Town, with an aim to direct the wind to each sub-district. The subsequent building layout will also enhance the visual porosity between the village area and the river channel.
- **Improve Interface with Existing Development:** To further address villagers' concerns that the proposed hospital is being too close to their villages, additional amenity strips, a "LO" and a "G" site reserved for village related uses are provided along the western boundary of Hung Uk Tsuen and Kiu Tau Wai to serve as additional buffers. As for villagers' concern on the proposed "OU (Commercial and Residential)" zone at Kiu Tau Wai being too close to the village, a strip of NBA (6m) is introduced in the zone to require building setback and to provide additional buffer. Moreover, to further address concerns from recognised villagers on high rise developments enclosing the existing villages, additional amenity strips have been incorporated at San Lee Uk Tsuen, Shek Po Tsuen, Kiu Tau Wai and Hung Uk Tsuen to serve as buffers from the adjacent uses.
- **Refine the Site Configurations for Port Back-up, Storage and Workshop Uses**: On the Revised RODP, the 24 ha of land for "OU (PBU+SWU)" for possible multi-storey buildings for accommodating some of the affected brownfield operations in a land-efficient manner is maintained. To allow flexibility for the design of multi-storey buildings which are expected to require a larger footprint, some of the land parcels are reconfigured. A PR of 7 would be adopted for technical assessment taking into consideration possible development of basement floors to increase capacity. Besides, to address the comments that some brownfield operations could not be moved into multi-storey buildings, a site with an area of about 4 ha is specifically designated for OS use as indicated on the Revised RODP.
- **Refine the Site Configurations for Logistics Facility:** In view of the concerns from the logistics operators raised during Stage 3 CE requesting larger sites to improve operational efficiency, sites zoned as "OU (Logistics Facility)" have been reconfigured and enlarged (ranging from 3.5 ha to 4.8 ha) under the Revised RODP to achieve economies of scale and to assist the industry in maintaining competitiveness within the region. The total land area reserved for Logistics Facility remained the same at about 37 ha.

- **Provide Village Resite and Expand Local Rehousing Site:** An additional 1.2 ha land parcel near Tsing Chuen Wai is zoned "Rural Residential Zone 4" ("RR4") for the re-provisioning of the affected building lots eligible for compensation under the Village Removal Policy and in this connection, a "RR4" site at the northern part is released for government uses. Moreover, the local rehousing site near Hung Fuk Estate is expanded.

Ameliorating Provision of Commercial and GIC Facilities

- **Provide More Commercial and Community Facilities:** Apart from the additional commercial and civic facilities at the "Regional Economic and Civic Hub" mentioned above, in response to public comments for more commercial and community facilities in the northern part of the NDA serving the Lau Fau Shan and Tin Shui Wai neighbourhood, a site near Sha Kong Wai originally planned for an open-air PTI is also rezoned to "OU (Commercial cum PTI and Public Carpark)" with a PR of 3 to better utilise land resources and provide more commercial facilities. PTI and public carpark is proposed in this site. In addition, a GIC complex is also proposed at a site near Tin Wah Road for clinic, community hall, RCP and other possible social facilities. These facilities will form a "Local Service Core" serving not only future residents of the HSK NDA, but also those from Tin Shui Wai and surrounding villages.

- **Extend Shopping Streets:** To further promote walkability and street vibrancy, retail frontages at the "Regional Economic and Civic Hub" and shopping streets lined with retail frontages along the Tin Shui Wai Main Channel are extended under the Revised RODP.

- **Adjust the Site Area of the Proposed Hospital:** As the Hospital Authority intends to expand the capacity of the new Tin Shui Wai Hospital in the long run to address the demand in the area, the site area required for the proposed hospital in the HSK NDA could be reduced from 9.3 ha to 6.5 ha. The southwestern part of the original hospital site is rezoned for "E" and "G" uses.

Improving Connectivity and Accessibility

- **Realign GTC and Relocate EFTS Depots:** Under the Revised RODP, the alignment of the GTC has been realigned to provide greater convenience to the existing villagers and future population. With the reconfiguration of the areas near the proposed HSK Station, the EFTS Depot originally proposed near Tsing Chuen Wai is now moved to a site within the "Logistics, Enterprise and Technology Quarter" where the depot is proposed to be accommodated in the ground floor of a multi-storey building for logistics facilities for better land utilisation. A site is also reserved for operational facilities for the EFTS to support the EFTS services in the area.

- **Improve Road Connection**: To improve the connectivity, a local road is proposed under the Revised RODP which will provide an alternative northwest to southeast connection, between Road D1 and Deep Bay Road. The proposed road will also provide a direct access to the commercial site near Lau Fau Shan roundabout.

- In addition, a new local road is also proposed to the west of Kiu Tau Wai and Hung Uk Tsuen to link up Ping Ha Road with Hung Tin Road. This road would provide more convenient and direct access for the villages and ease the traffic at Ping Ha Road in the vicinity of WR Tin Shui Wai Station, in particular those traffic that will be generated upon full development of commercial developments in the area. This road would also serve as an as an alternative route to the proposed hospital apart from the access at Hung Tin Road.

- **Enhance the Pedestrian Network:** The pedestrian street at the northern part of the NDA is reconfigured to provide better connection between a "District Open Space" ("DO") to some proposed GIC facilities and a site designated for commercial cum PTI and public carpark. Moreover, the existing river channel near Tin Sam Tsuen area will be realigned to create a continuous comprehensive blue network in north-south direction within the NDA. The regenerated river channel will also provide a continuous pedestrian walkway along the elevated WR to enhance the direct movement between the proposed Regional Plaza and HSK Station with the Regional Park. To facilitate the proposal, some areas within "V" zone are rezoned to "DO" and an area to the south of Tin Sam Tsuen with equivalent size is rezoned to "V" in compensation.

- **Improvement of Connectivity of Villages:** Additional road openings would be provided along Road D2 and D3 to allow vehicular connection with villages of Ha Tsuen including Tseung Kong Wai through existing village road. Similarly, a road opening has also been provided for San Lee Uk Tsuen. With the introduction of a new local road at Kiu Tau Wai and Hung Uk Tsuen area as mentioned above, additional connectivity to Kiu Tau Wai and Hung Uk Tsuen could also be provided.

Enhancing Natural and Landscape Resources

- **Protect Fung Shui Corridor:** In response to the recognised villagers' request for better protection of fung shui lane near Ha Tsuen Shi, the "LO" planned in front of the Declared Monument of Tang's Ancestral Hall and along the fung shui lane is further expanded. This "LO" would be designed to create synergy with the built heritage in the surroundings and allow cultural and associated activities to take place.

- **Protect the San Sang San Tsuen Egretry:** The "LO" located adjacent to the egretry in San Sang San Tsuen are reconfigured and enlarged to a width of about 100 m. In order to provide a suitable environment for the egrets and to protect the flight paths and corridors for the egretry, the "LO" is proposed for passive uses only, and should be integrated with landscape features which are in favour of the egrets.

Major Development Parameters

5.4.2 Under the Revised RODP, the future HSK NDA will cater for a total population of about 218,000 and employment opportunities of 150,000. **Figure 5.4.2** shows the Revised RODP of the HSK NDA and the major development parameters of the Revised RODP are summarised in **Table 5.4.1** below.

Table 5.4.1 Major Development Parameters of the Revised RODP for the HSK NDA

Total NDA Area	714 ha
Development Area	441 ha
Total Population	About 218,000 (including new population of 176,000 and population of about 42,000 from existing and committed developments)
New Housing Units	About 61,000
Housing mix	Public 51% : Private 49% (Together with Tin Shui Wai New Town, the overall housing mix is Public 69% : Private 31%)
Maximum PR	Residential : 6.0 Commercial : 9.5
New Employment Opportunities	About 150,000

Planning Concepts and Considerations

5.4.3 Capitalising on the strategic location and distinct setting of HSK, the HSK NDA will be the next generation new town of Hong Kong. The overall planning concepts and frameworks of the NDA are summarised as follows.

Positioning of the NDA

5.4.4 The NDA will be the next generation new town of Hong Kong creating a desirable place to live, work, play and do business for a population of about 218,000. Being strategically located in the NWNT and close to Shenzhen, Qianhai and Shekou, it will serve as a "Regional Economic and Civic Hub" for the NWNT apart from being a major source of housing land supply in Hong Kong in the medium to long term. According to the land use proposals under the Revised RODP, about 150,000 employment opportunities will be generated through a mix of commercial, business, industrial, community and Government land uses (see **Table 5.4.2**). The development of the NDA will help reduce the imbalance in the spatial distribution of population and jobs in the territory, boost the vibrancy of local communities, provide new employment opportunities for the adjacent Tin Shui Wai New Town and other parts of the NWNT and enable effective sharing of infrastructure and GIC facilities with the adjoining areas.

Table 5.4.2 Employment Opportunities to be Generated within the HSK NDA

Proposed Use	Employment (approx.)
Commercial	**75 000**
Office	32 000
Hotel	2 000
Retail, Dining, Entertainment and other Commercial	41 000
Industry	**61 000**
Enterprise and Technology Park	19 000
Logistics Facilities	23 000
Port Back-up, Storage and Workshop Uses	14 000
General Industrial	5 000
Community Services	**14 000**
GIC Facilities (including Education and Hospital)	12 000
Other Services	2 000
Total	**150 000**

Fostering Economic Vibrancy

5.4.5 Mixed commercial and residential sites with higher development intensity are planned around the proposed HSK Station and the existing WR Tin Shui Wai Station to reinforce their respective functions as "Regional Economic and Civic Hub" and "District Commercial Node". In each individual residential neighbourhood, street shops and/or local retailing services will be provided to meet the residents' daily necessities and enhance street vibrancy.

5.4.6 Given the geographical location of the HSK NDA as well as existing and planned transportation infrastructure, the north-western part of the NDA is designated as Logistics, Enterprise and Technology Quarter and industrial zone to provide development spaces for accommodating a wide range of industrial/special industrial uses including modern industries and non-polluting industrial uses. This would provide a new platform for economic generation and will become another major employment cluster in the NDA. It is also anticipated that certain demand for PBU uses will remain within the HSK NDA and options to consolidate and rationalise these uses in a land-efficient manner should be explored. The consolidation of these uses in the HSK NDA will eradicate the current situation in which they are environmentally despoiling and result in the waste of a valuable resource. By introducing an appropriate PR to these sites, it will enable these uses to be accommodated in a more efficient manner and the need for space will reduce. Furthermore, the environmental problems/impacts arising from the operations would be shielded off in the indoor environment. Landscape buffers and appropriate mitigation measures could be imposed to address the current situation and the identified implications. New roads will be provided to directly connect this area to KSWH so as to minimise movements of heavy vehicular traffic within the HSK NDA.

Social Mix and Supportive Community Facilities

5.4.7 The NDA will provide about 61,000 new flats in different types of housing as shown on the Plan. The ratio of new housing units in the NDA is around 51:49 in public and private housing developments. Taking both the NDA and the Tin Shui Wai New Town together, the overall public to private housing ratio will become 69:31. The proposed public to private housing ratio in the NDA will help to redress the existing imbalance of public/private housing in the Tin Shui Wai New Town. Suitable sites are reserved to facilitate local rehousing of eligible households affected by the NDA project.

5.4.8 The NDA is also planned for a people-oriented and balanced community taking into account the requirements of the surrounding areas including Tin Shui Wai. A wide range of social and community facilities should be provided to meet the needs of different ages and families, serving not only residents of the HSK NDA but also residents of the nearby areas.

Enhancing the Transport Network to Improve Accessibility

5.4.9 For sustainable development of the NDA, one of the key planning concepts is to minimise traffic generation. The provision of diversified employment opportunities within the NDA will facilitate local employment, thus helping reduce demand of external traffic. Possible new strategic highways connecting the NDA with the Tuen Mun and the urban area will be planned to cope with the anticipated traffic growth in the NWNT region in the long term. Moreover, the proposed HSK Station will help enhance the accessibility by mass transit system to the NDA. The progressive enhancement of the WR service through enhancement of the signalling system and addition of train compartments in the years ahead will generally be able to meet the demand of the NDA and other new developments in the NWNT region.

5.4.10 A GTC, including an EFTS, pedestrian walkways and cycle tracks, would be introduced in the NDA to provide rapid intra-district transport service and green mobility and connect the residential clusters with the employment nodes, railway stations and key community facilities to minimise vehicular traffic and carbon emission.

5.4.11 New primary and district distributors to facilitate east-west and north-south movements within the NDA will be provided to enhance the internal connectivity of the NDA. A comprehensive local road networks, cycle tracks, pedestrian walkways and pedestrian streets has been planned to facilitate internal vehicular and pedestrian movements. PTIs will also be provided to facilitate convenient transfer of various transport modes and enhancement of internal circulation.

Creating a Smart, Green and Resilient City

5.4.12 The NDA will be a green city adopting a sustainable and energy saving strategy in respect of town planning, urban design, transportation and green infrastructure to achieve efficiency, carbon emission reduction and sustainable living. Major population, economic activities and community facilities should be concentrated within walking distance of mass transit and public transport nodes. Green mobility is promoted within the NDA through the introduction of the GTC and a comprehensive cycling and pedestrian network. To promote sustainable use of water, reusing reclaimed water and harvested rainwater for non-potable purposes such as toilet flushing and irrigation within the NDA will be explored. Sustainable Drainage System and blue-green infrastructure will also be pursued.

5.4.13 To enrich the NDA as a green city, a series of other green initiatives including the provision of a community green station for environmental education and collection of recyclables from the local community; revitalisation of existing river channel system to enhance the channel ecological system; and promotion of energy efficient buildings and installations will be actively pursued. The use of DCS for non-domestic developments, and the establishment of a common spatial data infrastructure and an information and communication technology (ICT) platform to coordinate different city functions for enhancing city management and convenience of residents and businesses will also be explored.

Urban Design Framework

5.4.14 A comprehensive urban design framework responding to the physical environment and stated objective of developing NDA as a sustainable, quality and green living environment and socially integrated community has been formulated. The key elements are summarised below and will be further elaborated upon at **Section 6**.

- **Compact City** - Concentrate higher density developments around railway stations and public transport nodes;
- **Distinctive Nodes** - Develop a hierarchy of identifiable focal points to foster interaction and vibrancy;
- **Green Spine** - Capitalise green space along the river channel, the Regional Park, Regional Plaza and other open spaces to form a green spine of the NDA;
- **Blue-Green Design** - Revitalise existing river channel to form a continuous blue-green network;
- **Walkability** - Create local communities with good accessibility and walkability through pedestrian network including pedestrian and shopping streets;
- **Breathing Space** - Create ventilation corridors and breathing space through disposition of developments;
- **Celebrating Views** - Optimise vistas by maintaining fung shui lanes and introducing visual corridors;
- **Stepped Development Profile** - Create a harmonious urban context through stepped building height and development intensity profile;
- **Integrative Design** - Respond to the pattern of existing spatial layouts and character in the adjoining areas; and
- **Appreciation of Nature and Culture** - Preserve and enhance natural and cultural assets and connectivity.

Land Use Budget

5.4.15 The overall land use budget of HSK NDA for the Revised RODP is as follows:

Table 5.4.3 Land Use Budget of the Revised RODP

%	Land Use	Area (ha)	
18%	***Residential***	**80**	
	Residential and Commercial /Residential	80	
24%	***Economic***	**105**	
	Commercial (offices, hotels and retail)	22	
	Logistics Facilities	37	
	Port Back-up, Storage and Workshop Uses	24	
	Enterprise and Technology Park	9	
	Industrial	13	
20%	***Public Facilities***	**86**	
	Government, Institution or Community (other than Education)	32	
	Education and Related Uses	28	
	Public Utilities, Petrol Filling Station, EFTS Depot, etc.	21	
	Regional Plaza	5	
15%	***Open Space***	**66**	
	Regional Open Space (RO)	16	
	District Open Space (DO)	27	
	Local Open Space (LO)	23	
23%	***New Roads and Amenity***	**104**	
	New Roads	86	
	Amenity Area	18	
100%	**Sub-Total of Development Area**	**441**	
	Others		
	Existing Roads and River Channels	70	
	Green Belt (Preserved Knolls & Hillslopes)	54	
	Retained Existing / Committed Development (including villages)	149	
	Sub-Total of Non-Development Area	**273**	
	Total NDA Area	**714**	

Land Use Proposals

5.4.16 The general planning intentions and development parameters of various land use zonings are briefly described below.

Special Residential ("RS")

5.4.17 The "RS" zoning is intended for high-density PRH development. The seven planned "RS" sites are subject to a maximum domestic PR of 5.5 and a maximum non-domestic PR of 0.5, and will produce a total of about 19,400 flats. There is also an existing PRH (i.e. Hung Fuk Estate) providing about 4,900 flats.

Residential Zone 1 ("R1")

5.4.18 There are three "R1" sites within the HSK NDA near to the proposed HSK Station. They are primarily intended for high-rise high-density private residential developments with compatible non-residential uses. Developments in these sites are subject to a maximum domestic PR of 5.5 to 6 and a maximum non-domestic PR of 0.5, providing a total of about 2,900 housing units.

Residential Zone 1 (Local Rehousing) ("R1(LR)")

5.4.19 Two sites near Hung Fuk Estate are zoned "R1(LR)", which are reserved for local rehousing purpose. Developments in these sites are subject to a maximum domestic PR of 5.5, where one of them is also subject to a maximum non-domestic PR of 0.5. They will provide a total of about 2,000 housing units.

Residential Zone 2 ("R2")

5.4.20 There are 13 sites zoned as "R2" within the HSK NDA, in which one is an existing development located in the existing HSK neighbourhood, and one is a planned/committed development in the existing neighbourhood. Except the two existing/planned developments which are sub-urban medium-density residential developments, the rest of the 11 sites are intended primarily for medium density private residential development. Developments within these 11 sites are subject to a maximum domestic PR of 5.0. This will offer about 12,900 flats. Some of the "R2" sites are planned with non-domestic elements and are subject to a maximum non-domestic PR of 0.5.

Residential Zone 2 (Subsidised Sales Flat) ("R2(SSF)")

5.4.21 The "R2(SSF)" zoning is intended primarily for the provision of SSFs. There are nine sites are zoned "R2(SSF)", including the one to the south of WR Tin Shui Wai Station which is a planned development for approximately 2,400 flats. For the remaining eight sites, they are subject to a maximum domestic PR of 5.0 and a maximum non-domestic PR of 0.5, providing about 9,800 flats.

Residential Zone 3 ("R3")

5.4.22 The "R3" zoning is intended primarily for low-density residential development. Nine sites are zoned "R3" on the Revised RODP where three of them are existing/planned developments to the north of Castle Peak Road. The six newly proposed "R3" sites are located in the northern part of the NDA, subject to a maximum domestic PR of 2.5 (except Site 2-11 with a domestic PR of 3 and a non-domestic PR of 0.5). This will generate approximately 2,300 flats.

Residential Zone 4 ("R4")

5.4.23 There is one "R4" site which reflects an existing development, with a maximum domestic PR of 0.4 and maximum building height of 3 storeys (9 m) near San Lee Uk Tsuen.

Rural Residential Zone 4 ("RR4")

5.4.24 Three sites are zoned "RR4" located near Fung Kong Tsuen and Tsing Chuen Wai, which are proposed for re-provisioning affected building lots eligible for compensation under the Village Removal Policy due to the HSK NDA developments. These sites will be restricted to a maximum building height of 3 storeys.

Other Specified Uses ("OU") annotated Commercial and Residential Development

5.4.25 Eight sites are designated as "OU" zone annotated "Commercial and Residential Development" with the planning intention primarily for high-density residential and commercial developments in close proximity to the proposed HSK Station and existing WR Tin Shui Wai Station. Developments within this zone are subject to a maximum domestic PR of 4.5 and a maximum non-domestic PR of 2.5. There is also a site designated as "OU" zone annotated "Commercial and Residential Development with LR Facilities" with the planning intention for medium density residential and commercial developments incorporating some LR facilities. Development within this zone is subject to a maximum domestic PR of 4.5 and a maximum non-domestic PR of 0.5. These sites will offer a total number of about 11,400 flats.

Commercial ("C") and "OU" annotated Commercial cum PTI and Public Carpark

5.4.26 A total of 15 sites are zoned "C" within the HSK NDA, including one subject to planning approval for commercial development near WR Tin Shui Wai Station. These sites are located either around the strategic locations of the proposed HSK Station, the existing WR Tin Shui Wai Station or near the tourism node of Lau Fau Shan. The planning intention of those "C" zones around the proposed HSK Station and the existing Tin Shui Wai Station is primarily for commercial developments, which may include offices, hotels, shop and services, place of entertainment and eating places, for reinforcing the areas as regional/ district commercial nodes. In particular, the commercial node around the proposed HSK Station will be buttressed by two anchor developments, with one for office/hotel/retail uses and the other one for commercial/residential uses, and supplemented by the surrounding commercial/residential sites, having regard to the experience of successful retail developments across the territory especially in new towns. PTI and public carpark will also be provided in these two anchor sites.

5.4.27 For the "C" zone in the Lau Fau Shan area, it is intended primarily for commercial developments which may include retail, eating places and a public car park, functioning mainly as local commercial node serving the immediate tourism node and neighbourhood.

5.4.28 Apart from "C" zones, a site at the northern part of the NDA is also zoned "OU" annotated "Commercial cum PTI and Public Carpark" to provide commercial facilities serving residents in the northern part of the HSK NDA and Tin Shui Wai. A PTI is proposed to be incorporated into the commercial development for better land utilisation. Public carpark should also be provided within the site. The site is restricted to a maximum PR of 3.

"OU" annotated Enterprise and Technology Park

5.4.29 Five sites to the south of the Regional Economic and Civic Hub of about 9 ha are zoned as "OU (Enterprise and Technology Park)". The planning intention is to provide development spaces for accommodating a variety of innovation and technology uses, including research centres, testing and certification, data centre, modern industries and other related businesses and non-polluting industrial uses. Developments within this zone are subject to a maximum PR of 5.

"OU" annotated Logistics Facility

5.4.30 Nine sites with a total area of 37 ha under the Revised RODP are designated as "OU" zone annotated "Logistics Facility". This zone is intended primarily for reserving land for modern logistics facilities. To facilitate accommodation of modern logistics compounds with ramps for access by trucks and lorries, sites of at least 3.5 ha each have been delineated within this zone. Developments within this zone are restricted to a maximum non-domestic PR of 5. This zone is located just next to the KSWH to grasp the advantage of being easily accessible by strategic highways linking the Hong Kong International Airport, Shenzhen and other parts of the territories.

5.4.31 Among these sites, one of the sites is intended for the development of a Logistics Facility cum EFTS Depot. The EFTS Depot is proposed to be located on the ground level and basement (if necessary), while the logistics facilities to be accommodated on the floors above.

"OU" annotated PBU+SWU

5.4.32 About 24 ha of land is designated for "OU (PBU+SWU)". The intention is to construct multi-storey buildings to accommodate some of the affected brownfield operations including the PBU & OS operations. The reserved land in this zone also allows those industries requiring open air operations, in particular, a site of about 4 ha is designated for OS use. These sites are restricted to a maximum PR of 7.0 including possible basement development.

Industry ("I")

5.4.33 Ten sites with a total area of about 13 ha to the west of KSWH are designated as "I" zone with a maximum non-domestic PR of 3.0. The zone will not only provide land for general industrial development, but also help redistribute industrial activities to free up land at more central location within the HSK NDA.

Government ("G")

5.4.34 Several sites have been reserved for Government facilities within HSK NDA. The planning intention of the "G" zone is to reserve sites for provision of Government facilities such as police station, fire station, hospital, Government offices and magistrates' court, etc. The provision of Government facilities has been planned in response to relevant departments' requests and in accordance with the HKPSG. The overall Government provision would be adequate to serve the planned population for the HSK NDA. Generally, appropriate maximum building heights are assigned for different Government facilities to suit their operational needs.

Institution or Community ("IC")

5.4.35 Three sites are designated as "IC" on the Revised RODP to reflect the existing uses, i.e. existing RCHEs and church.

Education ("E") and "OU" annotated Education and Related Facilities

5.4.36 The planning intention of the "E" zone is to reserve sites for provision of standalone education facilities including primary and secondary schools or other school uses that Education Bureau (EDB) considered appropriate in future. The provision of education facilities has been planned in response to the requests of EDB and according to the HKPSG. The overall education provision would be adequate to serve the planned population for the HSK NDA.

5.4.37 A total of 28 sites have been reserved within the HSK NDA including 17 primary schools and 11 secondary schools. In general, developments at these sites are subject to a maximum building height of 8 storeys.

5.4.38 Moreover, a site is designated as "OU" annotated "Education and Related Facilities" with an aim to accommodate post-secondary educational uses, either for publicly funded or self-financing institutions for the purpose of constructing academic facilities and/or student hostels, depending on the prevailing needs then.

Regional Open Space ("RO")

5.4.39 A Regional Park is provided at the heart of the NDA which is zoned "RO", intending primarily for the provision of facilities with a greater scope than the core activities and serve the wider recreational needs of the territorial population and tourists. Community farming and farmers' markets could also be allowed within the Regional Park.

District Open Space ("DO")

5.4.40 A number of "DO" sites are planned within the HSK NDA to provide recreational and leisure spaces. "DO" is intended primarily for the provision of outdoor open-air public space for active and/or passive recreational uses serving the needs of residents as well as the general public in the district. It includes the area dedicated for the riverside promenades and green corridors.

Local Open Space ("LO")

5.4.41 "LO" are provided throughout the HSK NDA and is in close proximity to residential areas and employment centres to serve local residents and workers.

"OU" annotated Regional Plaza with Leisure, Food and Beverage Uses

5.4.42 To reinforce the identity of the "Regional Economic and Civic Hub" of HSK NDA, an area around the proposed HSK Station is rezoned to "OU (Regional Plaza with Leisure, Food and Beverages Uses)" on the Revised RODP. The Regional Plaza, with a site area of about 4.7 ha, stretching from north to south across the town centre will provide well-designed green walkways for public enjoyment and serve as a civic space for public interaction. A holistic design integration between the proposed HSK Station, with the shopping complexes and PTIs on both sides should be adopted. To enhance vibrancy and vitality of the Regional Plaza, a reference non-domestic PR of 0.05 is suggested to allow provision of supporting leisure, retail, food and beverage facilities. The Regional Plaza will also be a land reserve for possible future strategic railway development, while under the "HK2030+: Towards a Planning Vision and Strategy Transcending 2030", there is a proposed NWNT-Lantau-Metro transport corridor in Hong Kong West.

Amenity ("A")

5.4.43 The HSK NDA caters for a range of incidental green spaces which are landscaped for amenity. Amenity strips will be provided alongside roads as far as possible to enhance the amenity and to serve as visual buffers between existing villages and new developments. They offer good opportunities for landscaping, tree planting and community farming activities and farmers' markets.

Green Belt ("GB")

5.4.44 "GB" areas have been determined to primarily define the limits of urban and sub-urban development areas by natural features, and to contain urban sprawl as well as to provide passive recreational outlets, with a general presumption against development. Some of the existing "GB" areas are retained on the Revised RODP with slight adjustment to protect the permitted burial grounds. Moreover, new "GB" sites have been designated to protect existing ecological resources, such as the existing mitigation wetlands under the KSWH and San Sang San Tsuen Egretry and its associated flight path.

Village Type Development ("V")

5.4.45 In order to ensure that any future development or redevelopment within the "V" zone will retain a village character, a maximum building height of 3 storeys (8.23m) or the height of the existing building, whichever is the greater, is imposed.

Other Transport Facilities and Public Utilities

5.4.46 There are also other transport facilities and public utilities reserved on the Revised RODP:

- **Station** – A site is zoned "OU" annotated "Station" reserved for the proposed HSK Station, which will be a key node connecting the NDA with the urban area.

- **Parking and Operational Facilities for EFTS** – A site which is intended to accommodate parking and operational facilities for EFTS serving the HSK NDA, is designated as "OU" annotated "Parking and Operational Facilities for EFTS".

- **Sewage Treatment Works** – Two sites are designated as "OU" annotated "STW" to reflect the existing/planned sewage treatment works. One of the sites is for existing San Wai STW and the San Wai STW – Phase 1 under construction. Another site is reserved for the proposed HSK STW to cater the sewage generated from the HSK NDA.

- **Sewage Pumping Station** – Six sites are designated as "OU" annotated "SPS" for proposed/planned/existing SPSs for collecting sewage flows from the HSK NDA and pumping the sewage to the HSK STW or conveying the sewage flow from existing development to the San Wai STW.

- **Fresh Water Service Reservoir and Flushing Water Service Reservoir**– A site is reserved for the development of a FWSR & FLWSR to the southeast of the HSK NDA. A FLWSR near Fung Kong Tsuen is also proposed.

- **Refuse Transfer Station (RTS)** – In the northern part of the HSK NDA along the KSWH, a site has been proposed for the provision of a new RTS to support the existing NWNT RTS and cope with the new population waste generation. A Community Green Station is also co-located within the site to enhance environmental education and help collect different types of recyclables in the local community, which could provide synergistic effect to achieve better operational efficiency.

- **District Cooling System** – Two sites have been reserved in the vicinity of the proposed HSK Station and the existing WR Tin Shui Wai Station for possible development of DCSs.

- **Refuse Collection Point, Electricity Substation, Petrol Filling Station, Retention Tank, Emergency Access Point** – Several sites are also designated as "OU" for uses including "RCP", "ESS", "Petrol Filling Station", "Retention Tank" and Emergency Access Point" to reflect the various planned/newly proposed public infrastructures/facilities within the HSK NDA.

Transport Network

5.4.47 To support the development of the NDA, the railway system is planned as the backbone of the passenger transport system supplemented by other public transport services. A number of proposed modifications and improvements to the existing road network are necessary.

Road Network

5.4.48 Currently, the principal accesses to the NDA include YLH, Castle Peak Road and KSWH while the secondary accesses include Tin Wah Road, Ping Ha Road and Tin Ying Road. The NDA will be well connected with different parts of Hong Kong and surrounding areas by cross-boundary strategic road network as well as by a comprehensive existing and planned road network. Possible new strategic highways connecting the NDA with the Tuen Mun and the urban area will be planned to cope with the anticipated traffic growth in the NWNT region in the long term. A hierarchy of primary and district distributors and local roads is planned to provide convenient connection among various development areas and activity nodes. The transport network plan and a plan showing the road hierarchy are shown in **Figures 5.4.3** and **7.6.1** respectively.

5.4.49 As the special industrial land uses are planned to the western side of the NDA close to KSWH, the heavy vehicle traffic generated from the special industry would be conveniently directed to/from KSWH without going through the residential areas. The Road P1 is proposed to convey the traffic from KSWH to district distributor and vice versa. Slip roads and flyover are proposed to connect KSWH from Road P1 and Road D3. For other residential-related traffic, they are estimated to use other access such as Hung Tin Road via YLH or other district distributors via Castle Peak Road. Therefore, the heavy vehicles of special industrial land uses would not pass through the NDA to access the eastern part of YLH via Hung Tin Road.

5.4.50 In order to maximise the land use and alleviate the potential environmental impacts on the adjoining land uses, it is proposed to re-plan Tin Ying Road between its junction with Tin Wah Road and Ping Ha Road with GTC as well as to downgrade a section of Hung Tin Road between Ping Ha Road and Castle Peak Road. Alternative roads will also be provided to resemble function of Tin Ying Road including the widened Ping Ha Road and other new roads proposed to be connected to KSWH. Besides, the development of the HSK NDA will facilitate consolidation of the existing brownfield operations in the area and hence the traffic operations in the area and the traffic burden on existing roads such as Ping Ha Road from the brownfield operations will likely be alleviated in the future.

5.4.51 The major components of the proposed road hierarchy are as follows.

Primary Distributor Roads (Dual 2 Lane Standard)

- **Road P1**: majority of the new primary distributor road (Road P1) located under the existing KSWH at the western part of the NDA (approximately 3.2 km in length), provides a service access with 2 lanes per direction to both the “I” areas and the new core area around the proposed HSK Station. The at-grade alignment will have several connections to the proposed district distributor roads (Road D1/D5/D6/D7/D8). Two pairs of slip roads will be constructed to connect between the at-grade Road P1 and existing KSWH.

District Distributor Roads (Dual 2 Lane / Dual 3 Lane Standards)

5.4.52 A total of 8 Distributor Roads are proposed. All of them will provide a major role in servicing the proposed land uses and existing developments. These comprise:

- **Road D1**: this road provides a partly dual three and partly dual two, west to east primary connection at the northern part of the NDA linking Tin Shui Wai with KSWH and providing links to District Distributors that provide the secondary links to the south of the NDA.
- **Road D2**: Comprises a north-south primary route that links to Ping Ha Road and Hung Tin Road. Road D2 is planned to dual 2 standards by widening the existing Ping Ha Road to enhance the magnitude of residential development and reduce the environmental adverse noise impact that is realisable in the north-east of the NDA. The link will form part of the major road network to accommodate the traffic capacity currently carried along the Tin Ying Road and Ping Ha Road and also has the capacity to serve existing and proposed developments.
- **Road D3**: Provides a link between Road D4/D1 and Road D5. A depressed road will be constructed near the roundabout of Road D4/D1 to avoid reduction on the traffic flow efficiency to and from Road D1. A section of Road D3 will be constructed in abutment for connection from slip road from KSWH to the at-grade section of Road D3.
- **Road D4**: Provides a link between Road D1/D3 to Road D2 to facilitate an eastward connection to Tin Shui Wai New Town and Castle Peak Road via Road D4. This route will serve to alleviate the pressure on other west to east links. A section of Road D4 will be constructed as depressed road with partial pedestrian decking-over.
- **Road D5**: Provides a link between the services areas (e.g. “OU (Logistics Facilities)”) and connects to Road P1 in the west and Tin Ha Road in the east. The whole section of Road D5 will be at grade with a roundabout with Road D3.
- **Road D6**: Connects with Road D8 along its alignment. The route will play a major role in servicing the proposed HSK Station and related development as well as the proposed commercial sites and mixed commercial and residential developments. To avoid conflict with the pedestrian activity in the Regional Plaza near the proposed HSK Station, half of Road R6 will be constructed in depressed road with partial decking-over in the Regional Plaza section.
- **Road D7**: Road D7 provides access from Road P1 to the commercial sites to the west of Road D6.
- **Road D8**: Road D8 provides a connection between the proposed Road P1 and Castle Peak Road. The route will provide an important west to east link whilst also providing a major means of access to the proposed HSK Station, the civic hub, and the commercial and residential developments located east of the proposed HSK Station. The road will be constructed at grade with a depressed EFTS crossing under Road D8.

5.4.53 Apart from the re-planning of Tin Ying Road and proposed new primary road under KWSH (i.e. Road P1) and other district distributor roads, the Study has also proposed new secondary roads in Lau Fau Shan and Kiu Tau Wai area to enhance the connectivity.

Local Roads

5.4.54 Existing local roads within the HSK NDA would be maintained such as Tin Ha Road, Shek Po Road, Hung Shui Kiu Tin Sam Road, Hung Shui Kiu Main Street and Hung Yuen Road. All local roads are single 2-lane carriageways providing accesses to local villages and activity nodes including the planned hospital near the existing WR Tin Shui Wai Station.

Rail Transport

5.4.55 There are two forms of rail transport currently providing service to the HSK NDA:

- **West Rail Line Service** - This provides a mass transit rail link that extends from Tin Shui Wai to Hong Kong's Central Business District (a journey of about 37 minutes). The alignment dissects the central southern section of the HSK NDA. The alignment runs on a viaduct. Within the HSK NDA, the running tracks upon the viaduct are at an elevation of between 19mPD and 20mPD. The Tin Shui Wai Station is the only WR Station that is currently located within the HSK NDA. The proposed HSK Station has also been reserved on the Revised RODP which will help enhancing the accessibility by mass transit system to the NDA. The progressive enhancement of the WR service through enhancement of the signalling system and addition of train compartments in the years ahead will generally be able to meet the demand of the NDA and other new developments in the NWNT region.
- **Light Rail Transit System** - This provides local service to connect Tin Shui Wai and its service area that extends to Yuen Long and Tuen Mun along Castle Peak Road.

Environmentally Friendly Transport Services

5.4.56 While it is proposed under the Study using railway system as backbone supplemented by long haul bus services for external connections of the NDA, an effective linkage between railway stations and the major nodes outside 500 m catchment of railway stations is also considered necessary. A good feeder services could encourage public to use the railway system.

5.4.57 The proposed EFTS system, which may include environmentally friendly transport modes such as, subject to further studies, electric buses, rail-based transport system, and/or other form of green transport system, is to provide rapid intra-district feeder services to connect the residential clusters with the Logistics, Enterprise and Technologic Quarter, railways stations and other major commercial and activity nodes to minimise traffic and carbon emission. There will be a cycle track of 5m wide and footpath along the EFTS within the GTC allowing and encouraging public to walk and/or cycle within this corridor.

Public Transport Interchanges

5.4.58 Currently, there are a number of MTR feeder routes, franchised bus routes and public minibuses servicing the existing HSK area along the Castle Peak Road. There is a PTI located adjacent to the WR Tin Shui Wai station which will be retained. The PTI is currently serving the existing MTR feeder routes, franchised bus routes and future planned franchised bus routes in the Route Planning Programme. Considering that the capacity of the PTI may not be able to absorb additional services, two additional PTIs adjacent to the proposed HSK Station and one additional PTI at the northern part of the HSK NDA are proposed to provide capacity for the future arising road-based transport routes.

Car Parking Spaces / Loading and Unloading Facilities

5.4.59 All parking and services provisions will be in accordance with the HKPSG. Loading and unloading provision should also be provided within the curtilage of the site.

5.4.60 Moreover, 200 number of public car parking spaces in addition to the requirement of the HKPSG is required to be provided at "C" and "OU (Commercial and Residential Development)" sites near the proposed HSK Station, as well as the "C" and "OU (Commercial cum PTI and Public Carpark)" sites in the northern part of the HSK NDA. These four sites are located adjacent to railway or EFTS Station, and/or equipped with PTIs. This would encourage the use of public transport.

Cycling and Pedestrian Facilities

5.4.61 A comprehensive cycle track and pedestrian walkway system will be provided within the HSK NDA linking up major activity nodes in the NDA, including the existing and proposed railway stations, PTIs, residential and commercial areas, open spaces and GIC / recreational facilities. In general, cycle tracks would be provided along the major district distributors and some of the local roads. An artery cycle track will be provided linking Tin Shui Wai near Tin Wah Road with the proposed HSK Station. The new cycle track network would integrate with the existing cycle tracks at various locations in the NDA. Subject to detailed design, a 5m wide cycle track would also be provided along the proposed EFTS so that there would be cycling connectivity to Lau Fau Shan and Tin Shui Wai New Town. Cycling supporting facilities such as cycle parking areas would be provided at railway stations, PTIs, major residential developments as well as open spaces and amenity areas as far as practicable. With the comprehensive cycling network planned in the NDA, cycling would be one of the environmentally friendly transport modes which could act as a supplementary mode of transport for internal feeder services between developments or activity nodes.

5.4.62 In general, footpaths with minimum width of 3 m would be provided along both kerb sides of district distributors, local roads and between development sites in strategic locations to ensure the connectivity between developments. There would also be footpaths included within the GTC for connecting key activity nodes. Several shopping streets are also designated on the Revised RODP to allow commercial and leisure facilities such as café, restaurants and retail shops along GTC, Regional Plaza and/or riverside promenade. This provision will enhance and contribute the at-grade vibrancy and vitality as well as character of the activity nodes. With the provision of pedestrian facilities, it is intended to promote walking especially between major public transport hubs and activity nodes so that the road-based public transport demand for serving the people travelling between the activity nodes and the major transport hub could be reduced.

Cultural Heritage and Eco-Trail

5.4.63 To let the public appreciate the natural, ecological and landscape resources within and in the surroundings of the NDA such as knolls, maintain backdrop of Yuen Tau Shan, the San Sang San Tsuen Egretry and flight path of ardeids, and wetland compensation area for the Deep Bay Link project (currently named as KSWH), a possible eco-trail is proposed to link up the Regional Park with the above resources and the hiking trails in Yuen Tau Shan. The trail provides a safe and efficient amenity for people to explore many of the culturally significant areas in the HSK NDA and is also intended to help promote these features and draw people to the area. The route of the heritage trail is depicted on the Revised RODP.

5.5 Further Refinements to the Development Proposals

5.5.1 To facilitate timely implementation of the HSK NDA project, a departmental Outline Development Plan (ODP) has been prepared by the PlanD. The proposed land use patterns of the ODP generally follow those of the Revised RODP promulgated in September 2016 as well as the advice and comments from relevant B/Ds, and the latest circumstances of the area, except some minor refinements and generalisation to the land use zonings and zoning boundaries taking into account the ODP format under the larger scale plans. The proposed maximum PRs of individual sites and the housing provision etc. under the ODP are also the same as those under the Revised RODP.

5.5.2 Moreover, some refinements were also made to the plan taking into account latest planning circumstances and public views when formulating the ODP. These key refinements are summarised below and have been reflected on the ODP:

Provision of Public Market

5.5.3 In response to comments requesting for more community facilities and Food and Health Bureau's latest proposal to include a signature market in the HSK NDA, it is proposed that a public market be included into the "G" site located near to the proposed HSK Station. The layout and design of the various Government buildings and facilities in the "G" site would be subject to detailed design.

Extension of EFTS

5.5.4 In response to public concern on the connectivity with the northern part of Tin Shui Wai, the EFTS alignment along the Tin Shui Wai Main Channel is proposed to be extended eastward to join the EFTS section along Tin Wah Road such that future EFTS extension from Tin Shui Wai area, if any and subject to further studies, could be connected to the EFTS in the HSK NDA providing north-south connection along the river channel.

6 URBAN AND LANDSCAPE DESIGN

6.1 Urban Design Framework

6.1.1 The development of the Urban Design Framework has taken direct reference to the proposals and recommendations made to the relevant OZPs, Practice Notes for Authorised Persons, Sustainable Building Design (SBD) Guidelines, the HKPSG as well as the public aspirations from the Stage 1 to Stage 3 CE to inform the planning of the HSK NDA.

6.1.2 **Figure 6.1.1** depicts the Master Urban Design Framework. The proposed urban design framework for the HSK NDA has been designed to develop a coherent and legible structure of land uses, urban form and open space that is appropriate to the unique development context. The framework seeks to articulate a form and arrangement of development that is:

- Readable and aesthetically strong with definable landmark developments around the railway stations that promote orientation and way finding;
- Pleasant, liveable and serviced by readily accessible recreational facilities and uses;
- Serviced by a convenient and accessible transport system;
- Arranged and disposed to allocated specific land uses in appropriate locations to avoid adverse land use interfaces;
- Respectful and responsive to existing retained development; and
- Cognizant of environmental factors by removing physical infrastructure where it would otherwise compromise residential or recreational land use.

6.1.3 The arrangement of development also exploits the unexploited potential amenity and recreational value of the nullahs or riverine channels that dissect the HSK NDA. As will be seen from the Landscape Master Plan, these will consist of channels for recreational strolling and cycling as well as providing convenient and partially vehicle free pedestrian circulation. The river channels also provide an effective device for structuring land use and for the delineation of land use parcels.

6.1.4 Connectivity with established development areas is also an important consideration as new and old areas should read as one and as an integrated whole with mutually responsive uses and function.

6.1.5 The principal opportunities that can be exploited within the HSK NDA include:

- To utilise river channels as recreational corridors that capitalise on the visual and physical relationship of the natural landscape, existing development and proposed development;
- To remove, where practical and possible, large scale road infrastructure adjacent to riverine corridors to reduce environmental impacts and to optimise the extent of land that can be committed to residential development;
- To promote walkability and street vibrancy, shopping streets are recommended at the riverine promenade, major commercial node lined with retail frontages and the proposed HSK Station to enhance public realm experience;

- To enhance visual amenity, terrace design with setback should be adopted on the first floor of developments along major pedestrian streets / corridors with a restriction of maximum height of 5m on the edges of 10m in width to those developments along these corridors;

- To foster unique identities for the development areas within the HSK NDA to engender a sense of place, function and neighbourhood;

- To promote recreation and leisure activities by way of creating a quality living environment for residents and visitors;

- To provide 'breathing spaces' for the more densely populated areas adjacent to the area through the introduction of district parks and local open spaces;

- To enhance the north-south movement with designating a continuous pedestrian walkway and green spine;

- To promote lively streetscapes and activities at key nodes and along the riverine channels;

- To develop a comprehensive system of at-grade inter-connected pedestrian links minimising the need for footbridges; and

- To introduce the provision for a road-based or rail-based EFTS that will ameliorate environmental impacts and enhance connectivity.

6.1.6 The key urban design concepts that are encapsulated on the Recommended Master Urban Design Plan, the Recommended Landscape Master Plan and the Revised RODP are described in the following sections.

Creating Nodes

6.1.7 In order to create a legible urban structure and enliven the NDA, it is important to create strong nodes within the NDA. Two key nodes with a mix of commercial uses including offices, hotels and retail facilities, residential developments, social and community facilities and PTIs are planned around the proposed HSK Station (i.e. the "Regional Economic and Civic Hub") and the existing WR Tin Shui Wai Station (i.e. the "District Commercial Node") to serve as major focal points and activity nodes of the NDA. The "Regional Economic and Civic Hub" of the NDA around the proposed HSK Station will be complemented by the commercial complexes, residential developments of two anchor sites, a Regional Plaza as an important breathing and leisure space within the regional hub with good design integration with the proposed HSK Station, as well as the Civic Hub. To enhance the commercial mass for serving the NDA and the neighbouring Tin Shui Wai New Town, an integrated district node with shopping malls and office towers is planned around the existing WR and LR Tin Shui Wai Stations. The "District Commercial Node" will be developed as a secondary focal point of the NDA. It can also serve the needs of Tin Shui Wai New Town for additional commercial and community facilities. A plan showing the land use framework is shown in **Figure 6.1.2**.

6.1.8 A "Local Service Core" is also planned in the northern side of the NDA, with a mix of retail facilities, PTI, public car park, clinic and other social and community facilities. These facilities could also serve the population in the nearby Tin Shui Wai north.

6.1.9 The "Logistics, Enterprise and Technology Quarter" at the northwestern part of NDA constitutes an important economic and employment node of the whole NWNT with the dominant provision of modern industries.

6.1.10 To create a social and recreational hub easily accessible by the future and existing residents, a centrally located area in the midway of the "Regional Economic and Civic Hub" and "District Commercial Node" will be developed into the Regional Park with a sports ground and a sports centre which will be integrated with the riverside promenade for providing leisure, recreational and urban green space uses.

6.1.11 To complement the tourism activities in Lau Fau Shan and to serve the neighbourhood, a local commercial centre with car parking facilities is planned at the northern edge of the NDA.

Stepped Building Height and Development Intensities

6.1.12 A compact city form design is adopted for the NDA. The proposed stepped building height and development intensity profiles for the NDA give due regard to the physical form and setting of the existing and retained land uses. The development intensity and building height descend towards the northern periphery by designating some low-rise, low-density developments along Lau Fau Shan Road to allow visual relief between the NDA and the existing low-rise, low-density Lau Fau Shan area. As a broad general principal for the area along the revitalised Tin Shui Wai Main Channel, development heights intend to create a curvilinear form, falling towards the retained villages and other low-rise developments, and towards areas of open space. As such, the overall development intensity and height profile descending would ensure a better integration with the area and enhance variety in height and massing of new developments.

6.1.13 Besides, the proposed building heights and development intensity profile are configured to give emphasis to specific areas within the NDA that are proposed as major development nodes and points of congregation. Exemplifying the concept of rail-based planning, a gradation approach is adopted with developments of higher intensity and building height planned around within 500 m catchment of the railway stations to minimise the need for road transportation. Developments of higher density are clustered around the proposed HSK Station and the existing WR Tin Shui Wai Station. The development intensities descend to the north. Near Lau Fau Shan areas in the further north of the NDA, the proposed low-rise, low-density residential development sites are subject to a maximum PR of 2.5 to 3.5.

6.1.14 Landmark buildings will be located at the gateways of the NDA including the area around the proposed HSK Station, which is the principal gateway of the NDA. Higher development intensity and building height allow a greater differentiation in height profile when viewed from a distance and at key locations within the NDA. The gateway function could be reinforced by the application of expressive and distinctive architecture. For the area around the proposed HSK Station, it is marked by integrated commercial complexes comprising office buildings, hotel towers and large scale shopping malls, and the Regional Plaza.

6.1.15 Landmark buildings are also recommended in development sites adjacent to the eastern entrance of NDA around the existing WR Tin Shui Wai Station to allow a greater variation in building mass and height profile.

6.1.16 The Enterprise and Technology Park in the "Logistics, Enterprise and Technology Quarter" also provides an opportunity for creating further gateway to NDA by introducing landmark buildings with iconic architectural and greenery design at the entrance.

Formulating an Integrated Layout

6.1.17 The layout of future developments should avoid adverse interface issues. An integrated layout has been formulated to help mitigate incompatible land uses. Amenity strips, open spaces, NBAs and non-sensitive land uses are introduced in the development proposals to minimise the interface issues. Continuous amenity strips with pockets of local open spaces are designated along the western boundary of the "V" zone of Ha Tsuen to maintain a green buffer between the newly proposed employment quarter and the existing recognised villages. To further ameliorate the existing interface problem of PBU & OS uses and residential use in Ha Tsuen, the area to the immediate west of Ha Tsuen villages is planned for accommodating high-value added logistics industry and an Enterprise and Technology Park, which is for a variety of innovation and technology uses, including research centres, testing and certification, data centre, modern industries and other related businesses and non-polluting industrial uses. To address the concerns of possible air and noise impact from the KSWH, a continuous amenity strip is introduced as a buffer along the development sites to the east of KSWH.

Strengthening Connections and Vibrancy

6.1.18 It is important to connect the newly planned neighbourhoods within the NDA to the surroundings to integrate the existing and new communities. The riverside promenade planned along the river channels, the north-south running open space connecting the Regional Plaza as well as the Regional Park together serve as major connecting green spines between new and the existing communities in the NDA and the surrounding areas. For example, about 10m to 20m wide riverside promenade is planned along Tin Shui Wai Main Channel with pedestrian walkways, cycle tracks as well as retail and dining facilities which provides quality riverine public spaces and relaxed environment. Besides, three major pedestrian streets are planned to further strengthen connections between new and existing communities. A 20m wide pedestrian street is proposed to link villages in Ha Tsuen to the riverside promenade along the river channel which also echoes with the fung shui lane. To improve the pedestrian linkage connection between the existing and new communities as well as the proposed EFTS Station and the surrounding areas, a 15m wide pedestrian street is planned within the neighbourhood at the northern part of the NDA. As a major pedestrian connection between the existing communities to the south of Castle Peak Road and the town centre, a 15m wide pedestrian street lined with retail shops, cafes, and restaurants is also proposed near the proposed HSK Station to liven up the pedestrian environment. To provide a pleasant walking environment within the town centre, part of Road D6 would be submerged to allow seamless at-grade crossing between commercial complexes and mixed residential and commercial development on both sides of the proposed HSK Station.

6.1.19 In order to strengthen street vibrancy extended from the key nodes, the concept of retail frontage primarily at grade is adopted. In general, site edges connecting to the designated pedestrian street, the proposed GTC, Regional Plaza and/or the proposed HSK Station are designated as shopping streets for the provision of continuous retail frontages and the provision of commercial and leisure facilities such as café, restaurants and retail shops at ground floor, thus contributing to street vibrancy and local character. It is generally referred this arrangement as retail frontage. For commercial sites, retail frontage is encouraged on the ground floor of the development. For residential sites, this concept is further developed by providing terraces and setting back of first floor of podium so as to enhance visual amenity that a maximum building height of 5m is applicable of 10m in width from the specific edges.

6.1.20 Footpaths within the NDA will be pedestrian friendly, continuous and landscaped in order to provide a pleasant walking environment. Footpaths along major roads will be tree-lined throughout the NDA and sufficient spaces are reserved for amenity strips along the streets to provide a leisure walking environment. Pedestrian linkages in the form of footbridges and subway across Hung Tin Road and the river channel to be regenerated and its tributaries are proposed to provide easy access for pedestrians between the NDA and Tin Shui Wai area. Subject to detailed design, the proposed footbridges and subway may be replaced by at-grade crossing facilities, and their locations may be revised.

6.1.21 A strong emphasis is on providing a comprehensive and pleasant cycling environment within the NDA. A comprehensive cycle track network is planned along the riverside promenades and EFTS line to provide a more comfortable cycling environment. It is also planned with linkages to the existing cycle track network in the HSK and Tin Shui Wai area to provide convenient connections for the local communities. An artery cycleway along the river channel and connecting to the "Regional Economic and Civic Hub" is also designated within the NDA to provide a direct transport link to and from Tin Shui Wai and Tuen Mun New Towns. Major cycle parking facilities are proposed close to the proposed HSK Station, PTIs and major activity nodes to facilitate the use of public transport. A plan showing the pedestrian walkway network and cycle track is shown in **Figure 6.1.3**.

Enhancing Air Ventilation, Celebrating Views and Building Permeability and Separation

6.1.22 A comprehensive breezeway system is introduced in the NDA to promote better air ventilation and urban climate. The purpose of introducing breezeways is to provide unobstructed corridors or corridors containing relatively low-rise developments to enhance air exchange and passage of air streams through the built-up area. In general, the prevailing wind comes from the northeast quadrant on an annual basis and from the east and south to southwest during the summer months in the HSK area. A number of major air paths are incorporated in the layout for wind penetration which are aligned approximately in either east-west or northeast-southwest directions. They include (i) the north-south running Regional Plaza and the adjoining open space spines diverting wind to penetrate through the town centre to Tin Sam Tsuen, San Lee Uk Tsuen and various villages in Ha Tsuen; and (ii) a chain of public open spaces and "GB" sites running in northeast-southwest direction to facilitate penetration of wind from Tin Shui Wai to the Ha Tsuen area and the future employment quarter.

6.1.23 Breezeways will also be provided along major road and rail corridors, proposed pedestrian streets, revitalised river channels and public open spaces. The disposition and arrangement has also been structurally organised to permit the introduction of breezeways through proposed development clusters. The fung shui lanes will also be used as breezeways and will also form a constituent part of the open space framework. It is also proposed that other smaller breezeways will be provided within parks, along local streets, open spaces within developments, etc. to encourage a better ventilated microclimate. Structured tree planting along the breezeways will provide shade and amenity to the public.

6.1.24 To improve wind penetration at pedestrian street level, terrace frontage is adopted along the proposed shopping streets near the proposed HSK Station in the southeast, abutting the EFTS, and riverside neighbourhood to the west of river channel to be regenerated near Tin Shui Wai. The purpose is to enhance vibrancy in the street level and direct downward airflow to the pedestrian level. The urban design guidelines for improving air ventilation stipulated in the HKPSG and the Technical Circular and Technical Guide on AVA should also be referred to in the detailed design for the developments.

6.1.25 The urban design of the NDA also recognises the need to respect existing views. Principal views are maximised through the creation of green open space corridors. View corridors will principally be aligned along the major breezeways. The river channel system will provide a series of interlinked view corridors where distance views that will aid orientation and way finding will be achievable. Road corridors such as Road D4 will provide long distance views that will be deliberately terminated by development to provide a sense of closure. The north-south running open space spine and Regional Plaza also provide a long-range view towards the town centre from the Regional Park. To maintain the openness in the Regional Plaza and the proposed HSK Station, a stepped building height profile is proposed to the east of Regional Plaza while commercial developments at the other side are proposed about 100m to the west of the proposed HSK Station. The chain of open spaces and "GB" sites to the north of villages in Ha Tsuen maintains existing distant view from Tin Shui Wai to Yuen Tau Shan. Two fung shui lanes connecting to the Ping Shan heritage precinct and Ha Tsuen would also be maintained by aligning new pedestrian street and roads to the corridors, which provide two intersecting east-west and northeast-southwest visual corridors.

6.1.26 Separation of land uses between logistic facilities and existing villages have been considered by introducing "A" and "LO" zones as a buffer. Other measures such as setback and NBAs have also been incorporated in the NDA to enhance building separation and environmental quality.

- Several 5m wide NBAs are designated along the western boundaries of residential sites to the east of villages of Ha Tsuen in order to maintain a spacious corridor between the proposed developments and existing villages. This would also facilitate wind penetration and greening at pedestrian street level and enhance the pedestrian environment.

- A 6m wide NBA is designated along the southern side of an "OU (Commercial and Residential Development)" site near Kiu Tai Wai to enhance the existing buffer over a pond with the main cluster of village houses in Kiu Tau Wai, which results in about 20m buffer.

