Hong Kong Housing Authority

Agreement No. CB20120293 Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau

Final Technical Report No. 4A (TR-4A) - Preliminary Recommended Option

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Appendices

1 INTRODUCTION

1.1 Project Background

1.1.1.1 As stated in the Chief Executive's 2011-12 Policy Address, the Administration is committed to expanding the land resources and increasing housing land supply. To meet this policy objective, the Planning Department (PlanD) has carried out a comprehensive review of the areas zoned "Green Belt" (GB) on the Outline Zoning Plans (OZPs) focusing on sites which are no longer green or spoiled. A number of "GB" and "Open Storage" (OS) sites in Wang Chau, Yuen Long were identified as having potential for public housing (PH) development.

1.1.1.2 Subsequently, the Innovation and Technology Commission (ITC) and the Hong Kong Science and Technology Parks Corporation (HKSTP) advised of the need to expand the Yuen Long Industrial Estate (YLIE), in addition to the existing three Industrial Estates (IEs) at Tai Po, Tseung Kwan O and Yuen Long. It was requested to use a portion of the Wang Chau potential housing site for this purpose.

1.1.1.3 After due consideration, an agreement was reached between the Housing Department (HD) and ITC to share the 34.4 hectares (ha) site (the Site), tentatively with the northerly portion, around 16 ha in size, to be allocated for the YLIE extension (YLIEE), while the remaining 18.4 ha in the south would be developed for public housing use. It was further agreed that no Potential Hazardous Installations (PHIs) would be located at the YLIEE so as to minimize the potential adverse impact on the neighbouring PH development. The location of the Project Site can be referred to **Figure 1.1.1**.

1.1.1.4 Ove Arup & Partners Hong Kong Limited (Arup) was commissioned by Hong Kong Housing Authority (HKHA) under entrustments from the Government of the Hong Kong Special Administrative Region (HKSAR) & Hong Kong Science and Technology Parks Corporation (HKSTP) to conduct the Planning and Engineering Study for Public Housing Site and YLIEE at Wang Chau (the Study), which will examine the feasibility on developing public housing and YLIEE at Wang Chau by conducting planning, engineering and environmental assessments to formulate proposal for the PH site and YLIEE, and the

implementation strategies and programme for the proposed development.

1.2 Purposes of this Report

1.2.1.1 This Technical Report (TR-4) is to formulate the preliminary recommended options for the PH site and YLIEE site, and prepare the implementation programme and detailed cost estimates for the preliminary recommended options. According to the Clause 5.3 of the Brief, this report should comprise the following aspects:

- subsequent to the evaluation of the preferred development option and taking into account the views and comments from the Study Steering Group and relevant parties, refine and formulate a preliminary recommended option for the public housing development and YLIEE;
- prepare a financial appraisal for the recommended development option and associated costs (e.g. costs for land resumption and infrastructural works off-site). In particular, appraisals to demonstrate the viability of the recommended scheme to be implemented;
- refine development and planning parameters, where appropriate, for the preliminary recommended development option;
- evaluate the preliminary recommended option and provide recommendations on site formation, slope works, foundations works, natural terrain hazard mitigation works, road works and other infrastructure and mitigation measures to suit the recommended development scheme having due regard to the technical and financial assessments;
- prepare for the preliminary recommended option a Master Layout Plan (MLP) with detailed explanatory notes setting out (i) for the public housing development - the development parameters which will include but not limited to the plot ratio, flat number, proposed population level, details of non-domestic facilities e.g. retail, details of ancillary facilities, social and welfare facilities, G/IC facilities, and (ii) for the YLIE extension - the type of industries to be accommodated, distribution of industrial plots, supporting land uses, development requirements and parameters for the industrial estate, land area requirements, internal road layouts and external links, parking arrangement, buffer areas, estimated workforce, development mix etc., and (iii) for overall developments - the proposed road network, site formation works, slope works, foundation works, natural terrain hazard mitigation works, vehicular ingress and egress arrangements, public transport facilities, car parking areas, pedestrian linkages, open space, landscaping, recreational facilities, utility connections, infrastructural upgrading/improvement works as well as environmental mitigation works;

- prepare action plan and implementation programme for the preliminary recommended option. The action plan shall include but not limited to public consultation and other actions required obtaining planning/rezoning approval, land requirement/administration and clearance, prepare and obtain land grant documents, public consultation/engagement workshop, etc.;
- assess the adequacy of the existing mechanism in delivering the developments and the associated infrastructures/facilities and identify the issues involved;
- examine the issues related to the implementation of the proposed developments and infrastructures/facilities, e.g. land clearance/resumption, rehousing needs for non-indigenous villagers, etc.;
- identify possible agents and actions needed for managing/coordinating the proposed developments packages, associate infrastructures/facilities; and
- prepare detailed cost estimates for the different phases/packages of the developments and infrastructure to include the cost of land resumption and clearance.

1.2.1.2 However, in order to facilitate the preparation of the preliminary recommended option as well as the implementation programme under the tight schedule, this TR-4 has been divided into 2 parts: i) TR-4a for formulation and explanatory notes of the preliminary recommended option; and ii) TR-4b for implementation programme.

1.3 Structure of this Report

1.3.1.1 The structure of this Technical Report is as follows:

Section 1 Introduces the project background, purposes and the structure of this report.

Section 2 Presents the refinements on the preferred option which form the basis for formulating the preliminary recommended option.

Section 3 Presents the formulation of the preliminary recommended option, including the key development opportunities and constraints, guiding principles and land use proposals of the option.

Section 4 Presents the evaluation of the preliminary recommended option, including traffic and transport, geotechnics and foundation, site formation, natural terrain hazard, drainage, sewerage, water supply, other utilities and environmental concerns.

Section 5 Presents the explanatory notes of the preliminary recommended option for the PH site, the YLIEE site and the overall development with proposed improvement works and mitigation measures.

1.4 Nomenclature and Abbreviations

1.4.1.1 The following section lists out the abbreviated titles of Government bureaux, departments, offices, statutory bodies and public organizations mentioned in this report:

AFCD	Agriculture, Fisheries and Conservation Department
AMO	Antiquities and Monuments Office
CLP	China Light and Power
DSD	Drainage Services Department
EPD	Environmental Protection Department
GEO	Geotechnical Engineering Office
HD	Housing Department
HGC	Hutchison Global Communications
HKCG	Hong Kong and China Gas Company
HKHA	Hong Kong Housing Authority
HKSAR	Hong Kong Special Administration Region
HKSTP	Hong Kong Science and Technology Parks Corporation
HyD	Highways Department
IUCN	International Union for Conservation of Nature
ITC	Innovation and Technology Commission
MTRCL	Mass Transit Railway Corporation Limited
PRDEZ	Pearl River Delta Economic Zone
PlanD	Planning Department
SWD	Social Welfare Department
USEPA	United States Environmental Protection Agency
WSD	Water Supplies Department

1.4.1.2 The following section lists out the meaning of abbreviation for expressions adopted in this report:

ADWF	Average Dry Water Flow

ANL	Acceptable Noise Level
API	Aerial Photograph Interpretation
AQO	Air Quality Objective
ASR	Air Sensitive Receiver
Arup	Ove Arup & Partners Hong Kong Limited
ATWTW	Au Tau Water Treatment Works
AVA	Air Ventilation Assessment
BOD	Biological Oxygen Demand
C&D	Construction and Demolition
CA	Conservation Area
CDA	Comprehensive Development Area
COD	Chemical Oxygen Demand
DFC	Design Flow to Capacity
DM	Declared Monuments
DO	Dissolved Oxygen
EAP	Emergency Access Point
ECA	Ecological Compensation Area
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
ENTLI	Enhanced Natural Terrain Landslide Inventory
EP	Environmental Permit
EPS	Effluent Polishing Scheme
GB	Green Belt
GB	Graded Buildings [in Cultural Heritage Section]
GFA	Gross Floor Area
GI	Ground Investigation
G/IC	Government/Institution and Community
GLL	Government Land Licences
ha	hectare
HGC	Hutchison Global Communications
HKPSG	Hong Kong Planning Standards and Guidelines
HOS	Home Ownership Scheme

IE	Industrial Estate
IFA	Internal Floor Area
I/R	Industrial/Residential
ISWB	Integrated Social Welfare Building
LCA	Landscape Character Area
LOS	Level of Service
LR	Landscape Resources
LT	Laboratory Testing
L.V.	Low Voltage
mbgl	Metres Below Ground Level
MLD	Million Litres per Day
MLP	Master Layout Plan
MM5	Fifth-Generation NCAR / Penn State Mesoscale Model
MTR	Mass Transit Railway
NAP	Assessment Point for Noise
NNG	New Grant Lot
NO2	Nitrogen Dioxide
NOFA	Net Operational Floor Area
NSR	Noise Sensitive Receiver
NTHS	Natural Terrain Hazard Study
NTMFWPSR	Ngau Tam Mei Fresh Water Primary Service Reservoir
NTMWTW	Ngau Tam Mei Water Treatment Works
OS	Open Storage
OSL	Old Schedule Lots
OU(IE)	Other Specified Uses (Industrial Estate)
OZP	Outline Zoning Plan
PATH	Pollutants in the Atmosphere and the Transport over Hong Kong
PH	Public Housing
PHI	Potential Hazardous Installation
PME	Powered Mechanical Equipment
PMLP	Preliminary Master Layout Plan

PM2.5	Fine Suspended Particulates
PM10	Respirable Suspended Particulates
PODP	Preliminary Outline Development Plan
PPF	Person-Per-Flat
PRH	Public Rental Housing
PTI	Public Transport Interchange
PUDLP	Preliminary Urban Design and Landscape Plan
R(A)	Residential (A)
RBRGs	Risk-Based Remediation Goals
RC	Reserved Capacity
RMLP	Recommended Master Layout Plan
RODP	Recommended Outline Development Plan
RUDLP	Recommended Urban Design and Landscape Plan
SAB	Single Aspect Block
SI	Site Investigation
SO2	Sulphur Dioxide
SP	Specified Processes
SPS	Sewage Pumping Station
SS	Suspended Solid
SSSI	Sites of Special Scientific Interest
STT	Short Term Tenancies
SWL	Sound Power Level
TKTNFWR	Tan Kwai Tsuen North Fresh Water Service Reservoir
TMF	Temporary Mains Water for Flushing
TM-Places	Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites
TM-EIAO	Technical Memorandum on Environmental Impact Assessment Process
TPDM	Transport Planning and Design Manual
VE	Village Environs
VSR	Visually Sensitive Receiver
WBA	Wetland Buffer Area

WCA	Wetland Conservation Area
WCFWSR	Wang Chau Fresh Water Service Reservoir
WoCA	Woodland Compensation Area
WQO	Water Quality Objective
WR	West Rail Line
YLIE	Yuen Long Industrial Estate
YLIEE	Yuen Long Industrial Estate Extension
YLSTW	Yuen Long Sewage Treatment Works

2 Refinements on the Preferred Option

2.1 Introduction

2.1.1.1 Two initial development options have been generated for each of the PH site (i.e. Option 1 and 2) and YLIEE site (i.e. Option A and B) in the Technical Report No. 2 (TR-2). Option 1 has a lower development intensity in a plot ratio of 5.5 and population of about 47,938. Option 2 intends to reach for the possibility to maximize housing supply in response to the territorial need for housing while integrating with the existing communities and development in Yuen Long. It has a higher development intensity in a plot ratio of 6.0 and population of about 49,872. Option A has taken up a slope area in the western part of the YLIEE site and achieved a high maximum GFA of about 301,500 m^2. Option B intends to exclude the slope area while optimizing development and efficiency and offers a maximum GFA of about 288,800 m^2.

2.1.1.2 These options were evaluated against criteria of land use planning and urban design, land requirement, engineering, infrastructure and environmental impacts, and after which it was concluded that Option 2B was the preferred option for the Project Site.

2.1.1.3 Since the approval of TR-2, discussions with various government departments have been carried out. In response to their views and comments, iterative alternations have been made to the Project Site boundary, as well as the site layout and development parameters of the preferred option, which has resulted as the refined preferred option. Various technical assessments have been carried out based on the refined preferred option with recommendation of relevant mitigation measures in TR-3. The feasibility of the Project has been substantiated.

2.1.1.4 In this chapter, the refinement of the preferred option will be recapped and elaborated. The results, which form the preliminary recommended option, will be examined in Chapter 3.

2.2 Refinements on the Project Site Boundary of the Preferred Option

2.2.1.1 During the process of option generation, a number of key elements which play determining roles in delineation of the site boundary and formulation of initial development options have been identified. The

key elements that have been paid with due respect include the burial grounds at Kai Shan, Village Environs (VE) of Wing Ning Tsuen (D.D. 122), VE of Fung Chi Tsuen and Shui Tin Tsuen (D.D. 120 & 122) and the Umah International Primary School. In the TR-2, the preferred development option for PH site and YLIEE site has been formulated where the Project Site is about 33.61 ha in size, with about 18.69 ha for the PH site and about 14.92 ha for the YLIEE site.

