

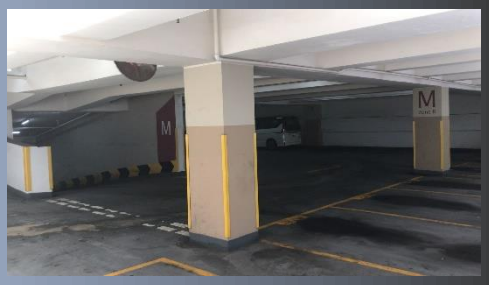





Agreement No. CE 38 / 2017 (TT)
Study on Parking for Commercial Vehicles - Feasibility Study

Final Report

AECOM Imagine it. Delivered.

October 2021

運輸署
Transport Department

Agreement No. CE38/2017 (TT)

Study on Parking for Commercial Vehicles – Feasibility Study

Final Report and Executive Summary

October 2021

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EXECUTIVE SUMMARY

Introduction

1. With the lapse of time, the change in economic and social situation in Hong Kong has resulted in substantial changes to the original assumptions and assessed parking demand made in the Second Parking Demand Study (PDS-2) conducted in 2002.

2. In addition, there has been a decrease in the number of short term tenancy (STT) and brownfield sites in recent years as many of them were closed to make way for permanent developments, such as infrastructure developments, housing developments, commercial developments, community facility developments, etc.. Since many STT and brownfield sites are used for the parking of coaches and goods vehicles (GVs), it is likely that the parking supply for commercial vehicles (ComV) will be further reduced in the future. The reducing supply of ComV parking spaces calls for a holistic review of this situation so that practical solutions could be devised.

3. In light of the above, the Transport Department (TD) commissioned AECOM Asia Company Limited (AECOM) to undertake "Agreement No. CE38/2017 (TT) Study on Parking for Commercial Vehicles – Feasibility Study" (the Study) in December 2017 to assess the ComV parking demand and supply by district and formulate measures to address the demand.

Study Process

4. Data collection - The study collected extensive information and data from various relevant Government departments, including TD, Lands Department, Planning Department, Rating and Valuation Department, Buildings Department, etc.. Parking surveys and consultations with trades were also conducted.

5. Review and Update of Parking Inventory - The parking inventory compiled by TD was reviewed and updated, based on the inventory data results obtained from parking survey conducted. The parking inventory is updated and stored in a spatial, GIS format, which allows speedy and accurate information / data compilation and/or retrieval.

6. Development of Parking Demand Model (PDM) - The PDM developed in PDS-2 has been reviewed. The PDM for various vehicle types has been developed for both the ownership-related and usage-related parking facilities. The PDM was used to establish the parking situations in the base year of 2018 as well as to estimate parking demand in design years 2021, 2026 and 2031.

7. Problem identification - The developed PDM showed the parking situations in the base year and future years by district, which enables a deeper look on the parking supply / demand difference on district basis.

8. Formulation and Recommendation of Remedial Measures - Based on the identified parking problems, remedial measures to address the parking demand have been formulated.

Study Findings

9. The territorial and district-based parking supply and demand in base year and design years have been summarised and reviewed. Parking supply refers to the number of spaces available for parking and loading/unloading (L/UL), whereas parking demand refers to number of vehicles in need of a space for parking and L/UL during a specified time period. For night-time parking, the parking demand model shows that the supply to demand ratio of parking spaces was 0.75 in base year 2018 in territorial level for ComV. The ratio is estimated to drop in design years 2021, 2026 and 2031, with a ratio of 0.69 in 2031. For daytime L/UL in base year 2018, the model indicates that, the L/UL supply to demand ratio for GV was 1.03 while that of coaches/light buses was 0.33. The L/UL situation is expected to be more or less the same in design years 2021, 2026 and 2031.