- A 10m wide NBA is imposed in the southern "I" site to minimise the potential interface issue, if any, between "I" use and other nearby areas.

- A 50m wide NBA is designated along the possible future railway expansion between the "RR4" site and a "G" site for vehicle depot at the southern part of the HSK NDA.

- Due to potential noise impact from the elevated WR, domestic development have to set back 60m from the western boundary of the "OU (Commercial and Residential Development)" site near proposed HSK Station, which is more than 90 m away from the railway tracks.

- There is also a 25m setback from the site boundary for sensitive uses of a school facing WR Line.

Landscape and Open Spaces Network

6.1.27 A coherent green framework with hierarchy of active and passive open spaces is proposed in the NDA covering riverside channel, planned open spaces as well as natural knolls. Two green landscape spines are proposed as a landscape corridor through the NDA and create an integrated landscape system.

6.1.28 The open space network is structured along the river channels. These provide the vertebrae of the open space framework from which a series of ancillary open spaces extend. Retail frontage of the residential sites will be introduced along the riverside promenade along the revitalised Tin Shui Wai Main Channel to add vibrancy to the area to form a unique shopping street which would become one of the major focal points of the NDA. The river edge along the regenerated Tin Shui Wai Main Channel will also be abutted by quality residential developments that will also contribute to the activation of the riverfront. Introduction of wider and continuous greening corridors to the north and north-east of recognised villages provides greater buffer for existing villages and to enhance the east-west connectivity.

6.1.29 A centrally placed Regional Park is located at the core of the HSK NDA. The scale and extent of the park is analogous to that of parks within the urban area and in the new towns. The park will provide active and passive open space. The park will be accessible to the general public and local residents. The park provides the central core of a comprehensively interlinked open space framework that extends from the structural open space vertebrae of the riverine channel. To promote a smart, green and resilient development concept in the NDA, a retention lake is proposed within the Regional Park as an important water and landscape feature which delivers a micro climate cooling mechanism and as part of the regulating measures to the overall drainage system in the NDA. An eco-trail is also proposed to connect the Regional Park with the hiking trails in Yuen Tau Shan through the “GB” sites and “LO” in the Enterprise and Technology Park.

6.1.30 The Regional Plaza, which serves dual functions of being an open space and leisure focus of the “Regional Economic and Civic Hub”, is planned at the core of the NDA. It is one of the important ‘breathing and leisure’ spaces within the high density built-up area of the “Regional Economic and Civic Hub”. It provides not just a beautifully landscaped public space connecting the station with the surrounding commercial complexes and PTIs but also provides leisure, retails and food and beverage facilities. Together with the Regional Park, it is conveniently located for the enjoyment of the new and existing communities. These facilities are easily accessible by the general public and local residents as it will be linked with the north-south running open space spines and riverside promenades.

Open Space Provision

6.1.31 About 66 ha of open space would be provided in the HSK NDA, of which about 16 ha is “RO” (i.e. the Regional Park), about 27 ha is “DO” and about 23 ha is “LO”. With the estimated total residential population of about 218,000 and a working population of about 150,000, about 22 ha and 29 ha of “DO” and “LO” respectively are required for the estimated residential and worker population in the NDA pursuant to the HKPSG for the level of provision of open spaces. In overall term, the open space provision can meet the HKPSG requirements.

6.1.32 The open space provided in the NDA would serve both the new and existing residents in the NDA and visitors. It also provides a good chance for the development of community gardens for farming activities and farmers’ markets in regional and district open spaces, in view of rising interest of Hong Kong people in appreciating farming activities.

Sustainable Building Design and Green Coverage

6.1.33 Developments in the NDA are required to comply with the SBD Guidelines promulgated by the Buildings Department. The guidelines on building separation, building setback and site coverage of greenery aim to achieve better air ventilation, enhance the environmental quality of our living and working space, provide more greenery and mitigate the heat island effect.

6.1.34 Making reference to the principles and guidelines on greening as provided in the HKPSG, and other Government studies on green roof application and sustainable living space, greening ratios of 30% to 45% and 30% to 85% are recommended for "DO" and "LO" respectively. For amenity areas, a minimum greening ratio of 85% is recommended. For public road works, which include distributor roads, local roads and footbridges, a minimum greening ratio of 10% to 15% greening ratio are recommended. For other development sites, a minimum greening ratio of 20% to 30% (depending on the site size) is recommended. Development proponents are encouraged to provide more greenery, especially at-grade tree planting, in the development sites.

Respecting Cultural Heritage

6.1.35 The HSK NDA and its environs have a rich history and heritage. The two declared monuments and the seven graded historic buildings within the NDA would be retained and preserved. A heritage trail is proposed within the HSK NDA to interlink the heritage features. The trail is proposed to be paved with rustic paving along its entire length. It will also be abutted where possible with shade trees to afford a degree of shade and shelter. It is suggested that bespoke signage be developed to allow visitors to find their way around the trail and to reach the destinations that they choose to visit.

6.2 Development Character Areas

6.2.1 Based on the planning design concept and urban design framework, five Development Character Areas (DCAs) are identified, each with a defined character and function. The DCAs are shown in **Figure 6.2.1**.

Regional Economic and Civic Hub

6.2.2 The "Regional Economic and Civic Hub" around the proposed HSK Station will be the major town centre of the NDA and the regional hub for NWNT. This major economic and employment node will be buttressed by two anchor developments creating critical mass of commercial uses, with one for office/hotel/retail uses and the other one for commercial/residential uses, and supplemented by less sizable commercial and commercial/residential sites, having regard to the experience of successful retail developments across the territory especially in new towns. A wide range of uses including offices, hotels, retail facilities and public and private residential developments, are planned within 500m of the proposed HSK Station and would generate commercial GFAs of more than 1 million m^2.

6.2.3 Located in front of the proposed HSK Station, the Regional Plaza stretching across the town centre will become an important breathing and leisure space within the regional hub, complemented by leisure, retail and food and beverage facilities. A civic hub comprising Government offices, a magistracy, a community hall, a performance venue and a market are planned. Post-secondary educational use is also planned to the southwest of the Regional Plaza and easily accessible by the WR to serve the wider catchment. The key planning and urban design objective for the area are to create a distinct sense of place and foster identity of the regional hub, legible urban structure, convenient access and urban vibrancy.

District Commercial Node

6.2.4 Located to the immediate south of the existing WR Tin Shui Wai Station, the "District Commercial Node" with commercial developments, private and public residential developments will be developed as a secondary node of the NDA and would generate commercial GFAs of more than 0.6 million m^2 for office, retail and hotel uses. It can also serve the needs of Tin Shui Wai New Town for additional commercial and community facilities. The residential and commercial development located to the west of Hung Tin Road will be overlooking the revitalised Tin Shui Wai Main Channel and the Regional Park.

6.2.5 A hospital is also proposed in this DCA to serve not only local residents of the NDA but also those in the neighbouring communities. The existing knolls next to Hung Uk Tsuen and Kiu Tau Wai will be preserved and open space will be planned for public enjoyment.

Logistics, Enterprise and Technology Quarter

6.2.6 The "Logistics, Enterprise and Technology Quarter" easily accessed by strategic transport corridors is designated for logistics facilities, Enterprise and Technology Park, industrial zone, as well as to provide land for development of multi-storey buildings for accommodating some of the brownfield operations affected by the NDA project. This location in the NDA enjoys direct access to strategic roads including KSWH, which could easily be connected to the Hong Kong International Airport, Kwai Tsing Container Terminals as well as Shenzhen. The direct access to strategic highways would also minimise movements and impact of heavy vehicular traffic within the NDA. The existing San Sang San Tsuen egretry will be retained and preserved, complementing the expanded open space corridor to further protect the egretry and the flight paths of the ardeids.

Riverine and Village Neighbourhood

6.2.7 The "Riverine and Village Neighbourhood" is located at the north-eastern extent of the NDA, alongside the regenerated river channel which flows towards and along Tin Shui Wai. This DCA provides quality residential neighbourhood and riverine public spaces. With the re-planning of Tin Ying Road, a promenade along the regenerated river channel is planned to enhance the riverside environment where retail and dining facilities will be provided to promote vibrancy, landscape planting and pedestrian walkways and cycle tracks are planned alongside the promenade to allow strolling and cycling in a relaxed environment. The Regional Park, which will become a regional landmark, will also be provided and be integrated with the riverside promenade for providing leisure and recreational uses.

Bayview Neighbourhood and Local Service Core

6.2.8 The "Bayview Neighbourhood" overlooking the beautiful scenery of Deep Bay and Yuen Tau Shan is mainly for residential development and GIC facilities. A stepped building intensity and building height profile is adopted to harmonise with the surrounding natural and rural environment near Lau Fau Shan and Deep Bay. A "Local Service Core" is planned within the "Bayview Neighbourhood" with a mix of retail facilities, PTI, public car park, clinic and other social and community facilities. These facilities could also serve the population in the nearby Tin Shui Wai north. A local commercial centre with car parking facility is also planned at the northern tip of the NDA for serving the neighbourhood and complementing the tourism activities in Lau Fau Shan.

6.3 Landscape Design Framework

Landscape Design Principles

6.3.1 The Master Landscape Plan (MLP) is shown in **Figure 6.3.1**. The MLP encompasses the following principal objectives:

Establishment of a high quality functional landscape network

- To establish a series of high quality functional outdoor spaces that provide for a range of passive and active recreation which can be integrated with the built environment;
- To establish a landscape setting that creates a strong sense of place and promotes legibility;
- To maintain, reinforce and augment existing natural and manmade features;
- To create distinct neighbourhoods of consistent quality and character through the use of both hard and soft landscape treatments;
- To provide functional passive landscape areas that contribute to enhancing streetscapes that are readily accessible to all residents;
- To provide a quality living environment by adopting a 'green design' and green measures such as the introduction of comprehensive cycle tracks and pedestrian walkways;
- To provide a responsive landscape design that separates planting from underground utilities wherever possible;
- To provide passive and active recreation activities for both residents in the HSK NDA and its adjoining neighbourhoods; and
- To provide landscape treatments to ameliorate the physical and visual impact of major infrastructure.

Enhancing connectivity

- To enhance visual and physical connectivity and introduce tangible design references related to the pedestrian level of activity which can act as points of identity and help to articulate specific urban conditions, i.e. gateways, landscape focal points, lighting and signage, etc.;
- To establish a high level of pedestrian permeability throughout the HSK NDA and its adjoining areas through the establishment of pedestrian streets, an open space network and a comprehensive pedestrian and cycling network that can integrate with existing connections; and
- To establish an integrated and pedestrian-oriented streetscape.

Establishing a green infrastructure network

- To provide green landscape buffers along transportation corridors, and especially adjacent to retained villages, to minimise potential adverse impacts to/from surrounding developments;

- To introduce street planting that can contribute to the provision of continuous shading towards mitigating negative environmental conditions at street level including heat radiation from buildings; and

- To establish a network of open spaces providing for a range of functions, and which are geared to facilitate and enhance pedestrian circulation.

6.3.2 The manner in which these objectives are to be realised and the design framework that is recommended are set out in the following sections. These approaches have been informed and guided by an inventory of existing LRs.

Landscape Design Framework

6.3.3 A hierarchy of active and passive open spaces will be created in the HSK NDA. The application of landscape treatment works are also proposed within the existing river channels that are located on the confluence of the Tin Shui Wai New Town and the HSK NDA. In line with these landscape treatment works, the introduction of two green landscape 'spines' are proposed in the HSK NDA from which vertebrae of open space corridors will extend. The introduction of these green spines in line with appropriate landscape treatment works could serve to evoke a strong environmental identity within the HSK NDA and its environs. The open space which will extend from the green spine will include open space in which a range of recreational activities can be provided.

Open Space and Green Areas within the HSK NDA

6.3.4 Proposed open spaces and green areas are illustrated in **Figure 6.1.1**. The three key elements / activities that serve to inform the development of the framework include:

- **Rest**: The open space framework should be geared toward providing residents with venues for rest and contemplation. These can be conceived as discrete spaces that are located in sheltered and semi-secluded areas where an element of privacy can be enjoyed.

- **Recreation**: Adequate space should be provided with provision for outdoor active and passive recreation facilities.

- **Interaction**: A range of spaces and facilities should be provided to facilitate interaction within the resident community. At minimum, at-grade spaces should also be provided to enable residents to meet and engage in conversation.

6.3.5 Individual open spaces within the HSK NDA shall include the following amenities:

- **Children's play areas and adult exercise areas**: These areas can include a range of play equipment and proprietary floor matting to protect children should they fall. Seating shall be provided adjacent to the play area to allow parents to keep sight of their children. Outdoor exercise stations could also be introduced to active open space areas that are usable by both the young and the elderly.

- **Accessible active spaces that encourage physical activities including walking, running, jogging, cycling, and playing**: Of primary importance is the establishment of a pedestrian and cycling network that allows for ease of movement. The aim will be to minimise barriers to pedestrians and cyclists and enhance green linkages within the HSK NDA. New at-grade pedestrian and cycling infrastructure shall be linked with existing connections to help to create an attractive and sustainable environment away from vehicular traffic. There is an opportunity to further enhance the existing river channels for recreational pursuits such as walking, jogging and running, by introducing appropriate soft and hard landscape treatments to transform them into active open spaces. Moreover, active open spaces should be strategically located

for convenience and ease of access. A network of open spaces that link together to create a strong green network is advocated. The proposed network of walking paths will permit free movement, and the design intention will focus on minimising barriers to pedestrians and encouraging walking through the design of user-friendly, vehicle-free pedestrian/green corridors that enhance spatial connectivity and green linkages.

- **Passive open spaces where residents can interact**: The provision of passive open space, with comfortable outdoor seating and appropriate softscape treatments, can help enriching the public realm and encouraging opportunities for social interaction.

- **Interpretive and educational spaces that teach visitors the cultural, historical and ecological significance of the area**: Of particular importance is the establishment of a pedestrian trail network linking together sites of archaeological, cultural, historical and/or ecological significance within the retained villages. The proposed Heritage Trail is intended to provide a walking experience reminiscent of village life in the olden days, linking together various historic assets to provide an immersive experience. The trail could be demarcated using a selection of hardscape treatments, such as special stone paving, trail markers or other similar treatments, and interpretive panels would explain the history and significance of the sites.

6.3.6 In accordance with the HKPSG, a 3:2 active to passive ratio should be applied to the "DO" to provide space for outdoor core activities as well as for passive recreation.

Landscape Enhancement Measures

6.3.7 A comprehensive open space network is planned within the HSK NDA, forming part and parcel of an attractive and sustainable public realm. The network extends to include the provision of passive and active open space areas, suitable for use by young and old alike. The application of hard and soft landscape features can help to facilitate the readability of public spaces, resulting in both a functional and attractive landscape within the HSK NDA. Creating high quality open spaces and streetscapes will serve to enrich the everyday experience of existing and future residents, thus creating a high quality living environment within the HSK NDA and its environs.

6.3.8 Following the Yuen Long District Greening Master Plan and best practices for the development of an attractive and sustainable public realm, a number of landscape enhancement measures, including both hard and soft landscape treatments, are recommended within the HSK NDA.

Greening Methods

- The use of green buffers along transportation corridors is encouraged. This will assist in mitigating anticipated dust and noise impacts and help to improve the visual character of the HSK NDA. Cycle paths are also promoted along transportation corridors to add to the character of streets and to provide convenient vehicle-free links. Moreover, pedestrian linkages and the provision of quality streetscape treatments will ensure that a good circulation environment is created. The proposed enhancement measures for transportation corridors are depicted in **Figure 6.3.2**.

- The use of street trees and structural planting along streets is promoted. It is important that the trees chosen be of a suitable scale to have an impact on the built environment, while providing functional benefits such as shading for pedestrians. For major roads, large trees should be selected as they will have the quickest impact. Where possible, tree planting should also be introduced to supplement retained existing tree planting. Once functional attributes are met, species can be further refined to create a particular form and character.

- The use of planting is also encouraged in both active and passive open space areas. Incorporating the planting of trees complemented by low level shrub plantings can create shaded areas for rest and recreation while also enhancing the micro-climate. Additionally, trees can be helpful in announcing entry points and delineating the boundaries of open spaces, throughout the HSK NDA.

- The use of green roofs and vertical greening is recommended wherever feasible to mitigate the visual impacts of buildings and structures. These greening techniques can help satisfy numerous functional, aesthetic and sustainability objectives, including the provision of functional open space and opportunities for food production, mitigation of urban heat island effect, stormwater retention, filtration of pollution, creation of natural habitat and reduction of noise levels among other benefits.

- Intensive green roofs incorporate large plantings such as trees and large shrubs. These can either be placed in tree pits (1.5m depth, with or without restraints) or in roof areas where structural provision has been made to accommodate a general soil depth of 1.5m.

- Extensive green roofs incorporate low level planting such as small shrubs and plants, as well as lawns. General cover, inclusive of drainage / irrigation, should be no less than 500mm in depth.

- Establishment of a nursery early in the implementation process is recommended to nurture plant stock in close proximity to where planting will ultimately take place. It is also recommended that semi-mature trees be installed on day one to engender a sense of maturity early in the construction and implementation process.

Paving

- Paving materials should be designed in a cohesive manner, following a common theme, so as to link streets and open spaces across the public realm and along streetscapes. To engender the sense of an environment that gives priority to pedestrians, it is proposed to create a blurring between the vehicular and pedestrian realms. Circulation routes should be paved to promote the appearance of being pedestrian circulation spaces.

- The use of permeable paving is recommended wherever feasible to promote infiltration and mitigate storm water runoff.

Lighting

- Appropriate lighting treatments should be included in response to safety and security. It is important that the use of lighting helps to create a safe night time environment. However, lighting should not only contribute functionally, but also aesthetically to the landscape and this can be achieved by using a combination of lighting types and colour.

- Lighting should be carefully designed to avoid light trespass and light pollution.

Site Furnishings and Wayfinding

- Open space areas should be provisioned with comfortable seating to encourage people to linger in parks and open spaces.

- Litter bins shall also be provided within open spaces to promote a clean and attractive public realm.

- Signage is important in assisting way finding and will be implemented throughout the HSK NDA. It should be implemented in conjunction with streetscape enhancements and carefully planned to avoid visual clutter. New signage would need to be coordinated with existing signage, to avoid overuse and confusion.

Tin Shui Wai Main Channel

6.3.9 The Tin Shui Wai Main Channel, which bisects the HSK NDA along a north-south axis and narrows as it extends southward, has the potential to be transformed into a vibrant open space corridor with strong habitat and ecological value. The revitalisation of this landscape feature and its integration with the open space network will provide an important visual and recreational amenity and help to create a positive identity for the community. The corridor will effectively form a green spine and major breezeway running the entire length of the NDA. It will also provide a better interface with the neighbouring community of Tin Shui Wai.

6.3.10 In particular, re-planning of Tin Ying Road adjacent to the northern portion of the Tin Shui Wai Main Channel will provide residential developments in the vicinity with unobstructed views of the river channel, reduce environmental impacts and introduce a river promenade featuring pedestrian walkways and cycle tracks along the river's edge. To bring vitality to the riverine zone, the open space corridor and promenade shall be extended along the entire length of the river channel. Areas of open space abutting the river channel shall be integrated with the riverine corridor and the overall open space network. Shrub planting may be introduced in the upland vegetation zone, with grasses, forbs, while aquatic species should dominate within the riverine zone. Seating should also be introduced where practical, and existing railings and barriers should be removed and replaced with functional and attractive barriers.

6.3.11 Realignment and regeneration of the river channel along the Tin Sam Tsuen segment will also provide greening features, a river promenade and a continuous pedestrian walkway along the elevated WR to enhance the direct movement between the proposed Regional Plaza and HSK Station with the Regional Park.

Flood Retention Lake

6.3.12 A retention lake is proposed within the Regional Park for regulating storm water during severe rainstorm events. In addition to its stormwater retention function, the retention lake will also serve as an attractive focal point and recreational amenity for the community.

6.3.13 To promote a healthy aquatic ecosystem and support wildlife, lake edges are intended to be naturalised and will be planted with native and adaptive species. The riverine zone will consist primarily of aquatic plant species, while the upland vegetation zone will consist predominantly of terrestrial species tolerant of flood pulses, including shrubs, grasses and forbs. The recreation zone will consist of a footpath located beyond the upland planting zone. Plant species within this zone shall provide greater visual interest for recreational users, while remaining compatible with ecosystem and habitat objectives. Landscape treatments for the footpath that winds around the lake shall consist of hardscape materials that echo the landscape theme established for the DCA.

7 TECHNICAL ASSESSMENTS

7.1 Introduction

7.1.1 In the Revised RODP, development proposals and associated infrastructure for the HSK NDA development have been recommended. Various technical assessments have been undertaken to evaluate the technical feasibility and impacts of these proposals. Findings of these technical assessments are summarised below.

7.2 Geotechnical Assessment and Site Investigation

Introduction

7.2.1 The objective of the Geotechnical Assessment and Site Investigation (SI) is to identify potentially ground engineering problems, landslide hazards on natural terrain and man-made slopes, to recommend engineering solutions and to make recommendation for additional ground investigation (GI) in detailed design stage.

Natural Slopes

7.2.2 The NDA is bounded to the west by the foothill of Yuen Tau Shan, to the north by the Kai Pak Ling and a number of hill slopes along Deep Bay Road. Most of the area is predominantly located on low-lying, flat terrain although areas of natural hillside are located to the north and west. The potential landslides on natural hillsides may impose risk to the development areas adjacent to natural hillsides.

7.2.3 The relative significance of the natural terrain hazards to any site will vary from non-existent in the middle of a flat plain to very high at a site below steeply sloping ground with a history of landslides.

Superficial Geology

7.2.4 Based on the 1:5,000 Superficial Geological Map Sheets 6NW-A (Tin Shui Wai) and Sheet 6NW-C (HSK) (GCO, 1989), the Study Area and the NDA are underlain by extensive deposits of Quaternary alluvium (Qa), terraced alluvium (Qpa) and debris flow deposits (i.e. colluvium) (Qpd and Qd). The terraced alluvium is present in the low-lying areas of the NDA with alluvial materials located along existing water courses. Estuarine deposits (Qam), beach deposits (Qb and Qrb), marine sand (ms) and marine mud (QHH) are indicated near the Deep Bay coastline in the northern portion of Study Area. Marine mud (QHH) is also indicated at the eastern part of the Study Area near Tin Shui Wai and in some areas to the east of Ping Ha Road within the NDA.

Solid Geology

7.2.5 The HKGS 1:5,000 scale solid geological maps (Sheets 6NW-A and 6NW-C) and the 1:20,000 scale solid & superficial geological map (Sheet 6) indicate that the majority of the NDA is underlain by volcanic rocks including metamorphosed tuff and tuffaceous siltstone, interbedded tuff-breccia/tuffaceous conglomerate and tuffaceous siltstone (with clasts of marble), block-bearing tuff and tuffite and andesite (Tuen Mun Formation).

7.2.6 The published maps also indicate that the Tsing Shan Granite (Jms) and Tai Lam Granite (Jma) are located at the northwestern edge (near Ngau Hom Shek) and southeastern edge (near Tai Tao Tsuen) of the NDA respectively. The Carboniferous Lok Ma Chau Formation (Csl) is located in both the southeastern and far northern portion of the NDA.

Structural Geology

7.2.7 A major northeast-southwest trending fault (the Tuen Mun Fault) is inferred in the northwestern portion of the Study Area and NDA. The fault separates the Tsing Shan Granite on the west from the older Tuen Mun Formation to the East. According to the HKGS 1:20,000 geological map, the fault is a thrust that dips to the west at 40 to 50 degrees and locally up to 80 degrees. Mylonite is indicated along the fault indicating ductile movement.

7.2.8 A second major northeast-southwest trending fault is located outside the southeast boundary of the NDA. The fault separates the Lok Ma Chau Formation and the Tai Lam granite. As shown on the 1:5,000 scale geological map, the fault is offset by several northwest-southeast trending faults which extend across the Study Area.

7.2.9 Features such as shear zones, cataclasite and fault breccia have been recorded in some of the boreholes located in close proximity to the inferred fault zones. These features suggest that the rock mass in the vicinity of the inferred faults could be highly fractured.

Scheduled Area No. 2

7.2.10 The eastern portion of the NDA and Study Area are located within Scheduled Area No. 2 as defined in the Environment, Transport and Works Bureau Technical Circular No. 4/2004. Scheduled Area No. 2 defines the limits within which the solid geology may comprise marble displaying a karstic upper surface with solution features.

7.2.11 According to the published geological maps, the solid geology of the Scheduled Area within the NDA consists of the Tuen Mun and Lok Ma Chau Formations. A minor block of the Yuen Long Formation is indicated in the far eastern corner of the NDA.

7.2.12 For the portion of the Scheduled Area that lies within the NDA, boreholes have identified two main rock types which are metamorphosed sedimentary rocks (predominantly meta-siltstone and meta-sandstone) and volcanic rocks (predominantly tuff/meta-tuff, tuffite and tuff breccia). Marble and dissolution features/cavities have been recorded in both rock types. Within the volcanic rocks the marble is predominantly identified as forming marble clasts and the cavities are therefore assumed to have formed from the dissolution of these clasts. Whilst most of these dissolution features are not extensive or large, occasionally the cavities can reach thicknesses of up to 5m.

7.2.13 Within the metamorphosed sedimentary rocks, several boreholes have recorded banded marble / marble clasts and cavities/dissolution features. The marble encountered in a project specific borehole was described as strong, grey, mottled and dappled white impure marble with local solution features. The marble was recorded from a depth of 60.90m to 63.20m bgl. The marble in another project specific borehole was identified in three separate layers between 34.20m to 52.65m bgl with layer thicknesses ranging from 1m to 6.3m. A shear zone and cataclastic features were also recorded occasionally in the marble. Further GI works will be required in these areas to determine the extent and engineering properties of these marble layers.

7.2.14 Marble clasts have also been recorded in the volcanic rocks outside the Scheduled Area in the southern portion of the NDA. In most boreholes these were relatively minor features where dissolution has left the rock mass with a honeycombed appearance. However, in a borehole located within the NDA along the WR line near Yick Yuen Tsuen, a marble clast had a recorded thickness of 4.88m.

7.2.15 Within the Scheduled Area, cavity infill deposits have also been recorded and are highly variable in composition and include clay, silt, sand, gravel, cobbles and boulders. The combined total thickness of the cavity infill revealed from the boreholes located within the Scheduled Area ranges from approximately 0.2m to over 26m. The rocks below are typically recorded as marble, siltstone, metasiltstone, pyroclastic breccias and tuff.

7.2.16 Saprolite was recorded above the cavity infill / cavity deposit in some of the boreholes located within the Study Area. In some of the boreholes several zones of cavity deposits were recorded within or beneath the soils derived from weathered rocks (predominately Grade V and Grade IV material). The cavity deposits have been recorded in several boreholes where depressions in the rockhead profile are also notable.

Groundwater Conditions

7.2.17 The lowest groundwater level (LGWL) and highest groundwater level (HGWL) from the available groundwater monitoring records from standpipes and piezometers within the Study Area. It is indicated that the available recorded ground water level within the NDA is generally high, with the recorded HGWL generally within 2m of the ground surface within the low lying parts of the NDA. A locally deeper groundwater level (approximately 9m bgl) was identified near WR Tin Shui Wai Station within the Scheduled Area. However, it is not certain if ground water control measures were being used during the monitoring period.

7.2.18 No groundwater level monitoring records were available for the natural hillside area within the NDA. However, a deeper groundwater level (generally more than 5m bgl) was generally recorded in the instruments located at Yuen Tau Shan. It is anticipated that a perched water table at shallower levels may exist during the wet season or after periods of heavy rainfall.

7.2.19 It should be noted that most of the available groundwater monitoring records were obtained from 7 day monitoring periods only. As a result, the HGWL and LGWL recorded could be exceeded.

Ground Investigation Works

7.2.20 GI works for the assignment were carried out in two stages. Stage 1 comprised eight boreholes formed by Fugro Geotechnical Services Ltd between November and December 2013. Of the eight boreholes formed, five were carried out primarily for land contamination assessment and as such were terminated at approximately 6m bgl. Stage 2 of the project specific GI works was carried out from December 2014 to August 2015 and comprised 3 geotechnical boreholes and 82 environmental boreholes formed by DrilTech Ground Engineering Ltd.

7.2.21 The engineering properties of soils within the NDA have been assessed using the existing and project specific GI records and laboratory test results. The results of the tests and recommended design parameters are detailed in the following table. The recommendations given will need to be reviewed in subsequent stages of the HSK development as further GI information comes available.

Table 7.2.1a Summary of Recommended Design Bulk Density of Soil and Rock

Soil Type	Recommended Design Bulk Density (Mg/m^3)
Fill	2.00
Pond Deposits	1.90
Marine Deposits	1.95
Alluvium	1.95
Colluvium	1.90
Residual Soil	1.90
CDG	2.00
CDV/T	1.90
CD Siltstone	2.00
CD Sandstone	2.00

Table 7.2.1b Summary of Moisture Content Test Results

Soil Type	Moisture Content (%)		
	Min.	Max.	Average
Fill	9.9	45	24.2
Pond Deposits	14	57	31.1
Alluvium	5.4	64	25.1
Colluvium	13.5	50	32.9
Residual Soil	22	36.2	29.6
CDG	8.9	44.6	24.1
CDV/T	5.5	65.2	33.6
CD Siltstone	2.9	84.5	26.7
CD Sandstone	10	43	23.7

Table 7.2.1c Recommended Effective Shear Strength Parameters

Soil Type	Effective Shear Strength Parameters	
	c' (kPa)	Φ' (degrees)
Fill	0	33
Pond Deposits	0	28
Alluvium (Silt / Clay)	0	30
Alluvium (Sand / Gravel)	0	32
Colluvium	3	32
Residual Soil	4	30
CDG	5	38
CDV	5	32
CD Meta-siltstone	3	33
CD Meta-sandstone	2	35
CD Meta-Andesite	1	30
Soil Type	**Undrained Shear Strength, S_u (kPa)**	
Marine/Pond Deposits	15	
Alluvium (Silt/Clay)	30	

Table 7.2.1d Summary of Soil Stiffness Parameters

Soil Type	SPT 'N'	Ev
Alluvium (sand/gravel)	N = 10 (≤10m); N = D/0.2333 – 32.86	1 x N
Colluvium	N = 10 (≤7m); N = D/0.22 – 21.863	1 x N
Residual Soil	N = 10 (≤15m); N = D/0.3333 – 35.01	1 x N
Grade V Granite Materials	N = 10 (≤20m); N = D/0.1667 – 109.98	1 x N
Grade V Volcanic Materials	N = 10 (≤30m); N = D/0.6111 – 39.09	1 x N
Grade V (Meta)Siltstone	N = 10 (≤30m); N = D/0.6111 – 39.09	1 x N
Grade V (Meta)Sandstone	N = 15 (≤30m); N = D/0.6471 – 31.36	1 x N

Table 7.2.1e Summary of Consolidation Parameters

Soil Parameter	Material	
	Marine / Pond Deposits	Alluvium (Silt/Clay)
Coefficient of Volume Compressibility, M_v (MN/m^2)	5.5	0.521
Coefficient of Consolidation, C_v (m^2/year)	2.5	10.0
Compression Index, C_c	0.23	0.10

Notes:
1. Values of Mv for Alluvium are based on the results of tests from within the HSK NDA.
2. Values of Mv for Pond/Marine Deposits based on Table 5.8.2 of GEO Publication No.1/2007.
3. Due to large range in site-specific tests results, values of Cv based on Tables 5.8.1 and 5.8.2 of GEO Publication No.1/2007.
4. Values of Cc based on Tables 5.8.1 and 5.8.2 of GEO Publication No.1/2007.

Table 7.2.1f Summary of Uniaxial Compressive Strength Test Results

Rock Type / Grade	Uniaxial Compressive Strength, UCS (MPa)		
	Max.	Min.	Average
Slightly Decomposed Tuff/Tuffite/Tuff Breccia	327.9	10.2	119.9
Moderately Decomposed Tuff/Tuffite/Tuff Breccia	111.9	10.3	46.6
Slightly Decomposed Granite	210.7	11.1	111.1
Moderately Decomposed Granite	175.2	9.6	68.9
Slightly Decomposed Meta-Sandstone	275.4	10.1	90.5
Slightly Decomposed Meta-Siltstone	321.0	4.0	73.4
Moderately Decomposed Meta-Siltstone	90.6	21.1	49.4
Rock Type / Grade	**Point Load Strength, IS50 (MPa)**		
	Max.	**Min.**	**Average**
Slightly Decomposed Tuff/Tuffite/Tuff Breccia	15.5	0.9	8.0
Moderately Decomposed Tuff/Tuffite/Tuff Breccia	2.9	0.8	1.7
Slightly Decomposed Granite	11.2	1.2	8.0
Moderately Decomposed Granite	1.8	1.5	1.65
Slightly Decomposed Meta-Sandstone	9.2	0.5	5.5
Moderately Decomposed Meta-Sandstone	4.8	2.2	3.5
Slightly Decomposed Meta-Siltstone	9.3	0.3	3.74
Moderately Decomposed Meta-Siltstone	2.3	1.6	1.9

Conclusion

7.2.22 The NDA is generally situated in areas of low topographic relief with the majority of areas being between +5mPD and +15mPD. Areas with existing ground levels lower than +6mPD are generally located at the eastern part of NDA and commonly adjacent to watercourses. The areas with ground levels higher than 15mPD are mainly located at the northwest corner of the NDA although localised small hills with ground levels over +15mPD are also located in other parts of the NDA.

7.2.23 Much of the site is covered by Quaternary superficial deposits including alluvium and colluvium near hillslopes areas. Recent marine and pond deposits are also located in the northeastern portion of the NDA. As the alluvium and recent pond / marine deposits contain compressible clays/silts, there is potential for significant consolidation settlement to occur, particularly during proposed filling works. The times for consolidation could be reduced by installing pre-fabricated vertical drains to reduce the drainage pathway lengths. Further detailed assessment of consolidation settlement should be carried out in the detailed design stage.

7.2.24 The solid geology within the NDA comprises granitic rocks in the west with the majority of the site underlain by metamorphosed sandstone and siltstone of the Lok Ma Chau Formation and volcanic rocks of the Tuen Mun Formation. Bedrock levels vary considerably across the site and may be deeper than 100m in some areas.

7.2.25 The eastern portion of the site falls within Scheduled Area No. 2 with marble (and dissolution cavities) identified in both the Tuen Mun and Lok Ma Chau Formations. In the Lok Ma Chau Formation the marble was predominantly identified as banded impure layers. In the Tuen Mun Formation the marble was identified as clasts within volcanic deposits. Large cavities have also been identified within the volcanic rocks of the Tuen Mun Formation both within and outside the boundary of the Scheduled Area. Ground improvement by infilling the cavities with cement grout could be a possible solution.

7.2.26 Due to the relatively high groundwater table at much of the NDA, groundwater control measures may be required for excavation and lateral support works. The hydrogeological conditions will therefore need to be carefully investigated to ensure that groundwater control measures are adequate and do not have adverse impacts on nearby structures, facilities etc.

7.2.27 An initial screening was carried out to identify those parts of the development that will require a Natural Terrain Hazards Study (NTHS) as defined in GEO Report No.138. Five NTHS areas have been identified which may affect the proposed development(s) and the likely scope of hazard mitigation works has been identified based on a preliminary assessment of the geomorphological characteristics of the study areas and their landsliding history.

7.2.28 Based on the available information, the HSK NDA is located in an area of complex geology which presents a number of geological/geotechnical risks and constraints. These potential constraints can be technically solved by possible solutions. However, it is considered that the proposed development(s) is technically feasible subject to the findings of further detailed investigations and assessments that should be carried out in future stages of the project.

7.2.29 Further GI works are likely to be required for any planned developments within the HSK NDA. The borehole/trial pit spacing, depth and requirement for any in-situ testing or geophysical surveying will need to be determined for the particular development under consideration.

7.2.30 For proposed structures, Geoguide 2 recommends a borehole spacing of 10m to 30m. This spacing however may be inadequate to fully characterise the ground in areas where marble cavities or karst weathering are located. In these circumstances reference should be made to GEO Publication No. 1/2006 which recommends that a preliminary investigation borehole should be provided for every 250m^2. Should cavities be identified, subsequent boreholes may need to be reduced to a 7-10m spacing to intercept specific karst features.

7.2.31 Detailed NTHS will be required for the five NTHS areas identified to assess the impacts induced from the potential natural terrain hazards to the HSK NDA. Appropriate mitigation measures should be applied to the specific development, such as boulder fence or stabilisation works against boulder/ rock fall hazard and construct debris flow barrier against the open hillslope, deep-seated failure and debris flow.

7.3 Site Formation Assessment

Proposed Filling Works to achieve Minimum Formation Levels

7.3.1 The minimum formation levels within the HSK NDA have been estimated in the DIA based on the hydraulic requirements to prevent flooding with adequate freeboard. The recommended site formation level is shown in **Figure 7.3.1**.

7.3.2 Models of existing ground surface and proposed ground surface are simulated by a computer programme ArcGIS. The existing ground level is based on the surface topography, i.e. spot levels and level contour, as depicted in the 1:1000 scale Government survey plans. The cut / fill volume are then calculated by ArcGIS.

7.3.3 Based on preliminary estimate, a total of approximate 6.0M m^3 of fill materials is required for the development of the HSK NDA.

Proposed Cutting for Forming Development Sites

7.3.4 Within the HSK NDA, the existing ground levels of some of the development sites are higher than the required minimum formation levels. These sites are mainly lying in the western and northwestern parts of the NDA. As the development sites for housing and GIC facilities will be formed on one platform, these sites will be cut to match with the adjacent road network and sites. Where possible, terrace or development platforms will be adopted in development sites to minimise the amount of cutting and the need to provide new earth retaining structures.

7.3.5 The amount of excavated material generated from major infrastructure works is estimated at approximately 4.8M m^3. It is estimated that 0.5M m^3 of rock excavation will be generated during formation of some sites adjoining the hillside and blasting works are not expected.

Fung Kong Tsuen Reservoir

7.3.6 Following recommendations in the Water Supply and Utilities Impact Assessment, it is proposed to construct a FLWSR near Fung Kong Tsuen at northwest part of the NDA. According to published geological map, the site is underlain by Megacrystic fine to medium grained granite. The inferred rockhead level at the northwestern side of the hill appears to be lower than the southeastern side with a corresponding difference in the thickness of saprolite. Based on a limited number of borehole records, excavation works in both soil and rock materials are likely to be required for the site formation works of the reservoir. Further GI works will be required to confirm the actual ground conditions and the properties of the materials. Also, further studies will be required to assess the impact of the reservoir construction to the stability of the natural slopes below.

Tan Kwai Tsuen Combined Fresh Water and Flushing Water Service Reservoirs

7.3.7 A combined FWSR & FLWSR is proposed on a hillside to the southeast of Tan Kwai Tsuen. The proposed minimum invert level of the reservoir is +65mPD. An access road seems to intersect the site. Available topographic information indicates that the proposed site intercepts with the existing road with current elevation of +80mPD and rises to +105mPD at the western side. However, the actual existing ground level and profile of the site will be subject to confirmation by topographic survey. It is inferred that the geological structure is more likely running in the directions of E-W, NNW-SSE and/or ENE-WSW, similar to the directions of the regional geological structures, the topographic depression (valleys) and/or the minor instruction (e.g. Dykes of quartzphyric rhyolite & basalt and quartz veins). The geological structures to intersect across the site should be taken into account. Further GI will be required to investigate the actual site geological profiles and ground conditions.

7.3.8 The rockhead level at the site is inferred to vary from about +85 to +100mPD (dipping towards NW in general). However, as mentioned above, geological structures may be presented at the site or in the vicinity. The in-situ rockhead may be more variable, deeper and/or more steeply inclined.

7.3.9 It is anticipated that part of the hillside would be cut away for the construction of the combined reservoir. Based on the available GI, the bedrock is relatively shallow. The final formation level of the combined reservoir would be subject to detailed design stage. The actual amount of bulk excavation and the arrangement of the site formation will be depended on the final formation level. However, excavation in considerable amount of rock alongside with some soil should be anticipated for the formation of this reservoir site.

7.3.10 Depending on the actual final formation level, forming slopes with considerable height may be required and the stability of such slopes may need to be taken into account for the design and planning of the combined reservoir construction. The construction of the combined reservoir may also affect the stability of the man-made features within the site or in the vicinity. The stability of such slopes should be taken into account for the design as well.

7.3.11 Initially it is considered that the excavated materials may be used for backfilling at the low lands. However, further GI will be required to confirm the actual ground conditions and the properties of the ground materials.

7.3.12 In general, the construction of the combined FWSR & FLWSR is geotechnical viable. Further studies will be required to assess the impact of the reservoir construction to the stability of the hillside.

Drainage Retention Facilities

7.3.13 Storage tanks / lake are proposed within the HSK NDA. The proposed locations are shown in **Figure 7.7.1** and discussed in **Section 7.7**.

7.3.14 The inferred bedrock within the site area for the tanks varies from a deep seated level of below -25mPD to about -5mPD.

7.3.15 Based on available G.I. information, the proposed drainage storage tank construction mainly involves shallow excavation less than 6m of depth in soil stratum. In view of large excavation area (at least 60m x 60m on plan), ground settlement in the adjacent areas due to dewatering works and ground loss throughout excavation is anticipated. In order to prevent excessive ground settlement, methodology for groundwater cutoff, cofferdam design to minimise ground movement and contingency plan, such as recharge wells for groundwater table control should be carefully considered during design stage.

Conclusion

7.3.16 With reference to the minimum formation levels recommended in the DIA Report and the geotechnical constraints as identified in the Geotechnical Assessment and SI Report, the site formation works for the HSK NDA have been reviewed and proposed. Although there are geological and geotechnical features/structures posing site constraints for the proposed developments and infrastructure, it is considered that the Study Area is still technically feasible for the proposed development as these constraints could be mitigated with engineering measures.

7.3.17 To meet the minimum formation levels recommended (see **Figure 7.3.1**) in the DIA Report, the proposed site formation works would require about 6.0M m^3 of fill materials where about 4.8M m^3 could be excavated from within the NDA. Non-inert C&D materials (about 0.18M m^3) would be recycled and re-used as far as possible. There will be a deficit of about 1.37M m^3 to be imported. The quantity of suitable material to be re-used within the HSK NDA will also depend on the classification of the excavated materials.

7.3.18 Unsuitable materials such as soft clays/silts may be encountered during excavation works within the HSK NDA. It is proposed to carry out appropriate soil mixing or cement mixing work to improve the physical properties of these materials such that they can be re-used on-site as general fill material.

7.3.19 For sites with current or previous land uses where activities/processes have potential to result in pollution of soil and or groundwater, further assessment with reference to Environmental Protection Department (EPD)'s Practice Guide is necessary. For sites that become accessible and will be resumed without further post-resumption activities with potential to result in contamination, further assessment to define a justified site specific investigation plan is necessary. If contamination is identified, remediation actions should be completed to mitigate land contamination impacts.

7.3.20 To provide an early indication of soil and groundwater quality, 30 boreholes have been drilled on former OS sites and 94 soil samples recovered for chemical analyses for metals, such as Volatile Organic Chemical (VOC), Semi-Volatile Organic Chemical (SVOC), Petroleum Carbon Range (PCR). Screening of results suggests widespread contamination is not present.

7.3.21 Based on the land contamination assessment, approximately 500 sites have been identified where past or current land uses (as identified during desk study reconnaissance) require that more detailed assessments be undertaken. GI will be required for sites with potentially contaminative land uses. The scope of investigation (sampling plan) for each site will reflect the findings of the detailed assessment. Depending on SI results, remediation may be required. Potential change of land uses may occur between the assessment and land resumption. However, preliminary study based on GI data obtained from some brownfield sites and sites adjacent to roads suggests no significant issues or need for widespread remediation.

7.3.22 Early consultation with the Fill Management Committee (FMC) and EPD to identify the feasible sites for disposal of excavated material and possible means to obtain the imported fill material should be made. The C&DMMP was already endorsed by the FMC.

7.3.23 The implementation programme also takes into account the quantities of fill and excavated materials in the development sites so as to minimise transportation of suitable material off-site during excavation and import of fill material for filling sites to the minimum formation levels.

7.3.24 The proposed site formation works would be carried out in conjunction with the infrastructure works for the HSK NDA development. The formed sites would be bounded by surrounding road networks. Temporary drainage systems should be provided for the formed sites to collect surface runoff within the sites before permanent drainage systems are in place. Sand traps should also be provided at the end of temporary drainage systems before discharging into the drainage networks to minimise the impact on water quality. The drainage mitigation measures or improvement works should be completed before commencement of site formation works.

7.4 Land Requirement Study

Introduction

7.4.1 The Land Requirement Study aims to identify the land requirements for the development and infrastructure proposals of the NDA. A site survey and desktop research have been carried out to obtain the land situation information.

Affected Private Lots

7.4.2 Based on the development proposals under the Revised RODP, the development area is approximately 441 ha, including private land and Government land of about 324 ha and 117 ha respectively. A majority of affected private land is currently occupied by existing PBU & OS uses and dwellings that are rural in nature.

Affected Structures

7.4.3 In estimating the number of structures which might be affected by the development proposals, both permanent and temporary structures within the HSK NDA were conducted. These structures are distributed all over the HSK NDA and their height and size varied. The number of affected structures is counted based on the desktop study on the digital map data and supplemented by field survey. The desktop study identified that most of the affected structures are concentrated in five areas, namely Yick Yuen Tsuen, Tin Sam San Tsuen, San Sang San Tsuen, Shek Po Road Mei Tsuen and Sha Chau Lei (II). Their locations are shown in **Figure 7.4.1**. Field surveys on these 5 areas were specifically conducted in September and November 2014 to verify the nature and use of the affected structures. Since there are no definite boundaries for these area, and that the dwellings are highly compacted and some of the structures are not accessible and could only be roughly estimated based on available aerial photos, findings of the survey present only an indicative rough situation. The affected structures were further categorised into living and non-living uses according to field observation and/or assumed percentage. Based on the rough estimation, about 1,500 living structures will be affected under the HSK NDA. The findings are summarised in **Table 7.4.1**.

Table 7.4.1 Estimated numbers of affected structures in the HSK NDA

	Affected Temporary Structures (Living)	Affected Temporary Structures (Non-living)	Affected Permanent Buildings (Living)(2)	Affected Permanent Buildings (Non-living)(2
Areas within the 5 Areas[1]	435	577	384[2]	--
Remaining Areas[3]	345[4]	640[4]	269[5]	985[6]
Sub-Total	780	1,217	653	985
Total	**1,433 living structures and 2,202 non-living structures**			

Remarks:

(1) Figures provided are based on field surveys conducted in September and November 2014. As there are no definite boundaries for these areas, the surveys were carried out based on the assumed boundaries.

(2) All the identified affected permanent buildings were assumed to be living structures.

(3) Figures provided are based on desktop study on digital map data provided by LandsD.

(4) The estimated percentage for living temporary structures is 35% of total temporary structures identified.

(5) All the identified affected permanent buildings were assumed to be living structures except those permanent industrial buildings in Kiu Tau Wai

(6) Including other affected structures not under the "building block" data contained in the digital map, e.g. canopy, pavilion, open-sided structure, etc.

Affected Existing Port Back-up and Open Storage Sites

7.4.4 Significant amount of lands within the HSK NDA are currently occupied by rural industries, recycling industry and PBU & OS uses. These uses are often referred as brownfield operations and are concentrated in the centre and northern part of the NDA, whereas some are scattering in the southern part of the NDA.

7.4.5 A questionnaire survey had been conducted between August and November 2015 with an aim to gather information and data to facilitate understanding of operation and usage of the existing brownfield sites within the HSK NDA. About 200 ha of lands are being occupied by brownfield operations within the HSK NDA boundary. Among which, about 190 ha would be affected by the works of the HSK NDA project. The indicative locations of these brownfield sites within the HSK NDA boundary are shown in **Figure 2.2.2**.

Affected Agricultural Land and Ponds

7.4.6 Within HSK NDA, there are some 7 ha of active agricultural land and about 20 ha of inactive agricultural land will be affected inevitably due to their locations. There are also about 1.3 ha of ponds without ecological significance that will be affected.

Affected Livestock Farm

7.4.7 There is 1 chicken farm within the HSK NDA situated in Kai Pak Leng, Ha Tsuen which will not be affected by any proposed developments under the Revised RODP.

Affected Graves, "Urns (Kam Taps)" or Shrines

7.4.8 Within the HSK NDA, there are considerable amount of graves, "Urns (Kam Taps)" or shrines especially at the location of the western side of the HSK NDA. Most of them are located within the existing "GB" zones on the extant OZPs. According to a rough estimation, about 55 graves, "Urns (Kam Taps)" or shrines will be affected.

Conclusion

7.4.9 Since private land accounts for about 73% of the total development area of the HSK NDA, land resumption would be inevitable. The land resumption boundary and activities/features to be cleared would be ascertained in the detailed design stage.

7.5 Land Use Assessment

Introduction

7.5.1 The HSK NDA provides land not only for housing development and supplementary community facilities, but provides also solution spaces in the NWNT to meet the surging demand for various economic land uses. An assessment of the different land uses requirements for the HSK NDA was therefore conducted taking account of the latest circumstances and the public comments received.

GIC Facilities and Open Space

7.5.2 An array of civic and GIC facilities will be provided in the HSK NDA to support the future residents living within and near the NDA, and create a family-friendly and age-friendly community.

7.5.3 On a regional and district basis, a civic node comprising performance venue, Government offices, magistracy, wet market, community hall, post office, youth facilities and higher education institute is planned in close vicinity to the proposed HSK Station, forming part of the "Regional Economic and Civic Hub". A hospital is also planned around the "District Commercial Node" near the existing Tin Shui Wai Station to provide public health and medical services to the wider region. Moreover, a "Local Service Core" is planned at the northern part of the NDA along Tin Wah Road. It comprises a commercial development and a proposed GIC complex, which will include community hall, clinic and RCP, as well as other social facilities. With enhanced accessibility to Tin Shui Wai New Town, the "Local Service Core" will serve not only future residents from the HSK NDA, but also those living in the northern part of Tin Shui Wai New Town.

7.5.4 Apart from these nodes of GIC facilities, there are also other community facilities planned within the HSK NDA, to be provided in "G" sites or within public residential housing sites. These include kindergartens, primary and secondary schools, sports ground, sports centres, community hall, clinics, police station, fire station, markets and other social welfare facilities (such as RCHEs, day care centres, etc.). The provision of GIC facilities has taken into account the requirement of the HKPSG and advice from relevant bureaux/departments.

7.5.5 Open space provision has also taken into account the requirement of the HKPSG and advice from relevant bureaux/departments. About 66 ha of open space would be provided in the HSK NDA, of which about 16 ha is "RO" (i.e. the Regional Park), about 27 ha is "DO" and about 23 ha is "LO". With the estimated total residential population of about 218,000 and a working population of about 150,000, about 22 ha and 29 ha of "DO" and "LO" respectively are required for the estimated residential and worker population in the NDA pursuant to the HKPSG for the level of provision of open spaces. In overall term, the open space provision can meet the HKPSG requirements.

Office Space

7.5.6 Capitalising on the strategic location of the HSK NDA, robust economic activities should be encouraged by reserving land for diversified economic uses. This will reinforce the position of the HSK NDA as the "Regional Economic and Civic Hub" for the whole NWNT region.

7.5.7 According to the Hong Kong Annual Digest of Statistics (2015 Edition) published by the Census and Statistics Department, there has been ongoing demand of office space in Hong Kong in the past years in line with the continuous Gross Domestic Product (GDP) growth. With the GDP rising steadily, the office absorption rate, which is the rate at which rentable office space is filled, will also go up. As the economy of Hong Kong is now more concentrated on services industry, there is a continuous demand for office space and retail area. On the supply side, the growth of office space in year 2010 to 2015 is rather limited with very small new supply. According to the statistics, the supply of new office has dropped with the vacancy rate dramatically dropped after year 2010 and stays at a low level with downward trend ever since.

7.5.8 As a matter of fact, the vacancy rate of office space in Kowloon and Hong Kong has recorded a trend of significant drop. With the restricted supply of new office space to meet the ongoing demand, the vacancy rate will further drop and office rental will inevitably rise. This will affect the operating businesses and the economy. As such, it is desirable to provide adequate office supply in some of the NDAs in the New Territories in order to relieve pressure for office space in the urban core, while meeting the needs of local residents.

7.5.9 In particular, the strategic location of the HSK NDA warrants the development as a commercial hub function for the NWNT region. The provision of adequate office space in the HSK NDA will provide support to various commercial activities, and create diverse employment opportunities to the local population. This will, at the same time, reduce the need for future residents to travel to urban areas for 'office work' and address the imbalanced home-job ratio across the territory.

Retail Space

7.5.10 Apart from office space, there is scope to develop the HSK NDA as a regional shopping centre in view of the lack of regional shopping centre in the NWNT. Desktop research indicates that except the YOHO Town Arcade in Yuen Long and Tuen Mun Town Plaza and V City in Tuen Mun, retail outlets in the Tin Shui Wai, Yuen Long and Tuen Mun are general small in scale, and could not serve the role of a district retail centre for the NWNT. In particular, shopping centres in Tin Shui Wai are particularly smaller and there has been a tendency for residents in Tin Shui Wai travelling to other districts for shopping.

7.5.11 Moreover, the proposed HSK Station could provide a convenient access to the urban area and serves as important pull factor in attracting visitors and shoppers from other districts in Hong Kong and the Mainland. As such, it is recommended that the regional retail centre be located around the proposed HSK Station, making reference to many of the established and successful retail centres in different districts in Hong Kong that have direct access to railway stations.

7.5.12 In order to create diversified retail experiences, a variety of shopping environment should be provided including large shopping complex and big box retail most preferably be located in close proximity to railway stations, smaller district and local retail centres throughout the NDA, as well as street shops that promote street vibrancy. Taking the area around the proposed HSK Station as an example, with the provision of two larger anchor sites immediately next to the proposed HSK Station for "C" and "OU (Commercial and Residential Development)" respectively and smaller sites slightly further away, it is anticipated that this planning layout could facilitate the development of a variety of shopping outlets in different scale. This is similar to the morphology of the Sha Tin New Town, which also comprises a larger shopping complex next to the railway station with smaller local shopping centres further away. A number of shopping streets are also proposed along the Tin Shui Wai Main Channel, to the southeast of the proposed HSK Station and along the GTC near the station with retail frontages for shops and services to promote a thriving local economy.

Open Storage and Port Back Up Uses

7.5.13 Currently, the existing extensive PBU & OS uses have degraded the rural landscape and resulted in negative environmental and visual impacts. The HSK NDA project is to transform the area into more optimal land uses and improve the overall environment. Yet, some of these brownfield operations are still contributing to our local economy.

7.5.14 Given the close proximity to the existing cross boundary links, the HSK area is a prime location for PBU & OS uses. It is likely that a certain demand for these uses will remain within the HSK NDA and efforts should be made to rationalise these uses. The consolidation of PBU & OS uses in land-effective manner, such as accommodating them in multi-storey buildings, will help eradicating the current situation which has caused environmental degradation and waste of valuable land resources. However, the feasibility of consolidating these uses in multi-storey buildings, including the financial viability and appropriate institutional mechanisms, would have to be explored and identified. To this end, the Government has already commenced separated study to explore the feasibility of accommodating some of the affected brownfield operations in proposed multi-storey buildings.

7.5.15 Ideally, these uses should be positioned on sites within close proximity to the strategic transportation networks and in an area far from residential development. Careful planning and urban design would be required to address the interface issue with the other competing uses. As such, about 24 ha of land have been reserved at the northwestern part of the NDA with direct access to the KSWH for PBU, storage and workshop uses. This would minimise the need for freight traffic to travel through the residential area in the HSK NDA.

7.5.16 Although the provision of land for these uses would imply a reduced amount of land available for other developments such as residential and economic uses, it is considered that eliminating the possibility to provide such uses in the HSK NDA could result in high levels of opposition from land use operators and land owners. The provision of PBU & OS uses in the NDA could also offer a diversity of job opportunities catering employees of different education background and skillsets. It is acknowledged that accommodating these uses within the HSK NDA will be incremental and may take some time.

7.6 Traffic and Transport Impact Assessments

Introduction

7.6.1 This assessment aims to assess the supporting transport infrastructure and networks (including both roads and railways) for the demand of forecasting years in initial development for Advance Works and Stage 1 (year 2026), intermediate development (year 2031) and ultimate development (year 2036) according to the Revised RODP.