2.2.1.2 Since the approval of TR-2, discussions with various government departments have been carried out and refinements have been made to address different concerns of particular departments.

2.2.1.3 With regards to the Project Site Boundary, a total of 13 refinements are proposed to optimize the development as shown in **Figure 2.2.1**. At the western boundary of the PH site close to Kai Shan, a small strip of land is proposed to be excluded to respect the existing burial urns **(P1)**. Also at the western boundary of the PH site, a smaller piece of land is proposed for exclusion to minimize impacts to private lots without affecting the proposed development **(P2)**. In the middle of the PH site, a pocket area is proposed to be excluded to minimize woodland cutting without affecting the proposed development **(P3)**. To the south-western and southern end of the PH site, smaller pieces of land are proposed to be excluded to avoid encroaching into the Village Environ of Wing Ning Village (D.D. 122) and to minimize impacts to private lots and structures without affecting the proposed development **(P4, P5 & P6)**. To the eastern boundary of the PH site, two strips of land are proposed to be excluded to reflect the existing zonings stipulated on the Approved Ping Shan Outline Zoning Plan (S/YL-PS/14) **(P7 & P8)**.

2.2.1.4 For the YLIEE site, along the eastern boundary site, a narrow strip of land is proposed to be excluded to reflect the existing zonings stipulated on the Approved Ping Shan Outline Zoning Plan (S/YL-PS/14) **(Y1)**. To the south of the site, a narrow strip of land is proposed to be included to reflect the existing zoning stipulated on the Approved Ping Shan Outline Zoning Plan (S/YL-PS/14) **(Y2)**. To the west of the YLIEE, a piece of pocket land is proposed to be included to provide on-site woodland compensation area which is also intended to adjoin the existing woodland at its southwest side **(Y3)**.

2.2.1.5 Between the PH site and YLIEE site, as a result of the addition of land to the YLIEE site (Y3) and to further optimize land usage and

management of the buffer area between the PH site and the YLIEE site, it is proposed to realign the boundary in between. A piece of the buffer area in the south-western tip of the YLIEE site is thus converted into a part of the PH site **(PY1)**. From that added piece, a strip of land is proposed for exclusion to minimize woodland cutting without affecting the proposed development (PY2).

2.2.1.6 With the abovementioned refinements, the total area of the Project site is about 33.46 ha, with about 18.81 ha for the PH site and about 14.65 ha for the YLIEE site.

Table 2.2.1: Summary of changes of the site area with the proposed refinements on Project Site boundary

	Area as in the preferred option (ha)	Area as in the refined preferred option (ha)
PH site	18.69	18.81
YLIEE site	14.92	14.65
Total	33.61	33.46

2.3 Refinements on the Development Scheme of the Preferred Option

2.3.1.1 In addition to the refinements on the Project Site boundary, the development scheme and layout of the preferred option have been slightly refined and optimised. The refinements are summarized below and in **Figure 2.3.1**. Numbers indicated demonstrate where the changes have occurred.

Refined Development Scheme of the PH Site

2.3.1.2 **Site Boundary:** As described in **Section 2.2**, The Project Site boundary has been updated and the refined preferred option reflects those changes **(1)**.

2.3.1.3 **Domestic Building:** A total of 24 blocks are proposed in the refinement with two additional blocks given by the reduced number of school sites (**Section 2.3.1.7** refers). Building heights and layouts have been updated in shape and location in order to optimize flat provision within the PH site **(2)**. Prescribed window treatment from the site boundary and between buildings, locations of roads and the refined areas of schools were all considered in these refinements. Major changes include:

- The towers that have changed in shape include: 11, 12, 13, 15, 16, 19, 20, and 24.

- Towers that have shifted in location include towers 10, 23, and 24.
- Towers that have changed in height include towers 1, 2, and 3.

2.3.1.4 **Road Layout:** Layout of both the northern and southern roads has been optimized to minimize paved surface and maximize potential for housing development **(3 - two instances)**.

2.3.1.5 **EVA:** Layout of the EVA has been optimized due to site formation work considerations **(4 - two instances)**.

2.3.1.6 **Retail Area:** Layout of the retail area in the northern portion **(5)** and middle portion has been updated **(6)**, forming a pedestrian corridor with retail facilities on both sides. Whilst layout of the retail area in the southwestern portion has been upgraded to reflect a 2-storey system, a footbridge tentatively linking the pedestrian walkway system of Long Ping Estate and the podium level of the residential blocks is proposed **(7)**.

2.3.1.7 **Schools:** The sizes of the three schools in the northern and south-western portions of the PH site have been revised **(8 - two instances)** with their respective locations unchanged. The revisions have taken into account the updated road layouts, the revision to the Project Site boundary, and the optimization of the residential areas. One school at the southern portion has been removed for two more residential blocks, labelled as towers 4 and 5 **(9)**. A total of three school sites will be provided in the refined preferred option.[1]

2.3.1.8 **Buffer Area:** As described in **Section 2.2.1.5**, after the realignment of the boundary between the YLIEE site and the PH site, there is an addition of buffer area to the PH site **(10)**. This additional area contributes to the net developable area of the PH site, maximizing the potential for housing development.

2.3.1.9 **Playgrounds and Recreational Facilities:** The placement of children's playgrounds and other recreational facilities has been revised and an indication of the location of the 7 badminton courts has also been included **(11)**. The placement takes into consideration the possibility of a phased development, and distributes such facilities accordingly. With the exception of the badminton courts, the quantity

[1] As advised by EDB, a total of three primary school sites, two of which with 30 classrooms and one of which with 36 classroom , is recommended for the proposed development.

of children's playgrounds and other recreational facilities remains unchanged.

2.3.1.10 **Underground Parking:** To provide car parking spaces for the future population of the proposed PH development, indicative locations of underground car parking spaces have been added in four locations **(12)**. The first two locations are situated in the southwestern portion, the third location in the middle portion, and the fourth location in the northern portion.

2.3.1.11 **Public Transport Interchange:** The PTI is updated as a semi-covered structure **(13)**.

Refined Development Scheme of the YLIEE Site

2.3.1.12 **Site Boundary:** As described in **Section 2.2**, The Project Site boundary has been updated and the refined preferred option reflects those changes **(1)**.

2.3.1.13 **Building Lots and Footprints:** As a result to the refinements mention below, the industrial lots and their respective indicative building footprints have also been updated to reflect the changes and maintain minimum impacts to the development potential of the YLIEE site **(i)**.

2.3.1.14 **Road Layout:** Layout of the internal road has been optimized to better meet Fuk Hi Street. Following the revised layout of the internal road, the amenity area originally attached to the road has been removed **(ii)**.

2.3.1.15 **On-Site Woodland Compensation Area:** As described in **Section 2.2.1.4**, a piece of pocket land is proposed to provide on-site woodland compensation area **(iii)**.

2.3.1.16 **Removal of Pedestrian Corridor:** Also described in **Section 2.2.1.5**, the buffer area originally belonged to YLIEE site is transferred to the PH site. The pedestrian corridor originally connecting to the buffer area has thus been removed as well **(iv)**.

2.3.1.17 **Local Open Space and Car Parking:** Due to the removal of the buffer area from the YLIEE, local open space has changed locations and the on-site parking area has been optimized. The provision of public parking area has been reduced to about 0.19 ha as advised by

HKSTP in consideration of the actual public parking demands with reference to the existing parking provision in YLIE **(v)**. Private parking areas will also be provided within the industrial lots.

2.3.1.18 **On-Site Ecological Compensation Area:** Towards the north-west end of the site, an on-site ecological compensation area has been reserved. This was not considered in the preferred option stage but is required as identified by subsequent ecological survey findings and discussion with AFCD **(vi)**.

2.3.1.19 **Pedestrian Corridor:** In consideration of drainage reserve, the pedestrian corridor connecting the YLIEE to the YLIE has been widened to 7.3m **(vii)**.

2.3.1.20 With the abovementioned refinements, this refined preferred option has become the preliminary recommended option of the Project and details of which will be described in the next chapter.

3 Formulation of the Preliminary Recommended Option

3.1 Introduction

3.1.1.1 The refined preferred option as discussed in Chapter 2 and assessed in TR-3 has been brought to become the preliminary recommended option. As a summary of the generation of this preliminary recommended option, this section provides a brief description of the existing site conditions, existing land uses and key development opportunities and constraints. Guiding principles considered in option formulation and the land use proposals for the preliminary recommended option will also be described.

3.2 Site Location and Existing Conditions

3.2.1.1 **Figure 1.1.1** shows the location of the Project Site. The Project Site is bounded by the existing YLIE, Fuk Hi Street and Fuk Hing Tsuen and Sai Tau Wai to the east, Long Ping Road and Long Ping Estate to the south, Kai Shan to the west, as well as Shing Uk Tsuen, Tai Tseng Wai and Ng Uk Tsuen to the north.

3.2.1.2 The Project Site is irregular in shape. In terms of topography, it is generally flat on its northern and central portions and has a slightly hilly terrain on the south strip.

3.2.1.3 According to the Approved Ping Shan OZP No. S/YL-PS/14, the PH and YLIEE sites are currently zoned as "Green Belt" ("GB") and "Open Storage" ("OS") (**Figure 3.2.1)**.

3.3 Existing Land Uses

3.3.1.1 Open storages/ workshops including vehicle parks and repair facilities, container storage areas, waste recycling workshops currently occupies about 50% of the Project Site and most of them are located within the YLIEE site and the northern part of the PH site. While there are no recognized villages within the Project Site, permanent and temporary houses are scattered, especially in the southern part of the PH site. Patches of agricultural land and strips of wasteland are found in the northern and central parts of the Project Site. Secondary woodland and plantation are found mainly in the periphery of the YLIEE site and southern portion of the PH site. A section of nullah runs along the

eastern periphery of the YLIEE site and there are several small watercourses entering from Kai Shan.

3.4 Surrounding Land Uses

3.4.1.1 The surrounding areas of the Project Site are characterized by a mixture of various land use zonings as well as different existing major land uses. Long Ping Estate which comprises a range of community facilities is located to the immediate south of the PH site across Long Ping Road. Long Ping West Rail Station is located right next to the estate connected by a footbridge. Clusters of villages are located to the east, to the south and to the north of the Project Site. Some low-rise residential developments of about 3-storey are also found adjacent to the Project Site. To the immediate west lies Kai Shan which is a "Conservation Area" ("CA") of approximate 50-110mPD, together with some vegetated knolls zoned "CA" and "Green Belt" ("GB"). Chu Wong Ling of approximate 40-50mPD zoned "GB" is located to the east. They all serve as extensive greenery backdrop. Large burial grounds with significant amount of graves can be found on Kai Shan and in areas to its south. The 67 hectare YLIE is located to the east. To the south of the PH site, industrial uses such as temporary open storage, workshops as well as scattered dwellings are found. To the southern tip of the PH site, the elevated West Rail is running along the site boundary.

3.5 Key Development Opportunities and Constraints

3.5.1.1 The planning of the PH site and the YLIEE site has taken into account a number of key development opportunities and constraints which are summarized as follows:-

Constraints

3.5.1.2 The principal determinant of development potential in the Project Site is physical topography. The area is enclosed by Kai Shan and vegetated knolls to the west. The constraining effect of the hills is reinforced by the presence of burial grounds, graves and urns on hilly slopes.

3.5.1.3 There are three clusters of villages adjacent to the Project Site. Their Village Environs form significant constraints to development. They are to be retained with area reserved for village expansion.

Development in close vicinity to these recognised villages should help enhance the overall amenity instead of imposing adverse impact on the villages.

3.5.1.4 The Umah International School should also be retained in its original location and potential impacts brought by the proposed development should be avoided as far as possible.

3.5.1.5 To the west of the Project Site, the area of Kai Shan zoned the "CA" zone should be well preserved. Any future development should avoid disturbing the "CA" zone to avoid any environmental and ecological impacts.

3.5.1.6 Careful considerations should also be given to the cultural heritage resources, Wetland Conservation Area, Wetland Buffer Area, secondary woodland and plantation within and in the periphery of the YLIEE site and PH site.

Opportunities

3.5.1.7 In view of the strong demand on public housing in the territory, the development potential of the PH site should be maximized in an optimum manner. Taking into account its close proximity to the existing Long Ping Estate and the Long Ping West Rail Station, there is potential for comparatively high-density residential use with supporting community, commercial and amenity facilities. While development intensity should also make reference to the adjacent Long Ping Estate to ensure visual compatibility, a graduation approach for assigning development density/ building height with lower plot ratios away from the station and respect to the adjacent recognised villages should be considered.