Remedial Measures

10. In light of the above estimated future demand and supply of ComV parking spaces, this study formulated various remedial measures to alleviate the difference under three directions:-

Direction	Measures
Increase Supply of Parking Spaces	Update of HKPSG parking standards
	Provision of public parking spaces in public vehicle parks for ComV
	Designating suitable on-street locations as night-time parking spaces for ComV
	Provision of parking spaces under flyovers
	Provision of on-street pick-up/drop-off facilities for coaches
	Specify the provision of a minimum number of ComV parking spaces in suitable STT sites
Fully Utilise Existing Spaces	Introduction of Shared-use parking spaces
	Opening up ComV parking and L/UL spaces for night-time public parking
	Encouraging schools to allow school buses to park within schools
	Making use of technology to increase illegal parking enforcement efficiency
	Disseminating real-time parking vacancy information
Preserve ComV Parking Spaces	Reprovision of existing parking spaces in STT sites in future developments
	Formulating strategy to accommodate existing ComV parking spaces in brownfield sites

Increase Supply of Parking Spaces

11. Given that the study findings indicated that the current ComV parking standards for subsidised housing developments cannot match with its ComV parking demand, it is recommended to revise the parking standards under HKPSG to increase the provision of ComV parking spaces in subsidised housing developments.

12. While the revision of parking standards under HKPSG helps address the ComV parking demand in future subsidised housing developments, additional measures to increase the provision of ComV parking spaces are required to address the current demand for more ComV parking spaces. It is recommended to incorporate public ComV parking spaces in suitable "Government, Institution or Community" (GIC) facilities and public open space (POS) projects in accordance with the "single site, multiple uses" principle introduced in 2017 Policy Address. This study identified eight potential locations to incorporate public ComV spaces for further planning and implementation. Four of these locations have been announced by the Government at the time of writing. Pre-construction activities are being conducted for the Amenity Complex in Area 103, Ma On Shan. Planning is on-going for the Leisure and Cultural Complex Project at Tin Yip Road, Tin Shui Wai and the Proposed Open Space cum Car Park at To Wah Road and Sports Centre and Open Space at Aldrich Bay, Shau Kei Wan.

13. Various short-term measures are also suggested to increase ComV parking supply, namely i) Designating suitable on-street locations as night-time parking for ComV; ii) Provision of parking spaces under flyovers; iii) Providing more on-street pick-up/drop-off (PU/DO) facilities for coaches; and iv) Specify the provision of a minimum number of ComV parking spaces in suitable STT sites, etc..

Fully Utilise Existing Spaces

14. Utilising ComV parking spaces is considered to be a cost effective way to address the parking problem. It is suggested that L/UL spaces in new commercial/industrial developments and PU/DO facilities in schools could be turned into night-time ComV parking spaces through various administrative measures.

15. With a view to increasing the utilisation rate of existing and future parking spaces, the study introduced new dimensional standards for "shared-use" parking spaces, permitting the use of a parking space by more than one type of vehicles with similar dimensions to maximise utilisation of the parking spaces. The study also recommended increasing the enforcement efficiency with the use of technology and dissemination of real-time parking vacancy information in private developments.

Preserve ComV Parking Spaces

16. ComV parking spaces in STT car parks and brownfield sites constituted a significant portion of ComV parking supply in Hong Kong. Due to the need to resume land for long-term development, it is anticipated that the supply of ComV parking spaces from STT and brownfield sites will continue to drop. As such, the study proposed the following measures to minimise the loss of ComV parking spaces:

- Reprovision of public parking spaces in suitable GIC facilities or POS projects in accordance with the “single site, multiple uses” principle to minimise the impact brought by the loss of ComV parking spaces in STT sites.

- comprehensive development programme (e.g. New Development Area) involving the resumption of brownfield sites should draw up solution (e.g. multi-storey buildings for brownfield operations) to address the existing parking demand in these sites.

Regular Review of ComV Parking Situation

17. Various measures have been recommended above to address the ComV parking problem identified in this study. A regular review is recommended for continuous formulation and implementation of measures to address the ComV parking problem.

18. The economy of Hong Kong changes rapidly and generates new issues related to parking from time to time. The past practice of conducting territorial parking study as when required will not be able to address such challenges in a timely manner. It is therefore recommended that territorial parking study should be conducted at regular interval.

19. The parking demand of various vehicle and development types evolve along with the ever-changing socio-economic situation, timely adjustment of the parking standards is therefore required to keep up with the constantly evolving parking demand. It is proposed to review the parking standards under HKPSG at a regular interval.