Traffic Modelling and Forecasting Methodology

7.6.2 To produce robust traffic forecasts that would be responsive to dynamic changes in future land use and infrastructure development, a two-tier modeling approach was adopted for this TTIA. The two-tier model structure comprises a strategic territorial model in the upper tier and a local area traffic model in the lower tier.

HSK NDA Road Network

7.6.3 The proposed road network within the HSK NDA is shown in **Figure 7.6.1**. The details of the proposed internal road network including each of the proposed primary distributors, district distributor and existing local roads, are discussed as below.

Primary Distributors

7.6.4 Primary Distributor Road P1 would mainly be a dual 2-lane carriageway running in north-south direction. The northern end of Road P1 would connect to the roundabout D1/P1 (J25) while its southern end would connect to a junction Castle Peak Road/Road P1.

District Distributors

7.6.5 There would be eight district distributors in the HSK NDA, namely Road D1 to D8.

7.6.6 The Road D1 is a dual 3-lane/dual 2-lane carriageway running in east-west direction. The eastern end of Road D1 connects to the roundabout Tin Wah Road/Lau Fau Shan Road while its western end connects to the roundabout junction with Road P1.

7.6.7 Road D2 is currently known as Ping Ha Road and would be upgraded to a dual 2-lane carriageway running in north-south direction. The northern end of Road D2 connects to the roundabout junction with Lau Fau Shan Road and Road D1. The southern end of Road D2 would connect to the roundabout junction with Hung Tin Road. Road D2 would be one of the major roads serving the residential developments and local villages in the north-eastern part of the NDA.

7.6.8 District distributors Roads D3 to D6 and D8 would be dual 2-lanes carriageways. These district distributors provide necessary linkages between the major activity nodes within the NDA and the external connections.

7.6.9 Road D6 and D8 would be the key access roads to the proposed HSK station and the major retails and commercial zones of the NDA. Roads D1, D2 and D4 would be the major district distributors serving the residential developments and local villages in the north-eastern part of NDA. Road D7 provides access from Road P1 to the commercial sites at the west of Road D6.

7.6.10 As mentioned above, Tin Ying Road between Tin Wah Road and Ping Ha Road would be re-planned and a section of Hung Tin Road between Ping Ha Road and Castle Peak Road would be downgraded. In addition, Ping Ha Road would be widened in order to cater for the future traffic loading and the traffic diverted from Tin Ying Road.

Local Roads

7.6.11 Existing local roads within the HSK NDA would be maintained and no further improvement measures would be required. Two local roads including one near the Lau Fau Shan Road and proposed Road D1 and another one near the proposed HSK hospital site connecting between Ping Ha Road and Hung Tin Road would be provided.

Car Parking

7.6.12 For the HSK NDA, the requirements of HKPSG are adopted for the provision of parking and loading/unloading spaces for different type of land uses. The proposed car parking and loading/unloading facilities requirements for HSK NDA by type of land uses are summarised in **Table 7.6.1**.

7.6.13 The last row of **Table 7.6.1** showed that the Revised RODP has reserved a total of 200 number of public car parking in the at the “C” and “OU (Commercial and Residential Development)” sites near the proposed HSK Station, as well as the “C” and “OU (Commercial cum PTI and Public Carpark)” sites in the northern part of the HSK NDA. These four sites are located adjacent to railway or EFTS station, and /or equipped with PTIs.

7.6.14 Also, communal parking spaces will be pursued underneath the GTC and/or the adjoining "LO" sites.

Table 7.6.1 Summary on the Parking and Loading/unloading Facilities Provision in the HSK NDA in accordance with the HKPSG

Facilities	Min. Provision	Max. Provision
Residential Development		
Private Car Parking Space:		
Public Developments	743	1114
Private Developments	4774	7163
Subtotal	5517	8277
Private Car (Visitor) Parking Space:		
Public Developments	0	0
Private Developments	77	385
Subtotal	77	385
Motorcycle Parking Space		
Public Developments	126	286
Private Developments	118	178
Subtotal	244	464
LGV Parking Space		
Public Developments	52	157
Private Developments	0	0
Subtotal	52	157
Loading/unloading Bay		
Public Developments	70	70
Private Developments	98	98
Subtotal	168	168
Commercial		
Private Car Parking Space	10527	14229
Motorcycle Parking Space	526	1423
Loading/unloading Bay	1220	1840
Hotel Layby for Taxis and Private Cars	15	
Hotel Layby for Single Deck Bus	10	
Community Facilities		
Private Car Parking Space	312	786
Ambulance Parking Space	3	8
Ambulance Lay-by	1	2
Taxi/Private Car Lay-by	246	385
PLB/Maxicabs Lay-by	4	8
School Buses Lay-by	84	
Loading/unloading Bay	4	6
Industrial		
Private Car Parking Space	9076	9650
Goods Vehicle Parking Space	2090	2640
Goods Vehicle Loading/unloading Bay	2090	2640
Container Truck L/UL Bay	412	
Public car parking (additional to the requirements of the HKPSG)	200	

Traffic Impact Assessment

7.6.15 In order to investigate the traffic engineering feasibility and traffic implications of the Revised RODP, capacity analyses have been conducted in accordance with the methods stated in the Transport Planning Design Manual (TPDM) published by Transport Department.

7.6.16 The proposed internal road network in the HSK NDA will be completed in phases by 2026, 2031 and 2036. The proposed internal road network is shown in the **Figure 7.6.1**.

7.6.17 Following Traffic Impact Assessment in this Study, the traffic impacts on strategic highway, local network and the associated junctions and the proposed improvement works are discussed below.

Traffic Impact on Strategic Highway

7.6.18 The results of the assessment on major road links were summarised in **Table 7.6.2**.

Table 7.6.2 Major Road Links Performance in Year 2026, 2031 and 2036

Key Link			Capacity (pcu/hr)	Peak	Link Performance (v/c ratio)		
					2026	2031	2036
L1	Yuen Long Highway – Hung Shui Kiu	E/B	6,100	AM	4740	5010	5460
					(0.78)	(0.82)	(0.90)
				PM	5520	6260	6420
					(0.90)	(1.03)	(1.05)
		W/B	6,100	AM	6120	6970	7030
					(1.00)	(1.14)	(1.15)
				PM	4260	4590	5030
					(0.70)	(0.75)	(0.82)
L2	Yuen Long Highway – Lam Tei	E/B	6,100	AM	5780	5130	5840
					(0.95)	(0.84)	(0.96)
				PM	6080	5200	6080
					(1.00)	(0.85)	(1.00)
		W/B	6,100	AM	6770	5710	6920
					(1.11)	(0.94)	(1.13)
				PM	5130	4550	5720
					(0.84)	(0.75)	(0.94)
L3	Kong Sham Western Highway	N/B	6,100	AM	1170	1370	1470
					(0.19)	(0.22)	(0.24)
				PM	1270	1450	1600
					(0.21)	(0.24)	(0.26)
		S/B	6,100	AM	1030	1160	1280
					(0.17)	(0.19)	(0.21)
				PM	1290	1460	1610
					(0.21)	(0.24)	(0.26)
L23	Kong Sham Western Highway (Near Yuen Long Highway)	N/B	6,100	AM	2180	3680	4720
					(0.36)	(0.60)	(0.77)
				PM	1800	3440	4410
					(0.30)	(0.56)	(0.72)
		S/B	6,100	AM	1790	3050	4920
					(0.29)	(0.50)	(0.81)
				PM	2120	3670	4700
					(0.35)	(0.60)	(0.77)

Key Link			Capacity (pcu/hr)	Peak	Link Performance (v/c ratio)		
					2026	2031	2036
L4	Castle Peak Road – Lam Tei	E/B	3,200	AM	1200	1230	1530
					(0.38)	(0.38)	(0.48)
				PM	1830	1860	1900
					(0.57)	(0.58)	(0.59)
		W/B	3,200	AM	1870	2050	2180
					(0.58)	(0.64)	(0.68)
				PM	1630	1730	1940
					(0.51)	(0.54)	(0.61)

7.6.19 All the strategic highways will be operating within or at the design capacity with the implementation of the TMWB and Route 11 under planning.

Traffic Impact on Local Road Network

7.6.20 New roads (P1, D1 to D8), would be designed with dual-two or dual-three traffic lanes which are the typical road carriageway design for the primary distributor and district distributor. All of them would operate well below their capacity.

7.6.21 In order to maximise the land use and alleviate the potential environmental issues to the NDA, it is proposed to re-plan Tin Ying Road between Tin Wah Road and Ping Ha Road and down-grade a section of Hung Tin Road between Ping Ha Road and Castle Peak Road . With reference to the existing observed traffic data, only around half of the traffic on Tin Ying Road is going to/from Tin Shui Wai, whereas the other half is accessing to/from HSK instead. By re-planning Tin Ying Road and downgrading Hung Tin Road, the affected traffic would be diverted to use (1) KSWH, Road D3, (2) Road D2 or (3) Tin Tsz Road, Long Tin Road for accessing Tin Shui Wai district and HSK. As such, the traffic loading on YLH – Tin Shui Wai would be relieved. It is assumed that traffic on Tin Ying Road will only be re-routed in 2034 after the completion of proposed internal road network.

7.6.22 All assessed slip roads of Hung Tin Road Interchange and KSWH Interchange would operate within or at their design capacity and all local roads will operate within their design capacity.

7.6.23 In order to relieve the traffic load on the existing Lau Fau Shan Road and avoid possible traffic increase due to the HSK development, a separate local road is proposed for connection to the development sites in the vicinity and for direct access to the deep bay road at north and Road D1 at south. As such, the traffic loading on the Lau Fau Shan Road after the development would be relieved.

7.6.24 In view of the long waiting time at the junction near the Tin Shui Wai Station, a new road will be provide to connect Ping Ha Road to the Hung Tin Road via the proposed hospital site near Kiu Tau Wai providing direct access to Tin Shui Wai station.

Traffic Impact on Local Junctions and Proposed Improvement Measures

7.6.25 All junctions would operate within their design capacity except the following junctions. The concerned junctions are shown in the **Figure 7.6.1**.

- J2 - Tin Wah Road / Lau Fau Shan Road / Ping Ha Road - Its performance would be improved after converting into a roundabout. The proposed improvement scheme for this junction would be subject to further study.

- J7 - Ping Ha Road / Tin Ha Road - its performance would be improved after the relocation of brownfield operations and after more internal road network are commissioned. It would also be converted to a priority junction.

- J11 - Castle Peak Road / Ping Ha Road – It is proposed to increase the traffic signal time to improve the junction.

- J23 - Castle Peak Road / Fuk Hang Tsuen Road / Ng Lau Road - To improve the junction performance, it is proposed to modify the traffic lanes configuration to optimise the junction performance by converting the Castle Peak Road southbound left-turn-only lane to straight-ahead-and-left-turn lane. Moreover, it is also proposed to increase the traffic signal cycle time.

- J28 - Hung Tin Road / Castle Peak Road (Ping Shan) - To improve the junction performance, it is proposed to increase the traffic signal cycle time.

Construction Traffic Impact

7.6.26 The site formation assessment study has already determined the quantity of cut and fill arising from the site formation works and unsuitable material from earthwork. The major C&D material generation is from the cut/fill work, the building demolition, tree felling and the clearance of ground surface. As the existing KSWH is in close proximity, it is recommended to utilise KSWH for transporting the C&D materials so as to minimise the traffic implications on the existing roads close to the existing residential areas.

7.6.27 Since Road P1 at the western of the HSK NDA will be completed in Advance Works, it will be feasible to adopt management measures to ensure that the construction vehicles will make use of Road P1 and KSWH for the construction of Stage 2, 3 and 4 works. This control measure can minimise the construction traffic along Ping Ha Road, Hung Tin Road and Ha Tsuen Road. The routes of construction traffic should be reviewed in the respective construction contracts.

7.6.28 For the construction areas not close to Road P1 and KSWH, either restriction of the construction traffic to non-peak hours (1000-1600) during weekdays or restriction for using Roads D6 and D8 could be considered to control traffic impact on Hung Tin Road and nearby interchange to YLH.

Public Transport Provision

7.6.29 By considering the proposed large number of population and employment as envisaged in the Revised RODP of the HSK NDA, and the anticipated higher share in public transport modes, there is no doubt that the future public transport demand of the HSK NDA would be huge.

7.6.30 The most effective way to handle the anticipated huge public transport demand should be through rail. Furthermore, according to the transport policy which has been adopted in Hong Kong for many years, rail should be the backbone of the public transport system and franchised bus services will complement railway services by providing feeder services to railway stations and inter-district bus services. The proposed public transport services for the HSK NDA are shown in **Figure 7.6.2**.

West Rail Line

7.6.31 The Revised RODP has envisaged the usage of rail as the backbone of public transport service. This would relieve the demand on road-based transport and hence to minimise any potential traffic congestion and air pollution problems. With reference to “The Railway Development Strategy 2014”, the indicative implementation window of the HSK Station for planning purpose will be 2021 to 2024. Nevertheless, the timing of the station opening should be reviewed subject to the development phasing of HSK NDA.

7.6.32 To alleviate the existing crowdedness of the WR Line, the number of train compartments of the WR Line has been gradually increased from 7-car to 8-car starting from January 2016. When comparing with the situation in 2015, the passenger carrying capacity will be increased by about 14% after all WR trains are operated with 8-car. With consideration of the facilities along the "East-West Corridor" (comprises Ma On Shan Line, Sha Tin to Central Link (Tai Wai to Hung Hom Section) and WR Line) such as the fire safety requirements at tunnel sections and the length of platforms etc., it is estimated that the "East-West Corridor" can ultimately reach an hourly frequency of 28 at each direction, with 8-car trains. On this basis, the carrying capacity of the WR Line will increase by 60% over the 7-car trains operating in 2015 at an hourly frequency of about 20.

7.6.33 Upon completion of the three new railway projects, i.e. Northern Link and Kwu Tung Station, Tuen Mun South Extension and HSK Station, according to the indicative implementation window, the WR Line will be able to meet the demands during the peak hours (around 8 am to 9 am) at the busiest section of the WR Line (i.e. from Kam Sheung Road Station to Tsuen Wan West Station) with the trains slightly congested. As pointed out in the "Railway Development Strategy 2014", when allowed by resources and other related factors, a service benchmark of four persons per square metre in train compartments will be adopted in the planning of the new railway lines. As for the existing railway lines (including the WR Line) or their extension, the service level will still be subject to the infrastructural constraints of the existing railway lines (i.e. six person per square metre), such as the signalling system and the shortest platform of a railway line.

7.6.34 In the long term, the Government will timely commence studies on improving the carrying capacity of the railways in the NWNT beyond 2031, to cope with the traffic demands.

Public Transport Interchange

7.6.35 In the Revised RODP, three new PTIs are proposed. Two of the PTIs are located near the proposed HSK Station and another new PTI is located at the northern side of HSK NDA near the junction of Tin Wah Road and Road D1. The sizing of these PTIs would be adequate to provide the interchange for different types of transportation modes. The PTI should also provide cycle parking facilities for interchange.

Other Environmentally Friendly Transport Facilities

Pedestrian Network

7.6.36 Convenient pedestrian facility network would enhance the connectivity between WR Stations, PTIs and the major facilities.

7.6.37 In general, a minimum of 3m-wide footpath would be provided along both kerb sides of district distributors and local roads to ensure the connectivity between developments. Footpath would also be provided along the GTC so that there would be a continuous footpath within the NDA. Moreover, in order to provide a pleasant walking environment, amenity zone would be provided for planting where appropriate.

7.6.38 In order to create a convenient pedestrian walking environment, grade-separated pedestrian facilities, such as subways or footbridges, would be provided across some junctions / roundabouts and roads. Signal controlled crossings would also be provided at the signalised junctions and/or mid-block location if necessary. The location of the proposed preliminary pedestrian crossing facilities are shown in **Figure 7.6.3** subject to review in detailed design stage.

Cycle Track Network

7.6.39 A comprehensive cycle track network would be provided within the HSK NDA. Cycle track would be provided along one side of the district distributors and some of the local roads. The cycle track network would be integrated with the existing cycle tracks at Ping Ha Road, Hung Tin Road, Hung Chi Road, Hung Shui Kiu Tin Sam Road, Hung Shui Kiu Main Street and Tin Ha Road. The proposed cycle track network would provide connectivity between major developments and public transport hub. In addition, an artery cycleway would be provided connecting between Tin Wah Road at north and proposed HSK Station and Castle Peak Road at south as for the major north-south cycle track network in the HSK NDA. The proposed cycle track network is shown in **Figure 7.6.4** subject to review in detailed design stage.

7.6.40 A more pleasant cycling environment would encourage cycling mode to share the road-based public transport demand. According to the HKPSG and TPDM, a minimum 4m-wide 2-way cycle track would be provided. Moreover, cycle track would also be provided along the GTC.

7.6.41 Cycle parking areas would be provided in the proposed HSK Station, PTIs and major residential developments. The provision of cycle parking spaces should meet the HKPSG guidelines. In addition, it is proposed to provide public cycle parking spaces along the artery cycleway. Moreover, bicycle rental or sharing services would also be explored within the NDA. Automatic bicycle rental or sharing systems which are used in the Mainland and overseas cities could be considered. This rental or sharing mode provides flexibility to suit varied physical capability of users. For implementation in the NDA, users could rent or share a bicycle at one point in the NDA and return at another point when they finish riding. These measures will be further explored and reviewed in the detailed design stage.

Environmentally Friendly Transport Services

7.6.42 A highly efficient rail-based or road-based public transport system – EFTS could provide large carrying capacity and reliable service to cope with high passenger demand. A feasibility study “Environmentally Friendly Transport Services in Hung Shui Kiu New Development Area and Adjacent Areas - Feasibility Study” is being carried out to identify the most suitable green transport mode(s) and further review the design and operation mode of the EFTS. On the other hand, it will support the green transport concept promoted in the HSK NDA.

7.6.43 The EFTS would need to cross a number of roads within the HSK NDA and grade-separated arrangement would be adopted at those intersections.

Conclusions

7.6.44 The recommended new road networks and improvement works would be able to support the proposed developments in the HSK NDA.

7.6.45 In addition, to accommodate the future public transport demand due to the proposed developments, WR Line as a major backbone supplemented by the feeder bus services plus long haul bus services and the EFTS could be able to handle the public transport demand of the future users.

7.6.46 The proposed pedestrian and cycling facilities could also be able to handle the needs of the proposed development.

7.6.47 The Revised RODP is therefore technically feasible in traffic and transport terms.

7.7 Drainage Impact Assessment

Introduction

7.7.1 A DIA has been carried out to assess the drainage impact arising from the proposed HSK NDA development. The assessment establishes the drainage impacts, recommends drainage infrastructure and measures to mitigate impacts arising from the proposed development.

7.7.2 The HSK NDA covers an area of 714 ha. Under the Revised RODP (see **Figure 5.4.2**), about 441 ha is considered as the development area and the remaining 273 ha will remain unchanged as non-development area which includes established/committed developments, villages and "GB" sites and no works will not be proposed within the non-development areas.

Assessment Objectives, Design Criteria and Modelling Scenarios

7.7.3 Apart from assessing the drainage impacts due to change in land-use arising from the NDA development, the DIA has also taken into account the impact of latest climate change and river revitalisation at major channels within the HSK NDA. The climate change effect is based on the latest findings released by the Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5) released in 2013.

7.7.4 In summary, the objective of the DIA is to assess the drainage impact arising from the following aspects and propose associated mitigation measures:-

- change in land use due to ultimate the HSK NDA development
- increase in rainfall intensity within the HSK NDA and sea level rise at Tsim Bei Tsui (with boundary conditions provided by DSD) due to impact of AR5 Climate Change for projection year 2050 Representative Concentration Pathways 8.5
- proposed river revitalisation at Tin Sam Channel, HSK Main Channel, Tin Shui Wai Main Channel, etc.

7.7.5 Hydrological and hydraulic software package *InfoWorks ICM v6.5* is used as a modelling tool in the assessment. To ascertain the impact and propose appropriate mitigation measures, two scenarios have been assessed and are described below:

- **Baseline Scenario**: This scenario represents the existing land use pattern and drainage system within the assessment area.
- **Post-Development Scenario**: Full NDA development with proposed drainage works in the HSK NDA completed.

Drainage Impact of Post-Development Scenario

7.7.6 To cope with the development, a new underground drainage system will be constructed along the carriageways, cycle tracks and promenades within the HSK NDA. Additional stormwater surface runoff will be generated from the increase in impermeable surfaces arising from the proposed NDA development, and increase in rainfall intensity due to climate change. In some locations, there will be loss of flood storage as existing low-lying area will be filled up after development. All these factors will result in a higher peak flow rate at rivers and channels at a shorter duration of time to peak.

7.7.7 The change in land-use due to NDA development and increase in rainfall intensity due to climate change will increase the flows at Hang Hau Tsuen Channel and Upper Tuen Mun River Channel. For Hang Hau Tsuen Channel, there will be loss of flood storage as the existing low-lying area near Fung Kong Tsuen Road will be filled up after development.

7.7.8 There will be some rises in water levels at Tin Sam Channel, HSK Main Channel and Tin Shui Wai Main Channel partly due to increase in channel roughness as a result of river revitalisation. A separate study will be conducted and any further mitigation measures will be proposed to minimise the drainage impact.

Drainage Improvement Works and Flood Protection Measures

7.7.9 To mitigate the adverse drainage impacts, necessary drainage improvement works are required. The concept of blue-green infrastructure, revitalisation of water bodies, water-friendly culture and sustainable drainage system will be adopted in the drainage design. In the Revised RODP, a number of locations at the planned local / district / regional open space have been identified to allocate stormwater retention facilities in controlling surface runoffs discharging to existing channels (see **Figure 5.4.2**). To accommodate the latest development on climate change and to allow the flexibility of other open spaces for other uses, three sites have been identified for stormwater retention and their locations are shown in **Figure 7.7.1**.

7.7.10 Following the principle of sustainability design and to design the NDA as a resilience development to adapt future climate change, the future lake in the proposed Regional Park is designed as a flood retention lake to attenuate peak surface runoff during extreme rainfall event. The upstream catchment runoff will be diverted to the lake at extreme rainfall events and be charged to Tin Shui Wai Main Channel via a controlled outlet when water level in Tin Shui Wai Main Channel recedes.

7.7.11 The “DO” located to the north side of Hong Mei Tsuen is designed as a floodable space for stormwater retention during extreme rainfall events. This will allow the co-use of land in combining the function of leisure and stormwater retention in one place.

7.7.12 Besides, an underground stormwater retention facility is proposed at a “LO” near Fung Kong Tsuen in Lau Fau Shan to control channel flow and water level rise to the downstream Hang Hau Tsuen Channel.

Conclusion

7.7.13 The drainage impacts arising from the development of the HSK NDA has been assessed based on the Revised RODP taking into account the change in land-use and increase in rainfall intensity due to climate change within the HSK NDA as well as impact due to river revitalisation. Based on the current findings and with implementation of the mitigation measures, there would be no insurmountable drainage impact caused by the proposed NDA development. The mitigation measures would be implemented in stages to match with the programme of the development.

7.8 Sewerage Impact Assessment

Introduction

7.8.1 A Sewerage Impact Assessment (SIA) has been carried out to assess the impact arising from the proposed population intake for the HSK NDA. The assessment establishes the additional sewage flow, recommends sewage treatment facilities and proposed sewerage facilities, and evaluates of the adequacy of the existing sewerage network to convey the flows from the NDA to the proposed sewage treatment facilities.

7.8.2 The assessment has been conducted based on the Revised RODP of the HSK NDA and in accordance with the EPD Report No. EPD/TP 1/05 Guidelines for Estimating Sewage Flows Ver. 1.0.

Existing and Planned Sewerage Infrastructure

Sewerage Improvement Works

7.8.3 Recent studies on the flow projection for San Wai Sewage Catchment have been conducted under Agreement Nos. CE88/2002 (DS), CE30/2006 (DS) and CE43/2007(DS). The sewerage works recommended under the above studies are tabulated in **Table 7.8.1**.

Table 7.8.1 List of Sewerage Improvement Works

PWP item/Ref.	Project Description
4215DS	Sewers at Kam Tin, Tan Kwai Tsuen and Tong Yan San Tsuen – Contract No. DC/2011/07
4384DS	Yuen Long and Kam Tin Sewerage Stage 3 Package 2 – Contract No. DC/2012/05
4376DS	Trunk Sewerage at Lau Fau Shan – Contract No. DC/2011/02
4411DS	Upgrading of San Wai sewage treatment works – phase 1 – Contract No. DC/2013/10 (tentative completion in 2020)

7.8.4 However, these planned sewerage works are not designed to cater for additional flow generated from the proposed the HSK NDA development.

Upgrading works of San Wai Sewage Treatment Works

7.8.5 In order to cater for the forecast sewage flow due to population growth in the NWNT, DSD have commenced the works contract no. DC/2013/10 in May 2016 - "Upgrading of San Wai sewage treatment works – phase 1" to upgrade the San Wai STW from preliminary treatment to chemically enhanced primary treatment plus disinfections facilities, and increase the treatment capacity to 200,000m^3 per day as shown in **Table 7.8.2**. The phase 1 upgrading works of the San Wai STW is to be carried out at a site adjacent to the existing San Wai STW as illustrated in **Figure 7.8.1**.

Table 7.8.2 Design Flows of San Wai STW – Phase 1

	Peak Wet Weather Flow (PWWF) (m3/s)	Peaking Factor	Average Dry Weather Flow (ADWF) (m^3 per day)
Upgrading of San Wai STW – Phase 1(1) (tentative completion at 2020)	5.72	2.55	200,000

Notes:
(1) Refer to "DSD Agreement No. CE43/2007 (DS)"

Ha Tsuen Sewage Pumping Station

7.8.6 Under DSD Agreement CE30/2006 (DS), Ha Tsuen SPS was expanded with an additional 1200mm diameter rising main constructed in parallel with the existing twin 1200mm diameter rising mains. Upon completion of the expansion works in 2014, the capacity of Ha Tsuen SPS has been increased to 192,940m^3 per day.

NWNT Sewerage Facilities

7.8.7 The effluent of the upgraded San Wai STW will be discharged to the existing junction chamber of the 9km long NWNT tunnel (of capacity 11.6m^3/s in terms of PWWF) and eventually discharged to the existing Urmston Road Submarine Outfall. The alignment of the existing NWNT effluent tunnel is shown in **Figure 7.8.2**.

7.8.8 With reference to the Operation and Maintenance Manual for NWNT Sewerage Scheme, the existing Urmston Road Submarine Outfall has been designed for a PWWF of 5.1m^3/s with a peaking factor of 1.5 taking into consideration that the large volumetric capacity of the 9km long NWNT effluent tunnel will attenuate the flow feeding into the downstream system. **Table 7.8.3** illustrates the design flow and capacity of the above NWNT Sewerage Facilities.

Table 7.8.3 Design Flows and Capacity of NWNT Sewerage Facilities

NWNT Sewerage Facilities	PWWF (m^3/s)	Peaking Factor	ADWF (m^3 per day)
NWNT Effluent Tunnel	11.6	2.5	400,896
Urmston Road Submarine Outfall	5.1	1.5	294,624

Notes: refers to "Operation and Maintenance Manual of North West New Territories Sewerage Scheme"

7.8.9 Nevertheless, the quantity of the treated sewage to be discharged to the Urmston Road Submarine Outfall will be subject to review on the water quality impact in the North Western Water Control Zone (WCZ). With reference to the EIA report approved in 2003 for "Upgrading and expansion of San Wai Sewage Treatment Works and expansion of Ha Tsuen Pumping Station" (Register No.: AEIAR-072/2003), the upgraded San Wai STW (Phase 1) equipped with Chemical-enhanced Preliminary Treatment (CEPT) with disinfection will improve the effluent quality. The water quality impact due to proposed effluent discharge of 246,000 m^3 per day of CEPT treated effluent had been assessed and the impacts are within an acceptable level. The approved quantity of effluent discharge of 246,000 m^3 per day will form a basis for water quality requirement.

Estimation of Sewage Flow

7.8.10 Based on the population and employment data of the Revised RODP for the HSK NDA, the net additional sewage flow generated from design population and employment of the HSK NDA will be 85,408 m^3 per day. The sewage flow for interim Year 2026 covering Advance Work and Stage 1 and interim Year 2031 covering Stage 2 will be 14,538 m^3 per day and 45,137 m^3 per day respectively.

Proposed HSK STW for HSK NDA

7.8.11 As the planned San Wai STW – Phase 1 was not designed to cater for the additional flow generated from the HSK NDA development, a new HSK STW is proposed to handle the sewage flow of 85,408 m^3 per day. For design purpose, the HSK STW (Phase 1) is proposed to provide treatment capacity of 70,000 m^3 per day using Site 3-26 in the Revised RODP and the HSK STW will be expanded to HSK STW (Phase 2) with total treatment capacity of 85,500 m^3 per day. As the San Wai STW – phase 1 is designed to replace the role of the existing San Wai STW to cater for the sewage in San Wai catchment, part of the land of existing San Wai STW will be explored as a potential location for the expansion of HSK STW (Phase 2) subject to future review of population growth in the San Wai Sewage Catchment at that time. A separate EIA Study under Schedule 2 of EIAO will be conducted for the new HSK STW.

7.8.12 In the early stage of the HSK NDA development, the initial sewage flow from the Advance Works and Stage 1 is proposed to be temporarily treated by the San Wai STW – Phase 1 that, upon advice by EPD, will have adequate capacity before 2031. The estimated sewage flow is around 14,538 m^3 per day. Upon commissioning of the proposed HSK STW (Phase 1) with treatment capacity of 70,000 in 2031, all sewage arising from the HSK NDA including the above-mentioned initial sewage flow will be solely handled by the new HSK STW (Phase 1). A further study and review on the updated population data and the sewage flow on San Wai Sewage Catchment is recommended to ascertain the required capacity for expansion to HSK STW (Phase 2) to serve the ultimate development of the HSK NDA.

Effluent Discharge and Reuse of Reclaimed Water in HSK NDA

7.8.13 In order to achieve a sustainable development, reclaimed water treated from the proposed HSK STW will be reused for toilet flushing in the HSK NDA.

7.8.14 The ultimate demand of flushing water under HSK NDA is estimated as 35,824 m^3 per day and will be provided by tertiary treatment plus hypo-chlorination facilities from the proposed HSK STW to ensure higher water quality standard while the rest of sewage effluent is suggested to be treated by secondary plus treatment (with UV disinfection and 75% nitrogen removal) and discharged to Urmston Road Submarine Outfall. The need for a higher treatment level than secondary plus treatment will be considered with further review on water quality condition in future separate EIA for the HSK STW.

7.8.15 Estimated volume of reclaimed water and sewage disposal of new HSK STW are shown in **Table 7.8.4**. The current target water quality standard of reclaimed water is shown in **Table 7.8.5** and will be subject to EIA Study under Schedule 2 of EIAO for the HSK STW.

Table 7.8.4 Estimated Volume of Reclaimed Water Reuse and Disposal of Treated Sewage

Description	Volume (m^3 per day)
Total sewage flow	85,500
Reclaimed Water reused in HSK NDA for flushing in ultimate stage (Tertiary Treatment)	39,804 (35,824/0.9*)
Remaining Treated Sewage to be discharged to Urmston Road Submarine Outfall (Secondary Plus Treatment)	45,696

Note:
(1) With reference to sewage treatment projects regarding reclaimed water generation including NENT project, minimum 90% of treated sewage will be produced from raw sewage for reuse.
(2) Secondary Plus Treatment is a combination of secondary treatment with 75% nitrogen removal and UV disinfection.

Table 7.8.5 Target Water Quality Standard for Reclaimed Water for Flushing

Parameter	Unit	Reclaimed Water Quality(1)
E. Coli	cfu/100mL	Not detectable
Total residual chlorine	mg/L	≥ 1 (out of treatment system) ≥ 0.2 (at point-of-use)
Dissolved oxygen	mg/L	≥ 2
Total suspended solid	mg/L	≤ 5
Colour	unit	≤ 20
Turbidity	NTU	≤ 5
pH	-	6 – 9
Threshold odour number	-	≤ 100
5-day Biochemical oxygen demand (BOD5)	mg/L	≤ 10
Ammoniacal nitrogen (NH3-N)	mg/L as N	≤ 1
Synthetic detergents	mg/L	≤ 5

Notes:
(1) The parameters are referenced to the target water quality standard adopted in NENT NDAs project.

7.8.16 As mentioned in **Section 3.4.3**, the water quality impact due to proposed effluent discharge of 246,000 m^3 per day of CEPT treated effluent had been assessed and the impacts are within an acceptable level. Upon the reuse of reclaimed water in the HSK NDA, the quantities of effluent discharge in this Project via Urmston Road Submarine Outfall will be smaller with Secondary Plus treatment level. Therefore, it is envisaged that the water quality would be further improved as compared with the condition in the approved EIA.

Sewerage Impact and Proposed Sewerage Facilities

Ha Tsuen SPS and New SPSs

7.8.17 It is noted that the expanded Ha Tsuen SPS (with capacity of 192,940 m^3 per day) is to serve the upgraded San Wai STW (Phase 1) with an estimated sewage flow of 200,000 m^3 per day as listed in **Table 7.8.2**. Thus, provision of new SPS(s) servicing the new HSK STW is required to cater for the additional sewage flow from the HSK NDA.

7.8.18 In accordance with new developments proposed in the Revised RODP, the existing Ha Tsuen SPS and new pumping stations, namely SPS1, SPS2, SPS3 and SPS4, are proposed to convey the sewage flows to the upgraded San Wai STW (Phase 1) for existing flow or the HSK STW for new flow. The locations and catchments of the existing and proposed SPSs are shown in **Figure 7.8.3**. SPS2 will receive the flow pumped from its own catchment area and also that from SPS1 and SPS3 and then convey to the HSK STW. However, the existing flow originally handled by San Wai STW (Phase 1) will still be treated by the San Wai STW. The projected sewage flow for each SPS is summarised in **Table 7.8.7**.

7.8.19 The existing Ha Tsuen SPS is proposed to collect the sewage in the eastern part of the HSK NDA. Together with the original sewage flow to be handled by the Ha Tsuen SPS, the sewage flow will exceed the capacity of the Ha Tsuen SPS at Year 2037/38 (with capacity of 192,940 m^3 per day) as presented in **Table 7.8.6** below. To spare the capacity of the Ha Tsuen SPS, it is proposed to divert the flow of existing sewage catchment from Tin Wah Road SPS to SPS4 and eventually to the new HSK STW and San Wai STW (Phase 1) respectively in 2031 as shown in **Figure 7.8.1**. On the other hands, the SPS4 will convey the equal amount of sewage flow of 30,332 m^3 per day from Tin Wah Road SPS to the new HSK STW so as to compensate the sewage flow that will be collected in the Ha Tsuen SPS for the HSK NDA. Therefore, the San Wai STW (Phase 1) will not handle any additional sewage flow from the HSK NDA ultimately. In this connection, the sewerage works from Ha Tsuen SPS to the HSK STW to convey the sewage from the Ha Tsuen SPS can be avoided for cost effectiveness.

7.8.20 This diversion of rising mains to SPS4 will not only spare the capacity in Ha Tsuen SPS for the sewage flow from the HSK NDA but also avoid the maintenance and management problem on the twin 800mm rising mains as Tin Ying Road between its junction with Tin Wah Road and Ping Ha Road will be re-planned. As advised by DSD, the design capacity of Tin Wah Road SPS is 43,546 m^3 per day. The capacity checking on the Ha Tsuen SPS is shown in **Table 7.8.6**.

Table 7.8.6 Capacity Checking on Ha Tsuen SPS

Catchment Area	Accumulate Sewage Flow (m^3 per day)(1)		
	Year 2026	Year 2031	Year 2037/38
Ha Tsuen SPS (Total) (2) (**without** diversion of sewage of Tin Wah Road SPS)	180,430	181,843	202,133
Ha Tsuen SPS (Total) (2) (**with** diversion of sewage of Tin Wah Road SPS to SPS 4 in 2031)		138,297	158,587

Notes:
(1) Include a minor portion of inflow from dry weather flow interceptors (i.e.: 10,363 m^3 per day) and 2.5% return liquid allowance.
(2) Include sewage flow due to HSK NDA.

7.8.21 **Table 7.8.7** to **Table 7.8.9** show the accumulated projected sewage flow, peaking factors and accumulated projected peak flows respectively for SPS1, SPS2, SPS3 and SPS4 for Year 2026, Year 2031 and Year 2037/38.

Table 7.8.7 Estimated Sewage Flows for Year 2026, Year 2031 and Year 2037/38 Scenarios

Facilities	Accumulated Sewage Flow (m^3 per day) (1)		
	Year 2026	Year 2031(4)	Year 2037/38(4)
Pumping Station SPS1	4,067	26,641	26,641
Pumping Station SPS2(3)	5,051	36,502	39,130
Pumping Station SPS3	NA	8,329	10,957
Pumping Station SPS4	NA	49,430 (2)	67,943 (2)

Notes:
(1) Include 2.5% return liquid allowance.
(2) Include sewage from Tin Wah Road SPS.
(3) SPS 2 will handle the sewage from SPS 1 and SPS 3
(4) From 2031 and onward years, the sewage flow from HSK NDA will be conveyed to the new HSK STW.

Table 7.8.8 Peaking Factors for Pumping Stations in HSK NDA

Facilities	Peaking Factors (PF) (1)		
	Year 2026	Year 2031	Year 2037/38
Pumping Station SPS1	3.27	2.90	2.90
Pumping Station SPS2	3.23	2.84	2.83
Pumping Station SPS3	NA	3.13	3.07
Pumping Station SPS4	NA	2.78	2.73

Notes:
(1) Peaking factors (PF) are calculated from EPD's guideline for population>50,000:
Max ($3.9/N^{0.065}$, 2.4), where N is the contributing population in thousands
Contributing population = Calculated total average flow in m3 per day /0.27/1000.

Table 7.8.9 Estimated Peak Flows for Year 2026, Year 2031 and Year 2037/38 Scenarios

Facilities	Accumulated Projected Peak Flows (m^3/s) (1)		
	Year 2026	Year 2031	Year 2037/38
Pumping Station SPS1	0.15	0.89	0.89
Pumping Station SPS2	0.19	1.20	1.28
Pumping Station SPS3	NA	0.30	0.39
Pumping Station SPS4	NA	1.59	2.14

Notes:
(1) Projected Peak Flows = (Projected ADWF x PF) x (1+2.5%).

Conclusion

7.8.22 The additional sewage flow generated from the proposed NDA cannot be handled by the planned San Wai STW – Phase 1 and therefore the proposed HSK STW with a total treatment capacity of **85,500 m^3 per day** will be required. The sewage will be treated by tertiary treatment and secondary plus treatment (with UV disinfection and 75% nitrogen removal). Further study and review on the updated population data and the sewage flow on San Wai sewage catchment shall be carried out to ascertain the required capacity for the HSK STW (Phase 2). A separate EIA Study for the new HSK STW will be conducted under Schedule 2 of EIAO.

7.8.23 Reuse of reclaimed water is recommended for non-potable uses such as toilet flushing. The reclaimed water will be provided from the HSK STW with tertiary treatment plus hypo-chlorination facilities to ensure a higher water quality standard. The rest of sewage effluent will be treated by secondary plus treatment and discharged to Urmston Road Submarine Outfall.

7.8.24 It can be concluded that the proposed developments in the HSK NDA are sustainable from sewerage collection, treatment and disposal perspectives.

7.9 Water Supply and Utilities Impact Assessments

Existing Fresh Water Supply

7.9.1 The HSK NDA is located within the fresh water supply zones of Tan Kwai Tsuen North FWSR, Tan Kwai Tsuen South FWSR, Yuen Long FWSR and Fung Kong Tsuen FWT. The capacities of these FWSRs are summarised in **Table 7.9.1**.

Table 7.9.1 Capacities of Existing Fresh Water Service Reservoirs

Fresh Water Service Reservoir	Capacity (m^3)
Tan Kwai Tsuen North Fresh Water Service Reservoir	81,516
Tan Kwai Tsuen South Fresh Water Service Reservoir	76,842
Yuen Long Fresh Water Service Reservoir	9,233
Fung Kong Tsuen Fresh Water Tanks	512

7.9.2 Currently, Yuen Long FWSR is supplied by Tuen Mun WTW. Tan Kwai Tsuen North FWSR is supplied by Ngau Tam Mei WTW. Tan Kwai Tsuen South FWSR is supplied by Ngau Tam Mei WTW, Tuen Mun WTW and Au Tau WTW. Fung Kong Tsuen FWT is supplied by Ngau Tam Mei WTW. The capacities of these WTWs are shown in **Table 7.9.2** below:

Table 7.9.2 Capacities of Existing Water Treatment Works

Water Treatment Works	Capacity (MLD)
Tuen Mun Water Treatment Works	280
Ngau Tam Mei Water Treatment Works	230
Au Tau Water Treatment Works(1)	238

Note:
(1) The modernisation of Au Tau WTW will be carried out and the capacity will decrease to 160 MLD during construction stage. Upon the completion of the project in 2027, the capacity will increase to *330MLD*.

7.9.3 The distribution of existing water mains in the HSK Study Area is shown in **Figure 2.6.1.** As the existing fresh water supply in the Study Area cannot cater for the future developments of the HSK NDA, new fresh water supply facilities comprising FWSR and trunk mains have been proposed.

Existing Flushing Water Supply

7.9.4 Currently there is no comprehensive salt water supply in HSK NDA for flushing purpose. Even though the NWNT Salt Water Supply System comprising the Tan Kwai Tsuen SWSR (with a capacity of 18,100 m^3/day), the Lok On Pai SWPS (with a pumping capacity of 83,000 m^3/day), the upgraded intermediate booster chlorination plant at Tuen Mun WTW and the associated salt water mains was completed, it aims to supply salt water to the Tuen Mun East areas, Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai, Yuen Long Town and part of the existing HSK area only. The supply zone does not cover the whole development area of the HSK NDA according to the latest planning data. Therefore new flushing water resources and distribution network are required to serve the development area of the HSK NDA.

Water Demand Estimate

7.9.5 Based on the population and land use distribution in the Revised RODP, the daily fresh water demand for the HSK NDA is approximately 107,600 m^3/day whereas daily flushing and other water demand (including water for irrigation) is approximately 39,400 m^3/day. Thus, the total estimated water consumption for the NDA is approximately 147,000 m^3/day including fresh water, flushing water and other water demands.

Proposed Water Supply Arrangement

7.9.6 As the HSK NDA is a relatively large scale development in the NWNT, the existing fresh water supply to the former HSK area cannot cater for the new developments. With reference to the results of previous studies and the water demands based on the Revised RODP, new fresh water and flushing water supply systems are required to be constructed to serve the HSK NDA.

Proposed Fresh Water Supply System

7.9.7 The proposed fresh water supply system for the HSK NDA will be supplied from existing Tan Kwai Tsuen South FWSR and the proposed new Tan Kwai Tsuen FWSR. The connections to the existing water supply systems and the alignments of the reticulation are proposed in three stages. These water supply facilities and stages are introduced in the following sub-sections.

7.9.8 Considering the limited capacity of the existing Tan Kwai Tsuen South FWSR, a new FWSR with a capacity around 86,000 m^3 is proposed for fresh water supply for the ultimate developments of the HSK NDA. The new reservoir will be located northeast of Tan Kwai Tsuen South FWSR.

7.9.9 The Fung Kong Tsuen FWSR as proposed in previous study is considered a less suitable location due to presence of graves and eagle nests at the hills and its relative long distance from the Au Tau WTW and Fresh Water Primary Service Reservoir (FWPSR) mentioned below. One 1400mm diameter inlet main will be required in order to transfer water from Au Tau WTW and FWPSR. Based on the current water supply condition of nearby districts, Tan Kwai Tsuen FWSR will be solely planned for the fresh water supply of the HSK NDA.

Stage I (Advance Works and Stage 1): Tan Kwai Tsuen South Fresh Water Service Reservoir

7.9.10 Stage I fresh water supply caters for the Advance Works and Stage 1 development, which mainly includes the area with easy access and/or existing infrastructure. Stage I water supply will serve the proposed multi-storage buildings to be developed under Stage 1 development and the major population intake from Advance Works.

7.9.11 Since existing Tan Kwai Tsuen South FWSR has sufficient spare capacity to cater for the water demand arising from Stage 1 and Advance Works of the HSK NDA, Stage I of the HSK NDA fresh water supply is best covered by Tan Kwai Tsuen South FWSR and extended from existing water supply network according to the supply zone location and the programme of Infrastructure development.

7.9.12 The fresh water supply network under Stage I is also planned to supply the flushing water demand before the construction of proposed flushing water reservoir is completed in Stage II. Tan Kwai Tsuen South FWSR's spare capacity is adequate for both fresh water and flushing water at Stage I.

Stage II (Year 2031): Proposed Tan Kwai Tsuen Fresh Water Service Reservoir

7.9.13 Stage II fresh water supply covers Advance Works, Stage 1 and Stage 2 NDA Development. The Stage II water supply will serve the development sites by providing new water mains from proposed Tan Kwai Tsuen FWSR and this will cover Stage 2 development area at the southern part of the HSK NDA along Castle Peak Road and northern part of NDA for PBU, storage and workshop uses. This package is planned to complete in 2031.

7.9.14 From this stage and onwards, Tan Kwai Tsuen South FWSR will be disconnected from Stage I supply zone and Stage I and Stage II are solely supplied by proposed Tan Kwai Tsuen FWSR.

Stage III (Year 2037/38): Tan Kwai Tsuen Fresh Water Service Reservoir

7.9.15 At Stage III (ultimate scenario) of the HSK NDA, the supply zone of Tan Kwai Tsuen FWSR would cover the whole NDA. This stage will extend the water mains constructed in Stage II so as to supports Stage 3 and 4 development areas which cover eastern part of the HSK NDA and along Tin Ying Road and northern parts of HSK around Ha Tsuen.

7.9.16 Based on the above discussions, the proposed Tan Kwai Tsuen FWSR should be implemented in two stages before Year 2031 and Year 2037/38.

Au Tau Water Treatment Works and Trunk Water Mains

7.9.17 The design capacity of Au Tau WTW will be resumed to 330,000m^3/day after completion of modernisation works in 2027. As advised by Water Supplies Department (WSD), Au Tau WTW and Ngau Tam Mei WTW will be redistributed in phases to cover increased demand in the NWNT and part of NENT new developments. The proposed Tan Kwai Tsuen FWSR will be supplied from Au Tau WTW.

7.9.18 A trunk main is proposed to be laid along YLH to minimise its length and construction cost, and to avoid already packed underground utilities along Castle Peak Road. **Figure 7.9.1** shows the proposed size and alignment of the water supply network between Au Tau WTW, Au Tau FWPSR and new Tan Kwai Tsuen FWSR. As high pressure gas main and congested underground utilities are now present along YLH, special attention is required for the construction of the trunk main, which is preferred to be aligned on the opposite lane. The exact alignment should be verified and further assessed in a separate study. Alternative alignment and different construction methods such as tunnel option should be explored.

Proposed Flushing Water Supply System

7.9.19 There are not enough salt water supplies planned in the vicinity to the HSK NDA. Potential flushing water supply source should be sought or further upgrading works of NWNT Salt Water Supply System should be carried out. A preliminary review was conducted and it was proposed to treat part of the sewage to a higher level and use reclaimed water as flushing water for the HSK NDA so as to avoid technical difficulty for salt water supply and reduce the water quality impact to North Western WCZ.

Stage I (Advance Works and Stage 1): Tan Kwai Tsuen South Fresh Water Service Reservoir

7.9.20 Since HSK STW will commission in 2031, Stage I flushing water resource will temporarily come from the fresh water supply network. The fresh water supply system discussed in the above sections has already considered the flushing water demand.

Stage II (Year 2031): Tan Kwai Tsuen Reclaimed Water Service Reservoir

7.9.21 To preserve the fresh water resource and reduce the water quality impact to the adjacent WCZ, it is proposed to use the reclaimed water for flushing water supply in the HSK NDA. In this connection, the development sites (in Advance Works, Stage 1 and Stage 2 development) at Stage II will be supplied with reclaimed water for flushing. A proposed HSK STW will be constructed with the part of sewage to be treated in tertiary treatment level. After treatment, chlorination of reclaimed water will be carried out at the outlet of the new STW for flushing purpose.

7.9.22 Reclaimed water from HSK STW will be transferred to a proposed reclaimed water service reservoir (RWSR) at Tan Kwai Tsuen.

7.9.23 The proposed new water mains will be developed to replace the flushing water supply network provided in Stage I.

Stage III (Year 2037/38): Tan Kwai Tsuen Reclaimed Water Service Reservoir and Fung Kong Tsuen Reclaimed Water Service Reservoir

7.9.24 At ultimate stage (Year 2037/38) of the HSK NDA, all sites will be supplied with reclaimed water as flushing water. As most of the development under Stage III is at the northern part of the HSK NDA, another RWSR is proposed at Fung Kong Tsuen to serve the flushing demand under this Stage.

7.9.25 The recommended alignment of water mains connecting STW and service reservoirs is shown in **Figure 7.9.2**.

7.9.26 The abovementioned provisions including the alignment of trunk water main and water supply network should be subject to review in the design stage.

Proposed Irrigation Water Supply

7.9.27 The total demand of irrigation water is 8,100m^3/day. Subject to further study, the water quality from the new HSK STW is considered appropriate for irrigation purpose after chlorination and dechlorination process. It is proposed that surplus reclaimed water from HSK STW could support the irrigation in the HSK NDA.

Other Utilities

Existing 400kV Overhead Lines (OHL)

7.9.28 The proposed utilities requirements and arrangements are available upon further liaison with corresponding utility undertakings, including the review on the proposal of relocation of the existing 400 kV from overhead to underground. In the Revised RODP, a buffer zone has been allowed for the 400kV OHL so that the new developments would not be affected. In addition, CLP Power Hong Kong Limited (CLP) has carried out preliminary estimation on power supply based on population data in recent RODP and the proposed locations for sub-stations have been allowed in the Revised RODP to serve the NDA development.

Power Supply for HSK NDA

7.9.29 A 132kV ESS 1 is planned to meet with the expansion of population, employment in Stage 1 and Advance Works of the NDA development. Another three ESSs are also planned to serve the NDA by 2031. The location of the proposed ESSs are indicated in **Figure 7.9.3**.

7.9.30 According to CLP's loading estimation, CLP confirmed that the Phases 1 and 2 of Advance Work for intake in 2024 and 2025 can rely on existing power supply network, while Stage 1 and Phase 3 of Advance Work for planned intake in 2025 and 2028 respectively will require supply from ESS 1. The power supply network extended from the three ESSs constructed in Stage 2 in 2031 will serve the Stages 2, 3 and 4.

Gas Supply for HSK NDA

7.9.31 Based on the existing gas main records provided by Hong Kong and China Gas Company (HKCG), diversions/abandonments of some existing gas mains are necessary to facilitate the development of HSK NDA. As advised by HKCG, the existing 400 mm medium pressure gas main along Castle Peak Road is the trunk gas main for supplying gas to Yuen Long and Tin Shui Wai areas and diversion of this main should be avoided as far as practical to minimise the disturbance of gas supply to these areas.

7.9.32 Based on the record of HKCG, it is also found that a new gas off-take station adjacent to the existing Ha Tsuen SPS is proposed to enhance the security of gas supply to Yuen Long, Tin Shui Wai and Yuen Long - Corridor areas.

7.9.33 Following the design review with HKCG in the Study, HKCG confirmed that medium pressure gas mains will be extended to serve the HSK NDA following road development in different phases. The proposed routes of medium pressure gas mains should be laid along Road P1, D1, D2 and eventually connected to existing gas mains near the Ping Ha Road/Tin Ying Road junction. The above ground gas governor kiosks (with a plan size not greater than 2m x 2.5m) are also required to be provided by HKCG. These governor kiosks are normally required for reducing the gas pressure to serve the local residents. Provision of such kiosks will be incorporated in the residential sites similar to the electricity transformer rooms. Specific site reservation for the governor kiosks is, therefore, considered not required.

Telecommunication

7.9.34 Liaison with telecommunication companies considering their expansion to the HSK NDA is completed. Hong Kong Broadband Network Limited proposed network will be extended from Castle Peak Road and Shek Po Road while PCCW Enterprises Limited network will be extended from Tin Ha Road.

7.9.35 Based on the road planning of the Revised RODP, major planned roads with minimum 3.5m width of footpath will be sufficient for laying various telecommunication cables based on the information acquired from the telecommunication companies.

Conclusion

7.9.36 For fresh water supply in the HSK NDA, it is proposed to divide into three stages to cater for the targeted population and employment. For Stage 1 and Advance Works Development (Stage I supply zone), existing Tan Kwai Tsuen South FWSR is anticipated with enough spare capacity and considered the best source because of its short supply route in accordance with the proposed staging of development. However, for Stages II and III, a new FWSR is proposed at Tan Kwai Tsuen to serve the water demand for the whole HSK NDA.

7.9.37 The existing Tan Kwai Tsuen South FWSR will be disconnected and stop supplying water to the HSK NDA in year 2031. Fresh water supply will only be supplied from the proposed Tan Kwai Tsuen FWSR ultimately.

7.9.38 As suggested by WSD, it is recommended to adopt Au Tau WTW as the supply source to the proposed Tan Kwai Tsuen FWSR. Associated proposed pipe networks from the service reservoir within the HSK NDA are proposed.

7.9.39 A preliminary review were conducted and it is proposed to treat part of the sewage to a higher level and use reclaimed water as flushing water for the HSK NDA so as to avoid technical difficulty for salt water supply and reduce the water quality impact to North Western WCZ.

7.9.40 Under Stage I, fresh water will be used as the source for flushing. Upon completion of Stage II and III, two reclaimed water reservoirs at Tan Kwai Tsuen and Fung Kong Tsuen are proposed to serve the water demand for the HSK NDA. Up to the ultimate stage, the Stage I flushing water system will be converted to reclaimed water supply by reclaimed water from the proposed HSK STW.

7.9.41 The surplus of reclaimed water from HSK STW could be used for irrigation purpose in NWNT including HSK NDA.

7.9.42 There is currently no plan for diversion of the overhead cable. The planning proposal for the HSK NDA has no conflict with the 400kV OHL. For new development in future, relevant guidelines in accordance with the HKPSG and regulations under relevant authorities should be observed and consulted.

7.9.43 Based on the current findings and with implementation of the proposed waterworks and utility infrastructure, there would be no insurmountable water supply and utilities impact caused by the proposed developments in the HSK NDA. The proposed water supply facilities and utilities would be implemented in stages to match with the programme of the development.

7.10 Air Ventilation Assessment

7.10.1 An experimental site wind availability study for the HSK NDA was conducted by CLP Power Wind/Wave Tunnel Facility at the Hong Kong University of Science and Technology. The Wind tunnel study was conducted as part of an AVA study for the HSK NDA.

7.10.2 The 1:2000 scale topography study was undertaken to determine the effects of the local topography and the surrounding urban environment on mean wind speeds, turbulence intensities and mean wind directions above the Study Site. The topography study results were subsequently combined with a statistical model of the Hong Kong wind climate, based on measurements of non-typhoon winds taken by Hong Kong Observatory at Waglan Island, to determine directional wind characteristics and the site wind availability for the Study Site. Wind roses for annual and summer months, corrected to an elevation of 500 mPD and with the averaged wind shifts applied, are presented in **Figure 7a** and **Figure 7b** respectively for the north measurement location and in **Figure 7c** and **Figure 7d** respectively for the south measurement location to illustrate the general wind characteristics above the Project Area.