3.5.1.8 Adequate development should take place at the Project Site to fully utilize the brownfield site and enhance its land value, as well as improving social harmony and inclusion, whereby individuals in the community can gain access to community services/facilities and employment opportunities.

3.5.1.9 The northern portion of the Project Site, i.e. the YLIEE site, which is situating adjacent to the YLIE site, should capitalize its locational advantage and maximize its development potential in order to cater for

the acute demand on industrial estate premises and promote industrial development.

3.6 Guiding Principles

3.6.1.1 The planning theme for the Project Site was generated from the overall land use planning context, public aspirations and the development opportunities and constraints of the planning area. It is aspired that the Project Site would be a potential brownfield site for both residential and industrial use in order to cater for the territorial housing demand and support economic development in Hong Kong.

3.6.1.2 At the outset of the Study, a set of Guiding Principles was established with a view to providing a robust and flexible framework to guide the design and layout of the Project Site. The Guiding Principles were developed with reference to the identified opportunities and constraints of the Project Site. In taking forward the aspiration to deliver a comfortable living and working environment, these Guiding Principles have been sustained in the formulation of the preliminary recommended option and are summarized below:

- To maximize the development potential of the PH site and the YLIEE site for meeting demand on public housing and industrial estate premises respectively
- To provide convenient and sufficient community facilities for the additional residing population and employers brought by the future development in the PH site and the YLIEE site as well as the nearby existing communities to ensure social sustainability
- To utilize the available/potential transportation and infrastructural facilities to optimize the development and enhance connectivity to surrounding developments and community as well as to Kai Shan to provide convenient access to the existing burial grounds and graves
- To minimize the potential environmental impacts on the PH site due to the Industrial/Residential interface and other pollution sources
- To respect and preserve natural landscape, habitats of conservation importance and cultural heritage resources
- To adopt sustainable urban design by integrating the future development with the natural topography, maintaining compatibility with the surrounding built form and preserving visual corridors/connections to surrounding natural landscape

3.7 Land Use Proposals

3.7.1.1 Building upon the guiding principles on aspects covering societal needs, community facilities, infrastructures, environment and urban design, together with the proposed refinements of the Project Site boundary and the development scheme, technical assessments have been undertaken on the refined preferred option and thus the preliminary recommended development option is formulated. Its relevant optimal development intensity, land use mix of the proposed land use option of the PH site and the YLIEE site are presented in the following sections.

3.7.2 Overall Development Intensity

3.7.2.1 It is one of the guiding principles of this Project to maximize the development potential of the PH site and the YLIEE site for meeting the demand on public housing and industrial estate premises respectively.

3.7.2.2 For the PH site, due considerations have been given to the surrounding built environment for compatible development. These include Long Ping Estate, located to the immediate south of the PH site, which has residential blocks ranging from 20 to 35 storeys, and the Yuen Long OZP No. S/YL/21, which allows a maximum domestic plot ratio of 5.0 or a maximum non-domestic plot ratio of 9.5 in "Comprehensive Development Area" ("CDA") zone and "Residential (A)" ("R(A)") zone in Yuen Long. Striking a balance to achieve compatibility with the surrounding environment and to optimize development intensity, a maximum plot ratio of 6.0 and maximum building heights from 31-41 storeys are proposed for the PH site.

3.7.2.3 Assuming that the proposed housing development will provide flat supply with a mix of public rental housing (PRH) and Home Ownership Scheme (HOS), an average flat size of 50 m^2 is proposed, taking consistent line with the average flat size of 45 m^2 in PRH and 54 m^2 in HOS.[2] A Person-Per-Flat (PPF) of 3.07 is also assumed with reference to the PPF of 3.06 in PRH and 3.08 in HOS.[3]

3.7.2.4 For the YLIEE site, reference is also made to the Yuen Long OZP No. S/YL/21 as well as the lease of the existing YLIE in which a

[2] Reference parameters as advised by the Hong Kong Housing Authority.
[3] Ibid.

maximum plot ratio of 2.5 and maximum building height of 8 storeys for the industrial development area in the YLIE is allowed. To maintain compatible and integrated development as an intended extension of the YLIE, the YLIEE is proposed to have the same maximum plot ratio of 2.5 and building height of 8 storeys for the industrial development area.

3.7.3 Land Use Mix of the PH Site

3.7.3.1 In the PH site, housing development represents the major land use. Other compatible and complementary land uses, including local open space, parking spaces, retail spaces, schools, integrated social welfare building, public transport interchange, roads, slope and amenity greening are also proposed to deliver a well-balanced living environment to house the future community.

Residential Area with Retail Area, Local Open Space, Recreational Facilities and Parking Space

3.7.3.2 A total of 14.49 ha of land has been reserved for housing development, together with supporting retail area, local open space, recreational facilities as well as car parking space.

(1) Residential Units and Population

3.7.3.3 With a maximum domestic plot ratio of 5.86 and buildings ranging from 31 to 41 storeys, 16,975 flats accommodating 52,113 persons will be supplied.

(2) Retail Spaces

3.7.3.4 To serve the daily need of the future population and to enhance vibrancy of the Project Site, retail spaces will be provided in the form of 1- to 2-storey street-shops in locations convenient to the local population as well as the neighbouring communities as far as possible. Taking into account of the Housing Authority's development project at Shui Chuen O where Internal Floor Area (IFA) of 0.2m^2 per person is provided, [4] equivalent to retail GFA of 15,634 m^2 for the proposed development, [5] together with a retail study conducted by a separate

[4] Reference material as provided by the Hong Kong Housing Authority.
[5] Assuming IFA to GFA ratio of 1:1.5.

consultancy, a total of 19,756 m^2 retail GFA is provided within the Project Site with a maximum non-domestic plot ratio of 0.14.

(3) Local Open Space and Recreational Facilities

3.7.3.5 In accordance with the requirements set out by the Hong Kong Planning Standards and Guidelines (HKPSG), local open space and respective recreational facilities are required to support the new population. While at least 52,113 m^2 (i.e. $1m^2$ per person) of local open space will be provided within the residential area, recreational facilities including 5 basketball courts, 1 mini-soccer pitch (7-a-side), 10 children's playgrounds, 7 table tennis tables, 7 badminton courts and 1 jogging tracks have also been proposed to cater for the need of the future population.

(4) Car Parking Spaces

3.7.3.6 In accordance with the parking standards for residential developments set out by the HKPSG and HA, a minimum of 768 number of private car parking, 185 number of motorcycle parking, 22 number of light goods vans, 42 number of loading/unloading, 10 numbers of accessible car parking and 24 numbers of visitor car parking will be provided in the underground car parking areas of PH site.

Other Land Uses

3.7.3.7 Corresponding to the residential development, provision of community facilities is also important to this Project. Suitable land area has been reserved for these along with other compatible land uses.

(1) Schools

3.7.3.8 A total area of 1.94 ha has been reserved to provide 3 numbers of 30-classroom primary schools within the PH site. With an aim to allow maximum flexibility for future development, one of the school sites is reserved with about 7,000 m^2, capable of being developed as a 36-classroom primary school or a 30-classroom secondary school.

(2) Integrated Social Welfare Building

3.7.3.9 Social Welfare Department (SWD) recommended for the PH site an Integrated Social Welfare Building (ISWB) which includes day

activity centre, hostel for severely mentally handicapped persons, hostel for moderately mentally handicapped persons, integrated vocational and rehabilitation services centre, care and attention home for severely disabled persons, special child care centre, early education and training centre, supported hostel for mentally handicapped persons, residential care home for the elderly and day care centre for the elderly. It is also advised by SWD that for the aforesaid facilities, a total Net Operational Floor Area (NOFA) of 5,908 m^2 would be required leading to a GFA of 8,862 m^2.[6] In response to SWD's recommendations and to meet district needs for the concerned facilities, a G/IC site of about 0.47 ha is reserved for the ISWB with the abovementioned facilities. It should however be noted that the development parameters are based on the "wish list" provided by SWD at the time of preparing the development plan and this report. An updated "wish list" has been received from SWD subsequently and the respective requirements will be revised in next stage of study.

(3) Public Transport Interchange

3.7.3.10 To facilitate the daily transportation needs of the future population of the PH site, a Public Transport Interchange (PTI) will be provided occupying around 0.41 ha of land. This PTI will also benefit the employers and other users in the YLIEE.

(4) Roads, Amenity Greening and Slope

3.7.3.11 Last but not the least, the PH site also includes roads which takes up about 1.31 ha of land. Given the irregular shape of the Project site, 0.02ha of amenity greening is reserved. Also as a result of the gradually hilly topography towards Kai Shan, a slope area of around 0.16 ha is reserved in the PH site.

3.7.4 Land Use Mix of the YLIEE Site

3.7.4.1 In the YLIEE site, industrial development represents the major land use. Other compatible and complementary land uses, including local open space, parking spaces, roads, slope, woodland compensation area and on-site ecological compensation area are also proposed to achieve a comprehensive development.

[6] Assuming a NOFA to GFA ratio of 1:1.5.

(1) Industrial

3.7.4.2 Industrial use occupies the majority of land area in the YLIEE site to facilitate the extension of industrial activities adjacent to the existing YLIE. A total of 11.66 ha of industrial lots with a maximum GFA of 291,545 m^2 is contained. In accordance with the HKPSG where a worker density of 75 m^2 is recommended, the proposed industrial lots would be able to accommodate 3,887 workers.

(2) Local Open Space

3.7.4.3 Taking into account the HKPSG which requires allocation of 0.5 m^2 of local open space per worker, i.e. around 0.19 ha of land for the proposed YLIEE development, a total of 0.27 ha of local open space will be provided to enhance the overall environment of the YLIEE.

(3) Car Parking Space

3.7.4.4 Car parking spaces are provided for the smooth daily operation of the YLIEE. As advised by HKSTP in consideration of the actual public parking demands with reference to the existing parking provision in YLIE, about 0.19 ha of public parking area will be provided, while the parking spaces required under HKPSG will be provided as private parking areas within the industrial lots.

(4) Woodland Compensation Area & On-site Ecological Compensation Area

3.7.4.5 With an aim to minimize undesirable impacts to the environment, about 0.41 ha of area is reserved for woodland compensation area (0.36 ha) and on-site ecological compensation area (0.05 ha).

(5) Road and Slope Area

3.7.4.6 Similarly as the PH site, the YLIEE has reserved 1.81 ha of land for the use of roads. Another 0.31 ha of land belongs to slope area which reflects the unique topographic feature of the development.

3.7.5 Land Use Budget of the Preliminary Recommended Option

3.7.5.1 **Table 3.7.1** below shows the land use budget of the preliminary recommended option:

Table 3.7.1: Land use budget of the preliminary recommended option

Land Use	Land use budget
PH Site	
Residential	About 14.49 ha
School	About 1.94 ha (3 school sites)
G/IC (Integrated Social Welfare Building)	About 0.47 ha
Public Transport Interchange	About 0.41 ha
Roads, amenity greening and slope	About 1.49 ha
Total site area	**About 18.81 ha**
YLIEE Site	
Industrial	About 11.66 ha
Local Open Space (On-site preserved woodland area)	About 0.27 ha
Roads	About 1.81 ha
Slope	About 0.31 ha
Woodland compensation area & on-site ecological compensation area	About 0.41 ha
Parking Spaces	About 0.19 ha
Total site area	**About 14.65 ha**

3.7.6 Proposed Layout of the PH Site

3.7.6.1 Taking into account of the above-mentioned development considerations, the preliminary recommended option is formulated and as shown in **Figure 3.7.1A.**

3.7.6.2 In order to optimize the flat production, most of the residential towers are placed on the northern and middle portions which are bisected by the proposed northern access road. Two school sites are situated in order to provide a visual relief towards Kai Shan among the residential clusters. Some of the towers are also erected along Long Ping Road. At the southwestern portion, residential towers, one school site and one G/IC site are proposed.

3.7.7 Proposed Layout of the YLIEE Site

3.7.7.1 In order to optimize the land use efficiency and distribution of various industrial plot sizes, industrial plots are designated along both sides of the main road which is designed to divide the piece of land into eastern and western portions and provide sufficient connections linking up the existing YLIE site and the YLIEE site itself. (**Figure 3.7.1B**).

3.7.8 Proposed Zoning of the Project Site

3.7.8.1 According to the Approved Ping Shan OZP No. S/YL-PS/14, the PH and YLIEE sites are currently zoned as "Green Belt" ("GB") and "Open Storage" ("OS") respectively (**Figure 3.2.1)**.