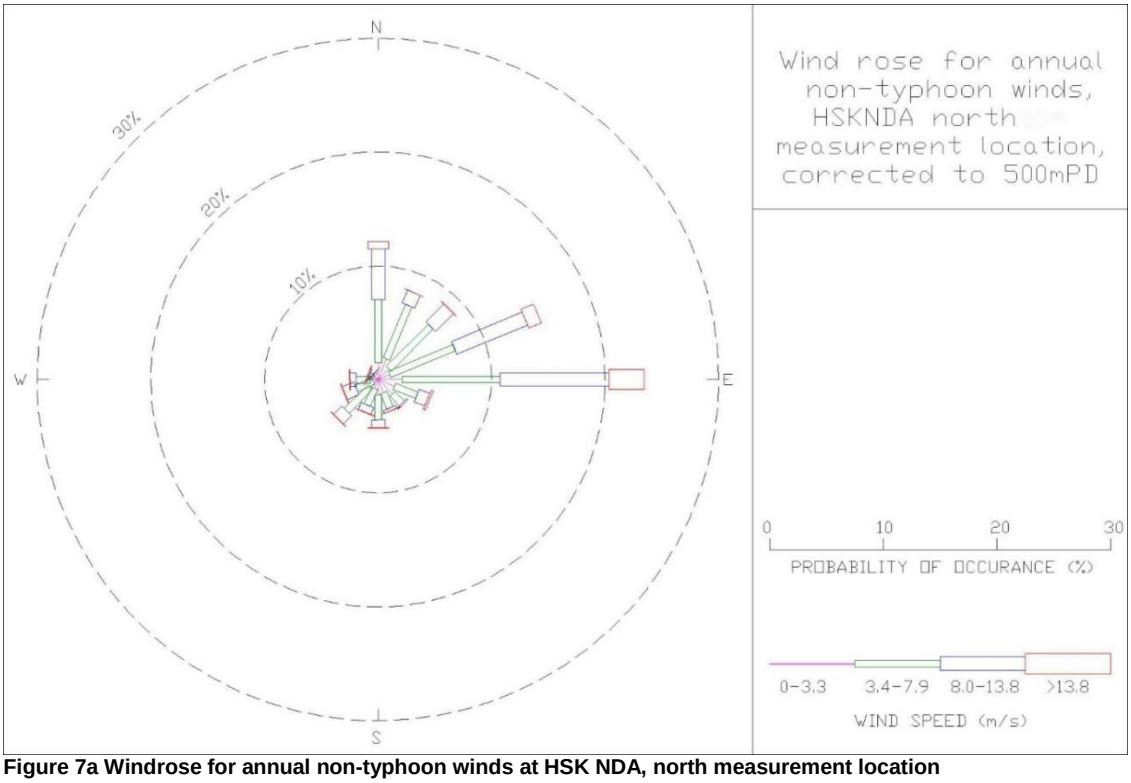


Figure 7a Windrose for annual non-typhoon winds at HSK NDA, north measurement location

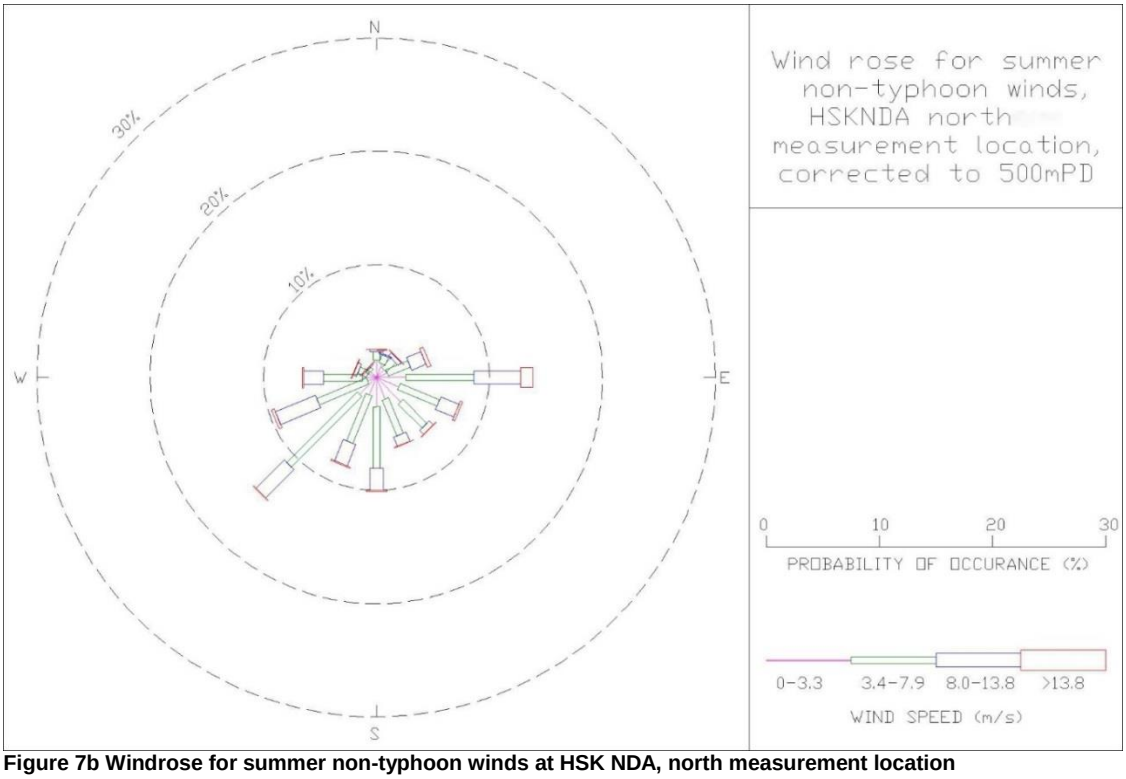


Figure 7b Windrose for summer non-typhoon winds at HSK NDA, north measurement location

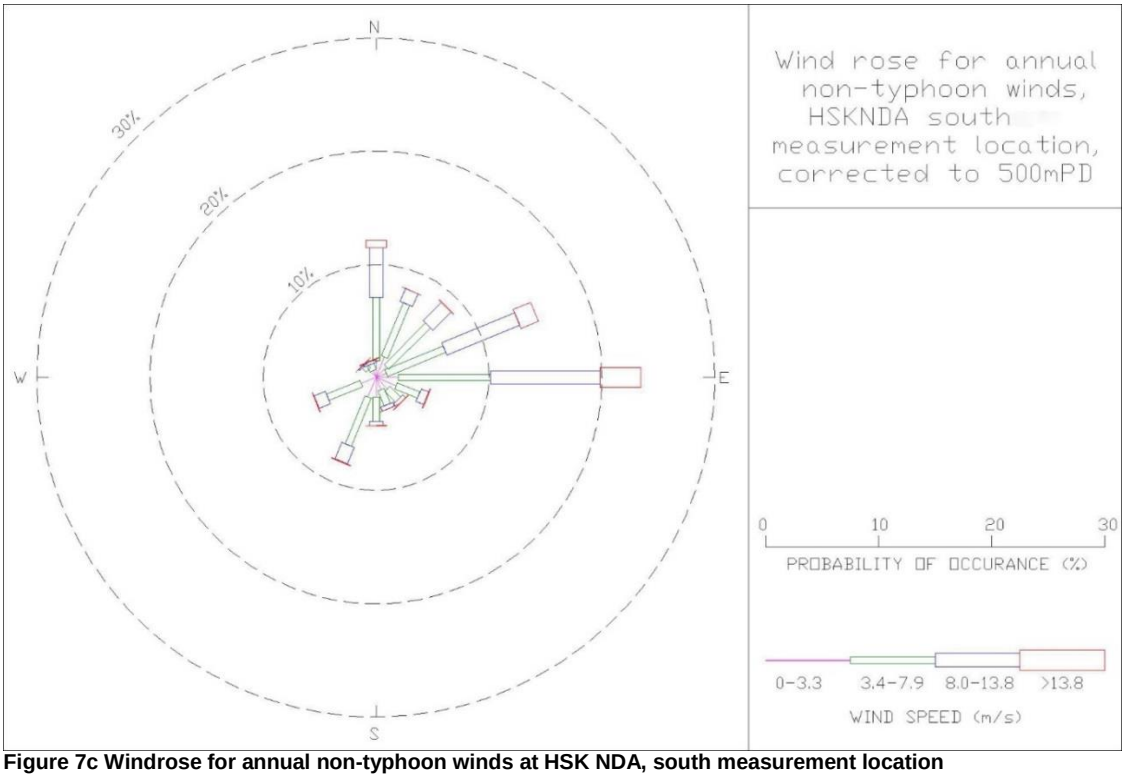


Figure 7c Windrose for annual non-typhoon winds at HSK NDA, south measurement location

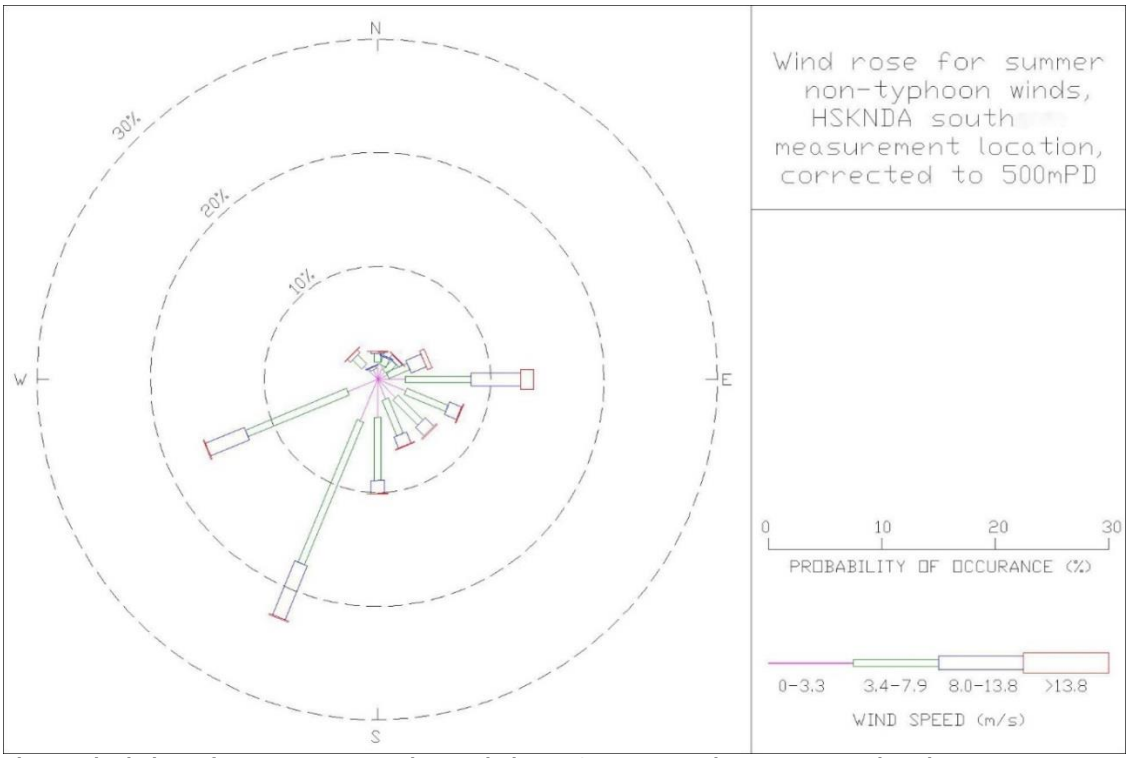


Figure 7d Windrose for summer non-typhoon winds at HSK NDA, south measurement location

Wind Tunnel Study

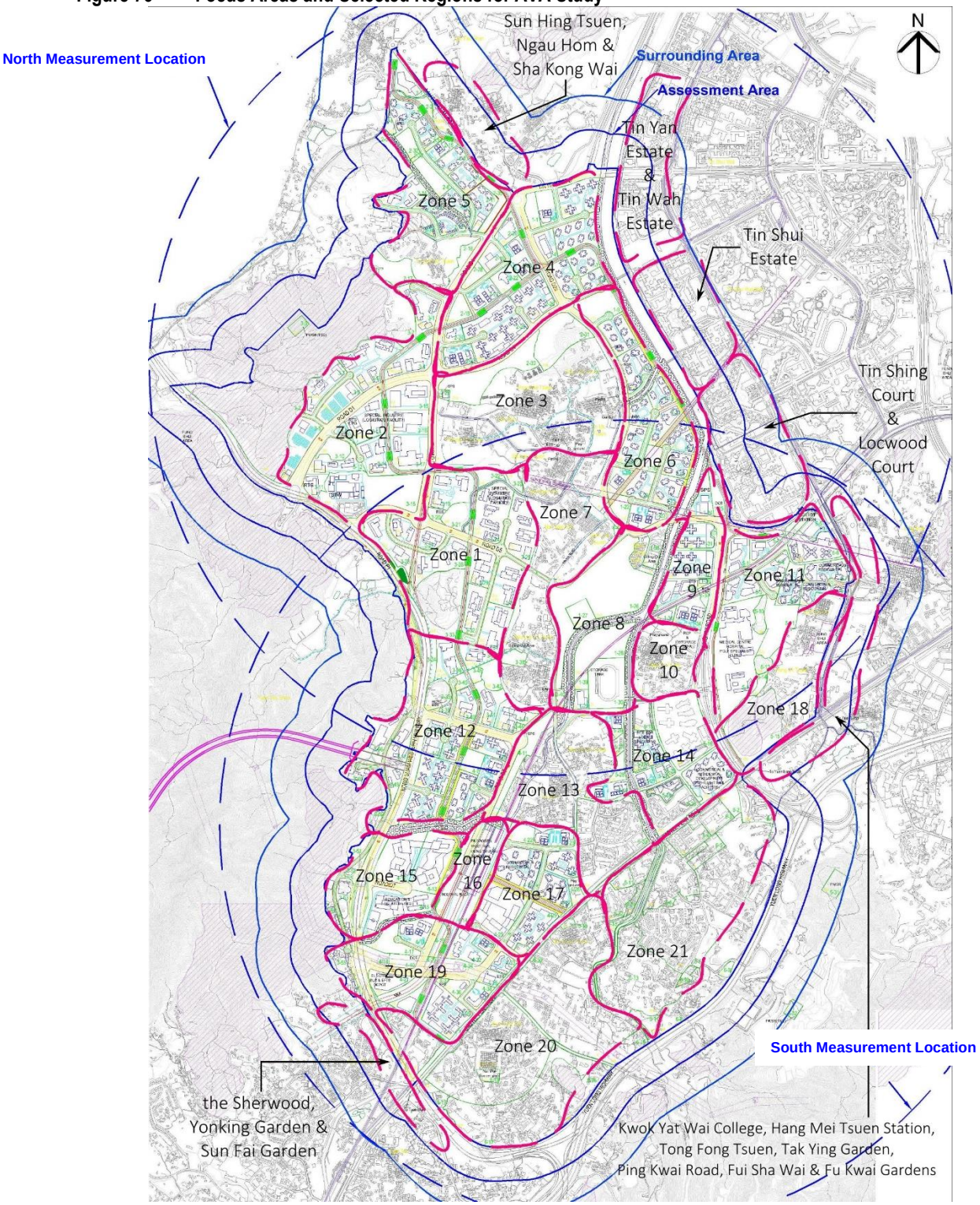
Methodology

7.10.3 A Detailed Study of an AVA using wind tunnel test technique was conducted by the CLP Power Wind/Wave Tunnel Facility at the Hong Kong University of Science and Technology for the proposed development at the HSK NDA. The study was to assess the effects of the proposed development at the HSK NDA on pedestrian level wind speeds of the Project and Assessment Areas.

7.10.4 The study was undertaken in accordance with the requirements stipulated in the Australasian Wind Engineering Society Quality Assurance Manual, AWES-QAM-1-2001 (2001), and the American Society of Civil Engineers Manual and Report on Engineering Practice No. 67 for Wind Tunnel Studies of Buildings and Structures (1999). The study was also conducted in accordance with the recommendations of Feasibility Study for Establishment of Air Ventilation Assessment System – Final Report (2005) and HPLB & ETWB's Technical Circular No, 1/06 for Air Ventilation Assessment (2006).

7.10.5 Both velocity ratio (VR) and median hourly mean wind speeds were measured at a total of 869 test points in the 1:800 scale model for 16 wind directions ranging from 22.5° to 360° (north) at increments of 22.5° using a multi-channel thermal anemometer system. Wind tunnel test results were combined analytically with the site wind availability data obtained from an experimental site wind available study prior to this detailed study, to determine the overall wind VR, Local Spatial Average Velocity Ratio, Site Spatial Average Velocity Ratio (SVR) and Spatial Average Velocity Ratio (SAVR) for each focus area. Due to the large extent of the project site, 21 focus areas at the HSK NDA and 6 selected regions adjacent to the HSK NDA were defined for the ease of assessment. They are shown in **Figure 7e** below.

Figure 7e Focus Areas and Selected Regions for AVA Study



Overall Wind Performance of Potential Air Paths

7.10.6 Based on the wind tunnel tests, it is found that the SVR and SAVR determined for the focus areas at the southern part of the HSK NDA are generally better than those of the northern part under both annual and summer condition. This is because the site environment around the southern part of the HSK NDA is relatively open in nature. Also, the pedestrian wind environment at the northern part of the HSK NDA would be affected by the existing residential developments in Tin Shui Wai. Such existing high-rise buildings would reduce the incoming annual prevailing wind coming from NE quadrant, while it would also create a resistance in the downstream to impede the wind penetration through the HSK NDA under summer prevailing winds coming from S and SW quadrant.

7.10.7 Under the Revised RODP, there are two fung shui corridors. The first fung shui corridor is aligned approximately from NE to SW heading towards Ha Tsuen Shi next to Sites 1-15 and 1-13. The second fung shui corridor extending near the existing Tin Shui Wai Station and Hung Tin Road is aligned approximately from ESE to WNW. Both the first and the second fung shui corridors pass through zone 6 which will accommodate relatively high-density new proposed developments. The average annual and summer median mean wind speeds of the relevant test points under the RODP for the first corridor are 0.77 m/s and 0.76 m/s, which are considered to be relatively low wind speed. In view of low wind speed on this corridor in the RODP, the sites near this corridor have been rearranged with education sites with low-density development and the local open spaces in Site 1-20 along Road D2 near Ha Tsuen Shi have been expanded with an aim to maintain the wind corridor as much as possible in the Revised RODP. The average annual and summer median mean wind speeds of the relevant test points located around the second Fung Shui corridor are 1.12 m/s and 0.90 m/s. The higher average median mean wind speed found at the second fung shui corridor indicate that it is more effective air corridor under both annual and summer conditions when compared with the first Fung Shui corridor.

7.10.8 We have also identified several other potential air paths in the HSK NDA which are worth incorporating into the Revised RODP. Section of Road D1 between zone 4 and zone 5 is considered to be a potential air path. The average annual and summer median mean wind speeds of the relevant test points are 1.05 m/s and 0.83 m/s. Section of Road D2 inside zone 4 is another potential air path and its average annual and summer median mean wind speeds of the relevant test points are 0.95 m/s and 0.95 m/s. Section of the existing Tin Sam Road is considered to be another potential air path. The average annual and summer median mean wind speeds of relevant test points along Tin Sam Road are 1.26 m/s and 0.85 m/s. Section of Hung Tin Road between zone 9, zone 10 and zone 11 is considered to be a potential air path. The average annual and summer median mean wind speeds of the relevant test points along Hung Tin Road are 1.14 m/s and 0.87 m/s.

7.10.9 Section of Castle Peak Road is another potential air path. The average annual and summer median mean wind speeds of the relevant test points of Castle Peak Road are 1.19 m/s and 0.94 m/s. Another potential air path is located between zone 12 and zone 15 along the river channel and its average annual and summer median mean wind speeds of the relevant test points are 1.15 m/s and 1.00 m/s. An ESE to WNW aligned district road distributor passing through zone 12 is another potential air path. The average annual and summer median mean wind speeds of the relevant test points for this distributor are 1.22 m/s and 0.94 m/s.

7.10.10 The average annual and summer median hourly mean wind speed for the 21 focus areas at the HSK NDA and 6 selected regions adjacent to the HSK NDA are presented in **Table 7.10.1** below.

Table 7.10.1 Annual and Summer Spatial Average Velocity Ratio Results for focus areas and selected regions

Focus Areas and Selected Regions	Average Annual MMWS	Average Summer MMWS
Zone 1	0.93	0.79
Zone 2	0.96	0.86
Zone 3	0.78	0.71
Zone 4	0.90	0.80
Zone 5	0.95	0.79
Zone 6	0.78	0.74
Zone 7	0.81	0.67
Zone 8	0.84	0.76
Zone 9	0.89	0.83
Zone 10	0.92	0.71
Zone 11	1.17	0.86
Zone 12	0.99	0.73
Zone 13	0.99	0.74
Zone 14	1.09	0.80
Zone 15	1.01	0.90
Zone 16	1.08	0.89
Zone 17	1.05	0.78
Zone 18	1.14	0.83
Zone 19	1.11	1.00
Zone 20	1.15	0.92
Zone 21	1.18	0.89
San Hing Tsuen, Ngau Hom & Sha Kong Wai	1.05	0.73
Tin Yan Estate & Tin Wah Estate	0.87	0.72
Tin Shui Estate	0.92	0.70
Locwood Court & Tin Shing Court	0.89	0.68
Kwok Yat Wai College, Hang Mei Tsuen Station, Tong Fong Tsuen, Tak Ying Garden, Ping Kwai Road, Fui Sha Wai & Fu Kwai Gardens	1.53	1.12
The Sherwood, Yonking Garden & Sun Fai Garden	1.05	0.94

7.10.11 The variation pattern of average median hourly mean wind speed for the focus areas is similar to that of SVR and SAVR. Higher average median hourly mean wind speeds of focus areas are found for the southern part of HSK NDA. Zone 19 is the only zone with both average annual and summer median hourly mean wind speeds higher than or equal to 1.0 m/s. The adjacent zones 14 – 18, 20 and 21 also have relatively high average annual and summer median hourly mean wind speeds. For the northern part of HSK NDA, relatively high average annual and summer median hourly mean wind speeds are also measured at zones 2, 4 and 5, attributing to the relatively open exposure of these zones to the north winds.

7.10.12 Zones 3, 6 and 7 have relatively low average annual and summer median wind speeds. As these zones are surrounded by existing and proposed developments of HSK NDA, cumulative sheltering effects from the surrounding developments are the predominant factor for the relatively low average annual and summer median wind speeds measured at these zones. Relevant mitigation measures for such problematic areas are described below.

7.10.13 For the surrounding areas, Tin Yan Estate and Tin Wah Estate and Locwood Court and Tin Shing Court have relatively low average annual and summer median hourly mean wind speed. This is mainly attributed to the sheltering effects of the existing buildings in those estates in Tin Shui Wai New Town.

Proposed Improvement Measures

7.10.14 The HSK NDA has incorporated a number of major air paths as mentioned in paragraphs 7.10.7 to 7.10.9 above. In addition, the Revised RODP has also included interconnected regional, district and local open spaces or planned roads covering the whole HSK NDA, which would facilitate wind flow. These unobstructed air paths allow the prevailing winds to penetrate into the built environment of HSK NDA as well as the existing developments in the surrounding.

7.10.15 To further enhance penetration of prevailing wind to individual development sites, development parcels together with a matrix of pedestrian streets are recommended to align in the N to S and NE to SW directions. Future developments should meet the requirements in the SBD Guidelines. The following design principles should also be considered for individual sites to improve wind penetration at pedestrian level.

- Incorporate terraced podium design;
- Introduce stepped building height profile in the proposed scheme to facilitate upper level winds reaching pedestrian level;
- Incorporate suitable building disposition orientation creating connecting air paths throughout the study area to facilitate penetration of prevailing winds into the proposed development zones;
- Maintain proposed regional, district and local open spaces, green belts and amenity areas which form the green spines throughout the HSK NDA;
- Incorporate greening measures with a target of not less than 30% for sites larger than 1 ha, and not less than 20% for sites below 1 ha, preferably through tree planting at grade for improving the outdoor environment in regions of low wind speed and to ameliorate potential pedestrian level wind gust;
- Adopt Building Permeability equivalent to 20% to 33.3% in accordance with PNAP APP-152;
- Minimise podium bulk with ground coverage of no more than 65% where feasible;
- Adopt building setback in accordance with PNAP APP-152;
- Avoid long continuous façades; and
- Make reference to the recommendations of design measures in the HKPSG.

7.10.16 The improvement measures would generally allow better wind penetration at pedestrian level and providing a wider spacing between the buildings that could improve the potential air paths. These measures are recommended in the Revised RODP.

7.10.17 In view that the majority of the technical factors in this assessment are linked to the land use structure of the RODP that there is no significant changes in the land use structure in the Revised RODP, therefore, the assessment results based on the RODP will be valid for the Revised RODP.

7.11 Socio-Economic Impact Assessment

7.11.1 A Socio-Economic Impact Assessment has been undertaken to set up the baseline socio-economic conditions through desktop research and field survey to identify the potential socio-economic impacts and mitigation measures required.

Historical Background

7.11.2 The 1864 map of Guangdong Gazetteer (廣東通志) indicated the existence of villages, Ha Tsuen (厦村), Chung Uk Tsuen (鍾屋村), Ping Shan Tsuen (屏山村), Shek Po (石莆 as present day 石埗) and Tuen Mun Tsuen (屯門村). The HSK district was considered as the largest flatland in the New Territories on the 1864 map. Back then, Ha Tsuen and Chung Uk Tsuen were agricultural area.

7.11.3 The significant settlements in Yuen Long can be traced back to the Song dynasty (AD960-1279). The Tangs settled in Kam Tin in the Northern Song dynasty. Their offspring branches moved to Ping Shan and Ha Tsuen later in the early to middle Ming dynasty. Ha Tsuen Shi and Ping Shan Market were founded in the district in the mid-18th century due to intensive trading activities which continued to strive until Yuen Long Market was established.

7.11.4 In 1661, the Yuen Long residents were ordered to withdraw 50 li (里) inland (approximately 17 miles) from the coast to stop their collusion with Ming dynasty's loyalist Zheng Chenggong (鄭成功) in Taiwan. The people were allowed to return to the land after 1669. After that, the Qing Government started to encourage Hakka people to migrate to the area from other provinces including Jiangxi, Guangdong, and Fujian.

7.11.5 According to the 1903-1904 Hong Kong map, the villages of Ngau Hom, Shek Po, Tung Tau, San Wai, Sai Shan, Chung Uk Tsuen, and Nai Wai, etc. already existed. It can be seen from the map that Ha Tsuen and Ping Shan used to be located next to a narrow waterway which connected to Deep Bay before the 1950s. This waterway also reached Castle Peak Bay and served many commercial boats that transported goods between Yuen Long and Guangdong.

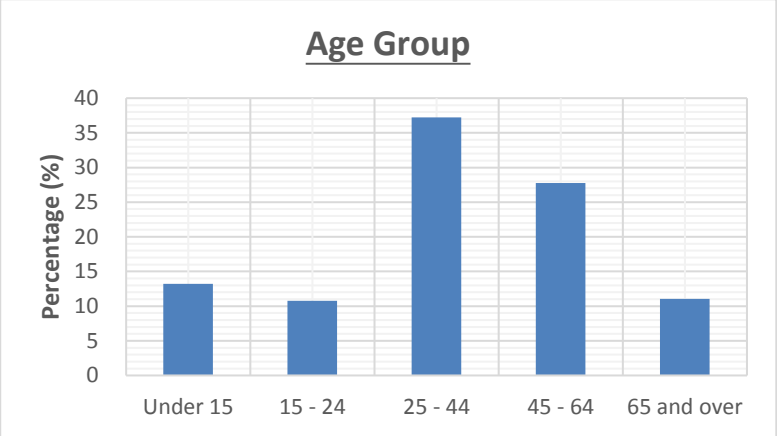
Population and Age Structure

7.11.6 An evaluation of the statistical data with respect to the population, household, labour force and employment characteristics was undertaken. This was done by using information sourced from the 2011 Population Census - Fact Sheet for TPU to provide an insight into the socio-economic characteristics of HSK NDA and its environs. Corresponding TPUs as shown in **Figure 7.11.1** are used to analyse the existing socio-economic condition of the HSK NDA.

7.11.7 Based on the 2011 Population Census, it is estimated that the existing population within the HSK NDA is about 16,100, among which about 10,000 reside within existing recognised villages which will be retained under the Revised RODP.

7.11.8 It is observed that the around 37% of the population was found to be between age 25 and 44. Over 60% of the population within the HSK NDA was found to be below the age of 44, which was slightly higher than the territory level of about 55%. The breakdown of the age structure of population in percentage terms is shown in the **Chart 7.1** below.

Chart 7.1 Breakdown of the age structure of population in percentage terms



Household Size and Income

7.11.9 Based on the 2011 Population Census, the average household size within the HSK NDA stood at 2.8 persons, which was slightly lower than the territory average of 3.0. Meanwhile, the average household size of Tuen Mun, Yuen Long and Tin Shui Wai New Towns were close to the territory average at 3.1, 2.9 and 3.2 respectively

7.11.10 The median of monthly household income for the HSK NDA is approximately HK$19,000, which was slightly lower than the territory level of about HK$20,500. Meanwhile, the median of monthly household income for Tuen Mun, Yuen Long and Tin Shui Wai New Towns were with HK$18,000, HK$20,000 and HK$16,000 respectively. The monthly household income distribution of various new towns is shown in **Table 7.11.1** below.

Table 7.11.1 Monthly Household Income Distribution

		<HK $ 10,000	10,000-19,999	20,000 - 39,999	≥ HK $ 40,000	Total
Tuen Mun New Town	No	45,891	45,178	53,186	24,735	168,990
	%	27%	27%	31%	15%	100%
Yuen Long New Town	No	49,055	53,860	56,035	31,335	190,285
	%	26%	28%	29%	16%	100%
HSK NDA	No	1,624	1,685	1,635	1,206	6,150
	%	26%	27%	27%	20%	100%
HK Territory	No	563,794	562,986	686,223	555,359	2,368,362
	%	24%	24%	29%	23%	100%

Source: 2011 Population census TPU data, Census and Statistics Department

Working Population

7.11.11 According to 2011 Population census, Census and Statistics Department, the proportion of working population which worked in the same district in the HSK NDA, Tin Shui Wai and Yuen Long is 20.2%, 13.0% and 17.1% respectively. This is lower than the proportion in Tuen Mun and Hong Kong territory wide which account to 27.4% and 26.4% respectively. This may be an indication that the employment opportunities within these areas are less when compared with the other areas.

Local Characteristics

Housing and Environmental Conditions

7.11.12 The HSK NDA has a mixed urban-rural character and characterised by low-density developments, which is contrary to the relatively high density and high raise developments in Tin Shui Wai. Land in the north and central parts of the NDA are predominately occupied by PBU & OS uses with traditional villages. There are 17 recognised villages and 1 village resite located with the HSK NDA. In addition, a small portion of "V" zone along Lau Fau Shan Road, which is for small house development of San Hing Tsuen, Ngau Hom Tsuen and Sha Kong Wai, also falls within the HSK NDA boundary.

7.11.13 Meanwhile, the southern part of the NDA is currently committed to development and land uses of various scales and character. Living structures, non-domestic structures and OS are particularly prevalent with the southwestern part of the NDA. The living structures in these areas are widely dispersed and some of them are impoverished temporary structures, intermingled with many non-living temporary structures. In contrast, the south-eastern part of the NDA is occupied by a series of contemporary developments including a range of residential developments with various densities. These are generally low to medium-rise modern developments including one public housing estate (i.e. Hung Fuk Estate).

Government, Institution and Community Facilities

7.11.14 Existing GIC facilities within the HSK NDA includes mainly elderly centres, recreational facilities and other miscellaneous facilities. In summary, there are inadequate provisions of the majority of GIC facilities to serve the existing population. In many cases, the Tuen Mun and Tin Shui Wai New Towns are the only providers of the majority of GIC facilities e.g. sports complex, schools, community halls, recreational centres for the elderly, libraries, child care centres, etc.

Local Business Activities

7.11.15 Based on the Questionnaire Survey of Brownfield Operations in HSK NDA conducted during August to November 2015, about 200 ha of land within the NDA are currently being used for PBU & OS purposes. Among which, about 190 ha would be affected by the works of the HSK NDA project. The number of existing operations within the NDA are about 368.

7.11.16 Apart from PBU & OS uses, a number of industrial uses are found near WR Tin Shui Wai Station, zoned "I" on the extant OZP with an area of approximately 10 ha. According to the "Report on 2014 Area Assessments of Industrial Land in the Territory", the vacancy rate (based on GFA) of this area is about 4.5%. It is mainly used for logistic use, vehicle testing, fabric manufacturing and canning. As observed and recorded during the site inspection conducted in October 2016, there were around 355 estimated number of employment within the operating firms.

7.11.17 Similar to Kiu Tau Wai, a number of industrial undertakings are also found operating near Hung Uk Tsuen. Based on the information given by the Hung Uk Tsuen Industries Association in September 2013, there are about 359 number of employment in the area.

7.11.18 While there are no centralised shopping malls or office towers, sparse commercial provision is currently located within the HSK NDA. They are predominantly planned for local needs only. The Lau Fau Shan area, may be the only exception given its regional and territorial significance for its fishing and oyster farming industries. This being said, the majority of the commercial activities in the vicinity of the NDA are located within the Tin Shui Wai New Town.

Agricultural Uses

7.11.19 Within the HSK NDA, there is some active agricultural land. Based on the field surveys conducted in 2016, it is observed that the active agricultural land is mainly found near San Sang San Tsuen, Ha Tsuen and the sides of WR Line, of which are normally located next to existing village settlements as a backyard for growing crops. Meanwhile, some inactive agricultural lands are also observed at San Sang San Tsuen and the northern part of the HSK NDA. There are also some ponds in the northern part of the HSK NDA directly to the south of Deep Bay Road, and in the south-southeast area located between KSWH and Castle Peak Road. There is also a licensed chicken farm within the HSK NDA situated in Kai Pak Leng, Ha Tsuen. The licensed area is approximately 4,604 m^2. According to site inspection on the livestock farm conducted at 2016, it was observed to be in full operation.

Cultural Assets

7.11.20 According to the "List of the Historic Buildings in Building Assessment" published by the AMO, two Declared Monuments and seven Graded Historic Buildings (including two Grade 2 Historic Buildings and five Grade 3 Historic Buildings) were identified within the HSK NDA. There are a total of five SAIs located within the HSK NDA, namely Ngau Hom Shek, Hang Hau Tsuen, Sha Kong Miu (North), Tung Tau Tsuen and Tseung Kong Wai. Four APAs containing unknown archaeological significance, were also identified in Lau Fau Shan, Kiu Tau Wai, Hung Uk Tsuen (North) and Hung Uk Tsuen (South).

Potential Socio-Economic Impacts

Impact on Existing Residents and their Social Network

7.11.21 The planning of the HSK NDA has minimised impacts on the existing residents as far as possible. However, it is unavoidable that some existing developments will be affected to make way for the provision of basic infrastructure, public and private housing, commercial, developments as well as GIC facilities for the development of balanced and socially integrated communities.

7.11.22 At the same time, with the overall improved infrastructure provision for the whole HSK NDA, opportunities will be taken to improve the environment of the existing villages such as providing buffer zones between the development and the existing villages via the amenity areas in order to minimise the possible development impacts. In addition, the provision of infrastructure, GIC facilities, open space could indeed further improve the living environment of the retained villages.

7.11.23 Yick Yuen Tsuen, Tin Sam San Tsuen, San Sang San Tsuen, Shek Po Road Mei Tsuen and Sha Chau Lei (II), in which there are some existing residential dwellings, will unavoidably be affected by the NDA development. Yick Yuen Tsuen, Tin Sam San Tsuen and San Sang San Tsuen are located within 500m of the proposed HSK Station which would be the future "Regional Economic and Civic Hub" for high density development. Shek Po Road Mei Tsuen and Sha Chau Lei (II) are also the central areas of the NDA and would be developed into the future Regional Park and sports facilities for serving the entire NWNT. As the affected structures are rather dispersed and varied in qualities, it is difficult to preserve them in any consistent manner without adversely affecting the coherence of the plan for the project. It is estimated that about 1,600 households would be affected. Shung Ming Home for Aged, which is located within the central location of the NDA and in a site planned for PRH development, will also be unavoidably affected.

7.11.24 To allow better understanding of the impacts of the NDA development on residents in the affected areas, an on-site questionnaire survey with the residents of the 5 affected areas was conducted by the Centre for Social Policy Studies of The Hong Kong Polytechnic University in February 2014. A total of 112 households have been interviewed.

7.11.25 Findings of the questionnaire survey showed that the respondents were mostly satisfied with the living conditions in the villages, in particular the air quality, housing environment, and the overall village environment. However, they were dissatisfied with the inadequate provisions of community facilities and supporting infrastructure in the villages, as well as the hygienic condition of the environment.

7.11.26 Overall, the respondents were mostly concerned about "financial burden" should they need to find a new accommodation, followed by "quality of living" and "transportation arrangements".

7.11.27 When asked about the kinds of rehousing arrangement that they find most acceptable if their land would be cleared, about 70% of the respondents responded that they would accept moving into PRH (if eligible), and about 33% responded that they would accept cash compensation. Only about 8% indicated that they would not accept any compensation or rehousing arrangement.

7.11.28 The clearance of existing residential dwellings will directly affect the social structure of the existing communities, which is built upon established norms, customs and formal and informal networks amongst the residents of the communities. Generally, the elderly and low-income families who rely heavily on their social network in receiving support and care from the relatives and neighbours living nearby may be more susceptible to the impact. The proposed sites for local rehousing could to some extent help the affected residents maintain their social network.

Impacts on Agricultural Activities

7.11.29 The only chicken farm within the HSK NDA will not be affected by the proposed development. Therefore, the impact on livestock farming arising from the development is considered minimal.

7.11.30 The planning of the NDA has minimised impact on the farmland under active cultivation as far as possible, however, some 7 ha of active agricultural land will inevitably be affected by the NDA development due to their locations. These agricultural land are mainly situated near the existing Yick Yuen Tsuen and San Sang San Tsuen area, in proximity to the proposed HSK Station, which will be the future town centre of the HSK NDA. The existing farmers will be displaced when their land be resumed for development.

Impacts on Local Business

7.11.31 With a view to enhancing land use efficiency and environmental quality, the HSK NDA will convert the vast extent of brownfield sites to more suitable uses including housing and other economic land. It is estimated that some 190 ha brownfield sites would be affected. Subject to detailed studies, some of the affected brownfield operations, may be consolidated and accommodated in proposed multi-storey buildings. Other affected businesses may have to move elsewhere should they wish to continue their businesses.

7.11.32 The consolidation of PBU & OS uses will eradicate the current undesirable situation in which PBU & OS uses fall on land outside their designated zoning, causing environmental degradation and wastage of our valuable land resource. At the same time, the consolidation of brownfield operations into multi-storey buildings will provide an opportunity for the trade to continue, but in a more efficient manner. Under the Revised RODP, about 24 ha of land at the northern fringe of the NDA is reserved for "OU (PBU+SWU)" to accommodate some of the affected brownfield operations.

7.11.33 While the existing industrial and commercial uses are relatively limited in the HSK NDA, under the Revised RODP, taking advantage of their close proximity to Tin Shui Wai Station, the existing Kiu Tau Wai area is proposed to be cleared for development and will be rezoned as "C" and "OU (Commercial and Residential Development)", whereas the area near Hung Uk Tsuen will be used for development of a hospital and educational facilities. According to site observation in Kiu Tau Wai in October 2016 and information given by the Hung Uk Tsuen Industries Association in September 2013, there are approximately 355 and 359 people working in the two areas respectively. Affected businesses may have to move elsewhere should they wish to continue their businesses.

Impacts on Cultural Heritage

7.11.34 Built heritage in Ha Tsuen area are all protected within the "V" and "GB" zones. While no declared monuments nor graded historic buildings will be affected by the HSK NDA development, 12 nil grade built heritage that assessed to contain no cultural significance located in Yick Yuen Tsuen, Tin Sam San Tsuen and south of Tin Sam Tsuen will be impacted.

7.11.35 Two of the SAIs within the HSK NDA, namely Tseung Kong Wai SAI and Tung Tau Tsuen SAI might be partially impacted by construction works, but no insurmountable impact is anticipated. The archaeological impact arising from the construction works should be assessed when the detailed design of the works is available. For the four APAs which are subjected to uncertain archaeological potential, further archaeological survey is required to ascertain the extent of any archaeological deposits within the APAs if any construction works will be carried out.

7.11.36 Most of the graves, "Urns (Kam Taps)" and shrines will be retained in-situ as they are located within the existing "GB" zones. However, about 55 graves, "Urns (Kam Taps)" and shrines will be affected by the development according to rough estimation.

Benefit from the HSK NDA

7.11.37 While the HSK NDA development will create disturbances to the existing residents and business operators, the future development of the HSK NDA could offer a catalytic role for the development of the NWNT. Certain benefits can also be brought to the existing community in the NDA as well as residents in the neighbouring areas of Tin Shui Wai, Tuen Mun and Yuen Long and Hong Kong as a whole. The benefits that will be incurred by the development of HSK NDA are discussed below.

Fulfilling Future Housing Demand

7.11.38 The HSK NDA is planned to be a new town for Hong Kong, providing land to meet the housing need of Hong Kong in the medium to long term. It will provide about 61,000 new housing flats. Upon full development, the NDA will accommodate about 218,000 residents, including 176,000 new population. Taking into account the relatively high proportion of public housing at Tin Shui Wai, only about half of the new homes at the NDA will be public housing to achieve a better overall balance in housing mix.

Improving Infrastructures

7.11.39 The proposed HSK Station and transport linkages will help enhance the accessibility of the HSK NDA. The proposed GTC will facilitate movements within the NDA, and provide access for Tin Shui Wai residents to travel to various economic and employment zones. The alignment of the GTC has been adjusted in response to comments received during Stage 3 CE with some sections closer to existing villages for ease of access of its residents. It will also provide an easy access for tourists to travel from Tin Shui Wai and HSK stations to the northern part of the NDA, thus help promote economic vibrancy and complement the tourism activities of Lau Fau Shan. Other proposals under the HSK NDA including upgrading of drainage and sewerage systems will also help improve the environment of the existing villages.

Enhancing Economic Vibrancy

7.11.40 The proposed commercial developments around the proposed HSK Station and the existing Tin Shui Wai Station should be able to provide a critical mass for decent retail facilities, which is currently lacking in the area. The proposed shopping streets along the Tin Shui Wai Main Channel and GTC and near the HSK Station with retail frontages for shop and services will also enhance and diversify retail facilities in NWNT areas.

7.11.41 According to 2011 Census, currently about 33% of the working population in West New Territories (including Yuen Long and Tuen Mun Districts) have to go to urban area for work. The planning of the HSK NDA has reserved land to accommodate diversified economic uses ranging from general commercial uses to special industrial uses. These economic activities clusters would provide about 150,000 new job opportunities which span across a wide spectrum of sectors and cater for labour force of different educational attributes and skills. The employment opportunities created by the HSK NDA will far outweigh the employment displaced.

7.11.42 In addition, the new employment opportunity in the HSK NDA will also benefit residents in the nearby districts such as Tin Shui Wai, Yuen Long and Tuen Mun by bringing jobs closer to their home. This will also help reduce the imbalance in the spatial distribution of population and jobs in the territory.

Providing Community, Social and Recreational Facilities

7.11.43 The provision of GIC facilities in the HSK NDA are planned according to the standard stipulated under the HKPSG and requests from various Government departments to meet local, district, and regional needs. Within the NDA, one hospital, one specialist clinic/polyclinic, and two clinics are proposed to provide medical services for the population within the NDA as well as the nearby residents. Sufficient schools will be provided in accordance with the requirement of the HKPSG to meet the educational needs of the new populations. Social welfare facilities such as RCHEs, day care centre for the elderly, child care centre, and integrated family services centre, etc. are also proposed in the NDA to provide services to the local community. Three new markets will be provided to cater for the daily needs of residents.

7.11.44 On a regional and district basis, a civic node comprising performance venue, Government offices, magistracy, community hall, post office, and youth facilities are planned to serve a wider population and support the role of the HSK NDA as the “Regional Economic and Civic Hub” of the NWNT. One of the new markets, which is planned to be of a reasonably large size, will be provided at this civic node.

7.11.45 A number of recreational facilities such as sports ground/sport complex and sports centres will be provided within the NDA. Open spaces including a Regional Park, a Regional Plaza, a continuous riverside promenade and other open spaces within residential areas and employment nodes throughout the NDA will provide recreational and leisure space for residents and workforce. These open space and recreational facilities will improve the livability of the NDA and allow social interaction of local residents, thus strengthen local networks and build social fabric of the community.

Mitigation of Impacts

7.11.46 The negative impacts to the affected residents, business operators, and farmers induced by the HSK NDA development should be properly addressed before implementation. Considering the scale of the development, these impacts can be effectively mitigated should the development be implemented gradually and in phases, and allow reprovisions of facilities as much as possible. Below are some mitigation measures proposed for Government's consideration, which mainly related to compensation and rehousing/relocation arrangements for affected residents and business operators, assistance to genuine farmers in finding agricultural land to continue their farming practice, and methods in conserving cultural heritage affected by the HSK NDA development.

Compensation and Rehousing Arrangements for Affected Landowners and Residents

7.11.47 According to prevailing policy, the Government will offer compensation to private land owners affected by public works based on standard administrative arrangements associated with land resumption under the provision of related Ordinances such as the Lands Resumption Ordinance (Cap 124). In addition, according to the New Territories Village Removal Policy, where land resumption is required for public works, the affected recognised villagers who owned building lots may be provided with village resite when their building lots are resumed. The Government will also provide various cash allowance and rehousing arrangement in the form of PRH or interim housing to eligible clearees affected by public works.

7.11.48 As for the HSK NDA project, the Government has announced that consideration will be given to provide special compensation and rehousing arrangements for affected clearees, making reference to the compensation and rehousing package for the KTN and FLN NDAs. Clearees who are not eligible for PRH, but meeting certain criteria, will be offered special ex-gratia allowance.

7.11.49 For the purpose of maintaining the social fabric of the existing communities, rehousing should preferably be made within the same district as far as possible. To this end, under the Revised RODP, local rehousing site and village resite areas have been reserved for those eligible affectees. The overall implementation strategy of the HSK NDA has taken into account the rehousing need of the affected residents and scheduled the provision of rehousing site/village resite in the early stage. By rehousing affected residents near their original locality could help minimise disruption and re-build the social fabric. A site near Hung Fuk Estate has been reserved for rehousing of eligible clearees to help maintain the social fabric of the existing communities. Furthermore, village resites are designated to accommodate affected villagers eligible for compensation under the Village Removal Policy.

7.11.50 Nevertheless, during CEs of the Study, there have been strong requests from the affected residents for relaxing the criteria for rehousing to PRH e.g. waiving of the comprehensive means test on both income and assets. It is understood that some affected households might find difficulties in finding suitable accommodation in the private market, and that some affected households might not be eligible for receiving full ex-gratia compensation under prevailing policy due to certain reasons, such as the length of their occupancy in the affected structure, sub-divided households living in the same structure etc.

7.11.51 Given the significance of the NDA project and to help minimising the hardship of affected residents arising from land resumption and clearances, it is worthwhile to explore enhancing the compensation arrangement and other local rehousing options to meet the rehousing needs of the clearees.

7.11.52 A Community Liaison Team has been set up since May 2015 in order to enhance the communication with the potentially affected households and to enhance their understanding about the development proposals for the HSK NDA. Other than providing relevant updated information of the NDA, the community liaison team also collects the views and concerns of the potentially affected households and provides basic assistance to the potentially affected households and refers the cases to appropriate parties to follow up.

Reprovisioning and Compensation to Local Businesses

7.11.53 The affected business operators were concerned about compensation and relocation arrangements, and requested Government's support in reapplying and obtaining relevant licenses and permits should they need to move elsewhere. Under the prevailing practice, eligible business operators will be offered ex-gratia allowances, but there will not be relocation arrangement provided by the Government under prevailing policy.

7.11.54 Land owners for PBU & OS uses will be compensated according to the prevailing land resumption policy. To allow the continuation of PBU & OS industry in the region as far as possible, under the Revised RODP, about 24 ha of land has been reserved for proposed multi-storey buildings to accommodate the affected brownfield operations.

7.11.55 As announced in the 2014-15 Budget and 2015 and 2016 Policy Addresses, the Government would improve land utilisation by exploring feasible measures to accommodate brownfield operations through land efficient means such as multi-storey buildings, taking HSK NDA as a pilot case. To this end, CEDD has commissioned feasibility studies on multi-storey buildings for accommodating brownfield operations in HSK NDA. The studies will cover the conceptual design, planning, engineering, environmental and financial assessments, and explore possible mode of operation and management of the proposed multi-storey buildings. Relevant stakeholders, including existing operators, trade representatives and locals, will be consulted during the feasibility studies in order to understand their operational needs and listen to their views. The studies are targeted for completion by mid-2018. Apart from multi-storey buildings, we also would not rule out the possibility and need for accommodating certain operations which could not be practically feasible to move into multi-storey buildings on suitable open-air sites with provision of proper infrastructure and segregation from sensitive receivers.

7.11.56 For "I" uses, under the Revised RODP, an "I" zone is planned at the western fringe of the HSK NDA near the KSWH to provide land for industrial operations. The affected operators may also find relocation premises/sites in other industrial areas in the region such as Yuen Long Industrial Estate and Tung Tau Industrial Area. However, certain types of rural industries may not be readily accommodated in conventional multi-storey buildings. Some affected industries may also not eligible to be accommodated in the Yuen Long Industrial Estate which is designed to primarily cater for high-end manufacturing and service industries. Depending on the business nature, some affected industrial operators might need to identify other suitable sites outside NWNT for relocation.

Compensation and Assistance to Affected Farmers

7.11.57 During the CE of the Study, some affected farmers expressed concerns about loss of agricultural land and requested for assistance to continue farming.

7.11.58 According to prevailing policy, owners of agricultural lands in the New Territories will be compensated for the land when their land is resumed. The Government will also provide technical support to assist the affected farmers to re-establish their farming activities. Affected genuine farmers whose domestic structures are affected by land clearance can apply to the LandsD for agricultural resite upon relocation. They can also apply various ex-gratia allowances such as crop compensation and disturbance allowance according to the established mechanisms.

7.11.59 To further assist affected farmers in finding suitable land for agricultural resite/rehabilitation, the Government will also pursue the special agricultural land rehabilitation scheme by providing proactive and priority assistance in matching of farmers and agricultural land owners.

Provisioning of GIC Facilities and Infrastructure

7.11.60 The provisions of GIC and recreational facilities should be introduced as early as possible when developing the NDA to strengthen the community support. A flexible approach is recommended in mobilising resources to address the particular need of population taking into account their unique demographic and social characteristics in adjusting the nature of services to be provided. At the same time, with the overall improved infrastructure provision for the whole HSK NDA, opportunities will be taken to improve the environment of the existing villages such as providing buffer zones between new developments and the existing villages in order to minimise the possible impacts. In addition, the provision of infrastructure, GIC facilities, open space could indeed further improve the living environment for the existing residents as well as residents.

Conserving Affected Cultural Heritage

7.11.61 To mitigate potential archaeological impact arising from the construction works, assessment and/or further archaeological survey on any affected SAIs and APAs should be conducted when the detailed design of the works is available. Preservation in situ is the top priority to safeguard the archaeological remains in the impacted area by amending the layout plans of the construction works. However, if the works cannot avoid disturbance to the archaeological deposit, depending on degree of direct impact, mitigation measures such as archaeological surveys, archaeological watching brief, preservation by record and relocation of archaeological remains should be considered.

7.11.62 12 nil grade built heritage, which are assessed to contain no cultural significance, will be unavoidably affected. Preservation by record (including cartographic and photographic record) prior to any construction works would be required for the directly impacted built heritage. A heritage trail to link up these heritage resources to facilitate public appreciation is proposed. A Conservation Strategy in Ha Tsuen area is recommended to maximise the public education, heritage and cultural tourism related opportunities in this area as heritage attractions. Conservation Management Plan should also be proposed to implement future maintenance and management of the cultural heritage.

7.12 Green Initiatives Study

7.12.1 Under the Study of the HSK NDA, we pay particular attention to incorporate green initiatives during the development of the ODP. The green initiatives will enable better utilisation of the available land for development and to minimise creating constraints to the development of the NDA in the coming decade. Most importantly, the green initiatives will help establish an environmentally friendly living and working environment for the future citizens.

Green Mobility

7.12.2 In order to minimise the areas of roads and to facilitate mobilisation within the NDA, EFTS has been considered as the internal backbone for the NDA, which connects with the WR stations. The EFTS will minimise the use of vehicles and reduce emissions from transportation means. Also the use of EFTS will reduce road layout and car parking facilities. A reserve has been planned for the proposed alignment of the EFTS to enable better service of the system

7.12.3 The proposed EFTS will run within the NDA with connection to the existing WR Tin Shui Wai Station and to the proposed HSK Station. There will be intensive developments around the railway stations to better utilise the landuse as well as minimising the traffic need resulting in reduction of the traffic emission.

7.12.4 In addition to mass transportation provided by EFTS, electric vehicles (EVs) are recommended to be running within the HSK NDA. Charging facilities are recommended to be installed within public and private developments as well as along roadsides. The use of EVs will reduce the roadside emissions within the HSK NDA.

7.12.5 Pedestrian walkways and cycling tracks will be provided along both sides of proposed roads and within GTC reserve to encourage people using cycling and walking for short distance travels to promote a walkable and cycle-friendly NDA. The pedestrian walkways and cycling tracks will also link up with open spaces within the NDA and join with the proposed heritage trail to facilitate better enjoyment of the environment in the open space and to promote cultural heritage in the region. Bicycle-sharing system may also be considered for the shared use of bicycles on a short term basis, these would be explored in further studies.

7.12.6 There will be over 150,000 new job opportunities to be provided within the NDA in various categories. The new jobs can also serve the residents in Tin Shui Wai New Town in the proximity so that they may not need to travel to other districts to work. In addition, Tin Ying Road is proposed to be re-planned to integrate the HSK NDA with Tin Shui Wai New Town. The re-planning of Tin Ying Road will divert vehicular traffic to the west making the northeast part of the NDA to have a better living environment. Also the re-planning of Tin Ying Road will release land for riverside developments.

7.12.7 The smart city concept essentially means efficiency which is based on the intelligent management and integrated ICTs and active citizen participation. Smart cities are defined by their innovation and their ability to solve problems. The degree of intelligence is depending on the person, the system of cooperation, and digital infrastructure and tools that a community offers its residents. Further separate studies on the establishment of a smart city in HSK NDA by using ICT is recommended.

Sustainable Drainage System

7.12.8 The proposed NDA will have an increase in paved areas and will result in increase in surface runoff. It is necessary to control the additional runoff to avoid increasing flooding susceptibility to the downstream. Following the principal of sustainability and to design the NDA as a resilience development to adopt future climate change, opportunities in applying the concept of blue-green infrastructure in HSK NDA have been identified. The future lake in the proposed Regional Park is designed as a flood retention lake to attenuate peak surface runoff during extreme rainfall event while serving other recreational and ecological functions. Blue-green infrastructure such as river revitalisation of Tin Shui Wai Main Channel, HSK Main Channel, Tin Sam Channel is also proposed.

7.12.9 Rainwater harvesting will be explored to collect rainwater for non-potable uses like irrigation. Also roadside bioretention swale will be explored to attenuate the surface runoff to the downstream.

Total Water Management

7.12.10 The domestic sewage generated from the HSK NDA will be collected, conveyed to STW for treatment before disposal. There is no comprehensive salt water system supplying in the HSK NDA for flushing, reclaimed water is proposed as flushing water for the HSK NDA.

7.12.11 Fresh water supply to the HSK NDA will be from Au Tau WTW. Smart water system is proposed in the HSK NDA for detection of water leakage of underground pipes by using remote control flowmeters to better monitor the fresh water supply.

District Cooling System

7.12.12 The use of water is preferable to the use of air as cooling agent for air conditioning because water can reduce the effect of the neighbouring ambient air temperature due to the higher coefficient of specific heat. Water cooling for air conditioning has been practised in Central, Wanchai, Causeway Bay as well as Tsim Sha Tsui East, the Hong Kong University of Science and Technology, where pipes have been laid to obtain sea water at the seafront of Victoria Harbour. The sea water after passing through the chiller of the commercial buildings will return to the seafront at slightly higher temperature.

7.12.13 In order to maximise the use of water, space for pumps and chillers and energy efficiency, DCS has been developed allowing the system to be used by a number of stakeholders, especially for non-residential developments instead of individual or isolated buildings. DCS has been adopted in some countries. In this connection, two sites for DCS plant have been reserved near HSK Station and Tin Shui Wai Station.

7.12.14 Similar to NENT NDA, HSK NDA is far from seafront and it is not practical or not cost-effective to lay long distance pipes for drawing sea water and discharging after used. Reclaimed water is also not considered as cooling agent for DCS in HSK NDA due to hygiene concerns. As such, the ordinary fresh water supply will be used for cooling agent for the DCS. The further detailed feasibility study for DCS in HSK NDA will be required by relevant departments.

Waste Management

7.12.15 There will be an increase in waste generated as the result of increase in population and jobs in the HSK NDA. Proper waste management facilities and measures are required to reduce increasing loading to the existing facilities. Apart from waste reduction strategy implemented by the Government to encourage reduction, recycling and reuse, sorting facilities and waste reduction plant will be recommended installing in residential estates, commercial buildings and within RCPs to reduce the volume of waste to be disposal off.

7.12.16 The waste management facilities including automatic refuse collection system (ARCS) and organic waste management facilities, for example organic waste treatment and co-digestion of food waste, have been explored in this Study and is recommended to be further explored in separate studies by relevant departments.

7.12.17 A Community Green Station is proposed to be co-located with the new RTS for environmental education purposes, convenient collection of recyclables from the local community, and to provide synergy to achieve better operational efficiency and environmental sustainability.

Green Buildings

7.12.18 Green building design is currently widely applied in public housing, Government buildings and private developments. The principles are to design for deconstruction, minimising building energy consumption, use of renewable energy and utilising sustainable resources. Currently there are regulations and guidelines under buildings and energy regulations that need to comply with. There are proven examples of meeting these requirements. In addition, most proponents are aiming at achieving high grade under Hong Kong Building Environmental Assessment Method (BEAM) and Leadership in Energy and Environmental Design (LEED) Green Building Rating System. For implementation of the green building concept in the HSK NDA, specifying in the planning brief and land leases by relevant departments can be considered.

7.12.19 The applications of green buildings to be used in design of buildings in HSK NDA will depend on the proponents of the developments.

Renewable Energy and Energy Efficient Devices

7.12.20 Apart from complying with the Building Energy Code, renewable energy will be used as far as possible. The technology in the application of solar energy is well advanced. Solar photovoltaic panels can widely be installed on the roof of Government buildings as well as in public housing blocks. The energy generated may be used for public lighting. In addition, solar energy can be used to drive the operation of pumps for irrigation in open spaces and for operation of irrigation systems and fountains in the town park.

Materials Reuse and Green Materials

7.12.21 Green materials will be recommended as building materials for the HSK NDA. Recycle materials such as rubble tyres, glass, will be used for paving blocks, while oyster shell will be used as infill of gabion wall for rehabilitation of drainage channel banks.

7.13 Carbon Appraisal

7.13.1 Carbon footprint is the greenhouse gas emissions caused by an organisation, event, product or town. To mitigate the effect of global warming, every NDA should reduce its greenhouse gas emission.

7.13.2 In the HSK NDA, the carbon appraisal will further enhance the “Hong Kong’s Climate Change Strategy and Action Agenda”, which was proposed by LegCo – Panel on Environmental Affairs, 2011 to reduce carbon intensity by 50-60% by 2020 when compared with 2005, so that the proposed strategy will be readily implementable to the context of NDA. A series of carbon reduction strategies to reduce the greenhouse gas emissions in the HSK NDA are proposed:

- Green residential, retail, education, social welfare and Government building
- Development to comply with the building environmental certification scheme, such as BEAM Plus certification scheme
- Green office, hotel, industrial and other development
- Energy efficient industrial development
- Low-emission transport and bicycle track for residents and workers
- Compact urban planning

- Waste recycling
- Total water management
- Carbon removal from tree planting
- Provision of renewable energy in building development by requiring development to comply with the building environmental certification scheme
- District cooling system

7.13.3 **Chart 7.2** shows the annual carbon emission for the baseline case and HSK NDA with carbon reduction strategies with good, better and best scenario. **Chart 7.3** shows the comparison of annual carbon emission per capita amongst Hong Kong resident, baseline case and HSK NDA with carbon reduction strategies with good, better and best scenario. With the reduction package of good, better and best scenario of carbon mitigation strategy, HSK NDA would meet the proposed carbon reduction target of "Hong Kong's Climate Change Strategy and Action Agenda".

Chart 7.2 Annual GHG emission of baseline case and HSK NDA with good, better and best carbon mitigation strategies

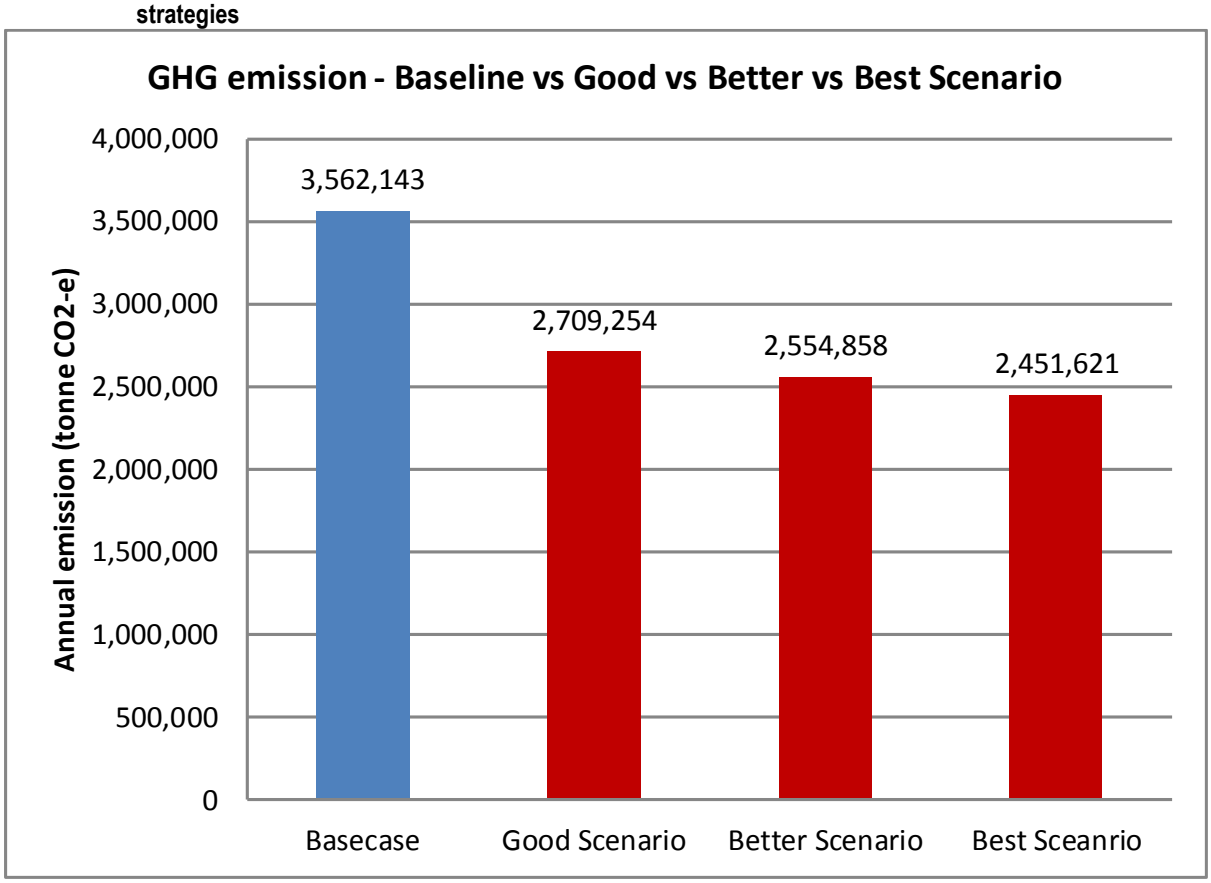
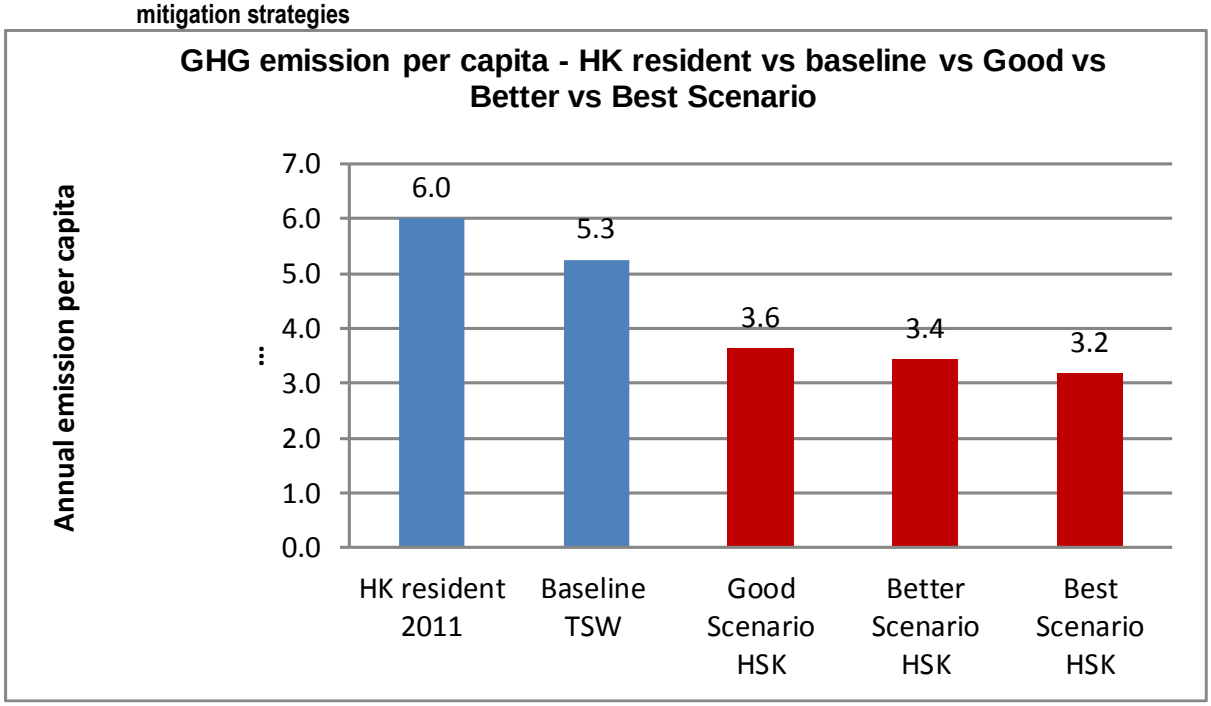


Chart 7.3 Annual GHG emission per capita of baseline case and HSK NDA with good, better and best carbon mitigation strategies



7.14 Sustainability Assessment

Introduction and Methodology

7.14.1 A Sustainability Assessment (SA) was undertaken using the Computer Aided Sustainability Evaluation Tool (CASET) adopted by the Sustainable Development Unit (SDU) of Environmental Bureau for the HSK NDA. The sustainability implications of the proposed developments have been assessed by adopting the guiding principles, indicators and evaluation criteria based on the sustainability guidelines established by the SDU.

Scenarios Considered

7.14.2 Two scenarios have been considered in the SA. The proposed HSK NDA ('With Development Scenario') has been compared against a counterfactual scenario of "no development" ('Without Development Scenario').

Assessment Criteria

Affected Indicators

7.14.3 After responding to the prescribed questions in the CASET system, 20 out of 27 indicators were triggered as "affected indicators", including cost-benefit, fixed capital, unemployment rate, construction waste, energy consumption, landfill capacity, local freshwater, freshwater supplied and consumed, municipal waste, significant landscape features (area), significant landscape features (point) and old and valuable trees, terrestrial eco-value, open space shortfall, carbon dioxide emitted per year, criteria air pollutants, excessive noise, river water quality, freight costs, travel speed and travel distance.

Social Checklist Question

7.14.4 After vetting against the Social Checklist, 12 aspects of the social checklist were also identified as "affected indicators", including equal opportunity, self-reliance, family solidarity, social cohesion, physical / mental health, leisure and cultural facilities, leisure and cultural activities, archaeological / historical sites, housing waiting time, private rent, living space and adequate housing.

First Sustainable Development Strategy Checklist

7.14.5 The SA has also responded to 3 questions under 'First SD Strategy Checklist', including solid waste management, energy efficiency and renewable energy technologies and urban living space.

Summary of Findings

Social and Economic Aspect

7.14.6 The SA indicates that the NDA will bring about benefits to the community by providing land to solve the housing shortage problem and improving environment and infrastructure for better quality of life. It will also increase investment in infrastructure, housing developments and other developments such as commercial/retail, PBU uses, logistics centre, data centre, information & technology centre, etc., creating new job opportunities and enhancing the economic competitiveness of Hong Kong in the long term.

7.14.7 The proposed NDA will promote social cohesion, self-reliance and equal opportunities through improvements in the quality of living, creation of job opportunities and provision of housing supplies. Provision of open spaces and recreational facilities in the NDA will also improve the health condition of the residents.

7.14.8 Various stages of CE activities have been conduct to gather and integrate the public views in the formulation of the development proposals.

Cultural and Environmental Aspect

7.14.9 While the HSK NDA will inevitably have some adverse impacts on natural resources, due consideration has been given to minimise them. Various measures, such as efficient waste management strategy, promotion of water saving and recycling facilities, and carbon reduction strategies etc., will be implemented to mitigate the adverse impacts arising from the NDA to an acceptable level. Provision of considerable amount of landscape area and preservation of significant landscape features has made the NDA development desirable.

7.14.10 Impacts to habitats and species have generally been avoided in the Revised RODP through its layout and the retention of habitats in "GB" zones. Sites of historical and archaeological interests have been identified. Proper land use planning has been adopted in Revised RODP, such as a proposed heritage trail, to integrate these cultural heritage resources into the proposed NDA development.

7.14.11 Air impacts from the proposed new roads will be suitably mitigated by proper disposition and arrangement of land uses such that heavy goods vehicles will be avoided from accessing the proposed residential areas, thus minimising the air impact to the residents. Road traffic noise will also be mitigated by proper arrangement of land uses and other mitigation measures such as erection of noise barriers, etc. Impacts from other sources, such as PBU & OS operation activities, will be mitigated by noise control treatments at source such as using quiet plant and equipment.

7.14.12 The proposed NDA will serve as a strategic location for logistic uses, which will be directly connected with the KWSH providing a rapid transit link between the Hong Kong International Airport and Shenzhen Airport. Connections within and between the proposed NDA and the surrounding areas will also be enhanced through the implementation of the new road links and EFTS. The shape and arrangement of the proposed road networks have been tailor-made for the Revised RODP to avoid through traffic movements of heavy goods vehicles from passing through the NDA.

Conclusion

7.14.13 In short, the SA shows that the proposed NDA development exhibits a range of benefits, particularly in the aspects of economy, leisure and cultural vibrancy and mobility. It nevertheless will bring about some potential impacts in natural resources and environmental quality aspects. However, due to the relatively insignificant implications, it is expected that it will contribute to positive effects with the implementation of the HSK NDA and no insurmountable issues due to the proposed developments are foreseen in terms of sustainability.

This Page Left Blank Intentionally

8 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Overview

8.1.1 An EIA has been conducted for the Revised RODP to determine whether the HSK NDA will comply with environmental standards and legislations, as well as the acceptability of the residual impacts from the HSK NDA and the protection of the population and environmentally sensitive resources.

8.1.2 The EIA has provided an assessment of the potential environmental impacts, including potential cumulative impact from other concurrent projects, associated with the construction and operation of the Project. Specific mitigation requirements for the Project have been developed during the assessment of the Revised RODP. An environmental monitoring audit (EM&A) manual has been formulated to ensure the effectiveness of the recommended mitigation measures.

8.1.3 The EIA report was approved conditionally by the Director of Environmental Protection (DEP) on 15 December 2016. The development of HSK NDA is a designated project (DP) under Item 1 Schedule 3 of EIAO - Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000, as it covers an area of 714 ha and will accommodate a total population of 218,000. In addition, based on the Revised RODP, the Project would comprise the following DPs by virtue of items A.1, A.2, A.3, A.8, A.9, B.5, F.1, F.3(b), F.4, G.2 and Q.1 of Schedule 2 of the EIAO (**Table 8.1.1**).

Table 8.1.1 Schedule 2 Designated Projects in the HSK NDA

Designated Project Reference No.	**Schedule 2 Designated Project**		**Work Component / Reference in Revised RODP**
DP1 [1]	Part I, A.1	A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing road	Construction of new primary distributor road (Road P1)
DP2 [1]	Part I, A.1	A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing road	Construction of eight new distributor roads (Road D1 to D8)
DP3 [2]	Part I, A.2	A railway and its associated stations	Construction of new West Rail HSK Station (Site 4-34)
DP4 [2] (Potential DP)	Part I, A.3	A tramway and its associated stations	Construction of EFTS – subject to further review

Designated Project Reference No.	Schedule 2 Designated Project		Work Component / Reference in Revised RODP
DP5 [1]	Part I, A.8	A road or railway bridge more than 100 m in length between abutments	Construction of slip roads between: Road D8 Junction and existing Castle Peak Road; Junction of D8/P1 and Junction of D7/P1; and KSWH connection to Road D3
DP6 [1]	Part I, A.9	A road fully enclosed by decking above and by structure on the sides for more than 100 m	Construction of partly depressed and partly decked-over roads located at Road D2, Road D4, and Road D6
DP7 [2] (Potential DP)	Part I, B.5	A container back-up area, container storage, container handling or container packing area (including a container vehicle parking area) more than 5 ha in size and within 300 m of an existing or planned receiver	Construction of a new container back-up and storage area (Sites 3-1, 3-4, 3-5, 3-13 and 3-14) – subject to further review
DP8 [2]	Part I, F.1	Sewage treatment works with an installed capacity of more than 15,000 m^3 per day	Construction of new HSK STW (Site 3-26 and part of existing San Wai STW)
DP9 [1]	Part I, F.3(b)	A sewage pumping station – (b) with an installed capacity of more than 2,000 m^3 per day and a boundary of which is less than 150 m from an existing or planned receiver	Construction of four new sewage pumping stations (Sites 2-34, 3-41, 3-48 and 4-35)
DP10 [2]	Part I, F.4	An activity for the reuse of treated sewage effluent from a treatment plant	Construction of flushing water service reservoirs for reuse of reclaimed water at Tan Kwai Tsuen and Fung Kong Tsuen (Sites 5-40 and 3-3)
DP11 [2]	Part I, G.2	A refuse transfer station	Construction of one refuse transfer station (Site 3-12)
DP12 [1]	Part I, Q.1	All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest.	Construction of Road P1 and slip-road from KSWH to Road D3 partly located within the "Conservation Area" of Yuen Tau Shan

Note:
1 Environmental Permit for the DP was issued by EPD in February 2017.
2 Subject to separate EIA Study, as required.

8.1.4 The conditions of approval and recommendations on the EIA report are listed below.

Conditions of Approval

8.1.5 The project proponent shall ensure adequate land reserve for the provision of power supply and associated infrastructure enabling the establishment of electric vehicle charging facilities to facilitate the use of EVs including, but not limited to, private cars, coaches and buses.

8.1.6 The project proponent shall conduct detailed assessment of the land contamination of all development sites within the project area, devise and implement remediation action plan (RAP) to ensure decontamination of the sites. Contaminated soil must not be used for planting and landscaping.

Recommendations

Landscape

8.1.7 The project proponent should devise a detailed landscape and planting plan for the HSK NDA, including setting up of a local stocking nursery, and consult the ACE on the plan.

8.1.8 The project proponent should consider the use of appropriate tree and plant species that could provide more shading, better noise screening effect and trapping of particulates, especially for road-side planting

Ecology

8.1.9 The project proponent should keep monitoring the San Sang San Tsuen Egretry and remove invasive climber on bamboo clump of the Egretry from now on until completion of the project.

Noise

8.1.10 The project proponent should consider restricting the use of new distributor roads D2, D4 and D5 by heavy goods vehicles, especially during night time to reduce the traffic noise impact on nearby residential areas.

Cultural Heritage

8.1.11 The project proponent should explore additional functions of the heritage trail to promote heritage conservation and education, to strength ecological connectivity to the retention lake, and to enhance place-making and harmony between urban and rural areas.

Other Environmental Impacts

8.1.12 The project proponent should strengthen the connectivity and walkability within acceptable distance between the existing and planned residential areas and the Tin Shui Wai MTR Station.

8.1.13 The project proponent should exercise better waste management and design the proposed RCPs to facilitate waste recovery, recycling and minimise odour nuisance.

8.1.14 The project proponent should conduct a detailed study to ascertain whether the proposed DCS could bring about environmental benefits in terms of energy efficiency before taking forward the proposed green initiative.

8.1.15 The project proponent should set environmental targets for the HSK NDA for achieving environmental sustainability and climate resilience in terms of green building design and construction, public spaces, carbon footprint and energy reduction, renewable energy generation, waste management, waste separation and recycling, and composting/recycling of food waste for use in community farms and fish culture.

8.1.16 The project proponent should ensure the sustainability of the development, include in land lease conditions for buildings within this development to achieve a certain rating under BEAM Plus (New Buildings).

8.2 Air Quality

Construction Phase

8.2.1 The potential air quality impact from the construction works of the Project would mainly relate to construction dust from excavation, material handling, spoil removal and wind erosion. With the implementation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures, good site practices, and EM&A programme, the predicted dust impact at air sensitive receivers (ASRs) would comply with the hourly, daily and annual particulates criteria stipulated in the AQOs and EIAO-TM.

Operation Phase

8.2.2 Cumulative air quality impact arising from the vehicular emissions from the open roads, portal emission and emission from ventilation building from TMWB and chimney emissions within the assessment area has been assessed at the worst case years. The assessment results conclude that the predicted cumulative 1-hour and annual average NO_2, 10-min and daily SO_2, daily and annual average respirable suspended particulates / fine suspended particulates concentrations at representative ASR would comply with the AQOs with the implementation of proposed mitigation measures.

8.2.3 The potential odour impact from nearby existing chicken farm has also been assessed. Exceedance of odour criterion would be expected at a small portion of one planned site “OU (PBU+SWU)”. It is proposed that these areas to be designed as non-air sensitive uses or with the fresh air intake located at higher level.

8.2.4 The potential cumulative odour impact from upgraded San Wai STW, new HSK STW and planned RTS have also been assessed. No unacceptable odour impact is predicted from these facilities with the provision of deodourising units and enclosed all odourous treatment facilities/sources. The proposed four new SPSs are not expected to pose odour impact to the nearby ASRs with the implementation of proposed mitigation measures.

8.3 Noise Impacts

Construction Phase

8.3.1 Construction noise associated with the use of powered mechanical equipment (PME) for different phases of construction has been conducted. With the implementation of practical mitigation measures including good site management practices, use of movable noise barrier, noise barrier and full enclosure, use of “quiet” plant and proper workfront management, proper grouping of PMEs for some construction activities at critical work areas and provision of minimum separations between the affected schools and the critical works areas during the examination period, no unacceptable impact arising from the construction of the Project will be anticipated.

Operation Phase

8.3.2 Operational road traffic noise impact on existing and planned noise sensitive uses within and in the vicinity of the Project have been predicted for the worst case year. Results indicate that the noise impacts from the Project roads can be mitigated by a combination of noise mitigation measures including (i) application of Low Noise Road Surface (LNRS) materials on some roads; (ii) vertical noise barriers/cantilever noise barriers along some Project road sections; (iii) alternative building layout and special building design such as provision of blank façade/acoustic windows/architectural fins in some buildings and (iv) provision of boundary wall, air conditioning and noise insulated windows for affected planned educational institutes to within the respective noise criteria. These mitigation would also ensure that the noise levels at the planned Noise Sensitive Receivers (NSRs) under this Project are within the respective noise criteria. Regarding the adverse noise impact from the existing road sections, LNRS would be considered to be implemented under the policy to address the existing noise impacts from existing roads or by the Project if significant noise impact from the existing roads is due to the Project. Different materials for LNRS are being reviewed and tested by the Government for application in Hong Kong. Environmental reviews will be conducted at the later design stage to review and ascertain the proposed provisional noise mitigation measures taking into account the latest design standard at that time for the suitability and application of the LNRS materials.

8.3.3 However, there is scope for adoption of alternative noise mitigation measures, for example, by means of alternative layout and design of individual developments at detailed design stage. Noise impact assessment at the planned residential sites is proposed to be conducted by future developers at the detailed design stage to study whether the future development layout would avoid exposing excessive traffic noise levels so as to minimise the scale/extent of the proposed noise mitigation measures.

8.3.4 Fixed noise assessment has been conducted. Noise impact from planned fixed plant could be effectively mitigated by implementing noise control measure at source during the detailed design stage. With the adoption of the proposed maximum permissible SWLs for the proposed fixed plant, the impact noise levels at representative NSRs would comply with the relevant noise criteria. The predicted noise levels at the planned NSRs due to existing fixed plant noise sources would also comply with the relevant noise criteria. Therefore, adverse fixed noise sources impact to the NSRs is not anticipated.

8.3.5 Rail noise assessment has been conducted based on rail noise source measurement and operational information from the railway operator. Results indicate that the noise impacts from WR Line on NSRs would comply with the statutory requirement with the provision of architectural fins and acoustic windows on the affected NSRs, and consideration of layout setback. The noise impacts from LRT on NSRs would be mitigated with the provision of architectural fins and acoustic windows on the affected NSRs.

8.3.6 An EFTS is proposed to be introduced to operate within the Project, which may be in the form of rail based or road based mode of transport. For conservative noise assessment, the rail based EFTS was assumed for rail noise impact assessment. Results indicate that the noise impacts on NSRs would comply with the statutory requirement after considering some track enhancement measures such as embedded rail, green track with vegetation, etc. With the provision of 10m buffer distance, the operation of EFTS would not pose adverse noise impact on the nearby NSRs.

8.3.7 The existing helipad near Ha Tsuen Interchange of KSWH is for emergency use. There is no routine flight expected. Helicopter noise assessment at the existing helipad during occasional take-off, overflight and approach has been conducted. Results indicate that the operation of the helipad would not pose environmental impact to the planned NSRs in the Project area and the existing NSRs.

8.4 Water Quality

Construction Phase

8.4.1 Water quality impacts from the construction works are associated with the general construction activities, construction site run-off, accidental spillage, and sewage effluent from construction workforce. The site practices as outlined in the ProPECCPN 1/94 "Construction Site Drainage" and the ETWB TC (Works) No. 5/2005 "Protection of natural streams / rivers from adverse impacts arising from construction works" are recommended to minimise the potential water quality impacts from the construction activities. Proper site management and good site practices are also recommended to ensure that construction wastes and other construction-related materials would not enter the nearby watercourses. Sewage effluent arising from the construction workforce would be handled through provision of portable toilets. Water quality monitoring and regular site inspection will be implemented for the construction works to ensure that the recommended mitigation measures are properly implemented.

8.4.2 An Emergency Response Plan is recommended to minimise the potential water quality impact from construction site discharges under failure of treatment facilities during emergency situations or inclement weather.

8.4.3 With the implementation of the recommended mitigation measures, the construction works for the Project would not result in unacceptable impacts on water quality.

Operation Phase

8.4.4 All sewage generated from the Project will be discharged to the public sewerage system and diverted to HSK STW for proper treatment. Part of the sewage will be treated in tertiary level and reused as reclaimed water for flushing in HSK NDA. The remaining treated sewage (under secondary plus treatment) will be discharged to the NWNT Effluent Tunnel for discharging to the Urmston Road Outfall for proper disposal at the North Western WCZ. Hence, no net increase in the pollution loading to the Deep Bay waters would be induced by the Project sewage effluent. The Project would actually have water quality beneficial effect by providing new sewerage to the existing unsewered areas and thus reducing the pollution loading to Deep Bay.

8.4.5 In view of the potential adverse effect of emergency sewage bypass and sewage leakage on the quality of the nearby watercourses, various precautionary measures are proposed to be incorporated in the design of the SPS and rising mains to avoid emergency bypass and leakage of sewage to the maximum practicable extent. A Contingency Plan is also recommended to deal with the remote occurrence of emergency discharge. With the incorporation of the precautionary measures and Contingency Plan as recommended in this EIA, the possibility of emergency sewage bypass and sewage leakage would be remote and the potential water quality impacts in the unlikely event that an overflow / leakage does occur would be minimised.

8.4.6 Another source of potential impact during the operational phase will be the run-off or non-point source pollution from road surfaces and developed areas. Stormwater control measures including adequate stormwater drainage system with suitable pollutant removal devices, blue-green infrastructure and best stormwater management practices are recommended for the Project to minimise the non-point source pollution. With proper implementation of the recommended mitigation measures, it is anticipated that the water quality impacts associated with the non-point source discharge from road surfaces and developed areas would be minimised.

8.5 Sewerage and Sewage Treatment

8.5.1 The proposed development will generate additional sewage flow which will require additional sewerage infrastructures such as new HSK STW and SPSs. The new HSK STW is proposed with a tertiary treatment process, for reuse of reclaimed water and secondary plus treatment (with UV disinfection and 75% nitrogen removal) for disposal of effluent.

8.5.2 Reuse of reclaimed water is recommended for non-potable uses such as toilet flushing and irrigation. With reuse of reclaimed water, part of the treated sewage would be reused and the effluent discharge to North Western WCZ will also be minimised.

8.5.3 Within the proposed development area, most of the existing villages and brownfield sites, are currently not covered by or properly connected to the existing sewerage system. New public sewers are proposed under this Project to collect sewage in the proposed development area which will replace the existing unsewered areas. This is likely to result in an improvement to the water quality of watercourses within the Project area.

8.5.4 Based upon SIA, it can be concluded that the proposed development is sustainable from sewerage collection, treatment and disposal perspective.

8.6 Waste Management

Construction Phase

8.6.1 The main waste types to be generated during the construction phase of the Project will include Construction and Demolition (C&D) materials, chemical waste, general refuse, excavated sediment and contaminated soil. Reduction measures have been recommended to minimise the amount of materials generated by the Project by reusing C&D materials as far as practicable before off-site disposal. Provided that the waste is handled, transported and disposed of using approved methods, adverse environmental impacts would not be expected.

Operation Phase

8.6.2 The main waste types to be generated during the operation phase of the Project will include Municipal Solid Waste, chemical waste, screenings, grits and sewage sludge. Three new RCPs and a new RTS have been included in the Revised RODP in preparation for the increased quantity of waste in the district. A Community Green Station is proposed to be co-located with the new RTS for environmental education purposes, convenient collection of recyclables from the local community, and to provide synergy to achieve better operational efficiency and environmental sustainability. Provided that the waste is handled, transported and disposed of using approved methods, adverse environmental impacts would not be expected.

8.7 Land Contamination

8.7.1 The land contamination assessment examined the potential contaminative land use within the assessment area and their potential impacts to future land use. The majority of the potentially contaminated sites could not be accessed to assess the site conditions by site walkover, at the time of reporting. For those sites that were accessible for site walkover, permission could not be obtained from the site operators to carry out the SI works. Due to this, the assessment on the potential land contamination was conducted based on the findings from desktop study, helicopter reconnaissance and site surveys.

8.7.2 Based on the findings from desktop review (e.g. review of historical aerial photos and relevant information from EPD and Fire Services Department), helicopter reconnaissance and site surveys, 480 potentially contaminated sites have been identified. 253 potentially contaminated sites are currently used as open area storage, container storage and warehouse. Warehouse sites may not be contaminated if they are used to store general household goods (e.g. furniture and toys). Container storage and open area storage, on the other hand, typically comprise a large portion of area for goods / container storage with possibly smaller portion for potentially contaminating activities such as vehicle / equipment maintenance area and the associated chemical handling/storage. The contamination (if any) is therefore expected to be localised if the main types of goods stored on-site are not potential sources of contamination. In addition, the land uses of the remaining identified potentially contaminated sites are not large scale polluting installations / facilities, such as oil depot and power plant, which further support that the contamination (if any) would be localised rather than widespread.

8.7.3 The chemicals of concern (COCs) that have been identified with the potential to be present at the potentially contaminated sites include metals, VOCs, SVOCs, PCRs and Polychlorinated Biphenyls. These COCs are readily treatable using established physical, chemical and biological techniques and soil contaminated with the abovementioned COCs had successfully been remediated in Hong Kong using proven remediation techniques. By implementing the recommended further works, the actual contaminated site(s) within the assessment area would be located and any contaminated soil and groundwater would be identified and treated.

8.7.4 Given the above, land contamination impacts are therefore considered not insurmountable to future occupants.

8.7.5 As the identified potentially contaminated sites are still in operation and the development will only commence in stages from 2019 to 2037/38, and there may be change in land use prior to development within both the potentially contaminated and non-contaminated sites, it is recommended to conduct further works. This would include: site re-appraisal, SI works as well as submission of supplementary Contamination Assessment Plan(s) (CAP(s)), Contamination Assessment Report(s) (CAR(s)) and RAP(s) for the EPD's approval after the sites are handed over to project proponent for development. If contaminated soil and/or groundwater were identified, remediation should be carried out according to EPD's approved RAP(s) and Remediation Report(s) (RR(s)) should be submitted to EPD for agreement after completion of the remediation works. No development works shall be commenced prior to EPD's agreement of the RR(s).

8.7.6 The implementation of the recommended further works under this Project would clean up any contaminated site(s) identified within the assessment area. The recommended further works would not only minimise the health risks to the future occupants arising from the exposure of the contaminated soil and/or groundwater, it would also provide the opportunity to treat the contaminated soil / groundwater using proven remediation techniques for reuse as useful materials (such as backfilling materials); thereby minimising the amount of waste disposing into the already depleting landfills in Hong Kong and achieving a more sustainable development.

8.7.7 Furthermore, the Project would allow the conversion of the contaminated site(s) into land that are safe for more optimal development (e.g. residential development). The more optimal development would assist in addressing Hong Kong's long-term housing demand and other land use needs.

8.8 Ecological Impacts

8.8.1 The Project area and boundary has evolved and adjusted, during the course of the Study, to avoid recognised sites of conservation importance or ecologically sensitive areas. Four sites of conservation importance were identified within the assessment area, including "Conservation Protection Area", Ngau Hom Shek egretry and Shenzhen Bay Bridge egretry which were located outside the Project area, and San Sang San Tsuen egretry which is located within the Project area in "GB" zone that would be retained. Although Road P1 and a slip road (under DP12) would be constructed in a small area of the "Conservation Area" zone to the northwest of San Sang San Tsuen, the affected area was small (0.1 ha) and developed (i.e. roads and reinforced concrete flood storage pond) without any species of conservation value recorded, therefore the impact was negligible.

8.8.2 Thirteen habitats were identified within the assessment area including developed area/wasteland, village/orchard, agricultural area (dry), agricultural area (wet), plantation, woodland, shrubland, grassland, marsh, fishponds and mitigation ponds, storm water drain/recreational pond, natural watercourse and modified watercourse. Among them, approximately 90% of the Project area (595 ha out of 714 ha Project area) were comprised of developed area/wasteland and village/orchard which was of low ecological value.

8.8.3 Habitats with high, moderate to high, or moderate ecological value (i.e. hillside woodlands, fishponds at the Deep Bay shore, mangrove and mudflat/coastal water body) are either located outside the Project area or would be retained within the Revised RODP. The majority of habitats, including woodland, shrubland, plantation, natural and modified watercourse, marsh and village/orchard would be retained based on the Revised RODP, which would also minimise impacts to fauna species (e.g. by protecting their foraging/roosting grounds).

8.8.4 The Project will involve proposed developments adjacent to the San Sang San Tsuen egretry and the existing mitigation ponds adjacent to KSWH; however, the implementation of proper mitigation measures would be required to minimise the impacts to an acceptable level. The San Sang San Tsuen egretry would be retained in "GB" zone and an eco-corridor comprising "LO" zone would be designated to maintain a development-free zone for the ardeid flight path. This would allow the ardeids to freely access their favourable foraging habitats such as Tin Shui Wai Main Channel. Moreover, the construction works in close proximity to the egretry should be scheduled outside the ardeid breeding months from March to August to minimise any disturbance impacts.

8.8.5 The four existing mitigation ponds which were developed under the Deep Bay Link project would be retained in the "GB" zone. While the Project would not have direct impact on these ponds, the proposed slip roads between Road P1 and KSWH would be located adjacent to the two eastern ponds which could result in a potential decrease of usage of these ponds by avifauna species (due to disturbance and potential barrier effect). To minimise the impacts an amenity strip is proposed adjacent to the eastern side of these ponds and additional buffer tree planting along the new Road P1 would provide screening minimise disturbance impacts from the surrounding roads.

8.8.6 To avoid direct impacts (loss) of one mature individual of Incense Tree recorded from the woodland at Tung Tau Tsuen, the woodland would be preserved in-situ and the tree would be protected.

8.8.7 The proposed revitalisation of the riverside channels should seek to find a balance between design for human requirements (e.g. aesthetics, recreation/leisure, access) and provision of ecological enhancements. The design should not result in disturbance impacts to the habitats/fauna utilising the channels (e.g. foraging avifauna).

8.8.8 Indirect and secondary impacts during the construction phase would comprise human disturbance, construction noise and vibration, construction dust, glare and construction site run-off. With proper implementation of good site practices, no significant adverse ecological impact is anticipated. The nature of disturbance during the operational phase would be comparable to the existing condition. No significant adverse impact is therefore expected.

8.8.9 The Project area covers a total area of about 714 ha. Excluding the retained areas (e.g. existing roads, major watercourses, hillside areas, villages and the committed developments), the development area is about 441 ha. Of which, about 200 ha (45% of the development area) is currently occupied by brownfield operations. The existing brownfield operation had created various environmental impacts, including ecology, air and noise, visual and water quality impacts. Therefore, the consolidation of the existing brownfield operations to modern facilities will help to reduce the current impacts and improve general quality of environment.

8.8.10 Ecological enhancement could be achieved by incorporating habitat creation through the landscaping plan (e.g. at “LO” and “DO” zones), particularly at areas connected to “GB” zone (i.e. natural habitats). Incorporation of ecological enhancement into channel design of the realigned Tin Sam Channel could improve the ecological value of the habitats during the operational phase. Consideration could also be given to the inclusion of suitable planting within the retention lake at the Regional Park to provide foraging and/or roosting/nesting habitats for wetland dependent species (e.g. ardeids). For example, shallow water with gentle sloping banks covered with marshy species may provide foraging ground for breeding ardeids.

8.8.11 The Revised RODP has generally avoided impacts to habitats and species through its layout and the retention of higher ecological value habitats (e.g. the egretry, woodland). With the implementation of the recommended mitigation measures (e.g. measures to avoid/minimise impacts to San Sang San Tsuen egretry, measures to reduce disturbance from construction activities, etc.), no unacceptable residual impacts including both direct and indirect residual impacts during construction and operational phases would be expected.

8.9 Fisheries Impacts

8.9.1 Existing fisheries resources within the assessment area include active fishponds (outside of the Project area) and capture fisheries resources of North Western and Deep Bay WCZs. The value of capture fisheries in the North Western WCZ is low to moderate while low in Deep Bay WCZ. An important nursery and spawning ground for commercial fisheries species has been identified within the North Western WCZ. No oyster culturing and intertidal fishing were recorded within the coastal area from Ngau Hom Sha to Lau Fau Shan.

8.9.2 Potential fisheries impacts arising from the Project have been assessed. No active fishponds are located within the Project area and therefore would not be lost due to Project. Three inactive fishponds would be lost due to the Project therefore the impact to pond fish culture is considered negligible to low when taking into account the potential conversion of inactive fishponds back to active fishpond.

8.9.3 No unacceptable water quality impacts to the Deep Bay WCZ and North Western WCZ are anticipated from the Project with proper implementation of mitigation measures. Therefore, monitoring of fisheries resources during the construction and operation phase would not be necessary.

8.10 Landscape and Visual Impacts

8.10.1 Given the generally rural nature of the Project area, development of the Project will likely bring about land use changes that will fundamentally change the visual and landscape character of the area. However such changes could be regarded as positive enhancement given the Project area is presently a large area of dilapidated and haphazard brownfield sites. The Project, though bringing changes to the existing environment, would intrinsically enhance the visual and landscape character of the area, ensure ample public benefit such as open space, and contribute to creating a vibrant, liveable and green new town.

8.10.2 Moreover, at the outset of drawing up the proposals on the Revised RODP, a planning and urban design framework has been formulated to minimise landscape and visual changes as far as possible. The Project has been carefully planned to achieve a distinct landscape and visual characteristic of a new town. A stepped building height and development intensity profile is adopted with the tallest and densest developments concentrated at the commercial nodes near the railway stations, and descending towards Lau Fau Shan and Deep Bay area which is more rural and low-rise in scale. Care has also been taken to establish a network of linked open spaces, accommodating a number of parks, green amenity strips, shopping streets and landscape/visual corridors, to create 'green' communities and partly compensate for any loss of landscape/visual resources due to the developments.

8.10.3 Despite cautionary design, it is inevitable that the Project at such large-scale would induce some potential landscape and visual impacts at the construction and operational phases (including site clearance and formation works, construction of new developments and roads, provisioning of utilities, realignment of roads, streams and watercourses, and the ultimate operation of the new developments). To evaluate the significance of such impacts, landscape and visual impact assessment for the Project was undertaken. Key findings are outlined below.

Landscape Impacts

8.10.4 A broad-brush tree survey has been carried out to determine, in broad terms, the potential impacts on existing trees. Within the assessment area, it is estimated that there are approximately 28,583 trees consisting of 200 species. Major tree species *include Ficus microcarpa, Macaranga tanarius* var. *tomentosa, Leucaena leucocephala, Dimocarpus longan, Ficus benjamina* and *Celtis sinensis*. The broad brush tree survey suggests that only about 45% of the trees are found within the Project area, and amongst them, about 50% would be preserved. While most of the trees surveyed belong to common tree species of variable quality, some rare tree species and other trees of relatively outstanding quality were found occasionally. One Old and Valuable Tree (OVT) was found in the assessment area but it is located outside the Project area. A total of 63 trees are potentially registerable as OVTs, while 28 additional trees identified as Important Trees (as per DEVB TCW No. 7/2015). Important trees, including trees already included or potentially registrable in the "Register of Old and Valuable Trees" under ETWB TCW No. 29/2004 "Registration of Old and Valuable Trees, Guidelines and their Preservation" should be identified for priority preservation at their existing locations. A detailed Tree Removal Application process will be carried out at a later detailed design stage to finalise the tree treatment and allocate compensatory planting areas. Tree compensation within the Project area will be provided at a 1:1 ratio. This means that for every tree that is removed, a new one will be planted. Furthermore, trees affected by DPs will be compensated within their respective DP areas.

8.10.5 Within the assessment area, 18 LRs and six Landscape Character Areas (LCAs) are identified. Due to the nature of the Project, some LRs and LCAs are inevitably affected. Based on the impact assessment findings, a number of mitigation measures have been proposed. These include tree protection and preservation, tree transplantation, compensatory planting, road greening, as well as integration of the abovementioned open space framework to mitigate the loss of major LRs and reinstate streetscape areas to equal or better quality than currently existing. With the mitigation measures in place, the residual landscape impacts during the operational phase will consist largely of loss of vegetation and fragmentation of some LRs only. The residual landscape impacts for some LRs and LCAs cannot be completely mitigated, for example the loss of agricultural land, low-lying woodland and grassland. The loss of vegetation in other LRs/LCAs, however, will only be temporary as it will be replaced by new and/or compensatory planting. The felling and compensation of trees will also occur in stages over the course of the construction of the Project rather than all at once. The concepts enshrined in the urban design framework create many opportunities to introduce new planting in areas of open space such as the Regional Park or along river channels. The reinstated vegetation is recommended to consist largely of native species so as to enhance the ecological integrity and biodiversity of the Project area. The provision of roadside “A” zones provides room for this type of planting.

8.10.6 The new developments and their site greening and amenity plantings, new high quality street trees and roadside vegetation along all district distributors and local roads, and the aforementioned trees and plantings within new open space sites and riverside promenade, will enhance the landscape quality of the area. Collectively, the new development will bring forth both impacts and new amenity that seeks to balance the new developments with ample greening and well-designed public space.

8.10.7 In particular, while disturbance during the construction phase would cause temporary impacts to the Tin Shui Wai Main Channel and Shek Po Channel, the LRs for these watercourses would be enhanced during operational phase as implementation of the proposed open space framework would upgrade the quality of these resources. Other watercourses at Hang Hau Tsuen Nullah, Ping Ha Road Nullah, Tin Sam Channel, San Sang San Tsuen Channel, and Yick Yuen Tsuen/Tsing Chuen Wai Nullah would also be subject to permanent impacts due to partial coverage and subsequent loss of sections of the watercourse. However, the overall impact on these resources would be enhanced via new amenity and native plantings, enhanced nullah edges and recreation zones along the lengths of these nullahs.

Visual Impacts

8.10.8 From a visual perspective, given the nature and scale of the proposed development with high-rise developments, the Project will likely to be altered significantly from the visual context of the area. A number of Visual Sensitive Receivers (VSRs), especially those located within and to the immediate surroundings of the Project area, are anticipated to experience substantial visual impacts:

- For Residential VSRs, the substantial visual impact after mitigation is largely due to the scale of the proposed development and proximity of the VSRs to the sources of impact. As a result, views are full and in some cases all-encompassing for those within the Project area.

- In the case of Recreational VSRs, several are afforded prolonged and recurring views toward the Project, such as hikers along the Castle Peak Trails.

- For Travelling VSRs, substantial impacts arise for those VSRs travelling along roads that intersect or pass through the Project area such that their views will be significantly altered for long durations of their journey, causing a substantial magnitude of change. In the case of cyclists along roadways, their higher sensitivity due to a slower travel speed and heightened awareness of their surroundings results in pronounced and prolonged exposure to visual impacts.

8.10.9 Based on the impact assessment findings, a number of mitigation measures have been proposed. These include adopting alternative designs or revisions to the basic engineering and architectural designs to prevent and/or minimise adverse impacts; remedial measures such as colour and textural treatment of building features; and compensatory measures such as the implementation of landscape design elements (e.g. tree planting, creation of new open space, etc.) to compensate for unavoidable adverse impacts and to attempt to generate potentially beneficial long-term impacts.

8.10.10 Given the overall visual character in the Project area would be significantly changed by the Project, the recommended mitigation measures may not be enough to adequately compensate for such a substantial magnitude of change for these highly sensitive VSRs. However, the overall change that is to occur as a result of development of the Project will ultimately bring about positive enhancement. The transformation of the area from what is presently an area predominantly occupied by haphazard and dilapidated brownfield sites into a contemporary planned community with varying DCAs and applicable landscape treatments will result in strong visual interest and character and improved visual outlook for the majority of VSRs. Added to this, a number of breezeways and view corridors planned along riverside promenade and fung shui lanes, as well as a stepped building height strategy enshrined in the urban design framework will add visual interest to the development and provide it a contextual setting and connection to the broader Project area and Tin Shui Wai New Town. The urban design framework sets forth a number of planning and urban design concepts intended to influence the form, scale and overall visual character of the Project with the intention to develop a holistic and visually dynamic new town arising from what is presently a brownfield site.

Overall Assessment

8.10.11 The urban design framework is an intrinsic part of the Project that must be viewed in connection with proposed mitigation measures. While not all impacts can be fully reduced or eliminated through the implementation of mitigation measures due to the nature of the Project, the urban design framework goes further by specifically outlining and dedicating areas for open space, riverside promenade development, fung shui lanes and view corridors, and greenbelt areas that will result in the creation of new, positive LRs with positive visual outlooks for VSRs. The urban design framework also provides guidelines on building heights, massing and scale in order to address the visual change that will result from new buildings and provide contextual, sensitive treatment to the surrounding developments. The measures sought in the urban design framework work in unison with mitigation measures to ensure that a quality, green, and attractive new town replaces the existing mix of industrial storage yards that presently exist with the goal of realising a positive impact as a result of the new town development.

8.10.12 Overall, assuming full implementation of mitigation measures in combination with the key urban design and planning proposals outlined above, the residual landscape and visual impacts are perceived to be acceptable with mitigation measures as outlined in Annex 10 of the EIAO-TM, provided that appropriate mitigation measures are implemented during the construction and operational phases of the Project.

8.11 Cultural Heritage

8.11.1 Based on desktop review and through AFS conducted in 2015, a total of six SAIs (five SAIs within Project area) and four APAs were identified within the assessment area. The six SAIs contained high archaeological significance. Tseung Kong Wai SAI and Tung Tau Tsuen SAI might be partially impacted by construction works, but no insurmountable impact is anticipated. The archaeological impact arising from the construction works should be assessed when the detailed design of the works is available. Preservation *in situ* is the top priority to safeguard the archaeological remains in the impacted area by amending the layout plans of the construction works. However, if the works cannot avoid disturbance to the archaeological deposit, depending on degree of direct impact, the following mitigation measures should be considered, such as archaeological surveys, archaeological watching brief, preservation by record and relocation of archaeological remains. The scope and programme of the archaeological fieldwork would be agreed with AMO.

8.11.2 The four APAs contained uncertain archaeological potential. Further archaeological survey is required to be conducted at two of the APAs to ascertain the extent of any archaeological remains within the APAs if any construction works will be carried out. Based on the findings of the survey, mitigation measures could be proposed, such as preservation in situ, preservation by record, or relocation of archaeological remains, in prior agreement with the AMO. Direct impact arising from the proposed development within the other APAs should be avoided as far as possible. As the land use of one of the APAs remains as “GB” and “V” and no construction works will be conducted, no mitigation measure is required.

8.11.3 A total of two Declared Monuments, seven Graded Historic Buildings (including two Grade 2 Historic Buildings and five Grade 3 Historic buildings), and 339 nil grade built heritage were identified within the assessment area. The Project would not affect any declared monuments or graded historic buildings, only 12 nil grade built heritage that assessed to contain no cultural significance located in Yick Yuen Tsuen, Tin Sam San Tsuen and south of Tin Sam may be impacted. Preservation by record (including cartographic and photographic record) prior to the commencement of any construction works is recommended for the potentially impacted nil grade built heritage.

8.11.4 Moreover, the Project provides an opportunity to promote the cultural heritage resources within and surrounding the area though the provision of a cultural heritage trail. This trail is proposed to begin at the existing Tin Shui Wai Station and the proposed HSK Station and permeates through the Project area, along the existing “Open Space” and “A” zones. The trail provides a safe and efficient amenity for people to explore many of the culturally significant areas in the Project area and is also intended to help promote these features and draw people to the area. A heritage trail to link up these heritage resources to facilitate public appreciation is proposed. A Conservation Strategy in Ha Tsuen area is recommended to maximise the public education, heritage and cultural tourism related opportunities in this area as heritage attractions. Conservation Management Plan should be proposed to implement future maintenance and management of the cultural heritage.

8.11.5 As no development is proposed in the “V” zones, no impact is anticipated and hence no mitigation measure is required.

8.12 Summary of Environmental Outcomes

8.12.1 The Project will be the next generation new town for Hong Kong. In addition, to provide housing and other land supply in Hong Kong, the Project will also serve as a "Regional Economic and Civic Hub" for the NWNT, given its strategic location in the NWNT and connection to Tin Shui Wai, Tuen Mun and Yuen Long New Towns. The Project aspires to turn the existing vast extent of brownfield sites including open storage, port back-up, construction material/machinery storage, car repair workshops, recycling yards, and rural workshops, etc. which have created considerable environmental, traffic, visual, and other problems, to more optimal uses and better land utilisation for future development of Hong Kong.

8.12.2 The EIA has provided an assessment of the potential environmental impacts associated with the construction and operation of the Project, based on the engineering design information available at this stage. This has also included specific assessment for the six Schedule 2 DPs subject to environmental permit application under this Study.

8.12.3 The assessment has been conducted, in accordance with the EIA Study Brief (No. ESB–291/2015) under the EIAO for the Project, covering the following environmental issues:

- Air Quality Impact
- Noise Impact
- Water Quality Impact
- Sewerage and Sewage Treatment Implications
- Waste Management Implications
- Land Contamination Impact
- Ecological Impact
- Fisheries Impact
- Landscape and Visual Impact
- Impact on Cultural Heritage

8.12.4 The findings of EIA assessment have determined the likely nature and extent of environmental impacts predicted to arise from the construction and operation of the Project. During the EIA process, environmental control measures have been identified for incorporation into the planning and design of the Project, to achieve compliance with environmental legislation and standards during both the construction and operation phases.

8.12.5 Avoidance of environmental impacts has been one of the key considerations throughout the entire EIA Study. The key environmental problems that have been avoided and any sensitive areas protected in the Revised RODP are summarised below.

Protection of Sites of Conservation Importance

- The majority of Sites of Conservation Importance ("CPA" zone and most of the "CA" zone) have been avoided. Where there is a slight encroachment into the "CA" zone, the preferred option has avoided impacts to semi-natural/natural habitats and graves.

Protection of San Sang San Tsuen Egretry

- The Egretry is retained and protected in "GB" zone, which is an improvement upon its current condition in a highly disturbed storage area. The egretry is also protected from disturbance through the provision of "LO" zone, which provides a buffer to the south of the "GB" zone. The "LO" zone also provides an eco-corridor, covering the ardeid flight paths, and connecting the "GB" zone supporting the egretry to "GB" zone and foraging habitats to the east.

Preservation of Habitats with Ecological Value and Species of Conservation Importance

- Most of the sites of conservation importance as well as habitats with high ecological value have been excluded from the Project area during the optioneering stages. In addition, the majority of "GB" zone is retained during the development to avoid the loss of natural habitats. This also includes avoidance of direct impacts to species of conservation importance.

Protection of Natural Watercourses in the Project Area

- A natural watercourse is located in the "I" zone in the west of the Project area. To avoid direct loss of this watercourse, the Revised RODP has zoned the watercourse and the area south of it as "GB" zone thereby protecting it from development.

Protection of the Deep Bay Water Quality

- There will be no increase in the pollution loading to the Deep Bay waters, as the sewage generated by the Project will be either reused as reclaimed water or properly disposed at North Western WCZ. In addition, providing new sewerage network in the Project which will replace the existing unsewered areas within the proposed development area, and will reduce the pollution loading to Deep Bay.

- The recommended preventative design measures of the four new SPSs would also protect the inland watercourses and Deep Bay waters downstream of the SPSs.

Preservation of Built Heritage

- All of the Declared Monuments and Graded Historic Buildings have been preserved within the Revised RODP. A cultural heritage trail is also proposed under the Revised RODP to allow public to appreciate these precious heritage resources by walking.

8.12.6 Other than measures to avoid environmental impacts, efforts have also been exercised to minimise and compensate any unavoidable impacts. The need for any environmental designs required to mitigate the associated impacts have been identified and will be implemented as appropriate.

Minimising Water Quality Impacts

- By reducing and attenuating stormwater flows through the adoption of sustainable drainage systems or facilities, flooding would be avoided/reduced, water quality of channels and subsequent ecological value of channels would be improved.

- By reducing the amount of effluent discharge from the new HSK STW via Urmston Road Submarine Outfall, with reusing part of the treated sewage effluent as reclaimed water, the pollution loading to the North Western WCZ would be minimised.

Minimising Landscape and Visual Impacts

- A comprehensive open space network is planned for the NDA to create a continuous riverside promenade, where additional open spaces are introduced on the Revised RODP with corresponding changes to the spatial layout of the developments along Tin Shui Wai Main Channel to further enhance air ventilation performance and visual porosity. The landscape and ecological value of the riverside promenade will be enhanced by planting vegetation of native species.

- Sufficient buffer has been introduced on the Revised RODP as "A" zone and NBA between the existing "V" zone and new developments. A 5m NBA is also proposed along Road D2 for the private residential developments facing Lo Uk Tsuen, Ha Tsuen and San Uk Tsuen to increase the separation of buildings from the "V" zone.

- The proposed building height and development intensity profile for the Project area gives due regard to the physical form and setting of the existing and retained uses. This will allow better integration with the existing / retained areas and enhance the quality of the overall visual character of the Project area.

Minimising Air Quality Impacts

- The Revised RODP has concentrated the population, key economic activities and major community facilities within walking distance of mass transit and public transport nodes. Community neighbourhoods will also be created within easily accessible daily necessities to promote walking. With the above planning, road traffic and associated vehicular emissions will be minimised.

- The GTC encompassing EFTS, pedestrian walkways and cycle tracks, and a comprehensive pedestrian walkways and cycle tracks network will connect residential clusters with the "Logistics, Enterprise and Technology Quarter", railway stations and key community facilities to facilitate people movement between different activity nodes within the Project area and hence minimise road traffic and vehicular emissions.

- The re-arrangement of the road network by re-planning of Tin Ying Road and downgrading of Hung Tin Road will minimise air pollutants generated from road traffic as well as reduce the existing road traffic noise.

- The Revised RODP layout also removes the existing interface problem between brownfield operations and the adjoining residential developments and will minimise movements of heavy goods vehicles traffic within the Project area by diverting the traffic to the new primary distributor underneath KSWH.

Minimising Noise Impacts

- As stated above, the Project has been carefully planned to minimise road traffic and associated emissions, and noise by: promoting walking and cycling; providing GTC within the Project area; and locating "PBU+SWU" sites away from residential areas, as far as practicable. The GTC will also be separated from future roads to minimise traffic disturbance, and the depressed sections at road junctions will also shield some of the traffic noise. Noise impacts to a significant number of residents in Tin Shui Wai will also be ameliorated through re-planning of Tin Ying Road. Non-noise sensitive uses and set-back from roads have also been proposed as far as practicable in order to avoid excessive noise barrier or sterilising too much land.