3.7.8.2 In consideration of the proposed development schemes, the PH site is recommended to be rezoned as "Comprehensive Development Area" ("CDA"), whilst the YLIEE site is recommended to be rezoned as "Other Specified Uses (Industrial Estate)" ("OU(IE)").

4 Option Evaluation On Engineering, Infrastructure and Environment

4.1 Introduction

4.1.1.1 Pursuant to the Section 5.3 (d) of the Study Brief, the preliminary recommended option has been evaluated and recommendations on site formation, slope works, foundation works, natural terrain hazard mitigation works, road works and other infrastructure and mitigation measures have been made based on findings from various technical assessments.

4.2 Traffic and Transport

4.2.1.1 **Assessment of major road links for the future years:** The results indicate that all assessed road links would be operating at satisfactory level except for eastern bound of Yuen Long Highway – Tong Yan San Tsuen Interchange & Shap Pat Heung Interchange where the V/C would increase to 1.19 for the with development scenario in 2031. Having reviewed the traffic forecast, the interchange would be operating with a V/C ratio of 1.17 for the without development scenario in 2031. The contribution of traffic from the proposed developments in Wang Chau is estimated to be 2% of the overall traffic on the interchange. Therefore, it is consider that the impact is negligible.

4.2.1.2 **Assessment of major junctions for the future years**: The results indicate that all assessed junctions are currently operating at satisfactory level except for Fuk Hi Street / Wang Lok Street and Shui Bin Wai Interchange which has been identified with potential capacity problems. Corresponding junction improvement schemes are proposed in **Section 5.4.3**.

4.2.1.3 **Pedestrian Impact Assessment**: Based on the "Level of Service" (LOS) analysis according to the definitions presented in the Highways Capacity Manual 2000, all the future pedestrian facilities are predicted to operate with LOS B or above, which means sufficient space is provided for pedestrians to freely select walking speeds, to bypass other pedestrians and to avoid crossing conflicts with other. It is anticipated that the impact on existing pedestrian network would be minimal.

4.2.1.4 **Provision of Transport Facilities**: Sufficient transport facilities provision including PTI and car parking facilities will be met according to various requirements which are discussed in **Section 5.4.6** and **5.4.7**.

4.2.1.5 **Construction Impact Assessment**: Based on the preliminary estimates on the excavation and construction material and the quantities for the various construction tasks, it is anticipated that the impact due to the construction traffic is manageable.

4.2.1.6 Based on the traffic and pedestrian analyses, the proposed developments in Wang Chau will have manageable traffic impact on the nearby road links, junctions and pedestrian facilities while appropriate improvement measures have been proposed as necessary. The conclusion therefore is that the proposed development is acceptable from the traffic point of view.

4.3 Geotechnics and Foundation Works

4.3.1.1 For the PH site, piled foundations are considered to be the most appropriate foundation type for the residential towers. The preferred pile option would be end bearing bored piles, socketed into competent rock (5 metres continuous Grade III or better with a minimum core recovery of 85%). However, if a very deep weathering profile or karst features are proven below these structures, end bearing bored piles may not be feasible, and an alternative solution such as friction piles may be considered.

4.3.1.2 The gravity survey interpretation suggests that rockhead may be deeper at the location of tower Nos. 14, 18, and 19, and so there is an increased potential that adverse geological conditions may be present at these locations.[7]

4.3.1.3 For the YLIEE site, pre-bored H-piles socketed into rock and end bearing bored piles are considered to be most appropriate deep foundation solution. As with the PH site, if adverse geological conditions such as deep rockhead and/or karst/cavities are encountered, an alternative engineering solution may be sought.

[7] As noted in the Gravity Survey Report (Appendix F of TR-3b), the rockhead interpreted in the gravity survey report should be deemed indicative only.

4.3.1.4 The gravity survey interpretation suggests that for the YLIEE site, the gravity anomaly boundary[8] varies between approximately -5 and -40mPD beneath the locations of buildings I to XI, and XIV. If this boundary is proven to be consistent with engineering rockhead during the ground investigation carried out as part of the detailed design, pre-bored H piles and end bearing bored piles will be appropriate for these buildings. The gravity survey interpretation suggests that rockhead is dipping to the east with particular areas of low rockhead at the locations of buildings XII, XIII, XV, and XVI, and so there is an increased potential that adverse geological conditions may be present at these location.

4.3.1.5 It should be noted that all proposed design and construction details of permanent foundation works within Scheduled Area No.2 are required to be submitted to GEO for checking according to ETWB TC(W) No. 4/2004.

4.4 Site Formation

4.4.1.1 In the southern portion of the PH site, existing ground levels range from about +4.9 mPD at Long Ping Road to around +11.0 mPD to +22.0 mPD at the hillside perimeter. For the middle portion, existing ground levels range from about +4.1 mPD at Fuk Hi Street to around +12.0 mPD to +20.0 mPD at the hillside perimeter. Existing ground levels within the northern portion of the PH site range from about +4.3 mPD at Fuk Hi Street to around +14.0 mPD to +20.0 mPD at the hillside perimeter. Site formation and slope works are proposed for the recommended development scheme. The proposed site formation layout and details of the proposed slopes and retaining structures for these areas are provided in **Section 5.4.5**.

4.4.1.2 In the YLIEE site, existing ground levels range from between +4.0mPD and +4.5mPD at Fuk Hi Street to between +9.4 mPD to +28.0 mPD at the hillside perimeter. Site formation and slope works are proposed for the recommended development scheme. The proposed site formation layout and details of the proposed slopes and retaining structures for these areas are also provided in **Section 5.4.5**.

[8] The rockhead interpreted in the gravity survey report is referred to as 'gravity anomaly boundary'

4.4.1.3 It should be noted that details of all permanent geotechnical works for man-made slopes and retaining walls are required to be submitted to GEO for checking according to ETWB TC(W) No. 29/2002.

4.5 Natural Terrain Hazards

4.5.1.1 For the PH site, the natural terrain hazards assessment carried out as part of **TR3-C** has concluded that there is no hazard to the PH site from boulder or rockfall and Chanelised Debris Flow. It has been identified that there is potential for Open Hillslope Landslide to impact on the PH site initiating in certain catchments (for details please refer to **TR3-C**) but as a result of the low volume of material expected to enter the proposed development, the consequence of a landslide is more likely to cause inconvenience at the proposed development rather than pose a hazard to human life or have a significant impact on the proposed building and infrastructure. As a result, mitigation in the form of flexible or rigid barriers is considered to be unjustified.

4.5.1.2 For the YLIEE site, the natural terrain hazards assessment carried out as part of **TR3-C** has concluded that there is no hazard to the YLIEE site from boulder or rockfall, Channelised Debris Flow or Open Hillslope Landslide. All modelling indicated that landslide debris and boulder/rock falls would come to rest in the low gradient slopes of the natural terrain. As a result, mitigation in the form of flexible or rigid barriers is considered unnecessary.

4.6 Stormwater Drainage

4.6.1.1 Due to the increase in paved area of the Project site, the peak surface runoff from the site to the existing downstream drainage system will be increased. Besides, change of landuse from village areas to urban areas will increase the flood protection requirement from 10-year to 50-year design return period. As revealed in previous study by DSD, the site's southeast corner at Fuk Hi Street is a problematic flooding location due to poor local drainage system. Meanwhile, upon meeting with DSD, it was advised that any additional flow arisen from this development should be diverted to Fuk Hi Street direction such that the existing flow condition at Tai Tseng Wai Channel could be maintained. The permanent drainage impacts arising from the Project are summarized below:

4.6.1.2 **Tai Tseng Wai Channel Discharge Point**: Delineation of catchment areas is maintain the same as existing condition as far as practicable such that effective catchment area and hence the flow rate match the existing condition, the proposed development creates no adverse impact to the downstream channel.

4.6.1.3 **Kai Shan South Channel Discharge Point**: Similar to the Tai Tseng Wai Channel Discharge Point, the peak runoff to the Kai Shan South Channel is slightly reduced by proper delineation of catchment areas. Therefore no adverse impacts are expected.

4.6.1.4 **Long Ping Road, Fuk Hi Street and Shan Pui River Discharge Point**: Due to the increase in effective catchment area from diverted Kai Shan South catchment and changes to the characteristic of the land within the Project area, the flow discharged to Long Ping Road and Fuk Hi Street increased. Peak discharge to Shan Pui River will increase by approximately 6.8m^3/s. resulting in a water level rise of about 7mm at the river during the 50-year event (0.16% higher than the 50-year design water level). The impact is considered minor.

4.6.1.5 In general, with incorporation of the proposed drainage system and upgrading of drains as shown in **Section 5.4.12.1**, anticipated flooding problems and/or insufficient freeboard is reduced.

4.7 Sewerage

4.7.1.1 The Project site is located within Yuen Long Sewerage Catchment. The existing sewage flow within Yuen Long Sewerage Catchment is treated at the existing YLSTW. Based on the planning parameters, the projected total sewage flows (ADWF) for the proposed developments are estimated to be 19,309m^3/d, with 11,223m^3/d from PH site and 8,086m^3/d from YLIEE site. It was agreed with EPD and DSD that the sewage flows from the proposed Wang Chau developments shall be conveyed to YLSTW with a maximum value of 24,000m^3/d (ADWF). The proposed Effluent Polishing Scheme (EPS) upgrading works at YLSTW is to be carried out by DSD however this is of no consequence to the project meeting the 'no net increase in pollution loads to Deep Bay' provision due to proposed development being within its entitled ADWF allocation.

4.7.1.2 It is understood that adoption of advanced sewage treatment technologies at YLSTW would be investigated under the EPS Study

by DSD. It is estimated that future demands from within the service catchment area will exceed the treatment capacity under the original EPS Study. Therefore it is recommended that DSD increase the design capacity of YLSTW under the final EPS scheme.

4.7.1.3 Sewage will be discharged to YLSTW directly and Long Ping Sewage Pumping Station (SPS) and pumping to YLSTW via existing gravity sewerage pipeline and rising main. Since the existing sewers are not designed for the proposed development, construction of new sewers/upgrade of existing sewerage network is required. The capacity of existing Long Ping SPS is sufficient to cater for the additional sewage from the proposed development and there is no sewage pumping station required under the proposed scheme. Impact to existing sewerage system and corresponding proposed mitigation measures are summarized in **Table 4.7.1** below.

Table 4.7.1: Summary of Impact to Existing Sewerage System and Proposed Mitigation Measures

Existing Conduit Details				Impact / Proposed Mitigation Measures
Location	Type	Size (mm)	Discharge Point	
Along Fuk Hi Street and connect to YLSTW	Gravity Pipeline	300Ø to 1800Ø	YLSTW	To be upgraded to 900Ø to 1050Ø
Along Fung Chi Road	Gravity Pipeline	450Ø to 750Ø	Long Ping SPS	To be upgraded to 600Ø to 750Ø
From Long Ping SPS to YLSTW (Upstream)	Rising Main	600Ø	YLSTW	No adverse impact
From Long Ping SPS to YLSTW (Downstream)	Gravity Pipeline	1350Ø to 1800Ø	YLSTW	No adverse impact

4.7.1.4 It is proposed to upgrade the existing sewer along Fuk Hi Street and Fung Chi Road as there is insufficient space for accommodating a separate proposed pipeline to cater exclusively to flows from the proposed development.

4.8 Water Supply

4.8.1.1 The projected water demands including the fresh water and flushing water demand are estimated to be 25,633m^3/d, with 17,665m^3/d from PH site and 7,968m^3/d from YLIEE site. Currently, there is no existing salt water supply system within or in the vicinity of the Project site for flushing. It is proposed to use Temporary Mains Water for Flushing (TMF).

4.8.1.2 The Project Site is currently occupied by open storage, vehicle parks, farmland, fallow land, rural residential dwellings and temporary structures etc. These facilities and residential dwellings near the Project Site currently source water from the DN900 fresh water trunk main directly feed from NTMFWPSR. In view of the proximity of the DN900 fresh water trunk main running adjacent to the Project site at Fuk Hi Street and the DN250 distribution main along Long Ping Road, it is proposed that the project will be served by the same DN900 trunk main with water supply from the NTMFWPSR.

4.8.1.3 Since the Ngau Tam Mei Water Treatment Works (NTMWTW) has nearly reached its capacity and it alone has no spare capacity to cater for additional water demand, it is proposed to operate the Au Tau Water Treatment Works (ATWTW) in parallel with NTMWTW in the long term to supply water to the proposed development.

4.8.1.4 The proposed water mains within the Project site would connect to the existing DN900 fresh water main at Fuk Hi Street and existing DN250 fresh water main at Long Ping Road. There are no long-term (Year 2026) adverse impacts on the existing DN900 fresh water distribution main along Fuk Hi Street. However a 125-meter section of existing DN250 fresh water main along Long Ping Road will require permanent upgrading to DN300 to cater for the additional water demand and maintain minimum residual head.