- NSRs are protected through various mitigation measures to comply with the statutory traffic noise limit. These include application of low noise road surfacing materials; noise barriers/cantilever noise barriers; and building set-back, orientation and special building design such as façade design, provision of architectural fins/acoustic windows for affected developments.

- The location of the planned logistics facilities buildings would help to screen the fixed plant noise from proposed "OU (PBU+SWU)" sites, thereby minimising impact on the existing village houses.

8.12.7 Overall, the EIA Study has predicted that HSK NDA development, with the implementation of the mitigation measures, would be environmentally acceptable with no adverse residual impacts on the population and environmentally sensitive resources. A number of enhancements (including enhancing ecological connectivity across the Revised RODP; provision of landscape planting in the "LO" zone adjacent to the egretry that could potentially be used by ardeids for nesting; wetland planting in the flood retention facilities in the Regional Park could provide additional resources for birds) and environmental benefits (including provision of dedicated "OU (PBU+SWU)" sites thereby reducing existing industrial / residential interface issues; rearrangement of the road network to reduce the existing traffic noise and minimise air pollutants generated from traffic; pollution loading to the Deep Bay waters will be reduced, as the existing unsewered areas within the proposed development area will be provided with new sewerage and no treated sewage effluent generated by the development will be discharged to Deep Bay) within the proposed development area are also likely to result from the HSK NDA development.

9 IMPLEMENTATION AND COST ESTIMATION

9.1 Implementation Mechanism

9.1.1 Implementation options can be set at two extremes: full public sector (i.e. by Government) and full private sector involvements. In general, the following evaluation criteria should be observed when considering the implementation options to be adopted for the HSK NDA:

- Feasible and workable realisation of the NDA proposals;
- Fair and equitable;
- Permitted under existing legislations;
- Efficient in implementation;
- Minimise Government expenditure as far as possible;
- Ensure certainty in timely delivery of housing land; and
- Minimise the possibility of inviting political challenge.

9.1.2 The CNT approach (i.e. “full public”) stood out as by far the best choice in achieving these implementation objectives, and has been used in implementing existing new towns in Hong Kong in the past, i.e. the Government being responsible for land assembly through land resumption and clearance, site formation, provision of infrastructure and disposal of sites for various developments. This allows secure time control by the Government to achieve a balanced and sustainable development.

9.1.3 In the recent development of the KTN and FLN NDAs where private land accounts for a high percentage of the developable areas unlike most of the existing new towns, the implementation option for the NDAs has been reviewed. Taking into account the public views and further examination of the CNT approach, some flexibility on the implementation mechanism of the CNT approach has been considered with allowance for modification of lease including in-situ land exchange applications meeting a set of criteria by specified deadlines. Notwithstanding the general approach of land resumption and clearance for new town development, lease modification / land exchange applications from private landowners had been accepted and processed on an ad hoc basis for individual sites on the private lots for which the new town development programme had not yet been implemented, or the development of which was intended to be left to private initiative under the development scheme. Fair treatment to existing occupants was required to be made by the private developers comparable to the prevailing compensation.

9.1.4 In view of the previous experiences of new town developments as discussed above, and considerations of public views collected during CE1, CE2 and CE3, reference to the KTN and FLN NDAs is recommended by adopting the “full public” approach with allowance of modification of lease including in-situ land exchange applications similar to the KTN and FLN NDAs.

9.1.5 With appropriate design of the mechanism for allowing modification of lease including in-situ land exchange applications in individual cases meeting the set criteria while retaining the CNT approach as the primary mode for implementation, the “enhanced” CNT approach could achieve the purpose of advancing housing supply with the benefit inherent in the “private” approach.

9.2 Implementation Programme and Development Packages

9.2.1 The implementation of the NDA is proposed to be divided into 5 stages (see **Figure 9.2.1**), namely Advance Works, Stage 1, Stage 2, Stage 3 and Stage 4, and the major site formation and engineering infrastructure works are sub-divided into 11 Works Contracts tentatively. The development packages and works contracts are summarised in this section, which will be subject to review in the detailed design stage.

9.2.2 The Advance Works Stage is sub-divided into 3 phases and is targeted to bring in early population and employment to the HSK NDA mainly within the capacity of existing strategic infrastructures. The required supporting infrastructure works is therefore minimal. Site formation works for local rehousing, village resite, public housing, residential, commercial and industrial uses, ESS, open spaces and some GIC facilities, utilities works including SPSs and associated rising mains, and roadworks including a primary distributor Road P1, will be implemented under this stage. Four contracts are proposed for Advance Works Stage. The construction is expected to start in Year 2019.

9.2.3 In the Development Stage 1, three "OU (PBU+SWU)" sites in the northern part of HSK NDA will be developed. Two pieces of land would be formed for "RR4" use. One contract package is proposed to cover the works under this stage. The construction is expected to start in Year 2022.

9.2.4 In the Development Stage 2, the development would focus on areas surrounding the proposed HSK Station and the remaining "OU (PBU+SWU)" sites in the northern part of HSK NDA. The completion of the "OU (PBU+SWU)" sites under Development Stage 2 could provide further opportunity for accommodation of brownfield operations to be affected by the subsequent stages of the HSK NDA development.

9.2.5 Two contracts are proposed to cover the key infrastructure works under Development Stage 2. Some key infrastructure works are required, such as District Distributors Road D1, D6 and D7, SPS No.3 and No.4, sewage rising mains and site formation. The construction is expected to start in Year 2026.

9.2.6 In the Development Stage 3, the development would focus on "OU (Logistics Facilities)" and "OU (Enterprise and Technology Park)" sites, public housing sites in the north and the Regional Park in the middle part of HSK NDA. The affected brownfield operations may be accommodated in the "OU (PBU+SWU)" sites completed under the Development Stages 1 and 2.

9.2.7 The required supporting infrastructure works are grouped according to their location and relevance. A total of three contracts are proposed to cover the works. The construction is expected to start in Year 2031.

9.2.8 In the Development Stage 4, the remaining residential development along the Tin Shui Wai Main Channel and the low density residential development in Lau Fau Shan area will be implemented.

9.2.9 One contract is proposed to cover the infrastructure works under Development Stage 4. The construction is expected to start in Year 2031.

9.2.10 The major works items under each works contract are summarised in **Table 9.2.1** below.

Table 9.2.1 Major Site Formation and Engineering Infrastructure Works under Development Contracts

Development Stage / Contract		Major Works	Description of Infrastructure Contract Packages
Advance Works Stage	Contract AWC1 – AWC3	Primary Distributor Road P1 under existing KSWH and associated interchange / Junction works connecting with KSWH, Castle Peak Road and other District Distributors	The contracts include the site formation and utilities works necessary for the development of residential, commercial and GIC facilities sites under the Advance Works Stage. It mainly includes construction of Primary Distributor Road P1, SPS1 and SPS2 and sewage rising main connecting San Wai STW. In order to convey the traffic along KSWH (both the cross boundary traffic from Shenzhen and the domestic traffic from YLH) to/from the western part of the HSK NDA, Road P1 underneath KSWH is proposed to be implemented to connect KSWH with district distributors. Slip roads from KSWH would be provided to connect the two proposed at-grade roundabouts on Road P1 near San Wai and Yick Yuen respectively, where majority of future commercial developments have been planned. It was expected that most of the heavy vehicles would make use of Road P1 to/from the western part of the NDA. Contracts AWC1 - AWC2 comprise the construction of a road connecting the "RR4" at site 4-20, which falls partly on the new Road P1 and partly on the district distributor Road D8. Contract AWC1 also comprises the site formation and infrastructural works for the local re-housing development at Site 5-26 and Site 5-24 (Government land portion). Site formation and infrastructural works for the local re-housing development at Site 5-24 (part) and village resite at Site 4-20 and for the electricity sub-station at Site 5-19 will be implemented in Contract AWC2. The remaining works of this package will be implemented in Contract AWC3.
		Site formation for residential, GIC, commercial and industrial development areas	
		Two new SPSs SPS1 and SPS2 and associated rising mains	
		Utilities (fresh and flushing water mains, drainage & sewerage pipe)	
Development Stage 1	Contract S1C1	A section of Road D1 connecting Port Back-up, Workshop and Storage Use sites to Road P1 and KSWH	Contract S1C1 would serve the 1st batch of "OU (PBU+SWU)" sites as well as two "RR4" sites in the northern area of the HSK NDA. A section of District Distributor Road D1 and new local road (together with modification of existing local road Fung Kong Tsuen Road) would be provided. Site formation, drainage and sewerage connection and utilities will be provided.
		Site formation and utilities (fresh and flushing water mains, drainage & sewerage pipe)	
Development Stage 2	Contract S2C1	District Distributor Road D6 and D7, and local roads	Contract S2C1 would serve the residential and commercial development surrounding the HSK Station. District Distributor Road D6 and D7 would form to provide access to the development sites. A new SPS3 and associated rising mains would be provided to convey the sewage generated from the NDA to the SPS2. A new FWSR will be provided near Tan Kwai Tsuen to supply fresh water to the HSK NDA. For the population intake of Development Stage 2, the completion of FWSR
		A new SPS No. 3 (SPS3) and associated rising main from SPS3 to SPS2	
		FWSR and trunk main from Au Tau to HSK	

Development Stage / Contract		Major Works	Description of Infrastructure Contract Packages
		Site formation for residential & commercial developments, GIC and Open Space areas	is a prerequisite. The new fresh water main from Au Tau to the FWSR will be constructed. Site formation works for the residential and GIC development areas would start immediately after the completion of land resumption. Revitalisation works may be carried out to beautify the existing Tin Sam Channel and HSK Main Channel.
		Utilities (fresh and flushing water mains, drainage & sewerage pipe)	
	Contract S2C2	District Distributor Road D1 and local roads	Contract S2C2 would mainly serve the remaining sites of "OU (PBU+SWU)". It includes construction of District Distributor Road D1. Road D1 would provide traffic an alternative route to access KSWH other than the heavily used existing Ha Tsuen Road. SPS4 was proposed to receive the flow from the northwest area of HSK NDA as well as the existing Tin Shui Wai Tin Wah Road SPS. New rising main connecting Tin Wah Road SPS to the proposed SPS4 and rising main connecting SPS4 to HSK STW would be provided under this contract. A new RWSR will be provided in the south of NDA near Tan Kwai Tsuen. Pumping system and rising mains would be provided to supply reclaimed water from proposed HSK STW to reservoirs.
		HSK STW	
		A new SPS No. 4 (SPS4) and associated rising mains	
		A new reclaimed water reservoirs and associated pumping stations and rising mains	
		Site formation for PBU, Storage and Workshop Use sites, RTS and R4 Residential sites	
		Utilities (fresh and flushing water mains, drainage & sewerage pipe)	
Development Stage 3	Contract S3C1	District Distributor Road D4 and Ping Ha Road (Road D2) widening	Contract S3C1 would serve the proposed residential development along Ping Ha Road, commercial sites at Kiu Tau Wai and hospital site. Ping Ha Road widening (Road D2) and District Distributor Road D4 will be implemented under this contract. A new RWSR will be provided in the north of NDA near Fung Kong Tsuen. Pumping system and rising mains would be provided to supply reclaimed water from proposed HSK STW to reservoirs.
		A new reclaimed water reservoirs and associated pumping stations and rising mains	
		Site formation for residential, commercial and GIC sites	
		Utilities (fresh and flushing water mains, drainage & sewerage pipe)	
	Contract S3C2	District Distributor Road D3 and D5 (including slip road connecting KSWH and Road D3)	Contract S3C2 would serve the proposed special industrial sites in the northwestern area of HSK NDA. Road D3 and D5 will be constructed to the area. Slip roads connecting Road D3 to KSWH and Road P1 will also be provided.
		Site formation for Logistics and Enterprise & Technology Park sites	
		Utilities	
	Contract S3C3	Local Roads serving district open space	Contract S3C3 would serve the development of Town Park in the middle part of HSK NDA. New local road and modification of existing local road would be provided. Revitalisation works may be carried out to beautify the existing Tin Sam Channel and HSK Main Channel. A retention lake for flooding mitigation will be constructed in the Regional Park area.
		Revitalisation of existing Tim Sam Channel and HSK Main Channel	
		Site formation and Utilities	
Development Stage 4	Contract S4C1	Works at the existing Tin Ying Road	Contract S4C1 would serve the remaining residential site along Tin Shui Wai Main Channel and in the north. After the completion of Ping Ha Road widening, the existing traffic on Tin Ying Road would be re-routed.
		Drainage Channel Revitalisation	
		Local roads serving development sites	
		Site formation and Utilities	

9.3 Statutory Procedures in Development Programme

9.3.1 To implement the NDA, a number of statutory procedures are required with a view to comply with relevant ordinances.

- Environmental Impact Assessment Ordinance
- Town Planning Ordinance (TPO)
- Land Resumption and Gazettal Procedure

9.4 Environmental Impact Assessment Ordinance

9.4.1 The study of the development of the HSK NDA is a DP under Item 1 of Schedule 3 of the EIAO and it includes various DPs under Schedule 2 of the EIAO.

9.4.2 The purpose of the EIAO is to avoid, minimise and control the adverse impact on the environment of DPs through the application of the EIA process and the environmental permit system.

9.4.3 DPs specified under Schedule 2 of the EIAO, unless exempted, must follow the statutory EIA process and require environmental permits for their construction and operation (if applicable, and decommissioning). DPs specified under Schedule 3 of the EIAO require approved EIA reports but will not require environmental permits.

9.4.4 According to the EIAO, EPD have issued the Study Brief No. ESB–221/2011 for the Project in March 2011 and a revised Study Brief No. ESB-291/2015 was issued by EPD on January 2016.

9.4.5 The EIA report in accordance to the EIA Study Brief was submitted to the DEP on 30 June 2016 and was exhibited for public to comment from 5 September 2016 to 4 October 2016. The EIA Report was conditionally approved on 15 December 2016 (Reference: (25) in Ax(6) to EP2/N6/S3/42 Pt.4) and the environmental permits for six of the various Schedule 2 DPs were issued on 21 February 2017.

9.5 Town Planning Ordinance

9.5.1 Under the TPO, amendments to the existing OZPs to facilitate the development of the HSK NDA would be gazetted in accordance with the TPO, and then authorised by the Chief Executive in Council. PlanD will undertake the preparation and submission of the amendments to OZPs to the TPB for consideration.

9.6 Land Resumption and Gazettal Procedure

9.6.1 Development of the HSK NDA and the construction of the supporting infrastructure will affect both Government land and private land and the latter involves land resumption. Private land involved can be acquired by proceedings under a number of ordinances, including (but not exclusively).

- Lands Resumption Ordinance, Cap 124
- Roads (Works, Use and Compensation) Ordinance (R(WUC)O), Cap 370
- Railways Ordinance, Cap 519
- Water Pollution Control (Sewerage) Regulation (WPC(S)R), Cap 358AL

9.7 Public Consultation

9.7.1 Public consultation is an important aspect in the planning and implementation of the HSK NDA Project and associated public works. Being accountable and open to the public are core principles of the Government and providing opportunities for public consultation are formalised in the Government's consultative and statutory processes.

9.7.2 Public consultation with Rural Committees and District Councils, as appropriate, will be conducted for all gazettal procedures under TPO, R(WUC)O, Railways Ordinance and WPC(S)R.

9.7.3 The gazettal of the OZPs will also be arranged in accordance with the TPO and the public can make representation within 2 months under the ordinance.

9.8 Summary of Implementation Programme

9.8.1 Except for the time required for statutory procedures, assumptions about time required for other procedures for development of infrastructure, residential buildings, Governmental facilities are made based on past experience of similar projects.

9.8.2 For this proposed implementation programme, scheme design for many infrastructure works, like water mains from Au Tau WTW and FWPSR, reclaimed water pumping station and reservoirs, has not been confirmed and might be subject to significant change later on. Thus implementation programme is formed based on rough timing assumptions of different activities and currently proposed development stages.

Table 9.8.1 Summary of Proposed Implementation Programme

Development Stage	Development Year
Advance Works Stage	2019 – 2029
Development Stage 1	2022 – 2025
Development Stage 2	2026 – 2031
Development Stage 3	2031 – 2035
Development Stage 4	2031 – 2038

9.9 Cost Estimation

9.9.1 The detailed development cost could only be worked out upon confirmation of the user requirements and finalisation of the design in the detailed design stage. Based on a rough estimate, the estimated total cost of site formation and engineering infrastructure works for the HSK NDA is in the order of $50 billion in September 2015 prices. The estimated cost will be reviewed in future detailed design assignments of the respective works packages.

10 PRELIMINARY ENGINEERING LAYOUT AND DESIGN MEMORANDUM

10.1 Introduction

10.1.1 Construction Works of HSK NDA is tentatively scheduled to commence in 2019 and complete by 2037/2038. To cater for the planned development schedule, implementation of the supporting infrastructures for HSK NDA is divided into 5 Stages with different contracts. The development packages and works contracts have been summarised in **Section 9.2**. Each infrastructure contract would include roads, drainage, sewerage, waterworks for serving the development sites. Implementation programme based on rough timing assumptions of different activities and currently proposed development stages is presented in **Table 9.8.1**.

10.2 Design Memorandum

10.2.1 The Design Memorandum (DM) for the proposed infrastructure in HSK has been developed, which presents the standards, the design concept and criteria. It is intended to serve as a reference guide to the use and interpretation of the relevant design manuals required during the design process.

10.2.2 Design shall generally adopt such technical standards, design standards and specifications as are in current use by the relevant Government bureaux/departments or, if non-existent, international standard codes of practice and specifications.

10.2.3 Any part of the works which is not designed in accordance with current Government standards shall be stated with full explanations and justifications. Comments shall be sought on proposed deviations from Government standards from the relevant parties including Government bureaux/departments, maintenance authorities and operation authorities.

10.2.4 MTRCL/RDO shall be consulted on the design of any interfacing work with the existing, planned or proposed railway structures and facilities within the NDA.

10.3 Preliminary Engineering Layout

10.3.1 Preliminary engineering design has been carried out, making reference to the DM, for the engineering works and environmental mitigation measures proposed under the proposed development packages on the basis of the findings of the various technical assessment/studies.

10.3.2 Preliminary engineering layouts of proposed site formation proposal have been developed for the following engineering works and environmental mitigation measures. Public utilities (such as power cables, gas mains, telecommunication cables) will be implemented by the utilities company and are not included.

- Site formation works with associated slopes and retaining walls;
- New roads (including 1 Primary Distributor, 8 District Distributors and local roads), improvement of existing roads and junctions, and associated roadworks, including noise barriers, footpath, cycle tracks; and
- Drainage, sewerage, waterworks and utilities systems, including FWSR, FLWSR and four SPSs.

This Page Left Blank Intentionally

11 CONCLUSIONS

11.1 General

11.1.1 This Study has established a planning and development framework for the HSK NDA to meet the medium to long term housing, economic and other land use needs of Hong Kong. Under the overall vision for creating a sustainable, people-oriented and balanced community, the HSK NDA will be developed as a desirable place to live, work, play and do business. Through comprehensive planning and development, the HSK NDA will transform the vast extent of deserted agricultural land being used for brownfield operations into a new generation new town with enhanced land use efficiency and environmental quality. The NDA will also give impetus to foster our city's economic growth and becoming the "Regional Economic and Civic Hub" for the NWNT.

11.1.2 Based on the findings of the Study, a Revised RODP for HSK NDA incorporating findings and recommendations of various planning, engineering and technical assessments including EIA have been formulated. The preliminary engineering layout, implementation programme and a rough cost estimation for the proposed infrastructure have been developed.

11.2 Strategic Positioning and Planning Objectives of the HSK NDA

11.2.1 To foster community support and generate consensus on the key issues, a 3-stage CE exercise has been conducted to engage the public and key stakeholders in formulation of the planning and development framework for the HSK NDA. Taking account of the public views received and findings of various technical assessments, appropriate amendments to the land uses in the HSK NDA have been made to the PODP and RODP to formulate the Revised RODP.

Positioning of NDA

11.2.2 Strategically located in the NWNT well connected to Tin Shui Wai, Tuen Mun and Yuen Long, the HSK NDA will serve as a "Regional Economic and Civic Hub" for the NWNT. Moreover, the NDA is conveniently connected to the strategic transport infrastructure including the existing KSWH, the proposed Route 11, the proposed TMWB, as well as the Tuen Mun Chek-Lap Kok Link and the Hong Kong-Zhuhai-Macau Bridge under construction. It is also close to Shenzhen, and efficiently linked with the SGA at Lantau and the Greater PRD region. Given its strategic location, the NDA will provide solution spaces to meet the surging demand for various economic land uses in the NWNT, including land for offices, retail, hotels and special industrial uses. Being a Regional Economic and Civic Hub, the HSK NDA will create about 150,000 new employment opportunities, bringing jobs closer to residents not only in HSK but also Tin Shui Wai, Tuen Mun and Yuen Long. The development of the NDA will also help reducing the imbalance in the spatial distribution of population and jobs in the territory.

11.2.3 The HSK NDA will be the next generation new town of Hong Kong. Upon full development, the NDA will provide homes for about 218,000 residents, including 176,000 new population. The NDA will help redress the imbalanced housing mix of the Tin Shui Wai New Town. Together with Tin Shui Wai, Yuen Long, Tuen Mun New Towns, and the Yuen Long South development under planning, it will form an enlarged new town development cluster in the NWNT. A series of civic elements and a wide range of GIC facilities will be provided in the HSK NDA. There will also be an integrated pedestrian and open space network for the whole NDA, creating a good quality living, working and business environment with easy access to the surrounding established developments.

Planning Objectives

11.2.4 The following planning objectives have been adopted in formulation of the Revised RODP:

- Reinforce economic development and employment diversity
- Strike an appropriate housing mix to address different housing needs
- Introduce a sensible layout to create a distinctive, vibrant and sustainable urban fabric
- Respect and integrate existing ecological, natural and cultural resources in planning and design
- Provide community and open space and other supporting facilities for the well-being of the living, working and business community
- Create a connected, accessible, pedestrian-oriented and cycle-friendly community
- Create a convenient, continuous barrier-free pedestrian and cyclist network

11.3 Highlights of the Development Proposals

Catalyst for Economic Growth and Job Creation

11.3.1 Taking advantage of the strategic location of the HSK NDA, it is proposed to reserve land to accommodate diversified economic uses ranging from general commercial uses to special industrial uses. These robust economic activities clusters would provide about 150,000 new job opportunities which span across a wide spectrum of sectors, and cater for labour force of different educational attributes and skills.

11.3.2 The HSK NDA will provide a total of about 2,055,000 m^2 commercial floor area, mainly concentrated at the following development nodes. Other retail facilities are provided within residential clusters, and shopping streets are proposed along Tin Shui Wai Main Channel and near the proposed HSK Station with retail frontage for shops and services to support and enhance local economy.

11.3.3 Area around the proposed HSK Station is planned to become a regional hub for offices, hotels, retail and other commercial uses for the NWNT. The regional hub is buttressed by two anchor developments located immediately adjacent to the proposed HSK Station, each of which should be able to provide a critical mass for decent retail facilities and planned with a PTI. They are supplemented by less sizable commercial and residential development sites. A comprehensive design for the area will be crucial to achieving the planning intention for realising a complete, coherent and distinctive regional hub.

11.3.4 Similarly, area around the existing Tin Shui Wai WR Station has been planned with offices, hotels and retail uses to enhance the existing commercial mass and to provide a district centre serving the NDA and the neighbouring Tin Shui Wai New Town.

11.3.5 Two commercial developments providing mainly local retail services are also planned at the northern part of the HSK NDA, where one of them will be planned with a PTI. They will also support residents in Tin Shui Wai North, and complement the tourism and recreation activities in Lau Fau Shan.

Logistics, Enterprise & Technology Quarter and Industrial Zone

11.3.6 The northwestern part of the NDA with direct access to the KSWH and other strategic highways is also designated as "Logistics, Enterprise & Technology Quarter", providing a total GFA of about 4,312,000 m^2.

Urban Living and Balance with Nature and Culture

11.3.7 The planning of HSK NDA has integrated a green and blue network, which will connect to the cultural and ecological assets within and near the NDA. It will be a place for urban living in balance with nature and culture. It comprises:

- A Regional Park (about 16 ha in size) at the heart of the NDA forming the key feature of the north-south green spine. A continuous Riverside Promenade (about 5 km in length) along the regenerated river channel forming a north-south spine of the open space framework.
- The spine of open space extends towards the south where the Regional Plaza (about 4.7 ha in size) is located in front of the proposed HSK Station. It will be an important public space for leisure amidst the high density Regional Economic and Civic Hub complemented by leisure, retail, food and beverage facilities.
- Appropriate greenings and landscaping along the comprehensive pedestrian network, including pedestrian streets, shopping streets and along the GTC. Amenity strips along pedestrian walkways and vehicular roads for enhancing cityscape and buffering between developments.
- Other open spaces within residential areas and employment nodes throughout the NDA providing recreational and leisure spaces for residents and workforce. Community farming and Farmers' Markets will be encouraged in designated open spaces to promote green living.
- The HSK NDA and its environs have a rich history and heritage which have been respected in the planning. Declared monuments and other graded historic buildings within the area would be preserved. A heritage trail is proposed to interlink the heritage features. An eco-trail is proposed to connect the Regional Park with the hiking trails in Yuen Tau Shan. Appropriate paving, signage, and tree planting would be applied to both trails.

A Supportive Community

11.3.8 A series of civic elements and a wide range of GIC facilities will be provided in the HSK NDA to support the future residents living within and near the NDA, and create a family-friendly and age-friendly community.

11.3.9 On a regional and district basis, a civic hub comprising performance venue, Government offices, magistracy, community hall, post office, youth facilities and higher education institute is planned to supplement the economic function of the “Regional Economic and Civic Hub”. Meanwhile, a hospital is also planned around the “District Commercial Node" near the existing Tin Shui Wai Station to provide public health and medical services to the district.

11.3.10 In response to public comments, a “Local Service Core” is added at the northern part of the NDA along Tin Wah Road, which comprises a commercial development and a proposed GIC complex. The GIC complex will include community hall, clinic, RCP and other social facilities.

11.3.11 There are also other GIC facilities within the residential clusters throughout the NDA, including schools, sports ground, sports centres, community hall, clinics, markets, police station, fire station and other social facilities.

A Smart and Green City for Living, Working and Doing Business

11.3.12 The proposed HSK Station and the existing Tin Shui Wai Station will serve as the public transport hub of the NDA. The majority of the population, key economic activities, and major community facilities will be concentrated within the walking distance of the mass transit and public transport nodes.

11.3.13 To promote a walkable and cycle-friendly NDA, local communities will be created with easily accessible daily necessities, and will be supported by a comprehensive, convenient and attractive pedestrian and cycling network.

11.3.14 A GTC comprising a highly efficient EFTS, pedestrian walkway and cycle track is planned to support the internal movement between the development clusters.

11.3.15 A new HSK STW will be constructed to partly secondary and partly tertiary treatment level allowing reuse of reclaimed water for toilet flushing.

11.3.16 The re-planning of Tin Ying Road will provide additional space for improving the environment along the Tin Shui Wai Main Channel. The Tin Shui Wai Main Channel can thus adopt regeneration design and river revilatisation. Major green spines, breezeways and view corridors would be introduced along the riverside.

11.3.17 The proposed flood retention lake in the Regional Town Park and other planned flood retention facilities will serve to regulate storm water for adjacent villages and as an important leisure and landscape feature. Rainwater harvesting will also be explored to collect rainwater for non-potable uses like irrigation and toilet flushing.

11.3.18 The use of ARCS and organic waste management facilities will be explored. There will be a Community Green Station for environment education purposes and collection of recyclables.

11.3.19 The construction of energy efficient buildings will be encouraged. The use of DCS will be explored. An ICT Platform will also be established.

11.4 Optimising Transport Infrastructure and Improving Mobility

11.4.1 The HSK NDA will be connected with the urban area through mass transit with the proposed HSK Station and the existing Tin Shui Wai Station. There will also be three proposed PTIs. In terms of road network, a new primary distributor is planned underneath KSWH which would divert traffic from the “Logistics, Enterprise & Technology Quarter”, avoiding heavy vehicles to use the roads within the residential neighbourhood. To cope with the increasing traffic volume in the NWNT region, the planning of TMWB linking up the NDA via KSWH to Tuen Mun-Chek Lap Kok Link and Route 11 connecting North Lantau and Yuen Long are underway.

11.4.2 A comprehensive transport network comprising one primary distributor, eight district distributors and a number of new local roads with various green transport modes including an exclusive GTC will serve internal vehicular movements. The proposed GTC is also designed to be separated from the vehicular road system to avoid junction conflicts. This transport network can facilitate east-west and north-south movements within the NDA, and provide access for Tin Shui Wai residents to travel to various employment zones. To better integrate with Tin Shui Wai, Tin Ying Road will be re-planned while its function would be supplemented by the widened Ping Ha Road and other newly planned vehicular roads.

11.4.3 A comprehensive cycle track and pedestrian walkway network is proposed in the HSK NDA. Attractive streetscapes with roadside planting will be created to provide amenity and shade, and safe and convenient at-grade crossings will be provided.

11.5 Environmental Impact Assessment

11.5.1 An EIA has been carried out to provide an assessment of the potential environmental impacts associated with the construction and operation of the HSK NDA based on the engineering design information available at this stage.

11.5.2 The assessment has been conducted, in accordance with the EIA Study Brief (No. ESB–291/2015) under the EIAO for the Project, covering the following environmental issues:

- Air Quality Impact
- Noise Impact
- Water Quality Impact
- Sewage and Sewerage Implication
- Waste Management Implication
- Land Contamination
- Ecological Impact
- Fisheries Impact
- Landscape and Visual Impact
- Impact on Cultural Heritage

11.5.3 The findings of the EIA have determined the likely nature and extent of environmental impacts predicted to arise from the construction and operation of the Project. During the EIA process, environmental control measures have been identified and incorporated into the planning and design of the Project, to achieve compliance with environmental legislation and standards during both the construction and operation phases. The Project Implementation Schedule (PIS) listing the recommended mitigation measures is presented in EIA.

11.5.4 Overall, the EIA has predicted that the Project, with the implementation of the mitigation measures, would be environmentally acceptable with no adverse residual impacts on the population and environmentally sensitive resources.

11.5.5 EM&A requirements have been recommended where necessary, to check on project compliance of environmental legislation and standards. These are presented in a separate, stand-alone EM&A Manual. The EM&A Manual includes a PIS, which summarises all of the mitigation measures, implementation locations, timeframe, agency, etc.

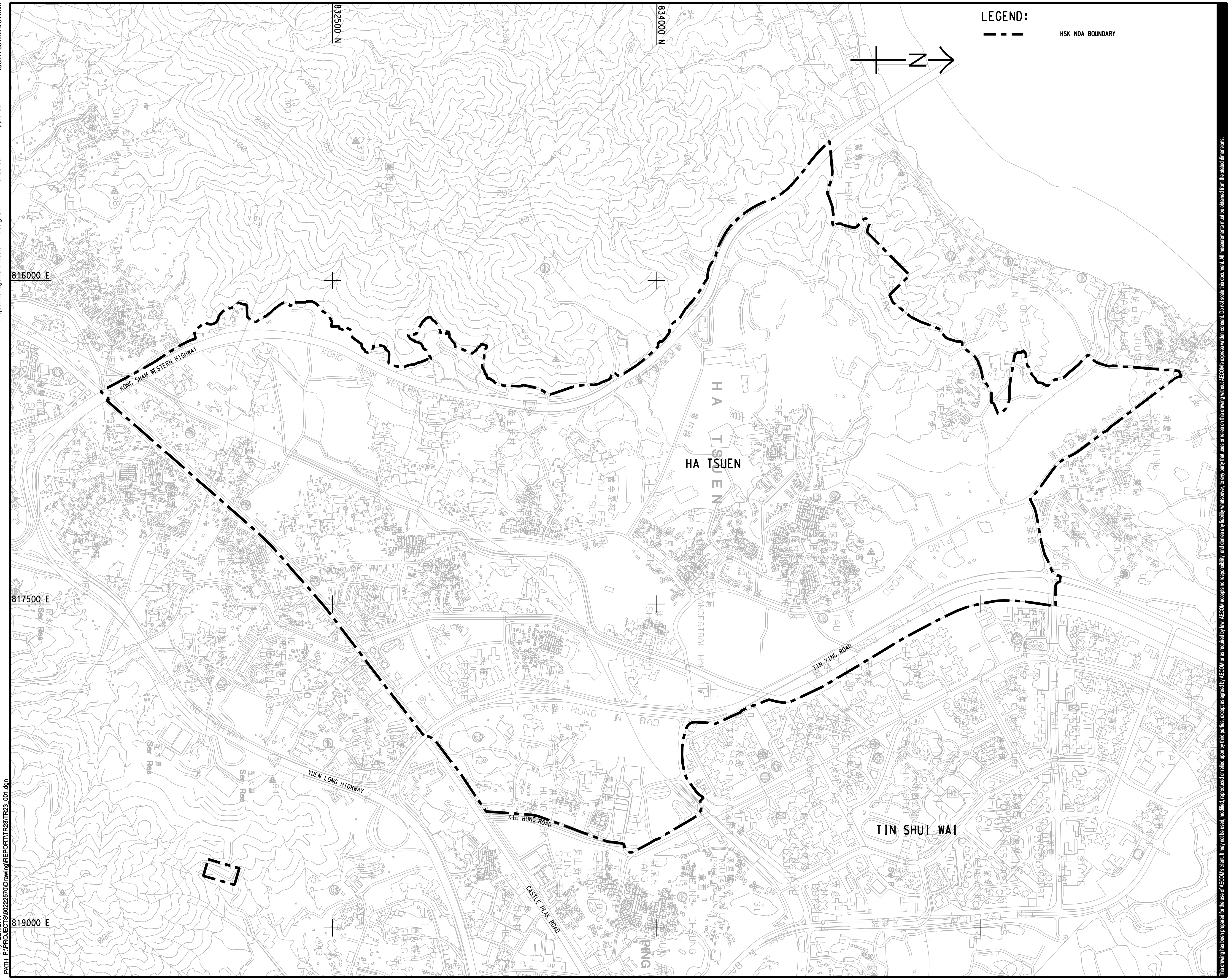
11.6 Technical Assessments

11.6.1 The relevant technical assessments have been conducted which demonstrate that the NDA development is technically feasible in traffic and transport, drainage and sewerage, water supply and public utilities, air ventilation and sustainable development aspects. For traffic and transport, it is proposed to construct a HSK Station and provide a comprehensive transport network with primary and district distributors, local roads and widened existing roads. For drainage and sewerage aspect, drainage works, flood retention facilities and STW are proposed. In sum, the NDA development will meet the standards and requirements in various aspects.

11.7 Implementation

11.7.1 The key issues, opportunities and constraints on HSK NDA project are identified and the feasibility is tested by a series of broad assessments. The proposed implementation programme with phasing and packaging of works for the project is thereby formulated. The EIA Report in accordance to the EIA Study Brief was conditionally approved on 15 December 2016. The amendment of relevant statutory OZPs has been proceeded with and the OZP will be gazetted in May 2017. Other preparatory work associated with the development project will follow. Subject to resources availability, part of the works will be undertaken as Advance Works Package and its detailed design is commenced in 2017. Construction works are tentatively scheduled to commence in 2019 and will be completed by phases with the first population intake expected in 2024. Other major works will start after the commencement of the Advance Works. The whole HSK NDA project is expected to be completed by 2037/38.

Figures



AECOM

PROJECT

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.

STATUS

SCALE: A3 1 : 16000

DIMENSION UNIT: METRES

KEY PLAN

PROJECT NO.: 60222570

AGREEMENT NO.: CE2/2011 (CE)

SHEET TITLE: HSK NDA BOUNDARY

SHEET NUMBER: 60222570/TR23/FIGURE 1.1.1

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

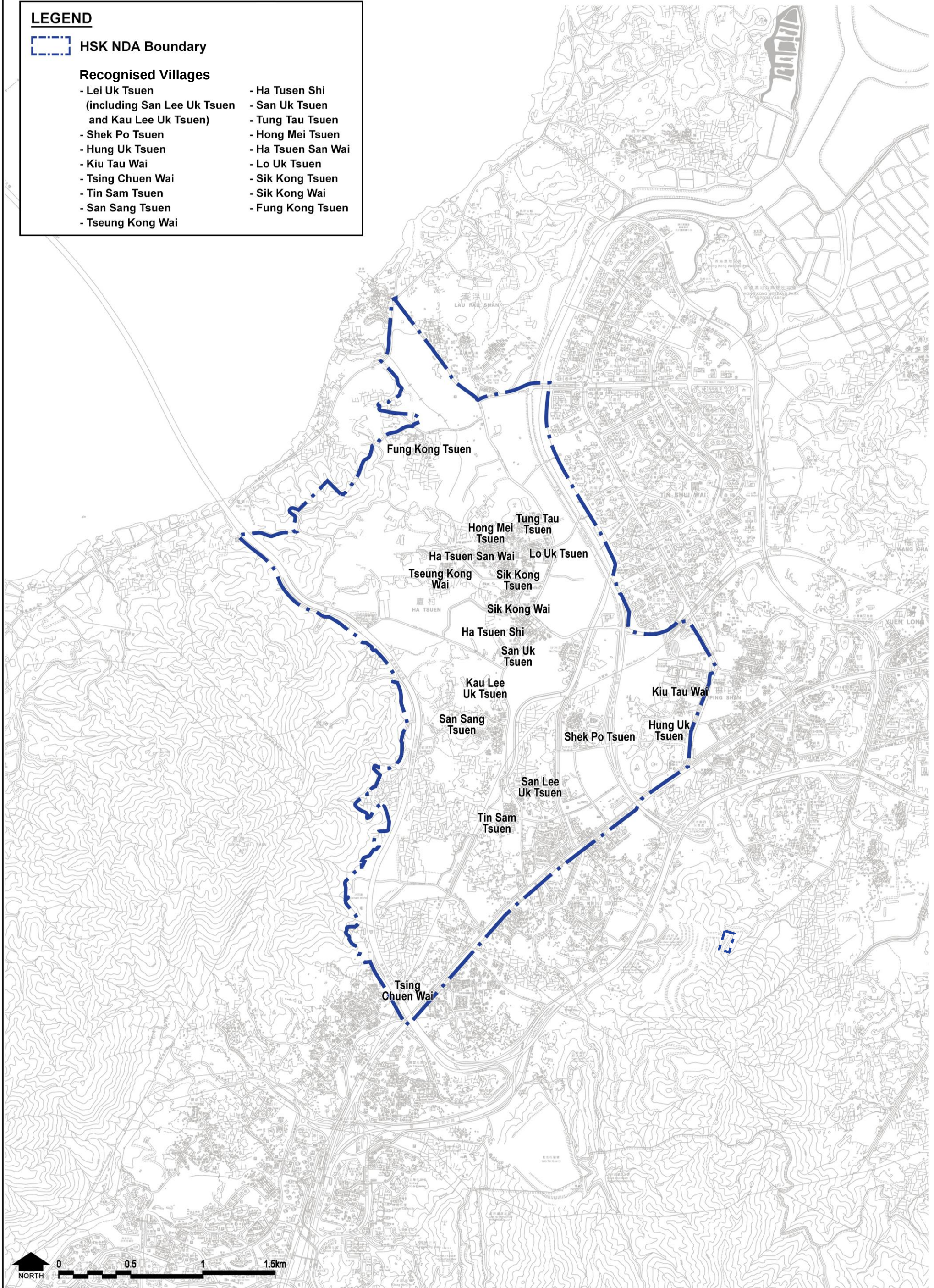
Plot File by: ZENGFX
PATH: P:\PROJECTS\60222570\Drawing\REPORT\TR23\TR23_001.dgn

LEGEND

HSK NDA Boundary

Recognised Villages

- Lei Uk Tsuen (including San Lee Uk Tsuen and Kau Lee Uk Tsuen)
- Shek Po Tsuen
- Hung Uk Tsuen
- Kiu Tau Wai
- Tsing Chuen Wai
- Tin Sam Tsuen
- San Sang Tsuen
- Tseung Kong Wai
- Ha Tusen Shi
- San Uk Tsuen
- Tung Tau Tsuen
- Hong Mei Tsuen
- Ha Tsuen San Wai
- Lo Uk Tsuen
- Sik Kong Tsuen
- Sik Kong Wai
- Fung Kong Tsuen



AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Location Plan of the Recognised Villages

SCALE	1: 24,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	KL
JOB No.	60222570	FIGURE 2.2.1	REV

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

832500 N

834000 N

816000 E

817500 E

819000 E

NOTE:

1. SITE BOUNDARIES OF BROWNFIELD OPERATIONS AS SHOWN ARE INDICATIVE ONLY BASED ON THE BEST AVAILABLE INFORMATION WHEN THE DESKTOP STUDY WAS CONDUCTED BASED ON AERIAL PHOTOS TAKEN IN AUGUST 2015.

LEGEND:

- HSK NDA BOUNDARY
- CONTAINER STORAGE
- OPEN STORAGE
- WAREHOUSE
- VEHICLE PARKING
- VEHICLE REPAIR
- VEHICLE BODY BUILING WORKSHOPS
- WORKSHOPS (EXCLUDING VEHICLE REPAIR AND VEHICLE BODY BUILDING WORKSHOPS)
- LOGISTICS OPERATION
- OTHERS

KONG SHAM WESTERN HIGHWAY

FUNG KONG TSUEN

SAN SANG TSUEN

TIN SAM TSUEN

HA TSUEN

SHEK PO TSUEN

TIN YING ROAD

YUEN LONG HIGHWAY

KIU HUNG ROAD

HUNG UK TSUEN

TIN SHUI WAI

CASTLE PEAK ROAD

Ser Res

Plot File by: ZENGFX
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_010.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
狀況

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

LOCATION PLAN OF EXISTING BROWNFIELD OPERATIONS IN HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.2.2

LEGEND

- HSK NDA Boundary
- Existing School
- Existing Kindergarten
- Existing Markets
- Medical and Health Service
- Fire Ambulance and Police Stations
- Social Welfare Facilities
- Elderly Facilities

NORTH 0 0.2 0.4 0.6 0.8 1km

AECOM

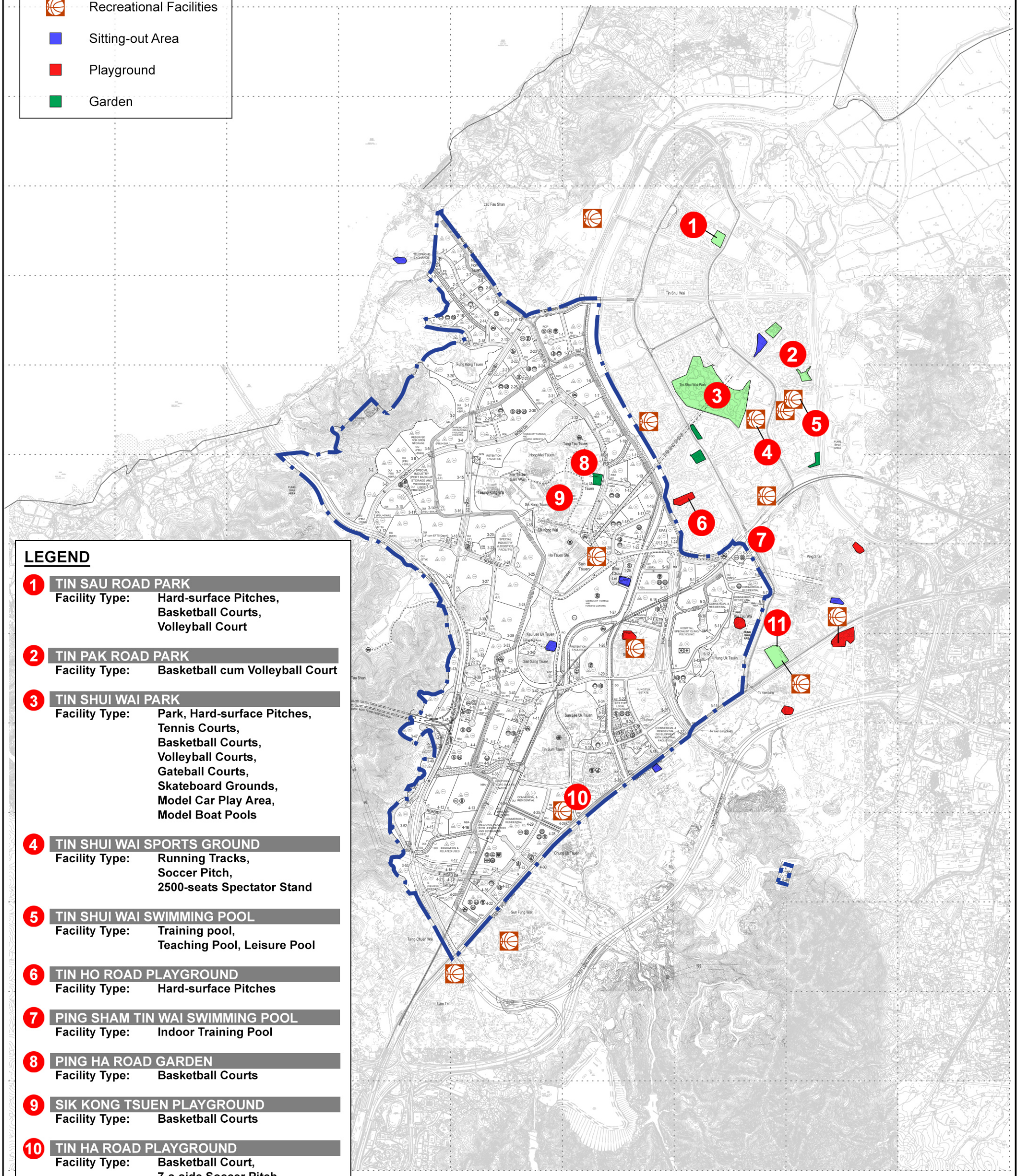
Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Existing GIC Facilities

SCALE	1: 25,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	FD
JOB No.	60222570	FIGURE 2.2.3	REV

LEGEND

- HSK NDA Boundary
- Park
- Recreational Facilities
- Sitting-out Area
- Playground
- Garden



LEGEND

1 TIN SAU ROAD PARK
Facility Type: Hard-surface Pitches, Basketball Courts, Volleyball Court

2 TIN PAK ROAD PARK
Facility Type: Basketball cum Volleyball Court

3 TIN SHUI WAI PARK
Facility Type: Park, Hard-surface Pitches, Tennis Courts, Basketball Courts, Volleyball Courts, Gateball Courts, Skateboard Grounds, Model Car Play Area, Model Boat Pools

4 TIN SHUI WAI SPORTS GROUND
Facility Type: Running Tracks, Soccer Pitch, 2500-seats Spectator Stand

5 TIN SHUI WAI SWIMMING POOL
Facility Type: Training pool, Teaching Pool, Leisure Pool

6 TIN HO ROAD PLAYGROUND
Facility Type: Hard-surface Pitches

7 PING SHAM TIN WAI SWIMMING POOL
Facility Type: Indoor Training Pool

8 PING HA ROAD GARDEN
Facility Type: Basketball Courts

9 SIK KONG TSUEN PLAYGROUND
Facility Type: Basketball Courts

10 TIN HA ROAD PLAYGROUND
Facility Type: Basketball Court, 7-a-side Soccer Pitch

11 PING PAK LANE PARK
Facility Type: Hard-surface Pitches, Basketball cum Volleyball Court

NORTH 0 0.2 0.4 0.6 0.8 1km

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Existing Recreational Facilities and Open Space

SCALE	1: 25,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	MC
JOB No.	60222570	FIGURE 2.2.4	REV

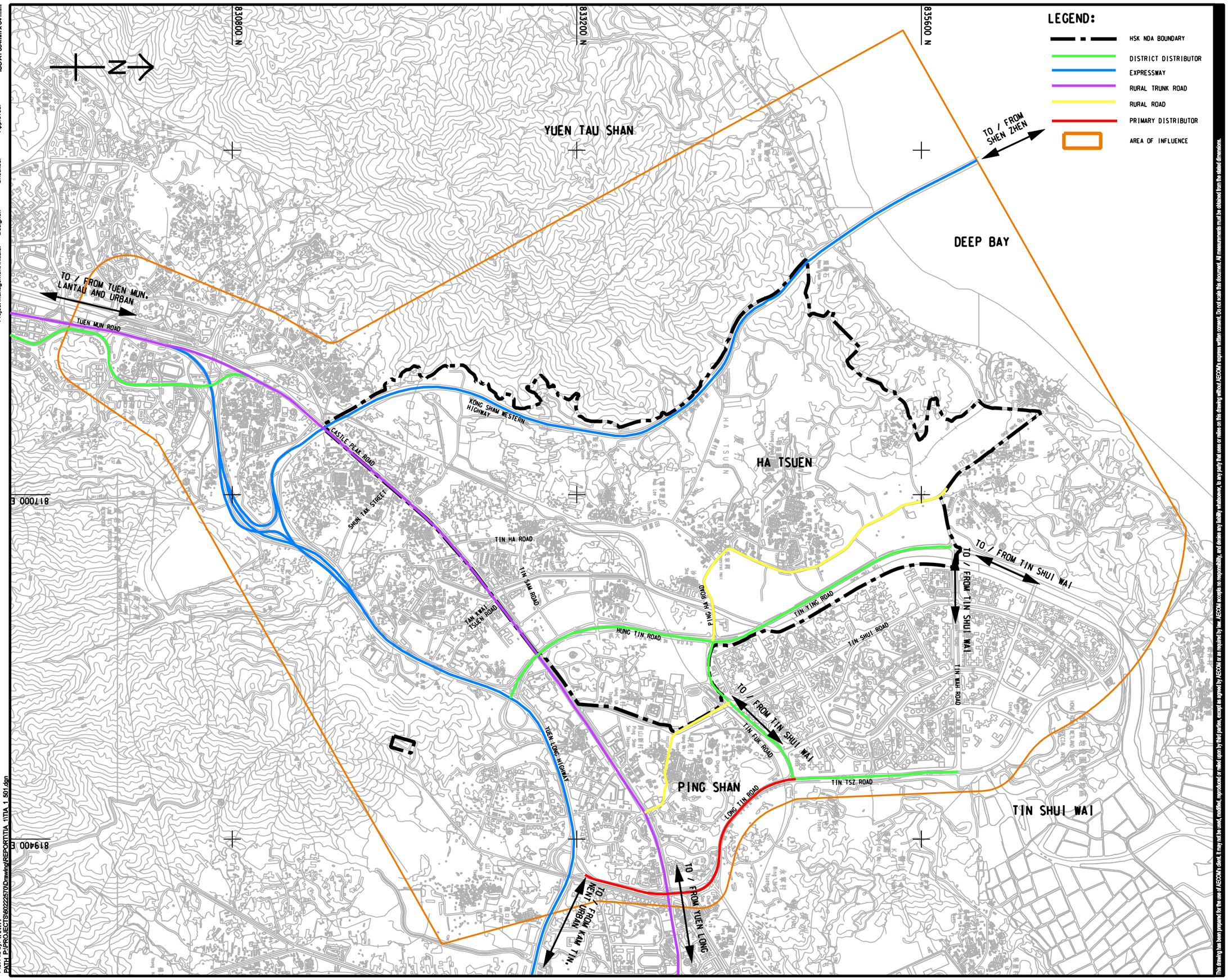
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: TANWT
PATH: P:\PROJECTS\60222570\Drawing\REPORT\TIA \1\TIA 1_501.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

SITE LOCATION, AOI AND EXISTING MAJOR ROADS SERVING THE SITE

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.5.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

834800 N

816500 E

818100 E

LEGEND:

HSK NDA BOUNDARY

EXISTING OUTBOUND HEAVY GOODS VEHICLES ROUTING

EXISTING INBOUND HEAVY GOODS VEHICLES ROUTING

DEEP BAY (SHENZHEN WAN)

HA TSUEN

HUNG SHUI KIU

PING SHAN

TIN SHUI WAI

KONG SHAM WESTERN HIGHWAY

CASTLE PEAK ROAD

SHEK PO ROAD

DEEP BAY ROAD

LAU FAU SHAN ROAD

PING HA ROAD

TIN YING ROAD

HUNG TIN ROAD

TIN WAH ROAD

TIN SAU ROAD

YUEN LONG HIGHWAY

TIN TSZ ROAD

Plot File by: TANWT
PATH: p:\projects\60222570\drawing\topcat\TIA -1\TIA_1_503.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
狀況

SCALE
比例

A1 1 : 8000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING INBOUND / OUTBOUND HEAVY GOODS VEHICLES ROUTINGS

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.5.2

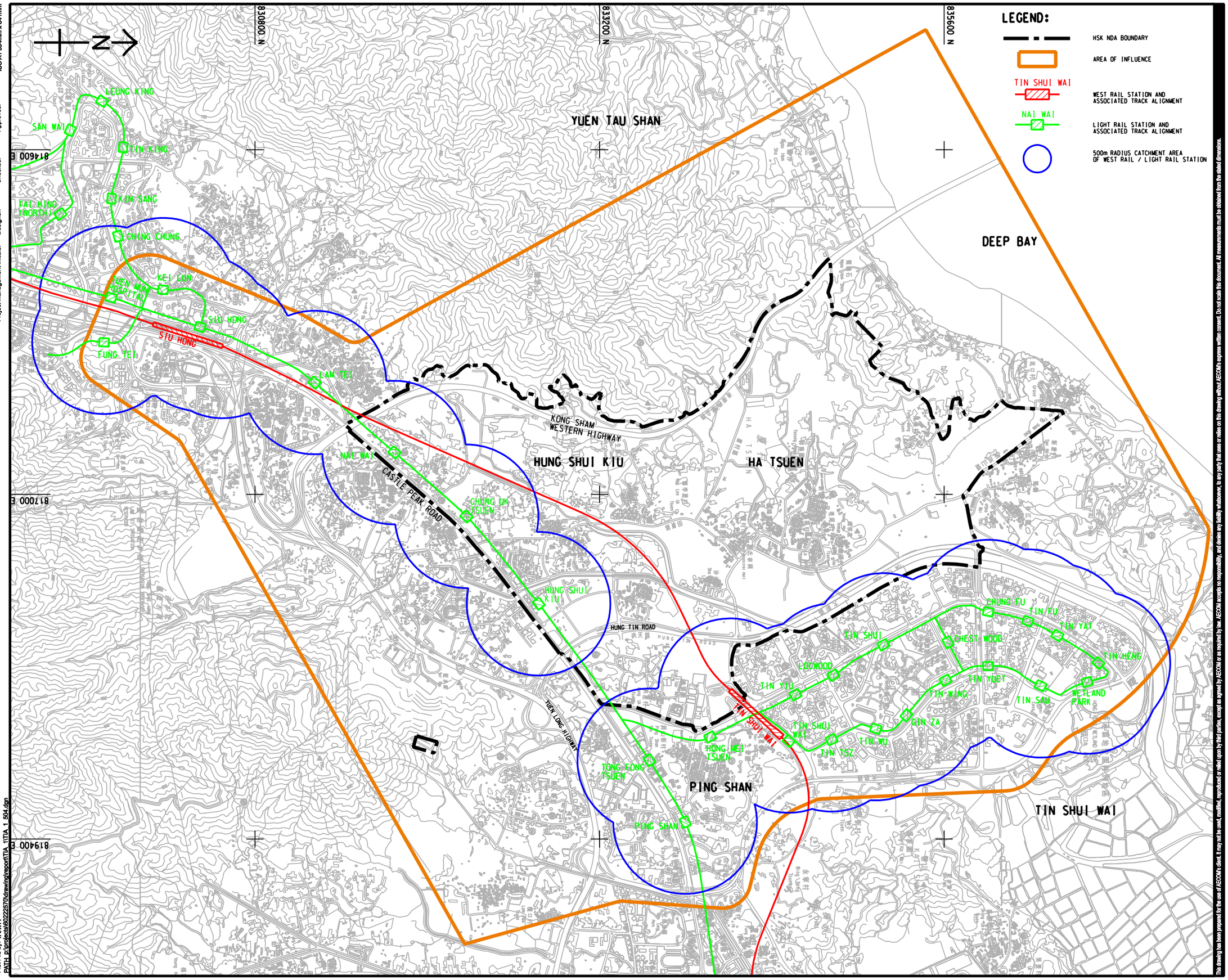
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: TANWT
PATH: p:\projects\60222570\drawing\pscript\TIA_1\TIA_1_504.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工務顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
參訂

I/R 參訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING RAILWAY NETWORK AND COVERAGE

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.5.3

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

HSK NDA BOUNDARY

EXISTING FRESH WATER SUPPLY NETWORK

N

832500 N

834000 N

816000 E

817500 E

819000 E

DEEP BAY
(SHENZHEN WAN)

KONG SHAM WESTERN HIGHWAY

CASTLE PEAK ROAD

HA TSUEN

HUNG SHUI KIU

TIN SHUI WAI MAIN CHANNEL

EXISTING TAN KWAI TSUEN SOUTH FRESH WATER SERVICE RESERVOIR

TIN SHUI WAI

PING SHAN

YUEN LONG HIGHWAY

Plot File by: CAOPA
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_414.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

DISTRIBUTION OF EXISTING WATER SUPPLY SYSTEM (FRESH WATER) IN HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.6.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

HSK NDA BOUNDARY

EXISTING SALT WATER SUPPLY NETWORK

832500 N

834000 N

816000 E

817500 E

819000 E

DEEP BAY
(SHENZHEN WAN)

KONG SHAM WESTERN HIGHWAY

CASTLE PEAK ROAD

HA TSUEN

HUNG SHUI KIU

TIN SHUI WAI MAIN CHANNEL

TIN SHUI WAI

PING SHAN

YUEN LONG HIGHWAY

Plot File by: CAOPA
PATH: J:\projects\60222570\Drawing\REPORT\WSUAIWSUIA 412.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
發行

I/R 發行	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
狀態

SCALE 比例
A3 1 : 16000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

DISTRIBUTION OF EXISTING WATER SUPPLY SYSTEM (SALT WATER) IN HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.6.2

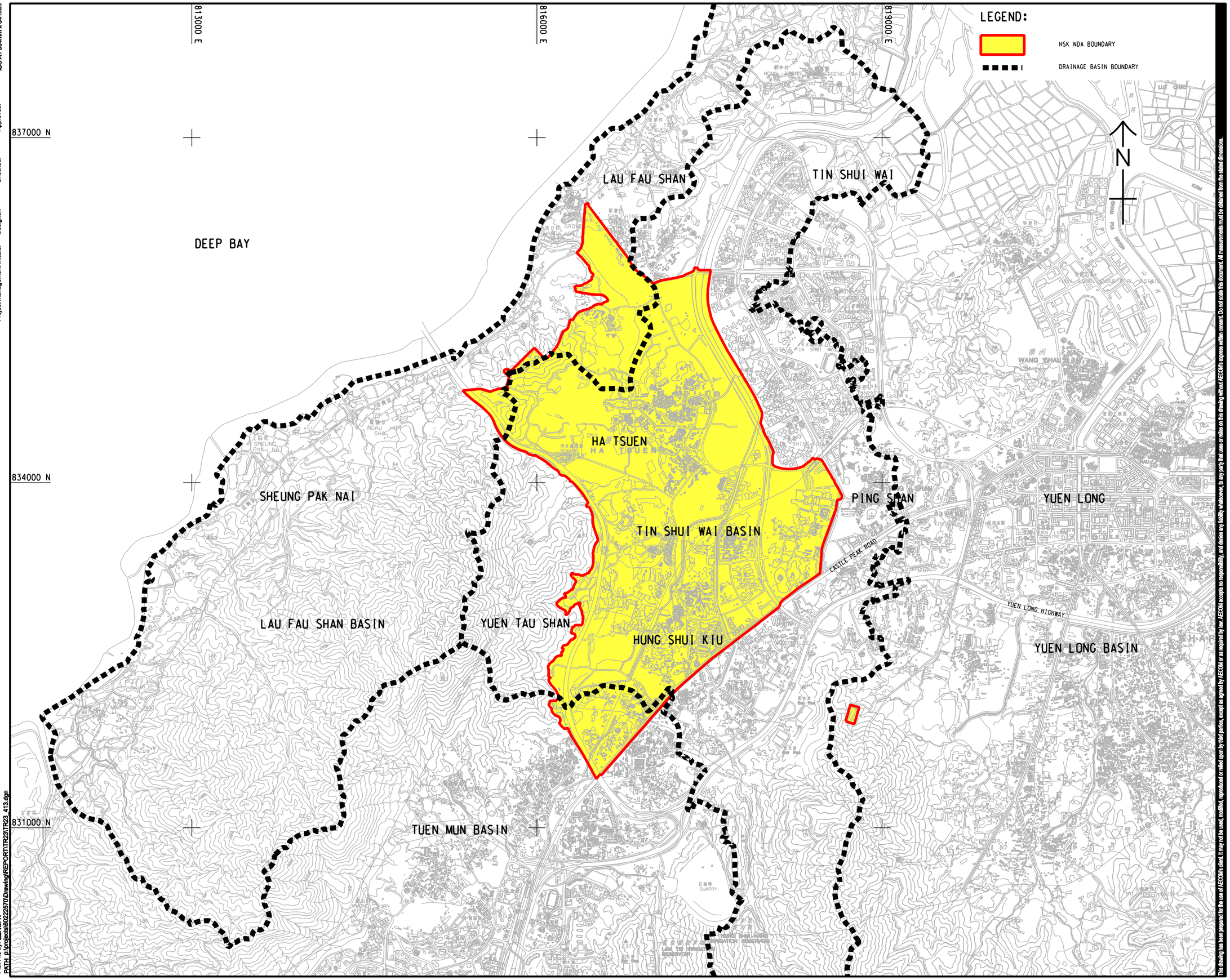
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: ZENGFX
PATH: P:\projects\60222570\Drawing\REPORT\TR23\TR23_413.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
發行

I/R 發行	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
狀況

SCALE 比例
A3 1 : 16001

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING CATCHMENT BOUNDARIES WITHIN OR ADJACENT TO THE STUDY AREA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.6.3

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

- HSK NDA BOUNDARY
- PIPELINE
- RIVER/CHANNEL
- EXISTING MANHOLE/BREAK

832500 N

834000 N

816000 E

817500 E

819000 E

DEEP BAY

KONG SHAM WESTERN HIGHWAY

Deep Bay Road

Hang Hau Tsuen Channel

Ha Tsuen Channel

HA TSUEN

Fung Kong Tsuen

Fung Kong Tsuen Road

Upper Tuen Mun River Channel

Tin Sam Channel

HUNG SHUI KIU

Hung Shui Kiu Main Channel

Hung Tin Road

TIN YING ROAD

Tin Shui Wai Main Channel

Ping Shan Nullah

TIN SHUI WAI

PING SHAN

CASTLE PEAK ROAD

YUEN LONG HIGHWAY

Plot File by: ZENGFX
PATH: P:\PROJECTS\60222570\Drawing\SKETCH\SK4390.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核查

STATUS
狀況

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING DRAINAGE NETWORKS OF HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.6.4

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

832500 N

834000 N

816000 E

817500 E

819000 E

LEGEND:

- HSK NDA BOUNDARY
- DECLARED MONUMENT
- GRADE 1 HISTORIC BUILDING
- GRADE 2 HISTORIC BUILDING
- GRADE 3 HISTORIC BUILDING
- SITE OF ARCHAEOLOGICAL INTEREST
- ARCHAEOLOGICAL POTENTIAL AREAS

DEEP BAY

KONG SHAM WESTERN HIGHWAY

YUEN LONG HIGHWAY

KIU HUNG ROAD

TIN YING ROAD

CASTLE PEAK ROAD

HA TSUEN

LAU FAU SHAN

TIN SHUI WAI

F1 F2 F3 F4 F5

A1 A2 C1 C2 C3 C4 C5 C6 C7

ID	CULTURAL HERITAGE RESOURCES	CURRENT STATUS
A1	TANG ANCESTRAL HALL (HA TSUEN)	DECLARED MONUMENT
A2	YEUNG HAU TEMPLE (HA TSUEN)	DECLARED MONUMENT
C1	GATE TOWER (HA TSUEN SHI)	GRADE 2
C2	KWAN TAI TEMPLE (HA TSUEN SHI)	GRADE 2
C3	SHI WANG STUDY HALL (SAN WAI)	GRADE 3
C4	SHRINE (TIN SAM TSUEN)	GRADE 3
C5	ENTRANCE GATE OF SHEK PO WAI (SHEK PO TSUEN)	GRADE 3
C6	OLD VILLAGE SCHOOL (TUNG TAU TSUSEN)	GRADE 3
C7	NOS. 76-77 HUNG UK TSUEN	GRADE 3
F1	TSEUNG KONG WAI SITE OF ARCHAEOLOGICAL INTEREST	LISTED SITE
F2	TUNG TAU TSUEN SITE OF ARCHAEOLOGICAL INTEREST	LISTED SITE
F3	HANG HAU TSUEN SITE OF ARCHAEOLOGICAL INTEREST	LISTED SITE
F4	SHA KONG MIU (NORTH) SITE OF ARCHAEOLOGICAL INTEREST	LISTED SITE
F5	NGAU HOM SHEK SITE OF ARCHAEOLOGICAL INTEREST	LISTED SITE

Plot File by: LIMH1
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_411.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
現狀

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING CULTURAL HERITAGE AND ECOLOGICAL RESOURCES

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 2.7.1

LEGEND

- HSK NDA Boundary
- HSK SGA Boundary
- Priority Action Area of HSK SGA
- Non-Priority Action Area of HSK SGA
- Residential
- Commercial
- Comprehensive Development Area
- Government, Institution Or Community
- Village
- Other Specified Uses
- Container Backup
- Green Belt
- Local / District Open Space
- Amenity
- Ecological Compensation Area

0 0.5 1 1.5km

NORTH

*Source: Agreement No. CE 66/96 Planning and Development Study on North West New Territories (2003)

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

NWNT - Hung Shui Kiu SGA Recommended Layout Plan

SCALE	AS SHOWN	DATE	APR 2017
CHECK	AM	DRAWN	FD
JOB No.	60222570	DRAWING No.	FIGURE 3.1.1
		REV	

LEGEND

- Study Area Boundary
- HSK NDA Boundary
- CDA — Comprehensive Development Area
- C — Commercial
- C/R — Commercial / Residential
- CA — Conservation Area
- CPA — Coastal Protection Area
- REC — Recreation
- AGR — Agriculture
- OS — Open Space
- GB — Green Belt
- G/IC — Government, Institution or Community
- I — Industrial
- I (D) — Industrial (Group D)
- V — Village Type Development
- OS — Open Storage
- OU — Other Specified Uses
- R(A) — Residential (Group A)
- R(B) — Residential (Group B)
- R(C) — Residential (Group C)
- R(D) — Residential (Group D)
- R(E) — Residential (Group E)
- U — Undetermined

APPROVED
LAU FAN SHAN AND
TSIM BEI TSUI
OZP No. S/YL-LFS/7
GAZETTED ON
18/02/2005

APPROVED
TIN SHUI WAI
OZP No. S/TSW/12
GAZETTED ON
12/09/2008

APPROVED
HA TSUEN
OZP No. S/YL-HT/10
GAZETTED ON
23/01/2009

APPROVED
PING SHAN
OZP No. S/YL-PS/16
GAZETTED ON
12/06/2015

APPROVED
LAM TEI AND
YICK YUEN
OZP No. S/TM-LTYY/8
GAZETTED ON
18/09/2015

APPROVED TONG YAN
SAN TSUEN
OZP No. S/YL-TYST/10
GAZETTED ON
17/02/2006

DRAFT TUEN MUN
OZP No. S/TM/33
GAZETTED ON
13/02/2015

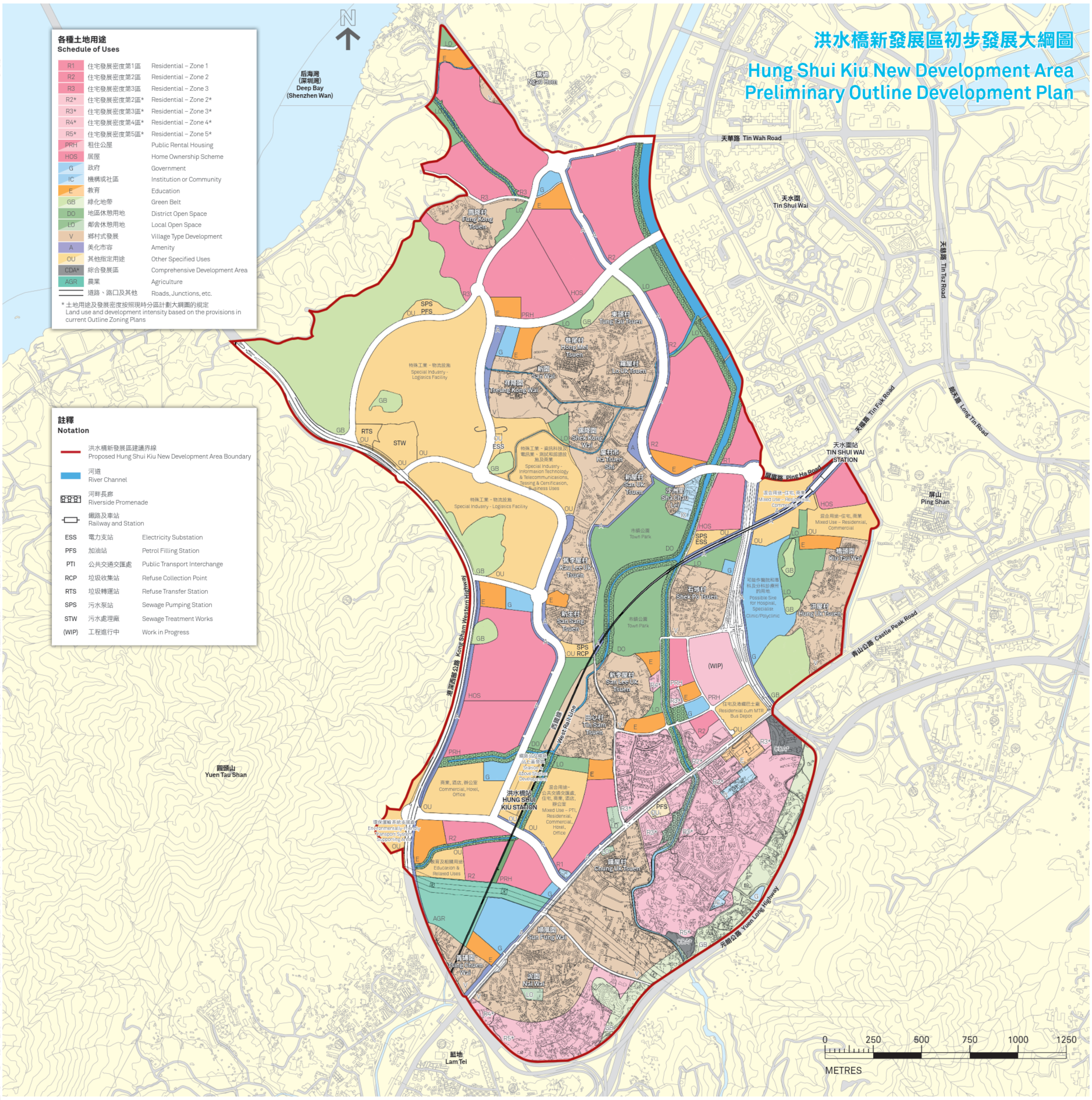
NORTH 0 0.2 0.4 0.6 0.8 1km

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Existing Land Use Zonings under Extant OZPs

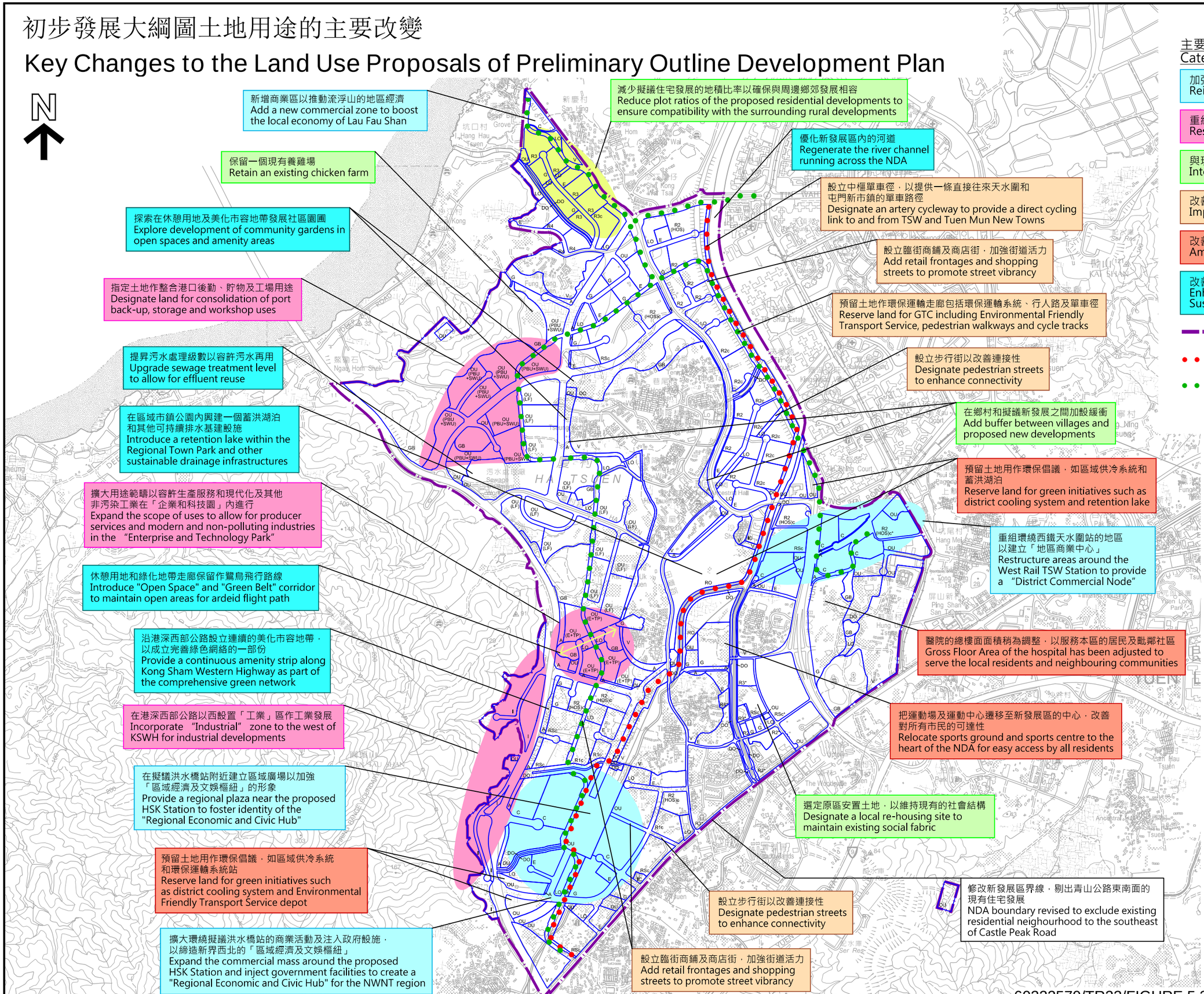
SCALE	1: 25,000 @ A3	DATE	JUN 2016
CHECK	AM	DRAWN	KL
JOB No.	60222570	FIGURE 3.1.2	REV



AECOM	Agreement No. CE 2/2011 (CE) Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation Preliminary Outline Development Plan	SCALE	1: 24,000 @ A3	DATE	APR 2017
		CHECK	AM	DRAWN	KL
		JOB No.	60222570	FIGURE 5.2.1	REV

初步發展大綱圖土地用途的主要改變

Key Changes to the Land Use Proposals of Preliminary Outline Development Plan



主要修訂類別 Catergories of Key Changes

- 加強商業中心 Reinforcing Commercial Nodes
- 重組特殊工業區 Restructuring Special Industry Quarter
- 與現有發展的融合 Integrating with Existing Developments
- 改善連接性和可達性 Improving Connectivity and Accessibility
- 改善政府、機構或社區設施供應 Ameliorating Provision of GIC Facilities
- 改善生態和締造可持續的環境 Enhancing Ecology and Creating Sustainable Environment

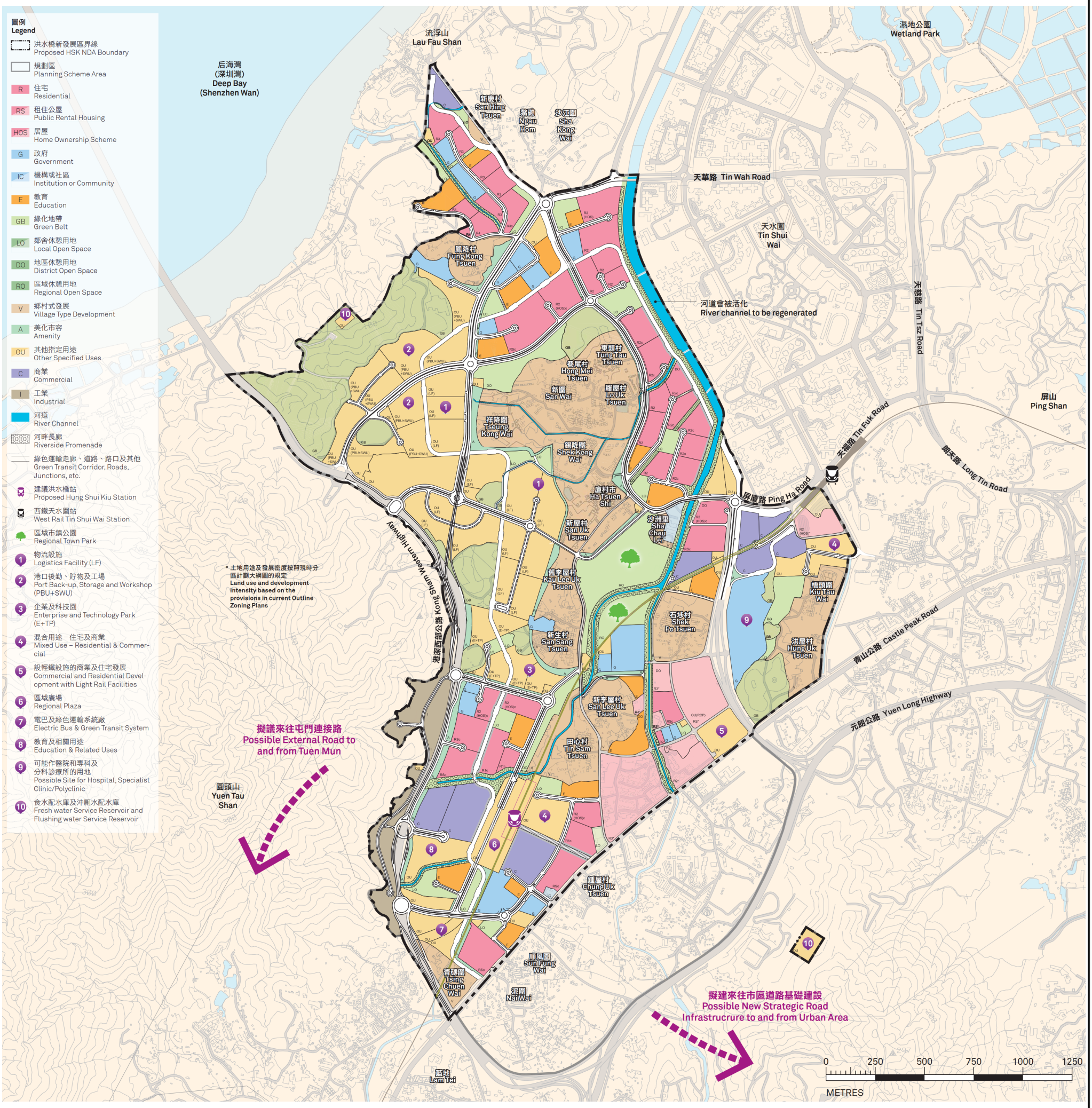
洪水橋新發展區界線 Hung Shui Kiu NDA Boundary
擬議中樞單車徑 Proposed Artery Cycleway
擬議環保運輸走廊 Proposed Green Transit Corridor (GTC)

各種土地用途 Schedule of Uses

- C 商業 Commercial
- R1c 住宅發展密度第一區 (包括商業用途) Residential – Zone 1 (with commercial)
- R2 住宅發展密度第二區 Residential – Zone 2
- R2c 住宅發展密度第二區(包括商業用途) Residential – Zone 2 (with commercial)
- R3 住宅發展密度第三區 Residential – Zone 3
- R3c 住宅發展密度第三區(包括商業用途) Residential – Zone 3 (with commercial)
- R4 住宅發展密度第四區 Residential – Zone 4
- RSc 公共屋宇(包括商業用途) Special Residential (with commercial)
- R2(HOS) 住宅發展密度第二區(居屋) Residential – Zone 2 (Home Ownership Scheme)
- R2(HOS)c 住宅發展密度第二區(居屋) (包括商業用途) Residential – Zone 2 (Home Ownership Scheme) (with commercial)
- G 政府 Government
- IC 機構或社區 Institution or Community
- E 教育 Education
- GB 綠化地帶 Green Belt
- RO 區域休憩用地 Regional Open Space
- DO 地區休憩用地 District Open Space
- LO 鄰舍休憩用地 Local Open Space
- V 鄉村式發展 Village Type Development
- I 工業 Industry
- A 美化市容 Amenity
- OU 其他指定用途 Other Specified Uses
- OU (PBU+SWU) 其他指定用途 (港口後勤、貯物及工場) Other Specified Uses (Port Back-up, Storage and Workshop)
- OU (LF) 其他指定用途 (物流設施) Other Specified Uses (Logistics Facility)
- OU (E+TP) 其他指定用途 (企業及科技園) Other Specified Uses (Enterprise and Technology Park)

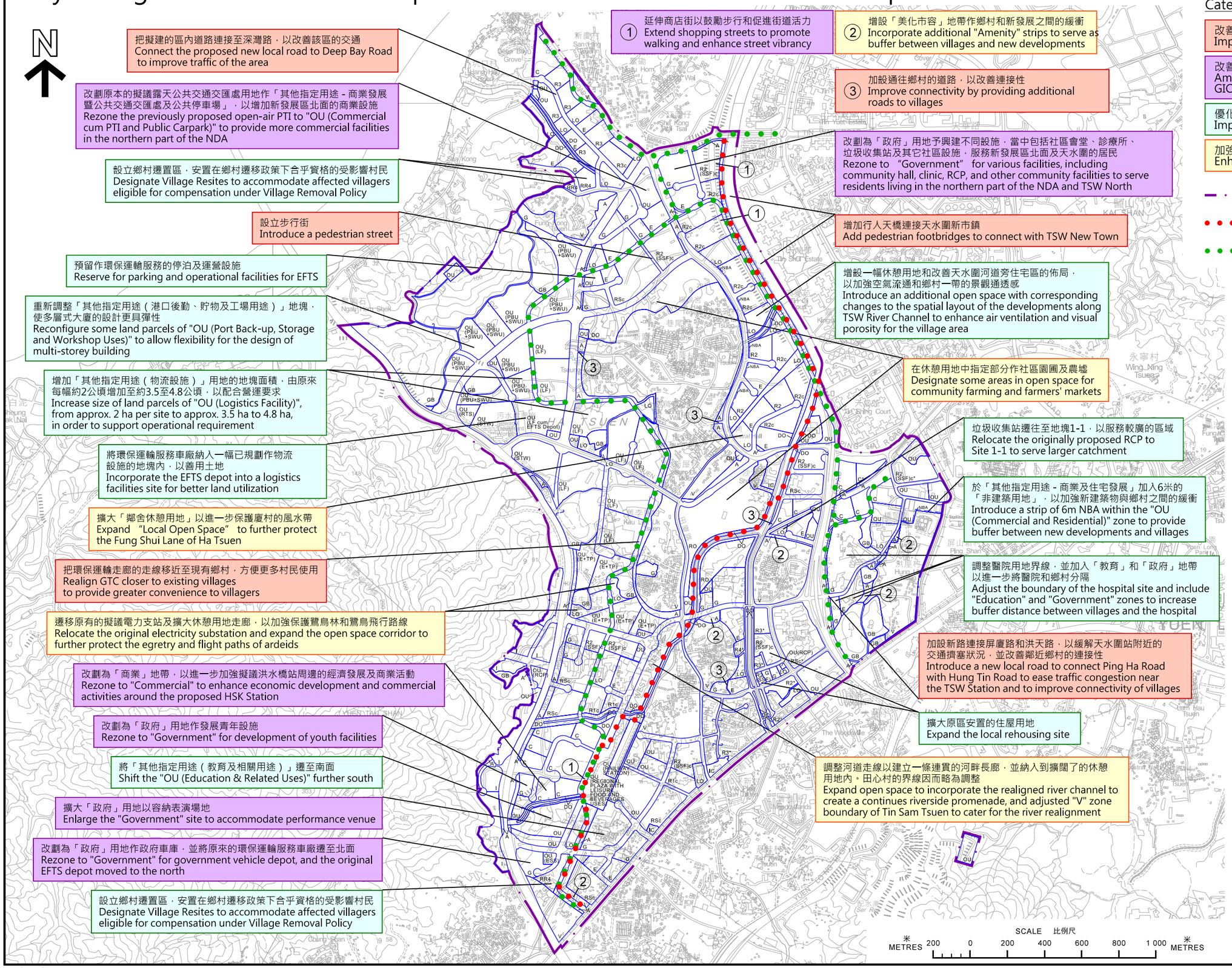
* 土地用途及發展密度按照現時分區計劃大綱圖的規定 Land use and development intensity based on the provisions in current Outline Zoning Plans

60222570/TR23/FIGURE 5.3.1



AECOM	Agreement No. CE 2/2011 (CE) Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation Recommended Outline Development Plan	SCALE	1: 24,000 @ A3	DATE	APR 2017
		CHECK	AM	DRAWN	KL
		JOB No.	60222570	FIGURE 5.3.2	REV

建議發展大綱圖土地用途的主要改變
Key Changes to the Land Use Proposals of Recommended Outline Development Plan



主要修訂類別
Categories of Key Changes

- 改善連接和交通暢達程度 Improving Connectivity and Accessibility
- 改善商業設施及提供政府、機構或社區設施 Ameliorating Provision of Commercial and GIC Facilities
- 優化規劃佈局 Improving Planning Layout
- 加強自然及景觀資源 Enhancing Natural and Landscape Resources

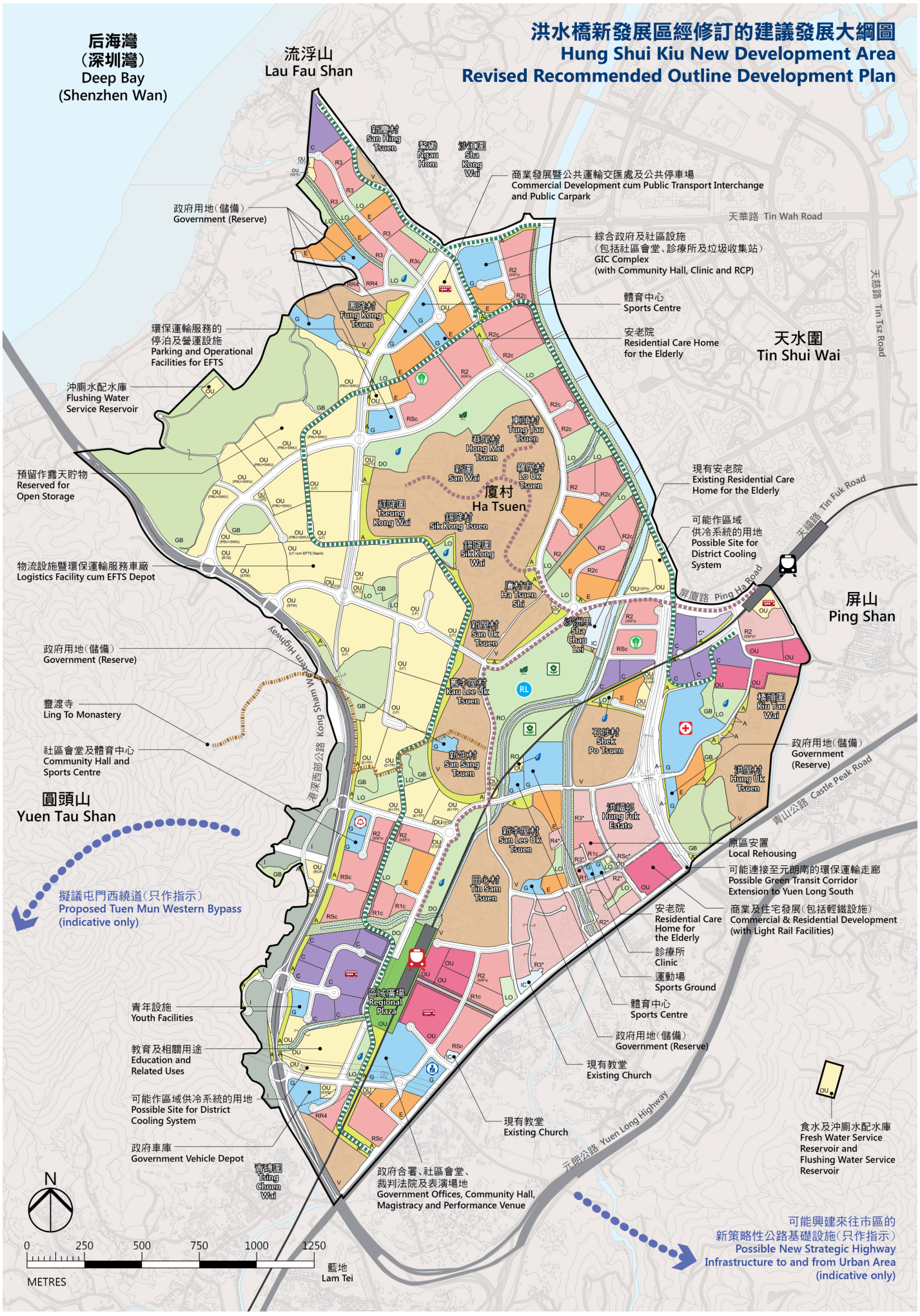
- 洪水橋新發展區界線 Hung Shui Kiu NDA Boundary
- 擬議單車主幹道 Proposed Artery Cycleway
- 擬議環保運輸走廊 Proposed Green Transit Corridor (GTC)

各種土地用途
Schedule of Uses

C	商業 Commercial
R1c	住宅發展密度第一區 (包括商業) Residential – Zone 1 (with commercial)
R2	住宅發展密度第二區 Residential – Zone 2
R2c	住宅發展密度第二區(包括商業) Residential – Zone 2 (with commercial)
R3	住宅發展密度第三區 Residential – Zone 3
R3c	住宅發展密度第三區(包括商業) Residential – Zone 3 (with commercial)
R4	住宅發展密度第四區 Residential – Zone 4
RR4	鄉村住宅發展密度第四區 Rural Residential – Zone 4
RSc	公共屋宇 – 租住公屋(包括商業) Special Residential (with commercial)
R2(SSF)	住宅發展密度第二區(資助出售房屋) Residential – Zone 2 (Subsidised Sale Flats)
R2(SSF)c	住宅發展密度第二區(資助出售房屋) (包括商業) Residential – Zone 2 (Subsidised Sale Flats) (with commercial)
G	政府 Government
IC	機構或社區 Institution or Community
E	教育 Education
GB	綠化地帶 Green Belt
RO	區域休憩用地 Regional Open Space
DO	地區休憩用地 District Open Space
LO	鄰舍休憩用地 Local Open Space
V	鄉村式發展 Village Type Development
I	工業 Industry
A	美化市容 Amenity
OU	其他指定用途 Other Specified Uses
OU(C&R)	其他指定用途 (商業及住宅發展) Other Specified Uses (Commercial & Residential Development)
OU (PBU+SWU)	其他指定用途 (港口後勤、貯物及工場用途) Other Specified Uses (Port Back-up, Storage and Workshop Uses)
OU(LF)	其他指定用途 (物流設施) Other Specified Uses (Logistics Facility)
OU(E+TP)	其他指定用途 (企業及科技園) Other Specified Uses (Enterprise and Technology Park)

60222570/TR23/Figure 5.4.1

洪水橋新發展區經修訂的建議發展大綱圖
Hung Shui Kiu New Development Area
Revised Recommended Outline Development Plan



註釋 Notation

- 洪水橋新發展區界線 Hung Shui Kiu New Development Area Boundary
- 河畔長廊 Riverside Promenade
- 西鐵綫 West Rail Line
- 道路、路口及其他 Roads, Junctions etc.
- 擬建洪水橋站 Proposed Hung Shui Kiu Station
- 現有天水圍站 Existing Tin Shui Wai Station
- 環保運輸走廊 Green Transit Corridor
- 規劃中的道路項目 Road Projects under Planning
- 擬議文物徑 Proposed Heritage Trail
- 擬議生態徑 Proposed Eco Trail
- 非建築用地 Non-Building Area (NBA)
- 公共運輸交匯處 Public Transport Interchange (PTI)
- 醫院和專科及分科診療所 Hospital, Specialist Clinic / Polyclinic
- 區消防局暨救護站及職員宿舍 Divisional Fire Station cum Ambulance Depot cum Staff Quarters
- 警區警署及已婚警察宿舍 District Police Station and Married Quarters
- 擬議街市 Proposed Market
  （三個擬議街市包括在一個方便易達的「政府」用地內設立大型街市以服務有關區域。就這些街市的確實位置將作進一步研究。）
  (Three proposed markets including one of reasonably large size to be provided on a "Government" site to serve the community in the region. Specific locations of these markets will be subject to further assessment.)
- 區域公園 Regional Park
- 社區園圃及農墟 Community Farming and Farmers' Market
- RL 蓄洪湖泊 Flood Retention Lake
- 蓄洪設施 Flood Retention Facilities
- 商店街 Shopping Street
- 步行街 Pedestrian Street
- 現有架空輸電纜 Existing Overhead Transmission Lines
- WRL EAP 西鐵綫緊急通道 West Rail Line Emergency Access Point
- ESS 電力支站 Electricity Substation
- LPG 石油氣加氣站 Liquefied Petroleum Gas Filling Station
- PFS 加油站 Petrol Filling Station
- RCP 垃圾收集站 Refuse Collection Point
- RTS 廢物轉運站 Refuse Transfer Station
- SPS 污水抽水站 Sewage Pumping Station
- STW 污水處理廠 Sewage Treatment Works
- TE 電話機樓 Telephone Exchange

各種土地用途 Schedule of Uses		地積比率 Plot Ratio
C	商業 Commercial	1.5 / 5 / 8 / 9.5
R1	住宅發展密度第一區（原區安置） Residential - Zone 1 (Local Rehousing)	5.5
R1c	住宅發展密度第一區（原區安置）（包括商業用途） Residential - Zone 1 (Local Rehousing) (with commercial)	6
R1c	住宅發展密度第一區（包括商業用途） Residential - Zone 1 (with commercial)	6 / 6.5
R2	住宅發展密度第二區 Residential - Zone 2	5
R2c	住宅發展密度第二區（包括商業用途） Residential - Zone 2 (with commercial)	5.5
R3	住宅發展密度第三區 Residential - Zone 3	2.5
R3c	住宅發展密度第三區（包括商業用途） Residential - Zone 3 (with commercial)	3.5
R4	住宅發展密度第四區 Residential - Zone 4	--
RR4	鄉郊住宅發展密度第四區 Rural Residential - Zone 4	--
RSc	公共屋宇 - 租住公屋（包括商業用途） Special Residential - Public Rental Housing (with commercial)	6
R2(SSF)c	住宅發展密度第二區（資助出售房屋）（包括商業用途） Residential - Zone 2 (Subsidised Sales Flat) (with commercial)	5.5
I	工業 Industry	3
OU	其他指定用途 - 商業及住宅發展 Other Specified Uses - Commercial & Residential Development	7
OU	其他指定用途 - 商業及住宅發展（包括輕鐵設施） Other Specified Uses - Commercial & Residential Development (with Light Rail Facilities)	5
OU(LF)	其他指定用途（物流設施） Other Specified Uses (Logistics Facility)	5
OU(E+TP)	其他指定用途（企業和科技園） Other Specified Uses (Enterprise and Technology Park)	5
OU(PBU+SWU)	其他指定用途（港口後勤、貯物及工場用途） Other Specified Uses (Port Back-up, Storage and Workshop Uses)	
OU	其他指定用途 Other Specified Uses	
OU	其他指定用途 - 區域廣場 Other Specified Uses - Regional Plaza	
V	鄉村式發展 Village Type Development	
G	政府 Government	
IC	機構或社區 Institution or Community	
E	教育 Education	
GB	綠化地帶 Green Belt	
RO	區域休憩用地 Regional Open Space	
DO	地區休憩用地 District Open Space	
LO	鄰舍休憩用地 Local Open Space	
A	美化市容地帶 Amenity Area	

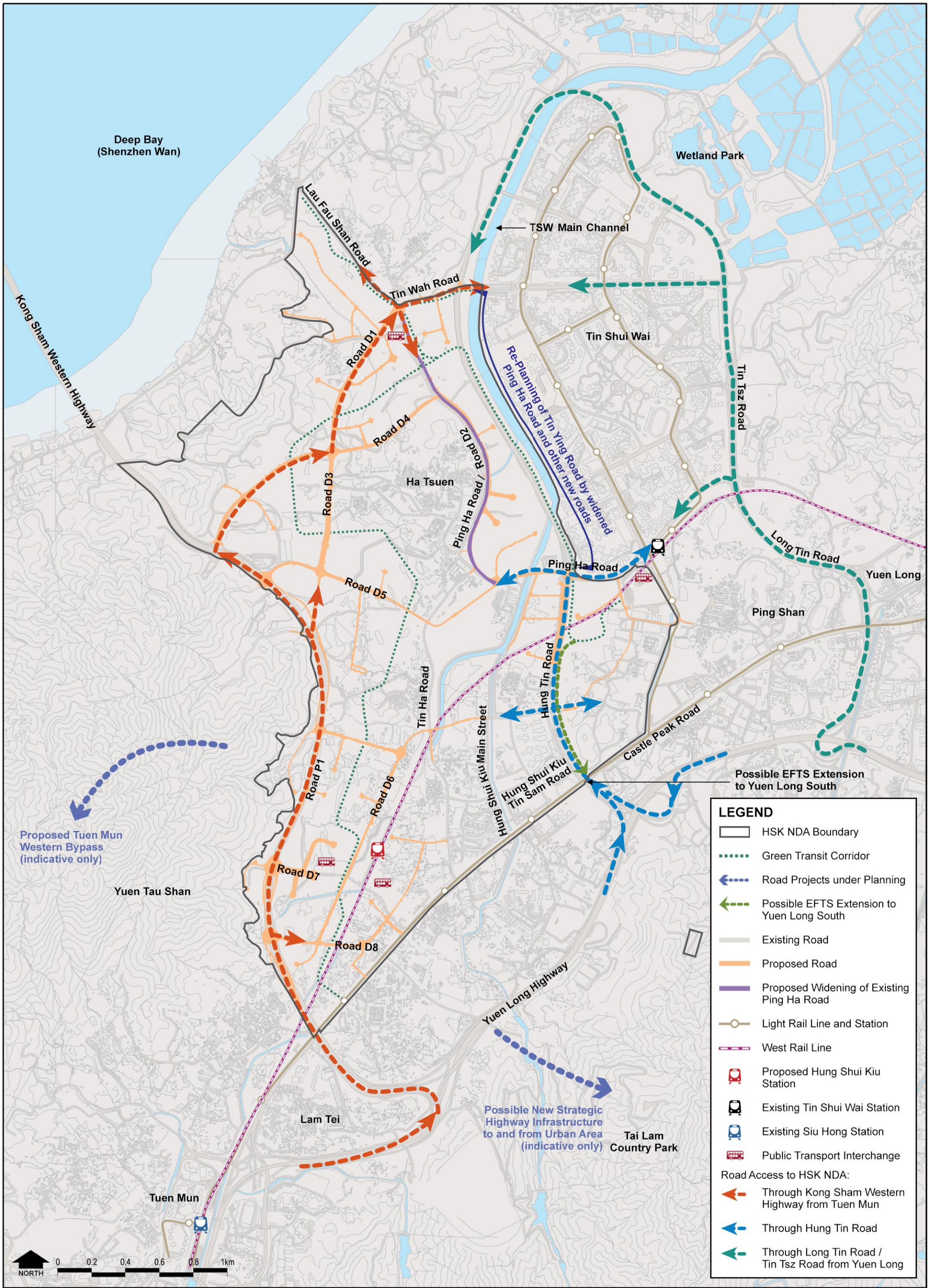
*土地用途及發展密度按照現時分區計劃大綱圖的規定
Land use and development intensity based on the provisions in current Outline Zoning Plans

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Revised Recommended Outline Development Plan

SCALE	1: 24,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	KL
JOB No.	60222570	FIGURE 5.4.2	REV

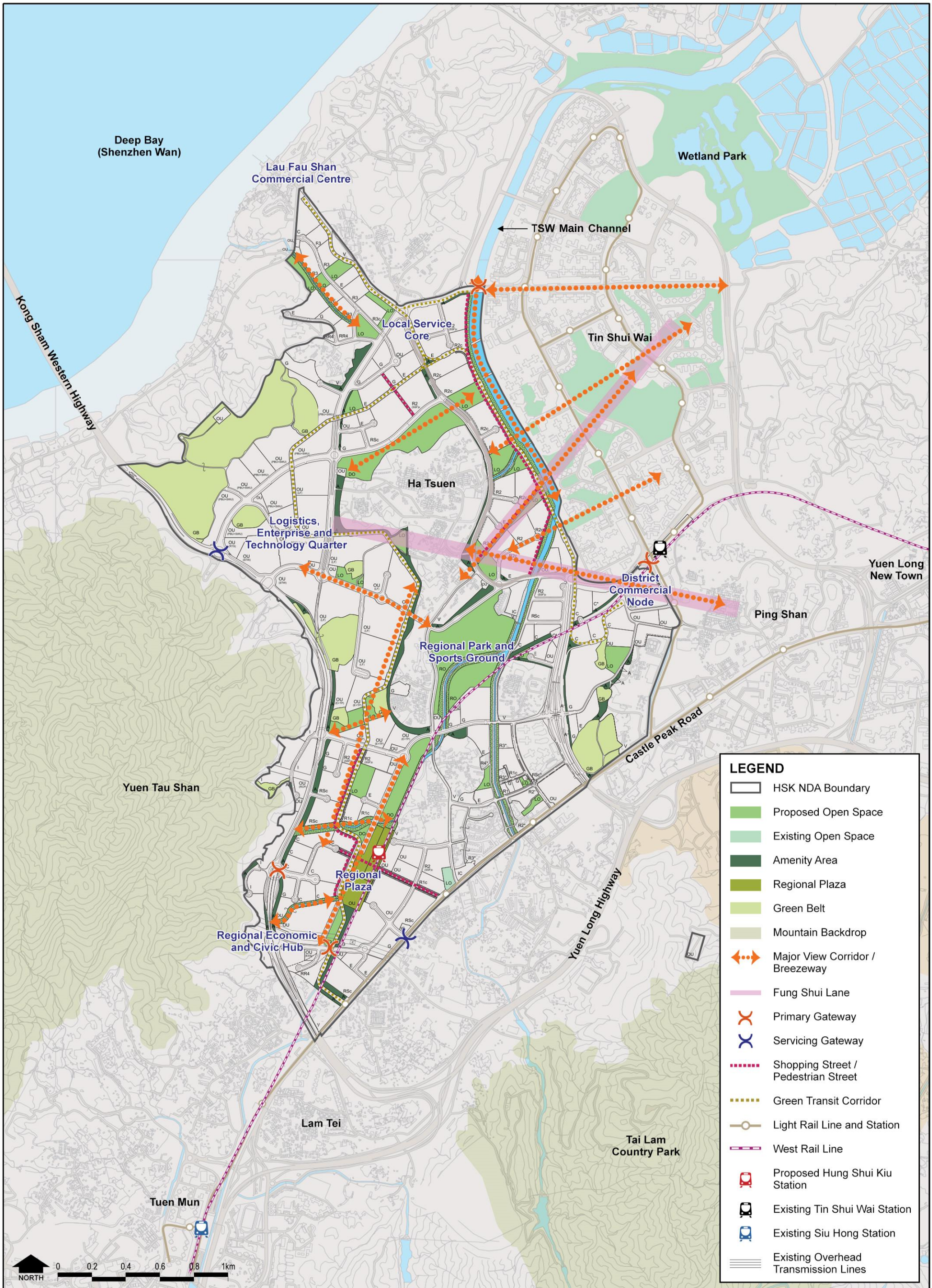


AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Transport Network Plan

SCALE	1: 20,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	KL
JOB No.	60222570	FIGURE 5.4.3	REV

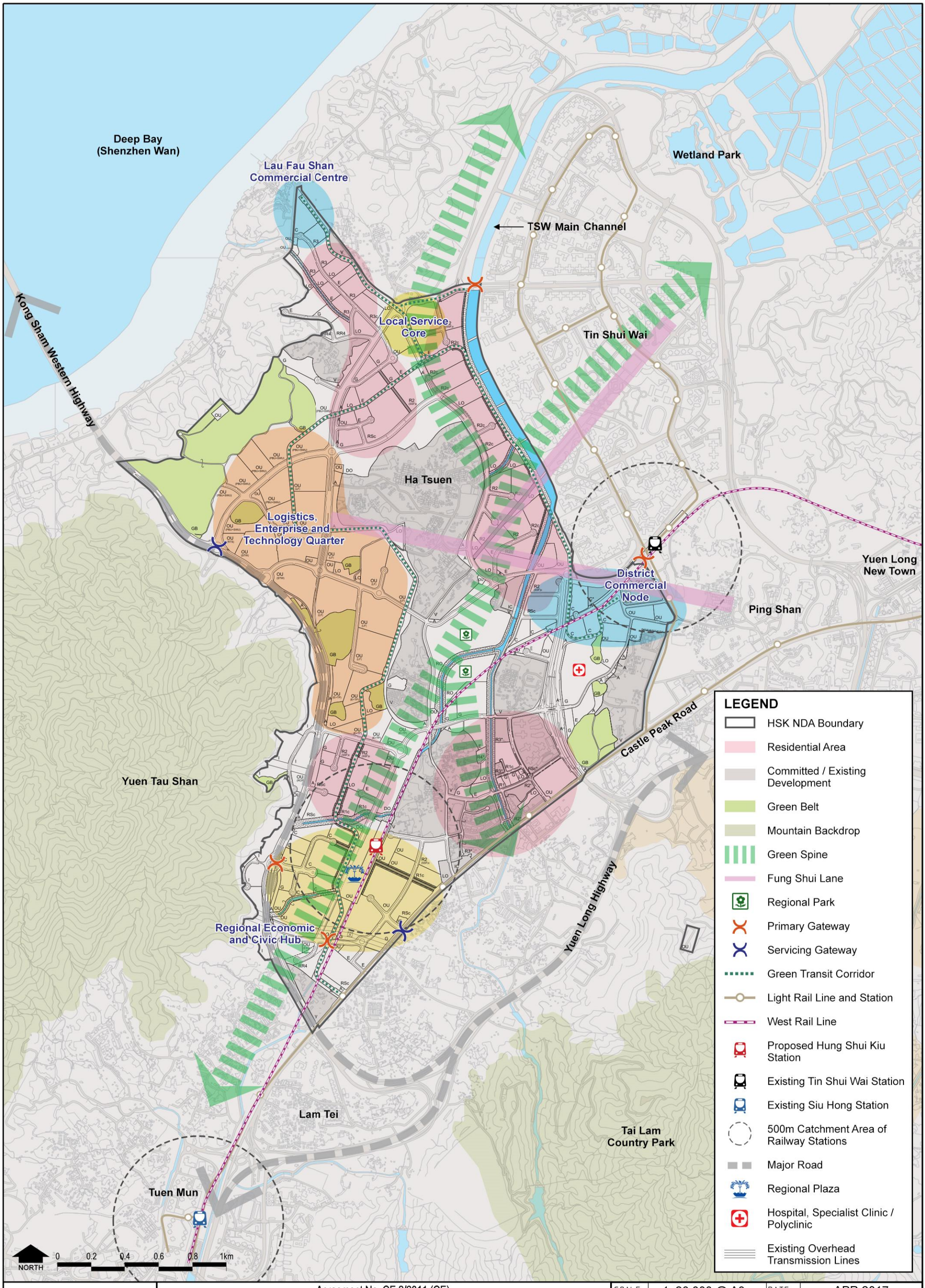


AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Master Urban Design Plan

SCALE	1: 20,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	PN
JOB No.	60222570	DRAWING No. FIGURE 6.1.1	REV

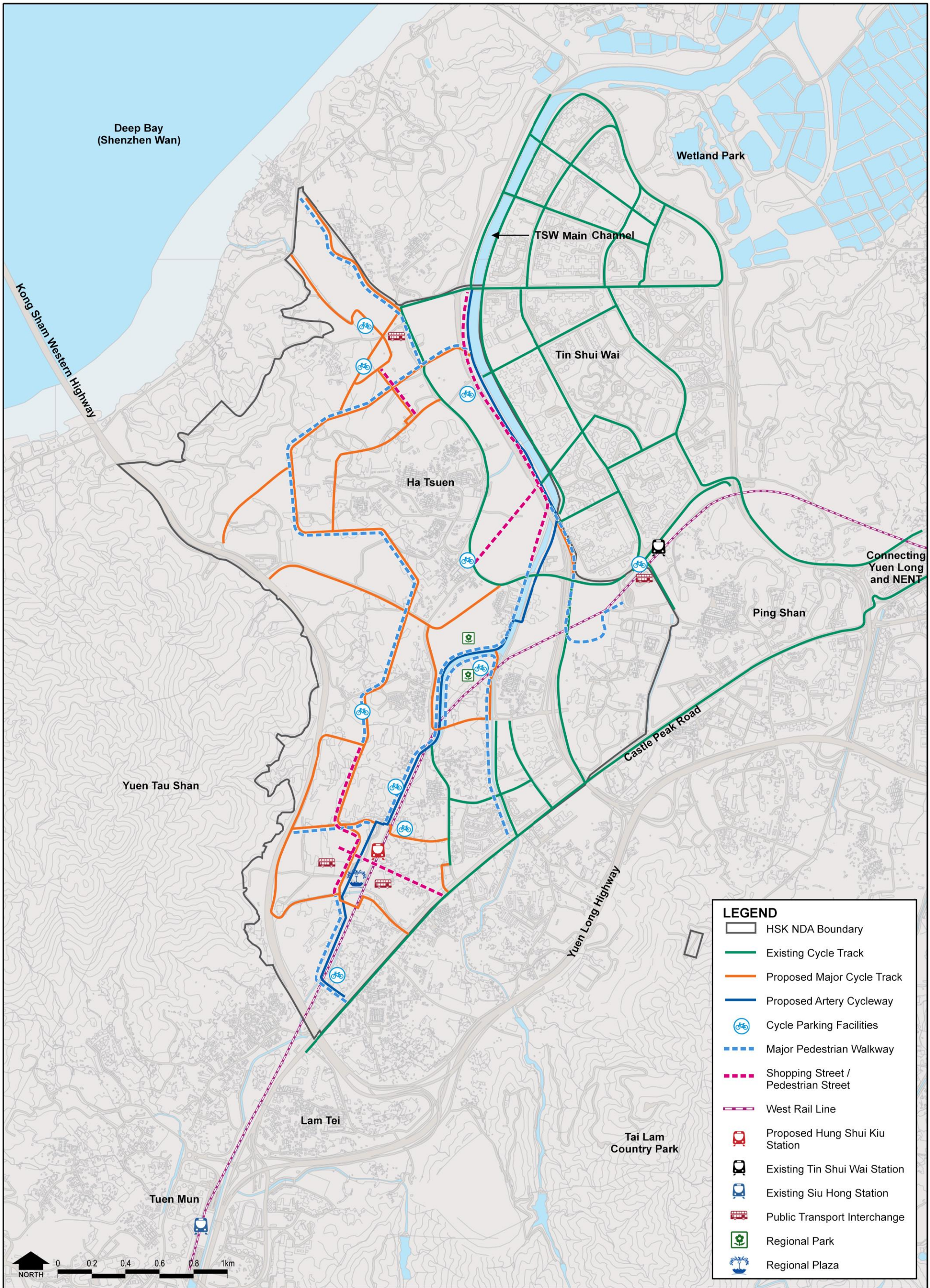


AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Land Use Framework Plan

SCALE	1: 20,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	KL
JOB No.	60222570	FIGURE 6.1.2	REV



AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Proposed Pedestrian Walkway Network and Cycle Tracks

SCALE	1: 20,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	PN
JOB No.	60222570	FIGURE 6.1.3	REV