4.9 Other Utilities

4.9.1.1 There are existing 132 kV and 11 kV cable circuits along Fuk Hi Street and Long Ping Road, and also existing Low Voltage (L.V.) cables within the development site. However, according to CLP, all existing 11 kV cables are serving existing developments and do not have spare capacity to serve the Project site. Moreover, a new 132kV power substation will be required to deliver power from the 132kV cables at Long Ping Road to the proposed development. A land area of 32m X 62m is required to accommodate the substation transmission equipment and it was agreed that CLP would approach LandsD for a site search for the new substation. To cope with the intake schedule of the proposed development, CLP should obtain land ownership, receive government approval, design, construct and commission the proposed 132kV power substation, which is estimated to take approximately six years to complete. It is also proposed to install new 11kV cable circuits from the proposed power substation to development platforms

via onsite roadways. Diversion / demolition of existing power cables running within Project site is required and detailed proposal is subject to agreement with CLP.

4.9.1.2 All public roads in the vicinity of the Project site are well served by street lightings. There is sufficient capacity within the proposed onsite roadway sections to accommodate Highways Department standard lighting details.

4.9.1.3 Currently there is no existing gas main within the Project site. An existing 315mm diameter medium pressure underground gas pipe along Fuk Hi Street and an existing 300/355mm diameter medium pressure underground gas pipe along Long Ping Road are identified. It is proposed to connect low to medium pressure gas services to medium pressure mains at Long Ping Road and Fuk Hi Street if predicted gas demands of the proposed developments do not exceed the spare capacity of the existing pipeline. Otherwise a new gas pipeline may need to be installed along the existing roads.

4.9.1.4 There are telecommunication services owned by PCCW, Hutchison Global Communications (HGC), Wharf T&T and Cable TV along Long Ping Road. HGC, Wharf T&T and PCCW also have cables laid along Fuk Hi Street. Telecommunication service for the Project site can be branched off from the existing communication cables along Fuk Hi Street and Long Ping Road depending on the future demand. Diversion of existing communication cables running within Project site is required.

4.10 Air Ventilation

4.10.1.1 A 1:4000 scale topographical study was constructed and results indicate that the annual prevailing wind is from ENE direction and the summer wind is from SW direction.

4.10.1.2 For the PH site, two main planned access roads are aligned approximately parallel to the annual prevailing wind direction and thus facilitate the penetration of wind from ENE direction. The proposed housing block arrangements can facilitate the air flow under prevailing annual wind condition. Wide gaps (>10m) are provided between building blocks to maximise the air permeability of the proposed development and to minimise the impacts on wind capturing

potential of adjacent developments. The stepped building height profile would also help wind deflection and avoid air stagnation.

4.10.1.3 The hilly terrain of Kai Shan at the western side of the PH site may block portion of wind from SW direction into the northern part of the PH site, but SW wind may still penetrate into the southern part of the PH site along Long Ping Road.

4.10.1.4 For the YLIEE site, the southern end of the main access road will channelize the annual prevailing wind into the site. The major axis of the buildings is approximately parallel to the annual prevailing wind and the building gap is at least 18m, which would facilitate the wind flow penetrating into the site.

4.10.1.5 The hilly terrain of Kai Shan at the western side may block portion of wind from SW direction into the YLIEE site. Thus, wind environment inside the development is likely to have relatively low wind speed regions.

4.11 Environmental Impacts

4.11.1 Air Quality

4.11.1.1 Construction activities for the proposed development would generate fugitive dust and hence are sources of fugitive dust. Assessment results indicate that mitigation measures including good site practices such as frequent watering would be required in order to suppress the dust generation. With those mitigation measures in place, adverse fugitive dust impacts are not anticipated.

4.11.1.2 An operational air quality assessment has been conducted based on the best available information. Based on the assessment results, it is found that the cumulative air quality at the planned residential blocks, schools, and Integrated Social Welfare Block of the PH site are able to meet the requirements of the new Air Quality Objectives (AQO) for all pollutants. Therefore, no adverse air quality impacts are anticipated.

4.11.1.3 It is found that the air quality at the retail shops in the PH site is generally able to meet the requirements of the new AQO except for annual NO_2 at facades facing Fuk Hi Street and Long Ping Road. Use of mechanical ventilation is recommended. The fresh air intake should be located at least 5m above the ground and doors facing Long

Ping Road and Fuk Hi Street shall be installed with air curtain and positive pressure system to ensure compliance of the new AQO. With the mitigation measures in place, no adverse air quality impacts are anticipated.

4.11.1.4 Assessment results indicate that air quality at existing ASRs in the neighborhood could also comply with the new AQO for all pollutants. Therefore, no adverse air quality impacts on the existing ASRs due to the Project are anticipated.

4.11.1.5 The traffic noise assessment has recommended few sections of the Fuk Hi Street and Long Ping Road to be installed with noise barriers. The air quality assessment has therefore also taken into account the associated secondary air quality impacts due to these noise barriers. The assessment results are very similar to that of the base scenario and the conclusion remains the same.

4.11.2 Noise

4.11.2.1 **Construction Noise**: Assessment results indicate that the use of good site practices and effective at-source control measures such as the use of quieter plant, the use of temporary noise barriers / enclosures etc would ensure compliance of the noise criterion at all of the residential receivers. The Umah International School would require additional mitigation measures to ensure compliance of the noise criteria during normal school period. All the construction noise impacts on neighboring schools would comply with the noise criteria during normal school period, however there would still be some noise exceedance during their examination periods. The use of the good site practices and control measures have minimized the impacts during their examination periods. It is recommended that the contractors shall maintain a close liaison with the school representatives so that any necessary actions could be implemented as soon as practicable on site to alleviate any adverse noise impacts.

4.11.2.2 **Operational Noise**: There are number of existing noise sources in the vicinity that would have certain bearing on the environmental acceptability of the Project during the operational phase, including road traffic noise from Fuk Hi Street, Long Ping Road, Long Tin Road, etc, West Rail Line running between Long Ping Station and Tin Shui Wai Station; and fixed plant noise within existing YLIE, those

scattered industrial workshops and other existing industrial noise sources.

4.11.2.3 **Road Traffic Noise**: On the southern portion of PH site, a Single Aspect Block (SAB) design has been adopted to the residential blocks to alleviate traffic noise impacts. Assessment results indicate that most of the residential units would be subject to noise impacts complying with the noise criterion, and only some of the planned residential premises at PH site would be subject to noise levels in excess of the criterion. Various mitigation measures are recommended including structural fins and noise barriers. With these mitigation measures in place, all residential blocks at PH site would be able to achieve the 70dB(A) criterion.

4.11.2.4 Potential noise impacts at the Umah International School shall be mitigated through the provision of appropriate acoustic insulation in form of upgraded windows and air conditioning in accordance with HKPSG. For the Integrated Social Welfare Block, given that the sufficient separation of about 75m from Long Ping Road has been provided, it could achieve a full compliance of the noise criterion.

4.11.2.5 For the existing NSRs in vicinity of Fuk Hi Street and Long Ping Road, since the traffic noise impacts due to the Project are significant, at-source mitigation measures such as sections of noise barrier and low noise surfacing along Fuk Hi Street and Long Ping Road have been recommended to protect these existing receivers.

4.11.2.6 **Railway Noise**: Assessments indicate that all residential blocks and schools would comply the respective noise criteria, and hence no mitigation measures are required. As potential adverse railway noise impacts are predicted at some facades of ISWB during night-time period, some constraints on the internal floor layout plan would need to be imposed. It is recommended that on the south wing of the block, it would generally be restricted to facilities/uses with daytime activities only. On the north wing of the block where both daytime and night time criteria could be met, there would have no restriction on the uses and all types of facilities could be planned.

4.11.2.7 **Industrial Noise**: The current design has allowed for a separation distance of about 50m between the PH residential blocks to the existing rural industrial noise sources to the east of the PH site, 170m between PH site to the existing industrial noise sources in YLIE and

65m to the planned industrial noise sources in YLIEE to minimize fixed noise impact. The assessment has recommended that all new sources such as chillers / processing plant on the roof of all industrial lots in YLIEE site would be provided with appropriate at-source noise control measures, including acoustic enclosure, silencer, low noise equipment design etc. Acoustic silencers or acoustic enclosures shall be installed as appropriate to ensure that the maximum allowable Sound Power Levels (SWLs) will not be exceeded. All open type loading and unloading activities shall be carried out at designated locations that should be screened by the industrial buildings itself.

4.11.2.8 **Other Noise Sources**: The PTI will be designed to ensure no line-of-sight of the noise sources at the noise sensitive uses and hence, it would not impose any development constraints on the site.

4.11.3 Water Quality

4.11.3.1 During construction phase, considering that impacts by construction activities can readily be controlled at-source by means of good site practices, adverse water quality impacts are not anticipated. The proposed development would also remove all existing water pollution sources and it would help alleviating the pollution loading to Deep Bay.

4.11.3.2 During the operational phase, adverse water quality impacts due to the additional pollution loading from the proposed development are not anticipated.

4.11.4 Ecology

4.11.4.1 Based on the identified habitat loss within the PH development footprint, compensation for the loss of secondary woodland (0.86ha) is recommended. Provision of the native woodland compensatory plantings of adequate quantity and quality on-site is recommended. Where not practicable, the off-site compensation shall be considered.

4.11.4.2 A crab species *Nanhaipotamon hongkongense* of conservation interest was recorded within the PH site. Precautionary site check shall be conducted and translocation of this aquatic invertebrate species may be required before the site clearance/construction.

4.11.4.3 Based on the identified habitat loss within the YLIEE development footprint, compensation for the loss of secondary woodland (0.31ha) is recommended. It should be noted that the secondary woodland within the proposed Woodland Compensation Area and Local Open Space in YLIEE site will be retained in the proposed development.

4.11.4.4 Reptile Reeve's Terrapin *Chinemys reevesii* and fish small snakehead *Channa asiatica*, which are of conservation significance, were recorded in a watercourse located within the northern YLIEE site. Suitable habitat is provided in the on-site Ecological Compensation Area (ECA) in the proposed development.

4.11.4.5 A summary of the proposed mitigation measures such as the provision of ECA and compensatory planting areas, planting of potential nectar/larval food plants, pre-site clearance check and emergency contingency plan is also provided in **Section 5.4.13.7**.

4.11.5 Fisheries

4.11.5.1 There is no direct impact on fisheries as there were no active fish ponds identified within the Project Site and the temporary works area. Hence direct impacts on the fish culture are not anticipated unless fish culture is resumed in the inactive/abandoned fishponds. Indirect impacts to the existing inactive fishponds will be avoided with good site practices and compliance with the Water Pollution Control Ordinance during the construction and operation stages and will not constrain resumption of the fish culture practice.

4.11.6 Landscape and Visual

4.11.6.1 Given the extensive alterations to the PH site and context of development to the north, east and south of the site, the development is considered to be compatible within the receiving landscape. Positive visual improvements are likely to be generated as a result of the removal of visually distracting open storage functions and low quality streetscape and replacement with a more coherent and visually appealing urban and landscape design with good compatibility with the adjacent Long Ping Estate. Negative impacts are likely to arise from large scale development encroaching into predominantly open rural fringe landscape. In this case, VSRs will experience a change in their view which could generate some minor adverse impacts.

4.11.6.2 For the YLIEE site, it is likely that the proposed development would not result in adverse impact as the proposed development would be an improvement on the existing condition. However, the encroachment of industrial land uses closer to Kai Shan is likely to have a slight negative influence on the distinctiveness of its character in this location.

4.11.6.3 The openness of views from the principle visual receptors located within residential properties in the villages of Ng Uk Tsuen and Tai Tseng Wai to the north would be reduced or partially obstructed. It is also considered that the engineered slopes and retaining walls would generate a negative impact where implemented and certain mitigation measures such as slope greening and tree screening will be required.

4.11.6.4 A tree survey has been completed with 1,873 trees surveyed. A total of 295 trees are recommended to be retained. The remaining 1,578 trees are recommended to be either transplanted (536 trees) or felled (1,042 trees). A planting proposal will be determined and provided in the Woodland Compensation Proposal to be submitted in next stage of study.

4.11.6.5 A number of landscape and visual mitigation measures are recommended and summarized in **Section 5.4.13.8**.

4.11.7 Waste Management

4.11.7.1 Potential waste management implications from the generation of waste during the construction phase have been evaluated. With the implementation of mitigation measures for the handling, transportation and disposal of the identified waste, adverse residual waste management implications are not anticipated for both construction and operational phases.