DEVELOPMENT CHARACTER AREAS

- Riverine and Village Neighbourhood
- Bayview Neighbourhood and Local Service Core
- Logistics, Enterprise and Technology Quarter
- Regional Economic and Civic Hub
- District Commercial Node

Bayview Neighbourhood and Local Service Core

Riverine and Village Neighbourhood

Logistics, Enterprise and Technology Quarter

District Commercial Node

Regional Economic and Civic Hub

Lau Fau Shan
Tin Shui Wai Park
Ping Shan
Yuen Tau Shan
Tung Tau Tsuen
Hong Mei Tsuen
Ha Tsuen San Wai
Tseung Kong Wai
Sik Kong Tsuen
Lo Uk Tsuen
San Uk Tsuen
Sha Chau Lei
Kau Lee Uk Tsuen
Shek Po Tsuen
San Sang Tsuen
Kiu Tau Wai
Hung Uk Tsuen
San Lee Uk Tsuen
Tin Sum Tsuen
Chung Uk Tsuen
Sun Fung Wai
Nai Wai
Tsing Chuen Wai
Lam Tei
To Yuen Long
To Yuen Long South
To Tuen Mun
POSSIBLE EXTERNAL ROAD TO AND FROM TUEN MUN
CASTLE PEAK ROAD
YUEN LONG HIGHWAY
FUNG SHUI CORRIDOR
FUNG SHUI AREA
ROAD D1
ROAD D2
ROAD D4
ROAD D5
ROAD D7
ROAD D8
TELEPHONE EXCHANGE
PROPOSED HUNG SHUI KIU STATION
HUNG FUK ESTATE
HOSPITAL, SPECIALIST CLINIC/ POLYCLINIC
SPECIAL INDUSTRY (PORT BACK-UP STORAGE AND WORKSHOP USES)
RESERVED FOR OPEN STORAGE
COMMUNITY FARMING AND FARMERS' MARKETS
EDUCATION & RELATED USES
SITE FOR LOCAL HOUSING
(COMMERCIAL & RESIDENTIAL DEVELOPMENT WITH LIGHT RAIL FACILITIES)
(REGIONAL PLAZA WITH LEISURE, FOOD AND BEVERAGE USES)
RETENTION FACILITIES
PTI COMMERCIAL CUM PUBLIC TRANSPORT INTERCHANGE AND PUBLIC CARPARK
(PARKING AND OPERATIONAL FACILITIES FOR EFTS)
NWSR & FLWSR

0 200 400 600 800m
NORTH

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Development Character Areas (DCA)

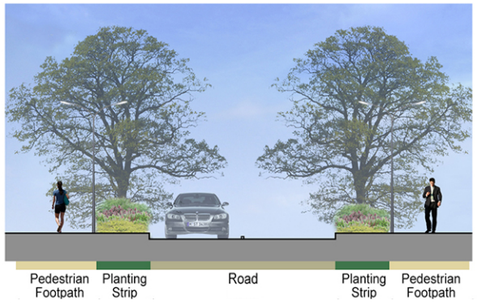
SCALE	1: 15,000 @ A3	DATE	APR 2017
CHECK	AM	DRAWN	PN
JOB No.	60222570	FIGURE 6.2.1	REV

AECOM

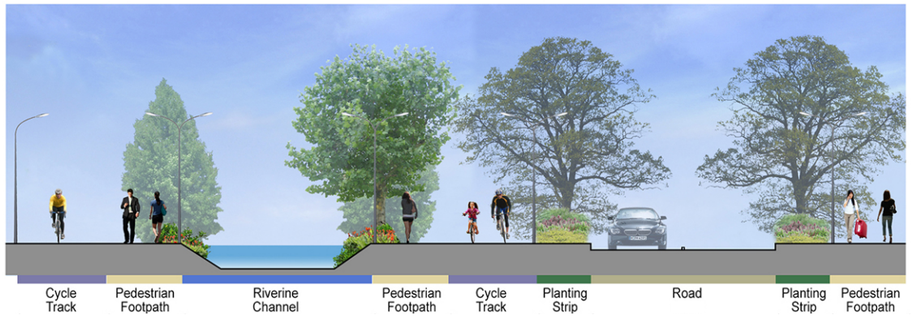
Agreement No. CE2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Master Landscape Plan

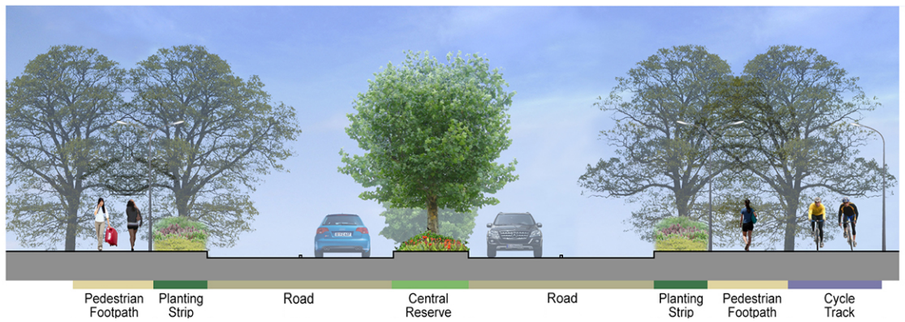
SCALE	AS SHOWN @ A3	DATE	APR 2017
CHECK	AM	DRAWN	PN
JOB No.	60222570	DRAWING No. FIGURE 6.3.1	REV



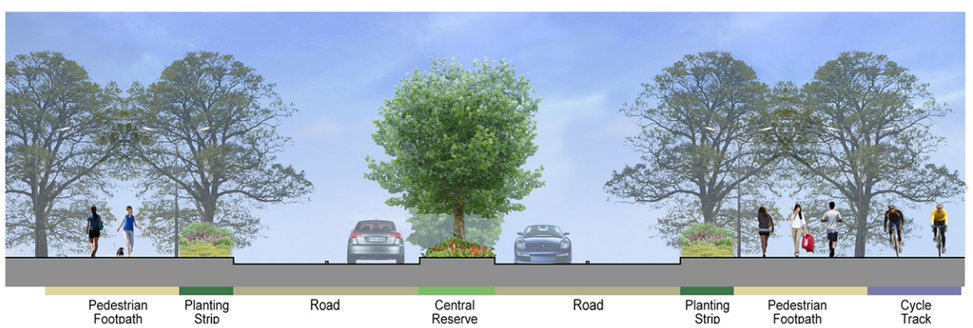
Section A - Single Carriageway



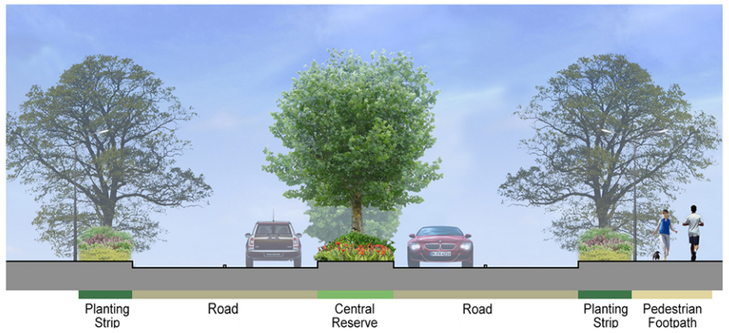
Section B - Single Carriageway



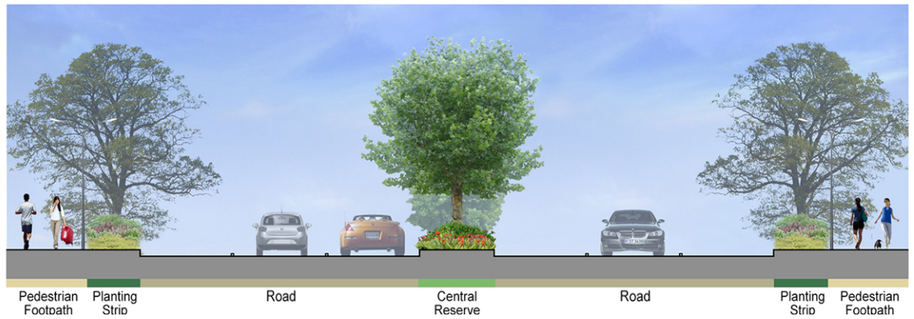
Section C - Dual-Two Carriageway



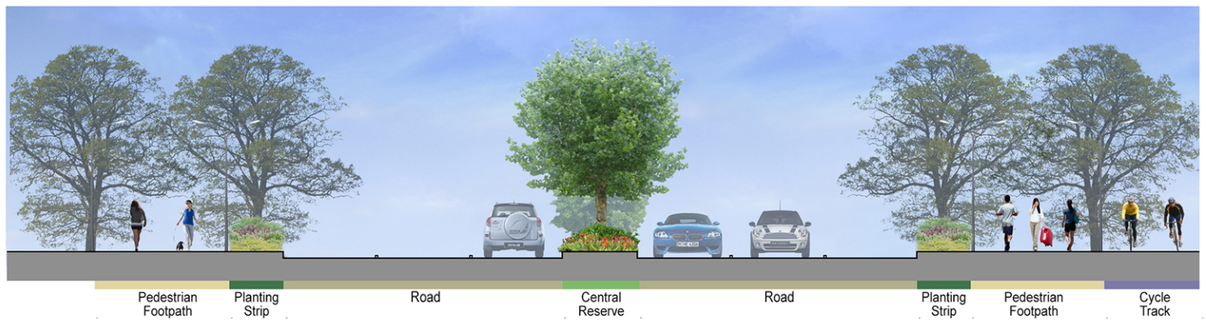
Section D - Dual-Two Carriageway



Section E - Dual-Two Carriageway



Section F - Dual-Three Carriageway



Section G - Dual-Three Carriageway

* Dimensions Subject to Preliminary Design

0 2 4 6 8m

AECOM

Agreement No. CE 2/2011 (CE)
Hung Shui Kiu New Development Area Planning and Engineering Study - Investigation

Proposed Enhancement Measures for Transportation Corridors

SCALE	AS SHOWN @ A3	DATE	OCTOBER 2016
CHECK	AM	DRAWN	KL
JOB No.	60222570	DRAWING No.	FIGURE 6.3.2
		REV	

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

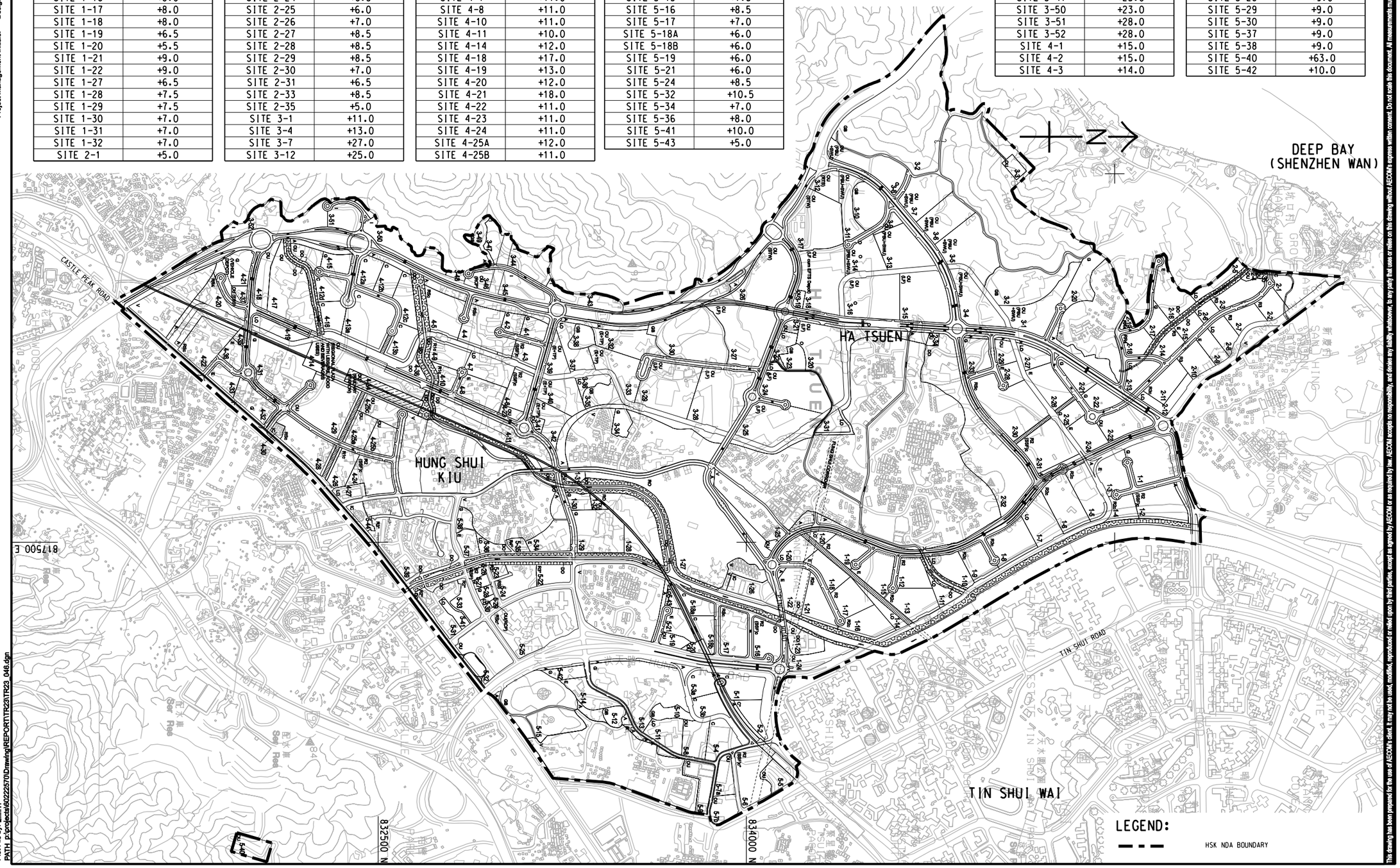
Project Management Initials:

RECOMMENDED FORMATION LEVELS FOR DEVELOPMENT SITES WITH FILLING

SITE NOS.	LEVEL
SITE 1-1	+6.5
SITE 1-3	+6.5
SITE 1-5	+6.0
SITE 1-7	+6.0
SITE 1-8	+6.0
SITE 1-9	+6.0
SITE 1-10	+6.0
SITE 1-11	+6.5
SITE 1-12	+6.5
SITE 1-13	+6.5
SITE 1-14	+7.0
SITE 1-15	+6.5
SITE 1-16	+8.0
SITE 1-17	+8.0
SITE 1-18	+8.0
SITE 1-19	+6.5
SITE 1-20	+5.5
SITE 1-21	+9.0
SITE 1-22	+9.0
SITE 1-27	+6.5
SITE 1-28	+7.5
SITE 1-29	+7.5
SITE 1-30	+7.0
SITE 1-31	+7.0
SITE 1-32	+7.0
SITE 2-1	+5.0
SITE 2-2	+5.5
SITE 2-3	+6.0
SITE 2-4	+5.0
SITE 2-6	+6.5
SITE 2-7	+6.0
SITE 2-8	+6.0
SITE 2-9	+6.5
SITE 2-10	+6.5
SITE 2-11	+6.5
SITE 2-12	+6.5
SITE 2-13	+6.5
SITE 2-14	+6.5
SITE 2-15	+6.5
SITE 2-17	+7.5
SITE 2-18	+7.5
SITE 2-21	+6.5
SITE 2-22	+6.5
SITE 2-23	+6.5
SITE 2-24	+6.5
SITE 2-25	+6.0
SITE 2-26	+7.0
SITE 2-27	+8.5
SITE 2-28	+8.5
SITE 2-29	+8.5
SITE 2-30	+7.0
SITE 2-31	+6.5
SITE 2-33	+8.5
SITE 2-35	+5.0
SITE 3-1	+11.0
SITE 3-4	+13.0
SITE 3-7	+27.0
SITE 3-12	+25.0
SITE 3-15	+13.0
SITE 3-18	+16.0
SITE 3-19	+16.0
SITE 3-21	+13.0
SITE 3-22	+13.0
SITE 3-24	+9.0
SITE 3-25	+10.0
SITE 3-26	+17.0
SITE 3-27	+14.0
SITE 3-28	+12.0
SITE 3-29	+12.0
SITE 3-39	+16.0
SITE 3-40	+12.0
SITE 3-41	+11.0
SITE 3-42	+11.0
SITE 3-45	+24.0
SITE 3-46	+24.0
SITE 3-48	+24.0
SITE 4-7	+11.0
SITE 4-8	+11.0
SITE 4-10	+11.0
SITE 4-11	+10.0
SITE 4-14	+12.0
SITE 4-18	+17.0
SITE 4-19	+13.0
SITE 4-20	+12.0
SITE 4-21	+18.0
SITE 4-22	+11.0
SITE 4-23	+11.0
SITE 4-24	+11.0
SITE 4-25A	+12.0
SITE 4-25B	+11.0
SITE 4-25C	+11.0
SITE 4-26	+12.0
SITE 4-28	+13.0
SITE 4-29	+13.0
SITE 4-31	+12.0
SITE 4-33	+12.0
SITE 4-34	+11.0
SITE 4-35	+12.0
SITE 4-36	+12.0
SITE 4-37	+15.0
SITE 5-1	+7.0
SITE 5-3A	+7.0
SITE 5-3B	+7.0
SITE 5-4	+7.0
SITE 5-7A	+5.0
SITE 5-7B	+5.0
SITE 5-8	+7.0
SITE 5-9	+5.0
SITE 5-13	+7.5
SITE 5-16	+8.5
SITE 5-17	+7.0
SITE 5-18A	+6.0
SITE 5-18B	+6.0
SITE 5-19	+6.0
SITE 5-21	+6.0
SITE 5-24	+8.5
SITE 5-32	+10.5
SITE 5-34	+7.0
SITE 5-36	+8.0
SITE 5-41	+10.0
SITE 5-43	+5.0

RECOMMENDED FORMATION LEVELS FOR DEVELOPMENT SITES WITH EXCAVATION

SITE NOS.	LEVEL
SITE 1-2	+6.5
SITE 1-4	+6.5
SITE 1-6	+6.0
SITE 1-23	+6.0
SITE 1-24	+7.0
SITE 2-5	+6.5
SITE 2-16	+7.5
SITE 2-19	+7.5
SITE 2-20	+13.0
SITE 2-32	+6.5
SITE 2-34	+10.0
SITE 3-3	+76.0
SITE 3-5	+22.0
SITE 3-6	+24.0
SITE 3-8	+28.0
SITE 3-9	+26.0
SITE 3-11	+22.0
SITE 3-13	+22.0
SITE 3-14	+21.0
SITE 3-16	+14.0
SITE 3-17	+20.0
SITE 3-20	+10.0
SITE 3-31	+8.0
SITE 3-32	+16.0
SITE 3-33	+12.0
SITE 3-34	+11.0
SITE 3-36	+12.0
SITE 3-37	+16.0
SITE 3-43	+25.0
SITE 3-44	+25.0
SITE 3-47	+25.0
SITE 3-50	+23.0
SITE 3-51	+28.0
SITE 3-52	+28.0
SITE 4-1	+15.0
SITE 4-2	+15.0
SITE 4-3	+14.0
SITE 4-4	+15.0
SITE 4-5	+16.0
SITE 4-6	+10.0
SITE 4-9	+11.0
SITE 4-12A	+17.0
SITE 4-12B	+16.0
SITE 4-12C	+15.0
SITE 4-12D	+18.0
SITE 4-13A	+15.0
SITE 4-13B	+12.0
SITE 4-15	+18.0
SITE 4-16	+15.0
SITE 4-17	+18.0
SITE 4-32	+12.0
SITE 4-38	+11.0
SITE 5-11	+8.0
SITE 5-14	+8.5
SITE 5-26	+8.0
SITE 5-28	+9.0
SITE 5-29	+9.0
SITE 5-30	+9.0
SITE 5-37	+9.0
SITE 5-38	+9.0
SITE 5-40	+63.0
SITE 5-42	+10.0



AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
現狀

SCALE 比例
A3 1 : 16000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱
RECOMMENDED SITE FORMATION LEVEL

SHEET NUMBER
圖紙編號
60222570/TR23/FIGURE 7.3.1

Plot File by: LMH1
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_046.dgn

NOTE:

1. THE FIGURE SHOWS THE INDICATE LOCATION OF THE VILLAGES ONLY.

LEGEND:

HSK NDA BOUNDARY

DEEP BAY

YICK YUEN TSUEN

SAN SANG SAN TSUEN

TIN SAM SAN TSUEN

SHEK PO ROAD MEI TSUEN

SHA CHAU LEI (II)

HA TSUEN

TIN SHUI WAI

PING SHAN

KONG SHAM WESTERN HIGHWAY

TIN YING ROAD

CASTLE PEAK ROAD

YUEN LONG HIGHWAY

832500 N

834000 N

816000 E

817500 E

819000 E

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: CAOPA
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_417.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
現狀

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

KEY PLAN FOR THE FIVE AFFECTED AREAS

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.4.1

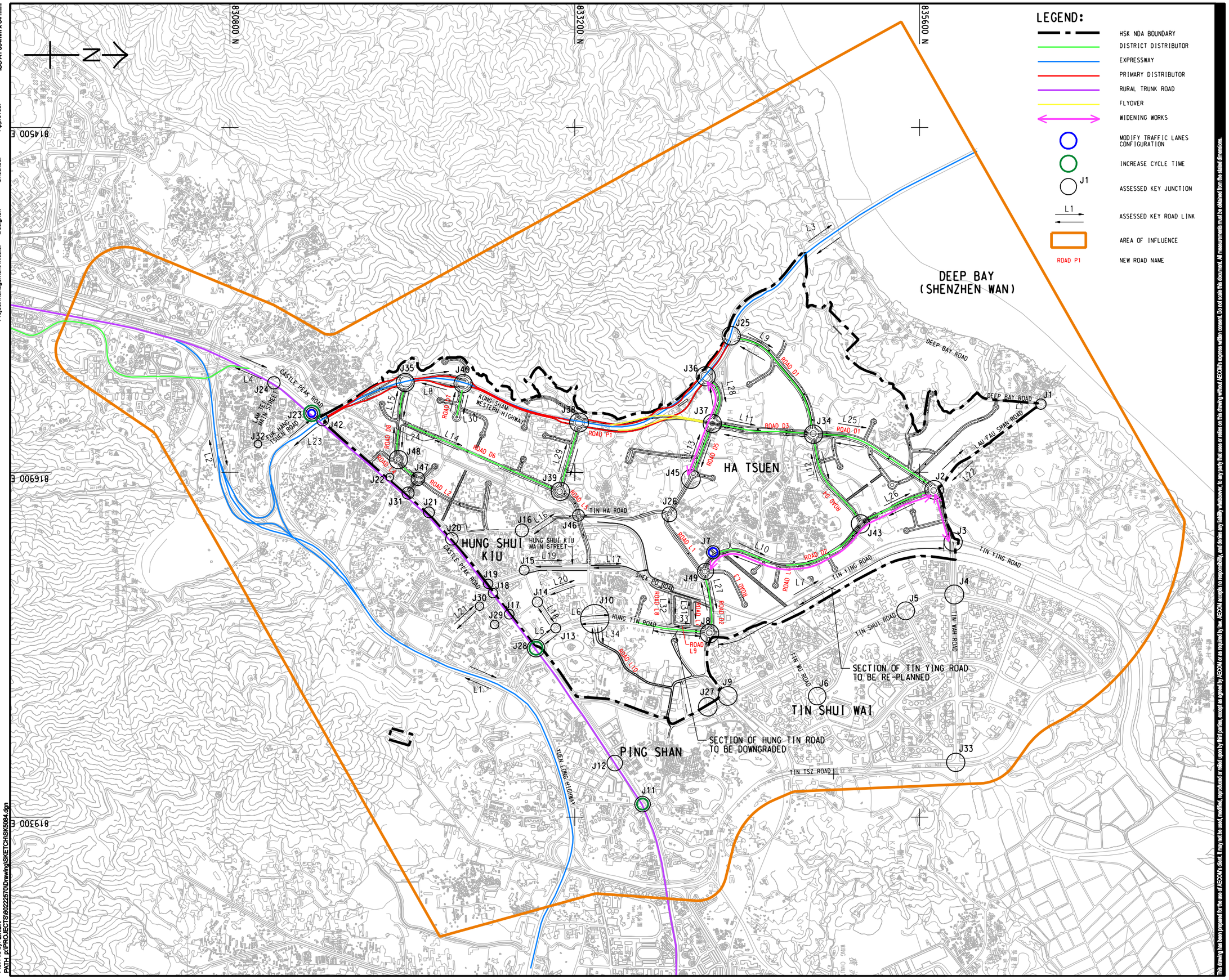
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: LINCR
PATH: p:\PROJECTS\60222570\Drawing\SKETCH\SK6084.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
階段

SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

PROPOSED ROAD NETWORK AND LOCATION OF ASSESSED JUNCTIONS AND ROAD LINKS OF THE HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.6.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initiatis:

830800 N

833200 N

835600 N

817000 E

819400 N

ALONG CASTLE PEAK ROAD

ORIGIN / DESTINATION	ROUTE NO.
HONG KONG ISLAND	960A, 960B, 960P, 960X
KOWLOON	63X, 68X, 258P, 268X, 606S YUEN LONG - MONG KOK / JORDAN
NT EAST	261P
SWNT	53, 68A
TUEN MUN / YUEN LONG	32 YUEN LONG-TUEN MUN
MTR BUS	K75, K75P, K75A
CROSS BOUNDARY	B2
AIRPORT	A33P, A36, A37
TIN SHUI WAI	619

ALONG TIN HA ROAD

ORIGIN / DESTINATION	ROUTE NO.
SWNT	53
MTR BUS	K75, K75P, K75A
KOWLOON	63X, 68X

ALONG LAU FAU SHAN ROAD

ORIGIN / DESTINATION	ROUTE NO.
YUEN LONG	33, 34, 35
MTR BUS	K65
NDA INTERNAL	34A

ALONG PING HA ROAD

ORIGIN / DESTINATION	ROUTE NO.
YUEN LONG	33, 34, 35
MTR BUS	K65, K75, K75A, K75P, K75S, K76
NDA INTERNAL	34A
CROSS BOUNDARY	618, B2P, B2X
TIN SHUI WAI STATION	619
SWNT	53
AIRPORT	N30, N3CS
HK ISLAND	969B, 969X

ALONG HUNG TIN ROAD

ORIGIN / DESTINATION	ROUTE NO.
MTR BUS	K75, K75P, K75A, K75S
SWNT	68A
AIRPORT	A37
NT EAST	261P
TIN SHUI WAI STATION	619

LEGEND:

- HSK NDA BOUNDARY
- EFTS ALIGNMENT
- POTENTIAL EFTS EXTENTION (SUBJECT TO FURTHER STUDIES)
- AREA OF INFLUENCE
- PUBLIC TRANSPORT INTERCHANGE
- PROPOSED PUBLIC TRANSPORT INTERCHANGE
- B2 — FRANCHISED BUS
- 618 — GREEN MINIBUS
- YUEN LONG - MONG KOK — RED MINIBUS
- TIN SHUI WAI — WEST RAIL STATION
- NAI WAI — LIGHT RAIL STATION
- FEEDER BUS ROUTE TIN SHUI WAI STATION - LAU FAU SHAN
- FEEDER BUS ROUTE HUNG SHUI KIU STATION - LAU FAU SHAN
- FEEDER BUS ROUTE TIN SHUI WAI STATION - HUNG SHUI KIU STATION

YUEN TAU SHAN

DEEP BAY

SIU HONG

HA TSUEN

PING SHAN

TIN SHUI WAI

LEUNG KING
SAN WAI
TIN KING
TIN SANG
TAI HING (NORTH)
TAI HING (SOUTH)
CHING CHONG
TUEN MUN HOSPITAL
KEI LUN
SIU HONG
FUNG TEI
LAM TEI
CASTLE PEAK ROAD
LAM TEI MAIN STREET
FUK HANG TSUEN ROAD
NAI WAI
KONG SHAM WESTERN HIGHWAY
HUNG SHUI KIU
CHUNG UK TSUEN
ROAD D1
ROAD D2
ROAD D3
ROAD D4
ROAD D5
ROAD D6
ROAD L1
ROAD L2
ROAD L3
ROAD L4
ROAD L5
ROAD L6
TIN HA ROAD
SHEK PO ROAD
HUNG TIN ROAD
DEEP BAY ROAD
LAU FAU SHAN ROAD
TIN YING ROAD
TIN SHUI ROAD
TIN WU ROAD
TIN WAH ROAD
TIN TSZ ROAD
YUEN LONG HIGHWAY
HANG MEI TSUEN
TONG FONG TSUEN
CHUNG FU
TIN FU
TIN YAT
TIN HENG
CHESTWOOD
COCOMO
TIN SHUI
TIN YIU
TIN WING
TIN YUET
TIN SAU
WETLAND PARK
GINZA
TIN SHUI WAI
TIN WU
TIN TSZ

AECOM

PROJECT
項目
HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主
CEDD 土木工程拓展署 Civil Engineering and Development Department
規劃署 Planning Department

CONSULTANT
工程顧問公司
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
現狀

SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱
FUTURE PUBLIC TRANSPORT SERVICES ON MAJOR ROADS IN HUNG SHUI KIU NDA

SHEET NUMBER
圖紙編號
60222570/TR23/FIGURE 7.6.2

Plot File by: JIANGMH
PATH: p:\PROJECTS\60222570\Drawing\SKETCH\SK5085.dgn

NO.	FOOTBRIDGE / SUBWAY TO BE PROVIDED IN STAGE OF DEVELOPMENT
SW1	STAGE 2
SW2	ADVANCE WORKS PHASE 3
SW3	STAGE 2
SW4	STAGE 3
SW5	STAGE 3
FB1	STAGE 3
FB2	STAGE 3
FB3	STAGE 4
FB4	STAGE 4
FB5	NOT USED
FB6	NOT USED
FB7	STAGE 3
FB8	STAGE 3
FB9	STAGE 3
FB10	STAGE 3
FB11	STAGE 3
FB12	STAGE 2
FB13	STAGE 3
FB14	STAGE 4

NOTE:

1. THE AT-GRADE PEDESTRIAN CROSSING IS NOT SHOWN AND SUBJECT TO FURTHER DESIGN REVIEW.

LEGEND:

- HSK NDA BOUNDARY
- FOOTBRIDGE
- SUBWAY
- EFTS ALIGNMENT

834000 N

835500 N

817500 E

819000 E

DEEP BAY (SHENZHEN WAN)

HA TSUEN

HUNG SHUI KIU

TIN SHUI WAI

PING SHAN

SW1 SW2 SW3 (EFTS) SW4 (EFTS) SW5 (EFTS)

FB1 FB2 FB3 FB4 FB7 FB8 (EFTS) FB9 FB10 (EFTS) FB11 (EFTS) FB12 (EFTS) FB13 (EFTS) FB14 (EFTS)

CASTLE PEAK ROAD

LAM TEI MAIN STREET

FUK HANG TSUEN ROAD

KONG SHAM WESTERN HIGHWAY

ROAD D1 ROAD D3 ROAD D5 ROAD D6 ROAD D8 ROAD P1 ROAD L2 ROAD L5 ROAD L1 ROAD L3 ROAD D2 ROAD D4

TIN HA ROAD SHEK PO ROAD HUNG TIN ROAD

DEEP BAY ROAD LAU FAU SHAN ROAD TIN YING ROAD TIN WAH ROAD TIN WU ROAD TIN TSZ ROAD

YUEN LONG HIGHWAY

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: LINCR
PATH: p:\PROJECTS\60222570\Drawing\SKETCH\SK5086.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核准

STATUS
狀況

SCALE 比例: A3 1 : 16000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60222570

AGREEMENT NO. 協議編號: CE2/2011 (CE)

SHEET TITLE
圖紙名稱

FUTURE PEDESTRIAN FACILITIES NETWORK

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.6.3

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTES:

1. 4.0 m WIDTH WILL BE ALLOWED FOR NEW CYCLE TRACKS WHILE 5.0 m WIDTH WILL BE PROVIDED IN THE GREEN TRANSIT CORRIDOR.
2. CYCLE PARKING AREAS TO BE PROVIDED IN HSK STATION, PTIS AND MAJOR RESIDENTIAL DEVELOPMENTS IN HSK NDA.

LEGEND:

- HSK NDA BOUNDARY
- EXISTING CYCLE TRACK
- PROPOSED ARTERY CYCLEWAY
- PROPOSED CYCLE TRACK/REPROVISION OF EXISTING CYCLE TRACK
- POTENTIAL CYCLE TRACK CONNECTION (SUBJECT TO FURTHER REVIEW)
- EFTS ALIGNMENT

832500 N

834000 N

819000 E

817500 E

CASTLE PEAK ROAD

LAM TEI STREET

MAIN STREET

FUK HANG TSUEN ROAD

KONG SHAM WESTERN HIGHWAY

ROAD D1

ROAD D8

ROAD D6

ROAD L4

ROAD L2

ROAD L5

TIN HA ROAD

ROAD D3

ROAD D5

ROAD L1

SHEK PO ROAD

HUNG SHUI KIU

HUNG TIN ROAD

ROAD D2

ROAD L6

ROAD L3

DEEP BAY ROAD

LAU FAU SHAN ROAD

ROAD D4

TIN YING ROAD

TIN SHUI ROAD

TIN WU ROAD

TIN TSZ ROAD

PING SHAN

TUEN LONG HIGHWAY

Plot File by: LINCR
PATH: p:\PROJECTS\60222570\Drawing\SKETCH\SK5087.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核查

STATUS
階段

SCALE
比例

A1 1 : 8000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

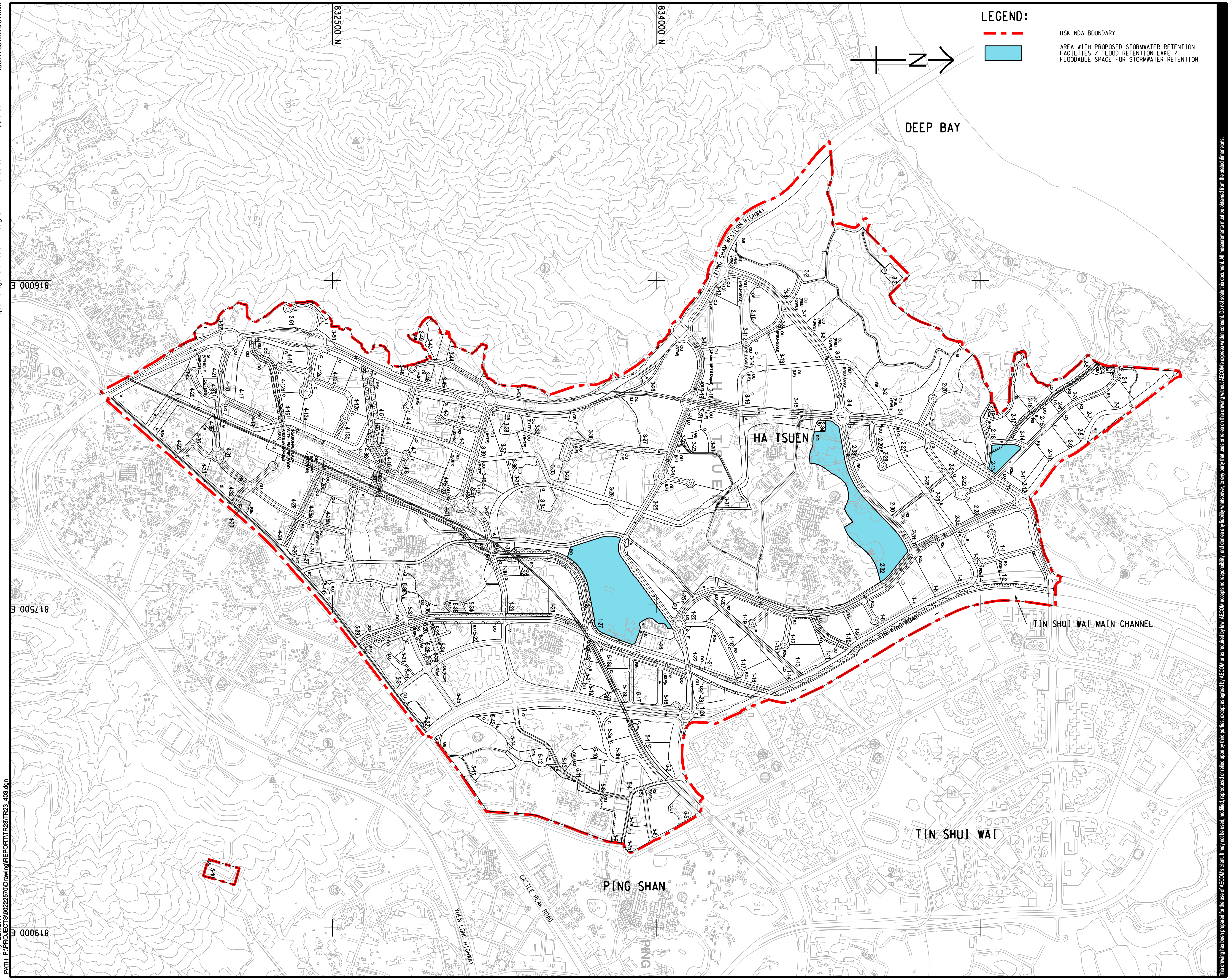
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

FUTURE CYCLE TRACK NETWORK

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.6.4



AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例: A3 1 : 16000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60222570

AGREEMENT NO. 協議編號: CE2/2011 (CE)

SHEET TITLE
圖紙名稱

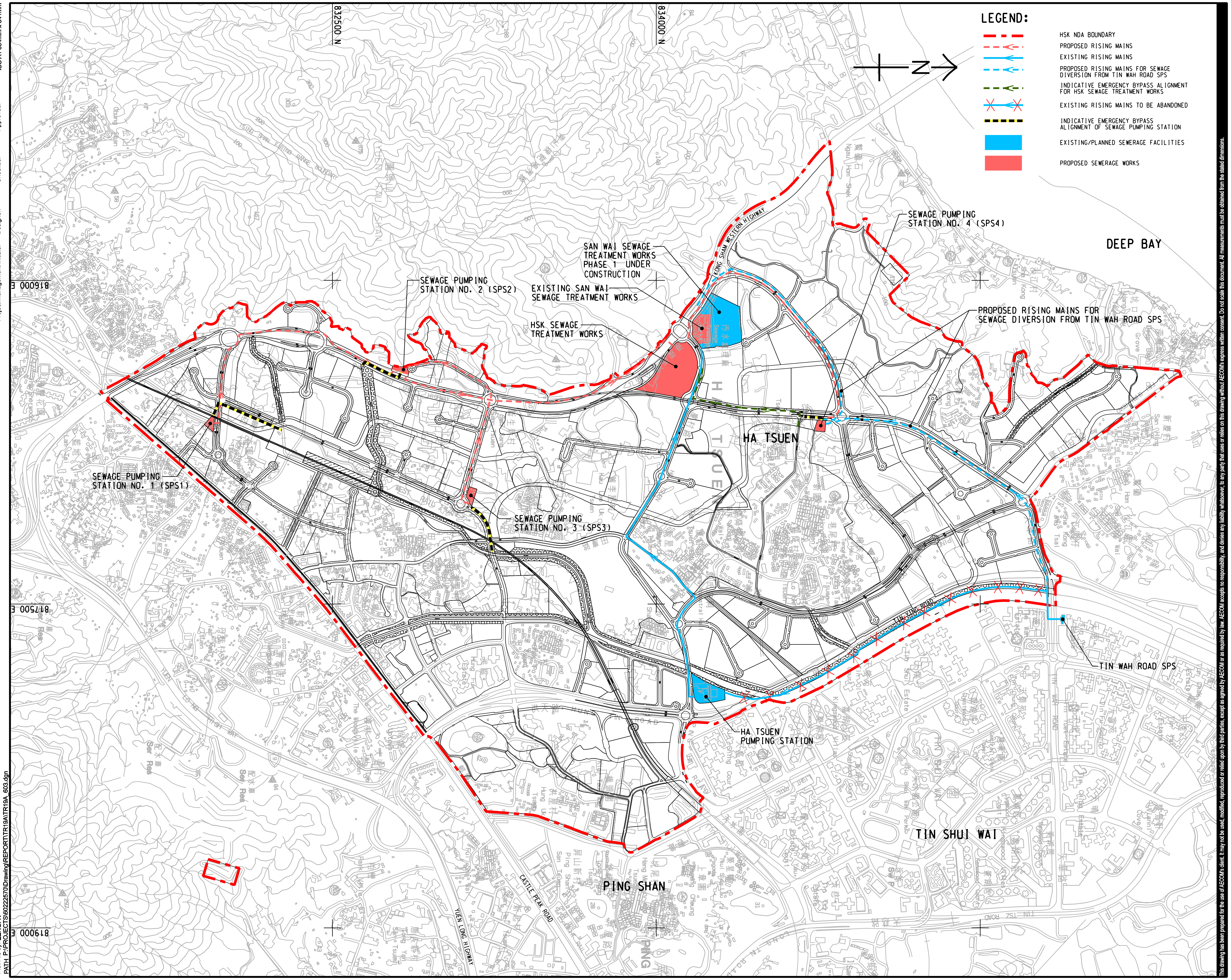
LOCATION OF PROPOSED FLOOD MITIGATION MEASURES

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.7.1

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: ZENGFX
PATH P:\PROJECTS\60222570\Drawing\REPORT\TR23\TR23_403.dgn



LEGEND:
HSK NDA BOUNDARY
PROPOSED RISING MAINS
EXISTING RISING MAINS
PROPOSED RISING MAINS FOR SEWAGE DIVERSION FROM TIN WAH ROAD SPS
INDICATIVE EMERGENCY BYPASS ALIGNMENT FOR HSK SEWAGE TREATMENT WORKS
EXISTING RISING MAINS TO BE ABANDONED
INDICATIVE EMERGENCY BYPASS ALIGNMENT OF SEWAGE PUMPING STATION
EXISTING/PLANNED SEWERAGE FACILITIES
PROPOSED SEWERAGE WORKS
832500 N
834000 N
816000 E
817500 E
819000 E
N
DEEP BAY
SEWAGE PUMPING STATION NO. 4 (SPS4)
SAN WAI SEWAGE TREATMENT WORKS PHASE 1 UNDER CONSTRUCTION
EXISTING SAN WAI SEWAGE TREATMENT WORKS
HSK SEWAGE TREATMENT WORKS
SEWAGE PUMPING STATION NO. 2 (SPS2)
PROPOSED RISING MAINS FOR SEWAGE DIVERSION FROM TIN WAH ROAD SPS
KONG SHAM WESTERN HIGHWAY
HA TSUEN
SEWAGE PUMPING STATION NO. 1 (SPS1)
SEWAGE PUMPING STATION NO. 3 (SPS3)
TIN YING ROAD
TIN WAH ROAD SPS
HA TSUEN PUMPING STATION
TIN SHUI WAI
PING SHAN
CASTLE PEAK ROAD
YUEN LONG HIGHWAY

AECOM

PROJECT 項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT 業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例: A3 1 : 16000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號: 60222570

AGREEMENT NO. 協議編號: CE2/2011 (CE)

SHEET TITLE 圖紙名稱

PROPOSED SEWERAGE NETWORK (MAIN LINE) FOR THE HSK NDA

SHEET NUMBER 圖紙編號

60222570/TR23/FIGURE 7.8.1

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:

Plot File by: ZENGFX
PATH P:\PROJECTS\60222570\Drawing\REPORT\TR19\ATR19A_603.dgn

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

814000 E

816000 E

818000 E

836000 N

834000 N

832000 N

DEEP BAY
(SHENZHEN WAN)

DEEP BAY ROAD

TIN WAH ROAD (AREA 101)
SEWAGE PUMPING STATION

TWINS 800mm DIAMETER
RISING MAINS

TIN YING ROAD

TIN SHUI WAI

HA TSUEN SEWAGE
PUMPING STATION

EXISTING SAN WAI SEWAGE
TREATMENT WORKS

HA TSUEN

TO SEWAGE TUNNEL

3 NUMBER OF 1200mm
DIAMETER RISING MAINS

PING SHAN

HUNG SHUI KIU

CASTLE PEAK ROAD

YUEN LONG HIGHWAY

NWNT EFFLUENT TUNNEL

WANG CHAU

N

LEGEND:

HSK NDA BOUNDARY

EXISTING SEWERAGE FACILITIES

EXISTING SEWERAGE PIPELINE (MAIN LINE)

HSK NDA BOUNDARY

Plot File by: LLU02
PATH: p:\projects\60222570\drawing\report\r1\tat\TR19A_602.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
現狀

SCALE
比例

A3 1 : 20000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

EXISTING SEWERAGE SYSTEM (MAIN LINE)

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.8.2

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

- HSK NDA BOUNDARY
- SEWAGE CATCHMENT AREA OF SPS 1
- SEWAGE CATCHMENT AREA OF SPS 2
- SEWAGE CATCHMENT AREA OF SPS 3
- SEWAGE CATCHMENT AREA OF SPS 4
- ADDITIONAL SEWAGE CATCHMENT AREA OF HA TSUEN PS FROM HSK NDA

N

DEEP BAY

832500 N

834000 N

819000 E

817500 E

SEWAGE PUMPING STATION NO. 1 (SPS1)

SEWAGE PUMPING STATION NO. 2 (SPS2)

SEWAGE PUMPING STATION NO. 3 (SPS3)

SEWAGE PUMPING STATION NO. 4 (SPS4)

HA TSUEN PUMPING STATION

HA TSUEN

TIN SHUI WAI

PING SHAN

KONG SHAM WESTERN HIGHWAY

CASTLE PEAK ROAD

YUEN LONG HIGHWAY

TIN HAU TEMPLE ROAD

Plot File by: ZENGFX
PATH: P:\PROJECTS\60222570\Drawing\REPORT\TR19A\TR19A_604.dgn

AECOM

PROJECT 項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT 業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核查

STATUS 階段

SCALE 比例

A3 1 : 16000

DIMENSION UNIT 尺寸單位

METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號

60222570

AGREEMENT NO. 協議編號

CE2/2011 (CE)

SHEET TITLE 圖紙名稱

PROPOSED SEWAGE CATCHMENT AREAS OF EXISTING AND PROPOSED SPS

SHEET NUMBER 圖紙編號

60222570/TR23/FIGURE 7.8.3

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

814300 E

817300 E

820300 E

836400 N

833400 N

830400 N

DEEP BAY
(SHENZHEN WAN)

SHENZHEN BAY BRIDGE

SAN WAI

YUEN TAU SHAN

PING SHAN

KAM TIN RIVER

Ø1400

PROPOSED NEW TAN KWAI TSUEN
FRESH WATER SERVICE RESERVOIR

AU TAU FRESH WATER
PRIMARY SERVICE
RESERVOIR

LEGEND:

HSK NDA BOUNDARY

PROPOSED DN1350 TRUNK
FRESH WATER MAIN

Plot File by: CAOPA
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_418.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
狀況

SCALE
比例

A3 1 : 20000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

PROPOSED LAYOUT OF TRUNK MAIN - AU TAU FRESH WATER PRIMARY SERVICE RESERVOIR TO TAN KWAI TSUEN SOUTH FRESH WATER SERVICE RESERVOIR

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.9.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

814300 E

817300 E

820300 E

836400 N

833400 N

830400 N

DEEP BAY
(SHENZHEN WAN)

SHENZHEN BAY BRIDGE

FUNG KONG TSUEN
RECLAIMED WATER
SERVICE RESERVOIR

SAN WAI

SAN WAI SEWAGE TREATMENT
WORKS PHASE 1 UNDER
CONSTRUCTION

EXISTING SAN WAI SEWAGE
TREATMENT WORKS

HSK SEWAGE
TREATMENT WORKS

YUEN TAU SHAN

PING SHAN

YUEN LONG STW

KAM TIN RIVER

TAN KWAI TSUEN RECLAIMED
WATER SERVICE RESERVOIR

EXISTING TAN KWAI TSUEN
SALT WATER SERVICE RESERVOIR

PROPOSED YUEN LONG SOUTH STW
WITH TERTIARY TREATMENT LEVEL
(UNDER YLS PDA)

SCHEMATIC ALIGNMENT OF
SALT WATER MAINS FROM LOK ON
PAI SALT WATER PUMPING STATION
(ALTERNATIVE OPTION)

LEGEND:

- PROJECT BOUNDARY
- PROPOSED NEW RECLAIMED WATER PIPE TO TKTRWSR
- PROPOSED NEW RECLAIMED WATER PIPE TO FKTRWSR
- PROPOSED SCHEMATIC SALT WATER ALIGNMENT CONNECTION TO TAN KWAI TSUEN SALT WATER SERVICE RESERVOIR

Plot File by: ZENGFX
PATH: P:\PROJECTS\60222570\Drawing\REPORT\TR23\TR23_416.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
狀況

SCALE
比例

A3 1 : 40000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

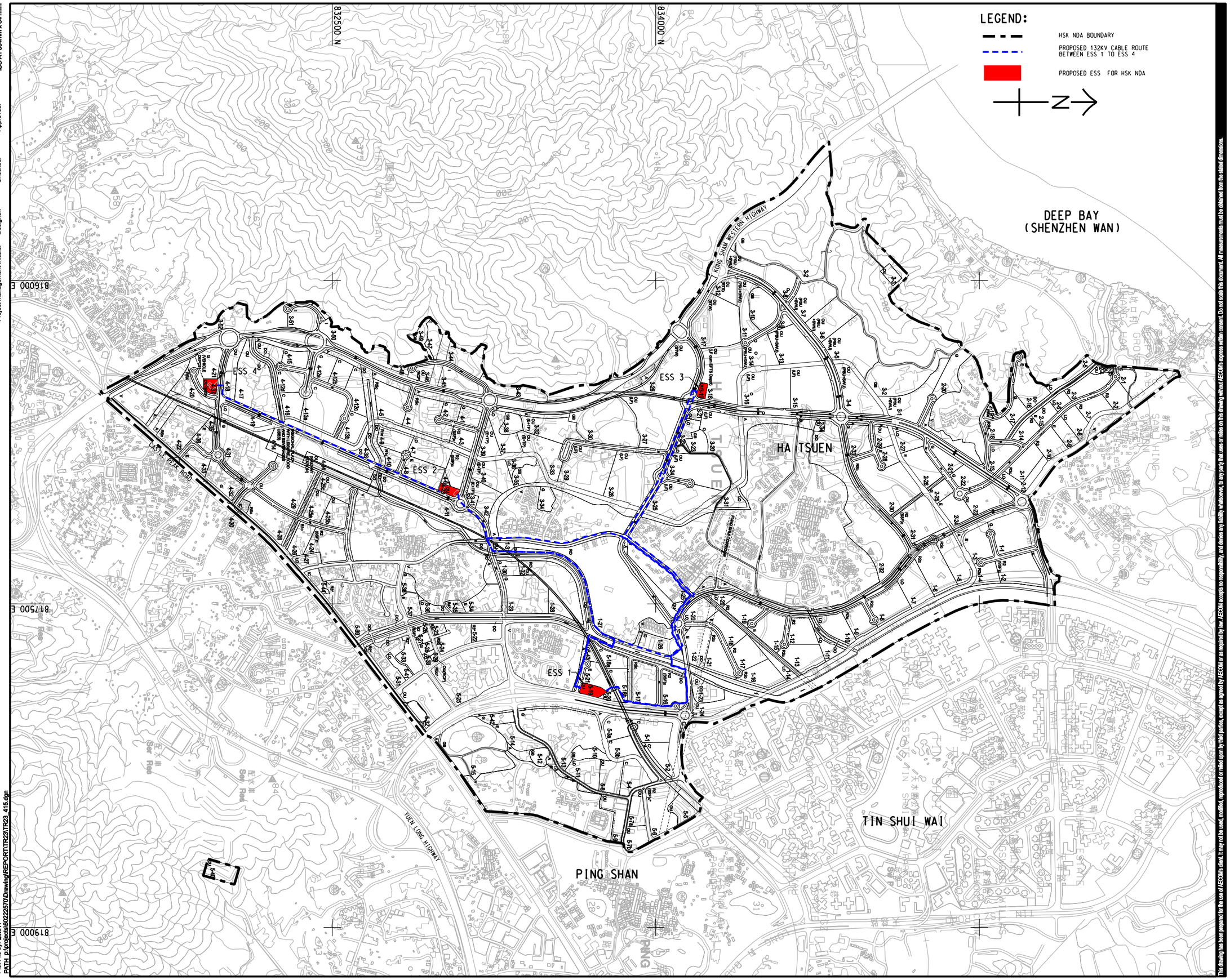
SHEET TITLE
圖紙名稱

PROPOSED LAYOUT OF
FLUSHING WATER SOURCE

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.9.2

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



Plot File by: LIMH1
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_415.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

規劃署 Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A3 1 : 16000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60222570

AGREEMENT NO. 協議編號
CE2/2011 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS OF PROPOSED ELECTRICITY SUBSTATIONS, 132kV CABLE ROUTES AND UTILITY RESERVE

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 7.9.3

Plot File by: CHENRH | Project Management Initials: | Checked: | ISO A3 297mm X 420mm

LEGEND

- Tertiary Planning Unit (TPU) Boundary
- 5.1.4 Tertiary Planning Unit (TPU) Number
- HSK NDA Boundary (Revised RODP)

5.1.4
流浮山
LAU FAU SHAN
81
新慶村
San Hing Tsuen
坑口村
Hang Hau Tsuen
沙江圍
Sha Kong Wai
天水圍
TIN SHUI WAI
香港濕地公園特別地區
HONG KONG WETLAND PARK SPECIAL AREA
鳳降村
Fung Kong Tsuen
東頭村
Tung Tau Tsuen
29
5.1.0
5.1.1
新圍
San Wai
121
5.1
馮家圍
Fung Ka Wai
橫洲
WANG C
鰲磡石
Ngau Hom Shek
鰲磡沙
Ngau Hom Sha
5.1.3
錫降圍
Sik Kong Wai
廈村市
Ha Tsuen Shi
港深西部公路
KONG SHAM WESTERN HIGHWAY
屏山
PING SHAN
坑尾村
Hang Mei Tsuen
31
廈村
HA TSUEN
5.1.2
5.1.8
石埗村
Shek Po Tsuen
188
129
42
灰沙圍
Fui Sha Wai
田心
Tin Sam
唐人新村
Tong Yan San Tsuen
圓頭山
YUEN TAU SHAN
375
洪水橋
Hung Shui Kiu
CASTLE PEAK ROAD
丹桂村
Tan Kwai Tsuen
元朗公路
山下村
Shan Ha Tsuen
5.1.9
鍾屋村
Chung Uk Tsuen
4.4.2
屯子圍
Tuen Tsz Wai
青山公路
泥圍
Nai Wai
藍地
Lam Tei
菜園村
Tsoi Yuen Tsuen
297
黃泥
Wong
新慶村
San Hing Tsuen
4.4.1
寶塘下
Po Tong Ha
桃園圍
To Yuen Wai
麒麟圍
Kei Lun Wai
嶺南大學
Lingnan University
137
楊
4.2.5

HUNG SHUI KIU NEW DEVELOPMENT AREA
PLANNING AND ENGINEER STUDY - INVESTIGATION

Project No.: 60222570

AGREEMENT NO. CE 2/2011 (CE)

Tertiary Planning Units (TPUs) within the HSK NDA Boundary under 2011 Population Census

AECOM

FIGURE 7.11.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTE:

1. AW DENOTES THE ADVANCE SITE FORMATION AND ENGINEERING INFRASTRUCTURE PROJECT.

LEGEND:

- HSK NDA BOUNDARY
- AW PHASE 1
- AW PHASE 2
- AW PHASE 3
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4

DEEP BAY

HA TSUEN

TIN SHUI WAI

PING SHAN

TSING LONG HIGHWAY

CASTLE PEAK ROAD

YUEN LONG HIGHWAY

832500 N

834000 N

816000 E

817500 E

819000 E

Plot File by: ZENGFX
PATH: p:\projects\60222570\Drawing\REPORT\TR23\TR23_048.dgn

AECOM

PROJECT
項目

HUNG SHUI KIU NEW DEVELOPMENT AREA PLANNING AND ENGINEERING STUDY - INVESTIGATION

CLIENT
業主

CEDD
土木工程拓展署
Civil Engineering and Development Department

規劃署
Planning Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核查

STATUS
階段

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60222570

AGREEMENT NO.
協議編號

CE2/2011 (CE)

SHEET TITLE
圖紙名稱

IMPLEMENTATION PHASING PLAN WITHIN HSK NDA

SHEET NUMBER
圖紙編號

60222570/TR23/FIGURE 9.2.1