4.11.8 Land Contamination

4.11.8.1 It is considered that the potential of land contamination within the northern part of the Project site is likely, while the southern part of the Project site is considered as having a much lower potential of land contamination. Due to the limitation in site access, environmental GI can only be conducted after land resumption. It is recommended that a re-appraisal (environmental sampling for groundwater and soil samples) in accordance with EPD's Practice Guide should be carried

out to assess the latest site situation after land resumption but before site clearance. Once the contamination levels are ascertained, the need for any mitigation measures should be recommended.

4.11.9 Cultural Heritage

4.11.9.1 The Project site has avoided the Declared Monument and Graded Historic Buildings which are located in and around the historical villages. In addition, both the PH site and the YLIEE would not encroach into any of the historical villages. The potential built heritage resources: Pak Kung Shrine and "Well and Shrine" within the PH site will also be preserved in-situ. Hence the development would have no impacts on built heritage resources. The site boundary has also excluded the burial grounds and most of the graves as far as possible. However few graves would be affected by the development and relocation is unavoidable. It is recommended that a cartographic and photographic survey of these affected graves should be conducted prior to the construction works. Besides, if construction works are to be conducted in the close vicinity of the graves, suitable mitigation in the form of condition survey, vibration monitoring, provision of buffer zone, provision of protective covering, etc. might also be required.

4.11.9.2 Two sites of archaeological interest in the wider environmental setting of the Study Area, Sheung Cheung Wai Site of Archaeological Interest and Mong Tseng Site of Archaeological Interest, will not be impacted by the project. Two areas of archaeological potential were identified for further investigation after land resumption including area in the centre of the proposed public housing site and series of smaller areas along the western and northwestern edge of the YLIEE site. Any mitigation measures including preservation in situ, watching brief or rescue excavation which may be required after the field survey will have to be agreed with AMO.

4.11.10 Financial Viability

4.11.10.1 For the PH site, the findings of the financial analysis indicate that under the assumptions adopted, inclusive of various revenue parameters, it is not financially viable with the existing source of funding, i.e. revenues from various facilities. In summary, the most profitable facility within the PH site is the HOS, and the least profitable facility is the carpark facility.

4.11.10.2 For the YLIEE site, the financial analysis indicates that under the assumptions adopted, the land premium rate must be higher than [redacted] in order to be financially viable in 4 years after construction.

4.11.10.3 The financial results may not solely be the 'decision rule' for the project as other social considerations have to be taken into account along with the financial results, such as improving productivity of Hong Kong and fulfilling the housing supply objective set by the Long Term Housing Strategy Steering Committee.

5 Explanatory Notes of the Preliminary Recommended Option

5.1 Introduction

5.1.1.1 Pursuant to the Section 5.3 (d) of the Study Brief, detailed explanatory notes are prepared for the preliminary recommended option of the Project Site in form of a Master Layout Plan (MLP) to set out the development parameters, planning and other technical requirements of i) the PH site, ii) the YLIEE site and iii) the overall developments which are listed as follows.

5.2 Public Housing Site

5.2.1.1 This PH Site is intended for comprehensive development/ redevelopment of the area for residential and/ or commercial uses with the provision of open space and other community and supporting facilities. To facilitate demonstration of its development mix, scale, design and layout of development taking account of various environmental, traffic, infrastructure and other constraints, a Master Layout Plan (MLP) has been prepared. The MLP is shown in **Figure 3.7.1A and Figure 3.7.1B** with a notional scheme for the development of the PH Site and the YLIEE Site.

5.2.1.2 The PH site has a site area of 18.81 ha. The total residential site area is of a total of 14.49 ha which excludes 30-degree cut slope areas, local roads, and non residential structures, such as the PTI, the ISWB, and the three school sites, based on the abovementioned land use proposals. The total maximum plot ratio of the public housing site is 6.0, where domestic plot ratio of 5.86 and non-domestic plot ratio of 0.14 has been applied with a maximum building height of 41 storeys.

5.2.1.3 As a result, a total of a domestic GFA of 848,750 m^2 and retail GFA of 19,756 m^2 will be provided. The proposed development option could then provide a total of 16,975 flats to accommodate around 52,113 populations.

5.2.1.4 In terms of non-GFA accountable facilities, the PH development will also offer local open space, complementary recreational facilities, car parking spaces, schools, social welfare facilities and a Public Transport Interchange.

5.2.1.5 A summary of the key planning parameters for the PH development is given in **Table 5.2.1** below.

Table 5.2.1: Key Planning Parameters for PH development

Development Parameters	Units
Gross Site Area (including residential, retail, schools, G/IC, PTI, roads, amenity greening and slope):	About 18.81 ha
Net Site Area (including residential and retail only):	Phase 1: about 3.83 ha Phase 2: about 5.00 ha Phase 3: about 5.69 ha (including I/R buffer) Total: About 14.49 ha(i)
Plot Ratio of Net Site Area:	6.0 (Domestic 5.86; Non-domestic 0.14)
Gross Floor Area of Net Site Area(iv):	Domestic: about 848,750 m^2 Non-domestic: about 19,756 m^2
Total No. of Flats:	16,975 flats(ii)
Design Population:	52,113 persons(iii)
Maximum Building Height (in storeys) (Ground floor included)	31 / 36 / 41
Maximum Building Height (in metres)	87.1m / 100.85m / 114.6m
Maximum Number of Residential Storeys	30 / 35 / 40
Assumed No. of Units per Storey	11 - 29 units
No. of Towers	24
Gross Floor Area of Social Welfare Facility(iv) (v)	8,862 m^2
Gross Floor Area of Public Transport Interchange(iv)	About 4,100 m^2 (GFA is equivalent to Site Area in this case)

(i) An adjustment of 0.02ha has been applied and subtracted from the total site area to avoid overprovision of domestic GFA.
(ii) It is assumed that 50% of the flats will be for PRH and 50% will be for HOS.
(iii) It is assumed that the number of person per flat is 3.07.
(iv) It is assumed that the social welfare facilities, PTI, underground parking areas, schools and recreational functions are not accountable for GFA.
(v) GFA breakdown of the Social Welfare Facility is provided in **Appendix 1**. It should be noted that the development parameters are based on the "wish list" provided by SWD at the time of preparing the development plan and this report. An updated "wish list" has been received subsequently and the respective requirements will be revised in next stage of study.

5.2.1.6 **The Southwestern Portion:** Residential buildings of either 31 or 36 storeys are proposed at the southwestern portion of the PH Site. Single-aspect buildings have been utilized in all of the buildings, with an exception (Block 3), in order to minimize any potential conflicts from traffic noise issues.

5.2.1.7 Besides of residential buildings, retail area, an integrated social welfare building (ISWB), a school, and complementary recreational

facilities are proposed at this portion. A two-storey retail facility has been placed strategically along Long Ping Road to allow street-front retail as well as serving the residents within the proposed new residential housing estate. A footbridge tentatively linking the pedestrian walkway system of Long Ping Estate would land at the same level as the podium level. The ISWB at the southwestern tip of this portion will provide a minimum NOFA of 5,908 m^2 for various social welfare facilities. A site of a primary school is reserved and proposed with a maximum building height of 8 storeys. Areas for 2 children playgrounds, 2 badminton courts, and 1 basketball court have also been reserved to serve the future residents. An existing shrine exists adjacent to the ISWB. Minimal disturbance has been taken into consideration with site formation in order to preserve this shrine.

5.2.1.8 **The Middle Portion**: The residential buildings in this portion taper from tallest (41 storeys) to the west to lowest (31 storeys) to the east, together with a retail area, an underground parking area, and other complementary recreational functions as well as a new road. A pedestrian corridor with retail facilities on both sides is proposed. This design will minimize the adverse interface conflict between pedestrians and vehicles. In terms of complementary recreational functions, areas for 4 children playgrounds, 3 badminton courts, and 2 basketball courts have been served. An existing well currently situated between the proposed Blocks 12 and 13 is proposed to be preserved and beautified to give the area more character.

5.2.1.9 **The Northern Portion**: The residential buildings taper from tallest to the west (41 storeys) to lowest to the east (31 storeys). This tapering is of similar nature as to the buildings tapering in the middle portion. Other facilities consist of a retail area, a semi-covered PTI, a buffer area, an underground parking area, two schools and complementary recreational functions. The retail area in this portion is placed in the vicinity of the PTI, and creates a gateway to the pedestrian corridor found in the middle portion with the intention that it would serve both the PH site as well as the YLIEE site. In order to minimize the adverse interface conflicts generated between the YLIEE and the PH sites, a 50-metre buffer has been created between these two distinct zones comprising of open space and complementary recreational facilities. Due to the shape of the 50-metre buffer area, this area is also most suitable for an underground parking area. Two schools have been placed strategically at the end of the proposed road, in order to further expand the frame of vision toward Kai Shan, as well as to

provide a visual buffer from the high-density developments of the middle and northern portions. The northern portion provides a football pitch, 2 badminton courts, 2 basketball courts and 4 playgrounds.

5.3 Yuen Long Industrial Estate Extension

5.3.1.1 The YLIEE Site is intended to provide/ reserve land for the development of an industrial estate for industries to be admitted by HKSTP according to the criteria set by the Corporation. Industries to be included would normally not be accommodated in conventional industrial buildings because of their specific requirements.

5.3.1.2 The total area for YLIEE site is 14.65 ha with 11.66 ha reserved for industrial use. A plot ratio of 2.5 and a maximum building height of 8 storeys for the industrial lots are proposed. A maximum GFA of 291,545 m^2 will be provided to accommodate about 3,887 workers.

5.3.1.3 A summary of the key planning parameters for the YLIEE development is given in **Table 5.3.1** below.

Table 5.3.1: Summary of key planning parameters for YLIEE development

Development Parameters	Units
Industrial Site Area	11.66 ha
Plot Ratio	2.5
Maximum GFA	291,545 m^2
Estimated No. of Worker*	About 3,887
Maximum Building Height (in storeys)	8 storeys
Maximum Building Height (in meters)	32m

* It is assumed that a worker density is 75 workers/ m^2 with reference to the HKPSG.

5.3.1.4 With reference to **Figure 3.7.1B**, the YLIEE Site consists of 16 individual plots, connected by a local road that terminates at a roundabout. Their sizes are in a range of 0.50 ha to 1.19 ha, and that the majority of plots (8 numbers) are within 0.60 ha to 0.69 ha which is considered the optimal size for industrial operation.

5.3.1.5 In terms of the distribution of industrial lots, a summary is given in **Table 5.3.2** below.

Table 5.3.2: Summary of industrial lot sizes

Industrial lot size	Number of lots
1.10 ha -1.19 ha	1
1.00 ha - 1.09 ha	0
0.90 ha - 0.99 ha	0
0.80 ha - 0.89 ha	2

Industrial lot size	Number of lots
0.70 ha - 0.79 ha	4
0.60 ha - 0.69 ha	8
0.50 ha - 0.59 ha	1
Total number of lots	**16**

5.3.1.6 Taking reference from HKPSG that a worker density is 75 workers/ m^2 for industrial estate, the proposed maximum GFA of 291,545 m^2 will accommodate about 3,887 workers.

5.3.1.7 In complementary to the industrial uses, local open space, public parking areas, on-site ecological compensation area, woodland compensation area as well as internal roads and slope area can be found within the site.

5.3.1.8 The LOS is currently occupied by woodland which will be preserved on-site. One on-site ecological compensation area has been proposed to the west of development plot VIII, and a woodland compensation area to the west of development plot VII has also been proposed.

5.3.1.9 A 50-m buffer area has been reserved between the public housing development and the industrial development of YLIEE to minimize I/R interface.

5.3.2 Types of Industries

5.3.2.1 An agreement was reached between the HD and ITC that no Potential Hazardous Installations (PHIs) would be located at the YLIEE so as to minimize the potential adverse impact on the neighbouring PH development. While the exact types of industries will be subject to individual application during the implementation period, as advised by HKSTP, the YLIEE would target on 3 major categories of industries including:

- Machinery and equipment manufacturing;
- Biotechnology related production; and
- Pharmaceutical.

5.4 Overall Developments

5.4.1.1 In view of the proposed developments of the PH Site and YLIEE Site, provision of various infrastructure and facilities are required to support the future uses. The required road works, site formation works,

slope works, vehicular ingress and egress arrangements, public transport facilities, car parking areas, pedestrian linkages, open space, landscaping, recreational facilities, utilities connections, infrastructure upgrading/ improvement works and environmental mitigation measures of the overall developments are set out in the following paragraphs.

5.4.2 Proposed Road Network

Proposed Access Road for the Southern Portion of the PH Site

5.4.2.1 In order to provide direct and convenient access to the southern portion of the PH site, it is proposed to modify the existing junction of Long Ping Road and Fung Chi Road such that a new access road could be provided to serve the southern PH site.

5.4.2.2 The proposed access road would extend northwards from the junction and continue towards the west near the existing West Rail track. The proposed access road is in single-2-lane configuration. It is anticipated that the proposed access road would be adequate to cater the traffic demand from the southern portion of the PH site, the G/IC building as well as the school.

5.4.2.3 Due to the physical constraints of the southern portion of the PH site, the proposed access road would rise from the existing level at around +5.9mPD on Long Ping Road then levels at +15.0mPD near block 20 with a combination of gradient ranging between 6% to 8%.

5.4.2.4 In terms of the accessibility to blocks 6 - 10, a primary access has been proposed on the access road to provide access to the car parking and loading/unloading area of blocks 6 - 10. A right turn pocket has also been proposed to minimise the interruption on prevailing traffic. A secondary access has been proposed on Long Ping Road opposite Kam Ping House of Long Ping Estate, which intended to provide emergency access only.

5.4.2.5 Run in/outs have been considered for blocks 4 - 5, blocks 1 - 3 as well as the G/IC building. However, the arrangement of the run-in/outs is yet to be determined at this stage of the Study and is subject to the implementation of these developments.

5.4.2.6 As for the school, a pick-up/drop-off area has been proposed to facilitate student pick-up/drop-off. As the access to locate in the vicinity of the bend of the access road, the boundary of the proposed school has been setback such that a minimum sight distance of 50.0m could be achieved.

Proposed Access Road for the Middle and Northern Portion of the PH Site

5.4.2.7 The middle and the northern portion of the PH site are anticipated to have the greatest traffic demand out of the entire Project Site. In order to minimise the impact on the local road network of Yuen Long Town, a traffic management scheme has been proposed to direct traffic from using the local roads within Yuen Long Town as far as possible.

5.4.2.8 The existing Fuk Hi Street is proposed to be widened from single-2-lane carriageway to a dual carriageway with 2 northbound traffic lanes and 3 southbound traffic lanes to cater for the anticipated traffic demand. The access road to the middle and the northern portion of the PH site and Fuk Hi Street together will form a signalised junction to provide access to the proposed and existing developments.

5.4.2.9 In order to direct traffic away from the local roads, the traffic leaving from the middle and northern portion of the PH site would be directed to use Fuk Hi Street and Long Ping Road such that the direct impact on the junctions along Long Yip Street could be reduced. The above traffic management measures are to minimise traffic using those local roads in Yuen Long Town Centre.

5.4.2.10 The access road leading to the middle and northern portion of the PH site will be designed with 4 traffic lanes to allow traffic to pass whilst there are kerbside activities occupying the nearside lane. It is anticipated that the proposed access road would be adequate to serve the middle and northern portion of the PH site as well as the two school sites. Run in/outs have also been considered. However, the arrangement of the run-in/outs is yet to be determined at this stage of the Study and is subject to the implementation of these developments.

5.4.2.11 Nonetheless, a pick-up/drop-off area has been reserved for the two school sites to facilitate student pick-up/drop-off.

Proposed Access Road for YLIEE

5.4.2.12 Similar to the existing roads in YLIE, a single-2-lane carriageway has been proposed to serve the future developments in YLIEE. With reference to Transport Planning and Design Manual (TPDM), this single-2-lane carriageway is assumed to be a secondary industrial access road with a minimum width of 10.3m. A turnaround facility has been proposed at the end of the access road.

5.4.2.13 The proposed access road would connect to the existing Fuk Hi Street in the form of priority junction. Sweptpath analyses had been conducted to ensure that the priority junction would be able to allow the turning of 16.8m long vehicles.

5.4.3 Proposed Junctions Improvements

5.4.3.1 As discussed in **Section 4.2.1.2**, junctions at Fuk Hi Street / Wang Lok Street and Shui Bin Wai Interchange have been identified with potential capacity problems. Corresponding junction improvement schemes are discussed below.

5.4.3.2 For Fuk Hi Street / Wang Lok Street, it is observed from the traffic forecast that there is an increased traffic demand from Wang Lok Street northbound left turn to Fuk Hi Street westbound. It is proposed to widen the existing Wang Lok Street northbound to provide an additional traffic lane to cater for the left turn traffic demand.

5.4.3.3 For Shui Bin Wai Interchange, it is observed from the traffic forecast that there is an increased traffic demand from Long Ping Road westbound left turn to Long Tin Road. It is proposed to rearrange the existing traffic island such that two left turn lanes can be provided to cater for the left turn traffic demand.

5.4.4 Pedestrian Linkages

5.4.4.1 There are existing footpaths at both eastern (along Fuk Hi Street) and southern (along Long Ping Road) frontages of the Project Site. The footpaths, particularly along the southern frontage, provide key connection between the Project Site and West Rail Long Ping Station.

5.4.4.2 The existing at-grade crossing facilities along Long Ping Road, Fuk Hi Street and Long Yip Street provide pedestrian access to/from the Project Site and the Yuen Long Town area.

5.4.4.3 In addition, a footbridge is tentatively proposed to connect the podium level of the residential blocks and the pedestrian walkway system of Long Ping Estate. Pedestrian can used the elevated walkway system through Long Ping Estate to gain direct access to West Rail Long Ping Station.

5.4.5 Site Formation and Slope Works and Foundation Works

5.4.5.1 For the southern portion of the PH site, the proposed site formation levels will be formed from +5.0 mPD to +14.0 mPD within the northern portion, +13.0 mPD within the central portion and +13.0 mPD to +15.0 mPD within the southern portion. Toe walls, 8 to 10m high bored pile walls and 4 to 7m high L-shaped RC retaining walls are proposed to form the steep cut slopes along the northern/western hillside perimeter. An approximately 30m long U-shaped RC structure is proposed either side of the narrow section. Toe walls and 4 to 7m high L-shaped RC retaining walls are proposed to form the edge of the fill platform along the southern/eastern site boundary. The proposed site formation layout and details of the proposed slopes and retaining structures for the southern portion of the PH site are provided in **Figure 5.4.1a**.

5.4.5.2 For the middle portion of the PH site, the proposed site formation levels will be formed at +7.0 mPD within the eastern portion adjacent to Fuk Hi Street; +5.0 mPD to +9 mPD within the central portion; and +9 mPD to +10 mPD within the western portion, closest to the hillside. Toe walls, 3 to 6m high L-shaped RC retaining walls, and 4m high RC retaining walls with a 30 degree cut slope at their crest are proposed along the western hillside perimeter. A temporary cut slope is proposed to form the edge of the fill platform along the southern/eastern site boundary. The proposed site formation layout and details of the proposed slopes and retaining structures for the middle portion of the PH site are provided in **Figure 5.4.1b**.

5.4.5.3 For the northern portion of the PH site, the proposed site formation levels will be formed from +4.5mPD to +7.0 mPD within the eastern portion adjacent to Fuk Hi Street; +6.0 mPD to +9.0 mPD within the central portion; and +10.0 mPD to +11.0 mPD within the western

portion, closest to the hillside. Toe walls, 3 to 6m high L-shaped RC retaining walls, and 4m high RC retaining walls with a 30 degree cut slope at their crest are proposed along the western hillside perimeter. 3m high L-shaped or inverted T-shaped RC retaining wall is proposed to form the edge of the fill platform along the northern boundary. A temporary cut slope is proposed to form the edge of the fill platform along the eastern site boundary. The proposed site formation layout and details of the proposed slopes and retaining structures for the northern portion of the PH site are provided in **Figure 5.4.1b**.

5.4.5.4 For the YLIEE site, The proposed site formation levels will be formed at +6.0 mPD and +6.2 mPD within the eastern portion adjacent to Fuk Hi Street; +7.0 mPD to +8.0 mPD within the western portion, adjacent to the hillside. 2 to 7m high L-shaped RC retaining walls, and 5 to 7m high RC retaining walls with a 30 cut degree slope at their crest are proposed along the western hillside perimeter. The retaining wall running along the northern boundary of the YLIEE site needs to cater for the proposed drainage pipe and box culvert. Reserve openings and part of the box culvert will need to be incorporated into the design of this wall **Figure 5.4.2a and 5.4.2b**.

5.4.5.5 It should be noted that details of all permanent geotechnical works for man-made slopes and retaining walls are required to be submitted to GEO for checking according to ETWB TC(W) No. 29/2002. A submission which usually includes the investigations and studies of existing man-made slopes and retaining walls within or in the vicinity of the site will be required, if such slopes or retaining walls could affect or be affected by the development or redevelopment under the project, or if their failure could affect lives and property within or outside the site under the project.

5.4.5.6 It should also be noted that all proposed design and construction details of permanent foundation works within Scheduled Area No.2 are required to be submitted to GEO for checking according to ETWB TC(W) No. 4/2004.

5.4.6 Public Transport Facilities

5.4.6.1 The size of the PTI is about 4100m^2. The layout of the PTI has been optimised such that it could accommodate all the demand of public transport of the proposed developments within the Study area. In meeting with the demand, the proposed PTI could accommodate 2 bus

bays (one single and one double), 1 green minibus (GMB) bay and 1 taxi bay.

5.4.7 Car Parking Areas

5.4.7.1 In accordance with the parking standards for residential developments set out by the HKPSG and HA, a minimum of 768 number of private car parking, 185 number of motorcycle parking, 22 number of light goods vans, 42 number of loading/unloading, 10 numbers of accessible car parking and 24 numbers of visitor car parking will be provided in the underground car parking areas of PH site. Table below summarises the minimum parking provisions in the PH site.

Table 5.4.1: Summary of the minimum parking provisions of the PH site

Facilities	Standard	Recommended Provision
PRH – Domestic[1]		
Private Car	Lower – 1 per 36 flats	237
Motorcycle	1 per 80 flats	107
Light Goods Vans	Lower – 1 per 400 flats	22
Loading/Unloading Bay	1 per block[3]	12
Accessible Car Parking	Subject to the total no. of car parking space in lot: 151-250 = 3	3
PRH – Non-Domestic[2]		
Private Car	Lower – 1 per 300 sqm GFA	33
Loading/Unloading Bay	Lower – 1 per 1200 sqm GFA	9
Accessible Car Parking	Subject to the total no. of car parking space in lot: 1 - 50 = 1	1
HOS – Domestic[1]		
Private Car	Lower – 1 per 19 flats	448
Motorcycle	1 per 110 flats	78
Bicycle	1 per 7.5 flats	1,134
Loading/Unloading Bay	1 per block[3]	12
Visitor Car Parking	Lower – 1 per 3 blocks	24
Accessible Car Parking	Subject to the total no. of car parking space in lot: 351-450 = 5	5
HOS – Non-Domestic[2]		
Private Car	1 per 200 sqm GFA	50
Loading/Unloading Bay	Lower – 1 per 1200 sqm GFA	9
Accessible Car Parking	Subject to the total no. of car parking space in lot: 1 - 50 = 1	1

Note:

1. Estimates based on the 50%:50% split of PRH and HOS. of the total no. of 17,000 flats;
2. Estimates based on the 50%:50% split of PRH and HOS. of the total no. of 19,756 sqm GFA; and
3. Estimates based on the 50%:50% split of PRH and HOS. of the total no. of 24 blocks.

5.4.7.2 As advised by HKSTP in consideration of the actual public parking demands with reference to the existing parking provision in YLIE, about 0.19 ha of public parking area will be provided. Whilst the parking spaces required under HKPSG will be provided as private parking areas within the industrial lots, Table below summarises the minimum parking provisions within the private parking areas in the YLIEE site.

Table 3.3.9: Summary on the minimum parking provisions within the private parking areas in the YLIEE site

Facilities	Standard	Minimum Provision
Private Car & Lorry	1 per 900 sqm GFA	Private Car = 162 Lorry = 162
Container Vehicle	1 per site	16
Accessible Car Parking	Subject to the total no. of car parking space in lot: 151 - 250 = 3	3

Note:

1. No. of site refers to Chapter 3; and
2. Based on the plot ratio of 2.5 for the YLIEE, the GFA is assumed to be 291,545 sqm GFA. Based on the requirement stipulated in HKPSG, the 1 per 900 sqm GFA standard would be applied.

5.4.7.3 As for cycling facilities, for the PH site it is envisaged that the current cycling tracks on Long Ping Road, Fuk Hi Street (South of Long Ping Road) and Fung Chi Road would be adequate to cater for the future demand. For the YLIEE, as a result of the anticipated negligible number of trips made by cycling, it was considered that further expansion of the cycling facilities within the proposed YLIEE would not be required.

5.4.8 Open Space

5.4.8.1 In the PH site, at least 52,113 m^2 of local open space will be provided within the residential area. While in the YLIEE site, a total of about 2,700 m^2 of local open space will be provided.

5.4.8.2 The public open space within the Project site will enhance the visual amenity of the area and improve the overall landscape character. Whilst there is no direct loss of Open Space (OS) designated land as a result of the project, it is considered that this function would assist in reducing the impact as a result of loss of agricultural plots. In this case, taking the form of community gardens, orchard planting and herb gardens which can be used by the future residents.

5.4.9 Landscaping

5.4.9.1 For the PH site, the core of the site accessed off Fuk Hi Street and initially comprises commercial and residential development with a pedestrian precinct; this forms a car free street between the buildings. This shopping area is designed to accommodate large numbers of people; as a result the streetscape is predominantly hard using permeable paving. Ornamental trees are planted throughout the street to provide shade and visual interest. Above the retail area, podium space is landscaped to provide additional recreational outdoor space for the future residents.

5.4.9.2 Beyond the pedestrian precinct, the appearance of hardscape reduces significantly as a series of paths connect to the adjacent residential towers, sports facilities and landscape spaces. Landscape planting becomes denser on the interface with Kai Shan and the western boundary to form a buffer between the development and the natural landscape beyond. Several access points to the Kai Shan footpath network are formalised so that this recreational resource can be accessed. A large area on the north western tip of the site has been set aside for woodland compensation planting; this is also accessible to the public so they may enjoy the woodland atmosphere.

5.4.9.3 The on-site footpath network continues to the southern section of the site running parallel with Long Ping Road so that residents can access the proposed school facilities safely without having to walk along the main road. Extensive tree and soft landscape planting within this area helps to maintain a strong natural character within the pedestrian spaces.

5.4.9.4 On the other hand, the provision of landscape space within the YLIEE is predominantly restricted to the main access road as the various plots would not form part of the future external realm. Mature avenue trees with understorey shrub planting is provided on either side of the main road to provide shade, visual interest, maximise green cover and create a more pedestrian friendly environment. A pedestrian footpath is provided on either side, also linking to a footpath which connects back to the YLIEE. At the northern end of the site a section of existing woodland will be retained at the foot of Kai Shan adjacent to a new car park area. Further to the west above the industrial units, a previously developed area within Kai Shan will be restored and provide space for woodland compensation planting.

5.4.10 Recreational Facilities

5.4.10.1 In the PH site, recreational facilities including 5 basketball courts, 1 mini-soccer pitch (7-a-side), 10 children's playgrounds, 7 table tennis tables, 7 badminton courts and 1 jogging tracks will be provided to cater for the need of the future population.

5.4.11 Proposed Reprovision of Access to Kai Shan

5.4.11.1 In view of the potential impacts to the existing tracks and footpaths found within the Project Site, various access points are proposed to reprovide such potential loss of existing linkage between Kai Shan and the surrounding localities. The indicative locations of the access points can be referred to in **Figure 3.7.1A** and **3.7.1B**.

5.4.12 Infrastructure Upgrading/ Improvement Works and Utilities Connections

5.4.12.1 **Stormwater Drainage**: Drainage proposals are formulated with aims to minimize the drainage impact on the existing drainage systems hence minimizing necessary upgrading works and flood protection measures, meanwhile maximizing the land usage and its flexibility within the Project site. The drainage proposals are summarized in **Table 5.4.2** below.

Table 5.4.2: Proposed Major Drainage System Upgrades

Catchment Discharge Point	Trunk Location	Type	Size (mm)	Remarks
Tai Tseng Wai Channel	YLIEE Main Roadway	Box Culvert	3000(W) x 2500(H)	Diversion of Tai Tseng Wai Channel
Shan Pui River	Long Ping Road	Pipeline	1500Ø	Upgrade of existing 900Ø to1500Ø pipeline
	Long Ping Road	Box Culverts (Single and Twin cells)	3500(W) x 2000(H)	Upgrade of existing 1200Ø to1800Ø pipeline
	Fuk Hi Street	Twin cells box culvert	3500(W) x 2000(H)	Proposed box culvert
Kai Shan South Channel	Kai Shan South (PH Site Phase 1)	Natural Stream	Variable	Diversion of existing channel

5.4.12.2 **Sewerage**: Proposed mitigation measures in response to impacts to existing sewerage system have been summarized in **Table 5.4.3**. As discussed in **Section 4.7**, it is recommended that DSD increase the

design capacity of YLSTW under the final EPS scheme to cater for the future demands from within the service catchment area.

Table 5.4.3: Summary of Proposed Mitigation Measures to Existing Sewerage System

Existing Conduit Details				Proposed Mitigation Measures
Location	Type	Size (mm)	Discharge Point	
Along Fuk Hi Street and connect to YLSTW	Gravity Pipeline	300Ø to 1800Ø	YLSTW	To be upgraded to 900Ø to 1050Ø
Along Fung Chi Road	Gravity Pipeline	450Ø to 750Ø	Long Ping SPS	To be upgraded to 600Ø to 750Ø

5.4.12.3 **Water Supply**: As discussed in **Section 4.8**, the proposed water mains within the Project site would connect to the existing DN900 fresh water main at Fuk Hi Street and existing DN250 fresh water main at Long Ping Road. It is also proposed that a 125-meter section of existing DN250 fresh water main along Long Ping Road will require permanent upgrading to DN300 to cater for the additional water demand and maintain minimum residual head. It is proposed to use Temporary Mains Water for Flushing (TMF). Nevertheless, separate fresh and flushing water supply systems will be provided within the Project site to allow a flexibility of changing the source of flushing water supply from fresh water to others, i.e. salt water or treated sewage effluent in the future by WSD if required.

5.4.12.4 **Other Utilities**: As discussed in **Section 4.10**, a new 132kV power substation with an area of 32m X 62m is required and it was agreed that CLP would approach LandsD for a site search for the new substation. It is also proposed to install new 11kV cable circuits from the proposed power substation to development platforms via onsite roadways. Diversion / demolition of existing power cables running within Project site is required, details proposal subject to agreement with CLP.

5.4.12.5 It is proposed to connect low to medium pressure gas services to medium pressure mains at Long Ping Road and Fuk Hi Street if predicted gas demands of the proposed developments do not exceed the spare capacity of the existing pipeline. Otherwise a new gas pipeline may need to be installed along the existing roads.

5.4.12.6 Telecommunication service for the Project site can be branched off from the existing communication cables along Fuk Hi Street and Long Ping Road depending on the future demand. Diversion of existing communication cables running within Project site is required.

5.4.13 Environmental Mitigation Measures

5.4.13.1 **Air Quality**: For retail structure, facades facing Fuk Hi Street and Long Ping Road, use of mechanical ventilation is recommended. The fresh air intake should be located at least 5m above the ground and doors facing Long Ping Road and Fuk Hi Street shall be installed with air curtain and positive pressure system to ensure compliance of the new AQO.

5.4.13.2 **Noise - Road Traffic**: A SAB design has been adopted to the residential blocks of the southern portion of PH site to alleviate traffic noise impacts. Various mitigation measures are also recommended to all residential blocks including structural fins and noise barriers. Umah International School shall be provided with appropriate acoustic insulation in form of upgraded windows and air conditioning. For the existing receivers in vicinity of Fuk Hi Street and Long Ping Road, at-source mitigation measures such as sections of noise barrier and low noise surfacing have been recommended to protect these existing receivers.

5.4.13.3 **Noise - Railway**: It is recommended that the south wing of the ISWB be restricted to facilities/uses with daytime activities only. On the north wing of the block there would have no restriction on the uses and all types of facilities could be planned.

5.4.13.4 **Noise - Industrial**: The assessment has recommended that all new sources such as chillers / processing plant on the roof of all industrial lots in YLIEE site would be provided with appropriate at-source noise control measures, including acoustic enclosure, silencer, low noise equipment design etc. Acoustic silencers or acoustic enclosures shall be installed as appropriate to ensure that the maximum allowable SWLs will not be exceeded. All open type loading and unloading activities shall be carried out at designated locations that should be screened by the industrial buildings itself.

5.4.13.5 **Noise - Other**: The PTI will be designed to ensure no line-of-sight of the noise sources at the noise sensitive uses.

5.4.13.6 **Ecology**: The key mitigation measures proposed include:

- ***Creation of an Ecological Compensation Area (ECA)***: The ECA within YLIEE (0.05 ha) is designed to provide suitable habitats for species of conservation significance such as Reeve's Terrapin

and Small Snakehead. The existing watercourse located to the west of northern YLIEE will be diverted into the ECA than being culverted. Although it is designed for Reeve's Terrapin and Small Snakehead, since the ECA will not be available before the site clearance due to the construction programme of the project, translocating the individuals of conservation significance, if any of them are found, to the upper stream section of watercourse is recommended before the establishment of the ECA. The responsibility for the creation and initial establishment of the ECA would need to be further determined and agreed in next stage of study and there is no long term management required once the wetland is established.

- ***Compensatory planting area***: To compensate for the loss of total 1.17 ha of secondary woodlands, 0.61 ha of on-site Woodland Compensation Areas (WoCAs) are proposed [including the originally reserved 0.36 ha woodland compensation area at the western side of YLIEE as mentioned in **Section 3.7.4.5** as well as the additionally recommended 0.25 ha on-site WoCA at PH site]. These WoCAs are subject to further review and would be incorporated to the proposed development scheme at the later stage upon confirmation with AFCD. Planting of native tree and shrub species is recommended and should be undertaken by a qualified plant ecologist/botanist. Besides, a potential offsite WoCA with area of more than 0.56 ha has already been identified at the west of the Wang Chau Service Reservoir. The responsibility for the planting and long-term management would need to be further determined and agreed in next stage of study. Detailed Woodland Compensation Proposal and Woodland Planting and Management Plan (including the fire control measures) shall be prepared and submitted to and approved by AFCD at later stages.
- ***Planting of potential nectar/larval food plants***: Planting floral species which are the host plants or can provide a nectar source to butterflies in the landscaped areas within the sites is recommended.
- ***Pre-site clearance site check***: Precautionary site check shall be carried out by qualified ecologist or appropriate specialists to check for the presence of, for example, bat roosts, bird nests, freshwater fauna species or any other species of conservation significance. Appropriate measures should be taken if species of conservation significance is found (e.g. re-phasing the

construction period or translocation of freshwater fauna species to nearby watercourses with similar microhabitats which will not be impacted by the development).

- ***Emergency Contingency Plan:*** It will be incorporated as part of the Environmental Management Plan to deal with accidental spillage events.

5.4.13.7 **Fisheries**: Good site practices and compliance with the Water Pollution Control Ordinance during the construction and operation stages are recommended.

5.4.13.8 **Landscape and Visual**: The key mitigation measures proposed include:

- Considerate design for earthworks and slopes to carefully optimize topographical change and provide visually interesting engineered slopes and earthworks which are compatible with surrounding landscape and tie into existing levels.
- The form, textures, finishes and colours of the proposed building, engineered structures and noise barriers should aim to be compatible with the existing surroundings. Where practicable, the building design should be refined to reduce visual bulkiness. In addition light earthy tone colours should also be considered to enhance the compatibility of the development with the landscape setting.
- The construction sequence and works programme should be optimized to minimise the duration of impact.
- Decorative screen hoarding erected around the site to screen low level views of construction works.
- The extent of slope cutting should be optimized and vegetation should be planted where the slope gradient allows.
- Existing trees to be retained within the site should be carefully protected during construction, where retention is not possible transplantation should be considered.
- Compensatory tree planting for all felled trees should be provided to the satisfactory of relevant Government department. If the area of on-site compensatory tree planting is not enough for the compensation of the loss, off-site area(s) will be looked for.
- Tall screen/buffer trees and shrubs should be planted to screen proposed structures such as roads and buildings.

- Provision of roadside and amenity planting to compliment the urban design and enhance visual experience and character.

5.4.13.9 **Waste Management**: Implementation of mitigation measures for the handling, transportation and disposal of the identified waste is recommended.

5.4.13.10 **Land Contamination**: Any need for any mitigation measures should be recommended once the contamination levels are ascertained.

5.4.13.11 **Cultural Heritage**: The potential built heritage resources: Pak Kung Shrine and "Well and Shrine" within the PH site will be preserved in-situ. If construction works are to be conducted in the vicinity of the graves, mitigation in the form of condition survey might be required. Any mitigation measures for the two areas of archaeological potential may be required after the field survey.

6 Conclusion

6.1.1.1 This TR-4a has presented the preliminary recommended option for the proposed public housing and Yuen Long Industrial Estate Extension development in Wang Chau. In the previous chapters, the refinements on the preferred option have been revisited, and the formulation of the preliminary recommended option has been discussed with technical evaluation and explanatory notes of the option as form of a MLP.

6.1.1.2 As the second part of the TR-4, implementation programme will be presented in TR-4B.