Conclusion

20. This study reviewed the overall ComV parking situation in the territory and recommended various measures to tackle the parking problem identified. A regular review of ComV parking situation for continuous formulation and implementation of measures was also recommended.

1 INTRODUCTION

1.1 Background

1.1.1 With the lapse of time, the change in economic and social situation in Hong Kong has resulted in substantial changes to the original assumptions and assessed parking demand made in the Second Parking Demand Study (PDS-2) conducted in 2002.

1.1.2 In addition, there has been a decrease in the number of short term tenancy (STT) and brownfield sites in recent years as many of them were closed to make way for permanent developments, such as infrastructure developments, housing developments, commercial developments, community developments, etc.. Since many STT and brownfield sites are used for the parking of coaches and goods vehicles (GVs), it is likely that the parking supply for ComV will be further reduced in the future. The reducing supply of ComV parking spaces calls for a holistic review of this situation so that practical solutions could be devised.

1.1.3 In light of the above, the Transport Department (TD) commissioned AECOM Asia Company Limited (AECOM) to undertake "Agreement No. CE38/2017 (TT) Study on Parking for Commercial Vehicles – Feasibility Study" (the Study) in December 2017 to assess the ComV parking demand and supply by district; formulate measures to meet the demand; and review the parking requirements stipulated in the Hong Kong Planning Standards and Guidelines (HKPSG).

1.2 Objectives of the Study

1.2.1 The Study Area as identified in the Brief covers the whole Hong Kong Special Administrative Region, and the following vehicle types are classified as ComV:

a) light goods vehicles (LGV) (including van-type light goods vehicles and non van-type light goods vehicles),
b) medium/heavy goods vehicles (MHGV) (excluding container vehicles[1]),
c) public light buses (PLB),
d) private light buses (PrLB),
e) private buses (PB) and
f) non-franchised buses (NFB).

1.2.2 The overall objective of the Study is to assess the parking demand and supply of various types of ComV as mentioned in paragraph 1.2.1 at territory-wide and district level (covering 18 districts according to Schedule 1 of the District Councils Ordinance) and devise remedial measures to address the differences between the parking demand and supply identified.

1.2.3 The main tasks and specific objectives of the Study can be described as follows:

[1] Since the majority of container vehicles are currently parked at port back-up land in Kwai Tsing District or brownfield sites in the New Territories, and some operate on the Mainland, the supply of, and demand for, parking spaces for container vehicles are largely stable. In view thereof, container vehicles are excluded in the study.

a) plan and conduct parking surveys to assess the existing supply of and demand for parking and loading/unloading (L/UL) spaces for different types of ComV at different daily and seasonal peaks on a district basis;

b) review and enrich the existing geographic information system (GIS) based database for the existing supply of parking spaces for ComV suitable for inclusion into the Transport Information System of TD;

c) develop models to forecast the demand of parking spaces for different types of ComV on district basis. The model should be compatible with the 454-zone system of the Territorial Population and Employment Data Matrix, the enhanced Geographic Information System for Parking (GIS-P) and GIS database;

d) review the existing demand and supply of ComV parking, and forecast the demand and supply of parking spaces (including L/UL) for different types of ComV in different districts in the design years of 2021, 2026 and 2031 based on the model developed and known development plans;

e) conduct a comprehensive assessment on the existing/forecast difference between the supply of and demand for parking spaces (including both day-time and night-time parking) for different types of ComV to identify possible reason(s) for the difference;

f) study and formulate various measures to address the difference between the supply of and demand for ComV parking spaces;

g) consult stakeholders on study findings and recommendations.

1.3 Structure of Report

1.3.1 Following this introduction, the report is subdivided into further sections as follows:

- **Section 2** describes the study process and tasks.
- **Section 3** reports the study findings.
- **Section 4** elucidates the remedial measures.
- **Section 5** summarizes the study findings and recommendations.

1.3.2 A list of abbreviations used in this report is presented below:

AECOM	AECOM Asia Company Limited
ComV	Commercial Vehicle
GFA	Gross Floor Area
GIC	Government, Institution or Community
GIS	Geographic Information System
GIS-P	Geographic Information System for Parking
GV	Goods Vehicle

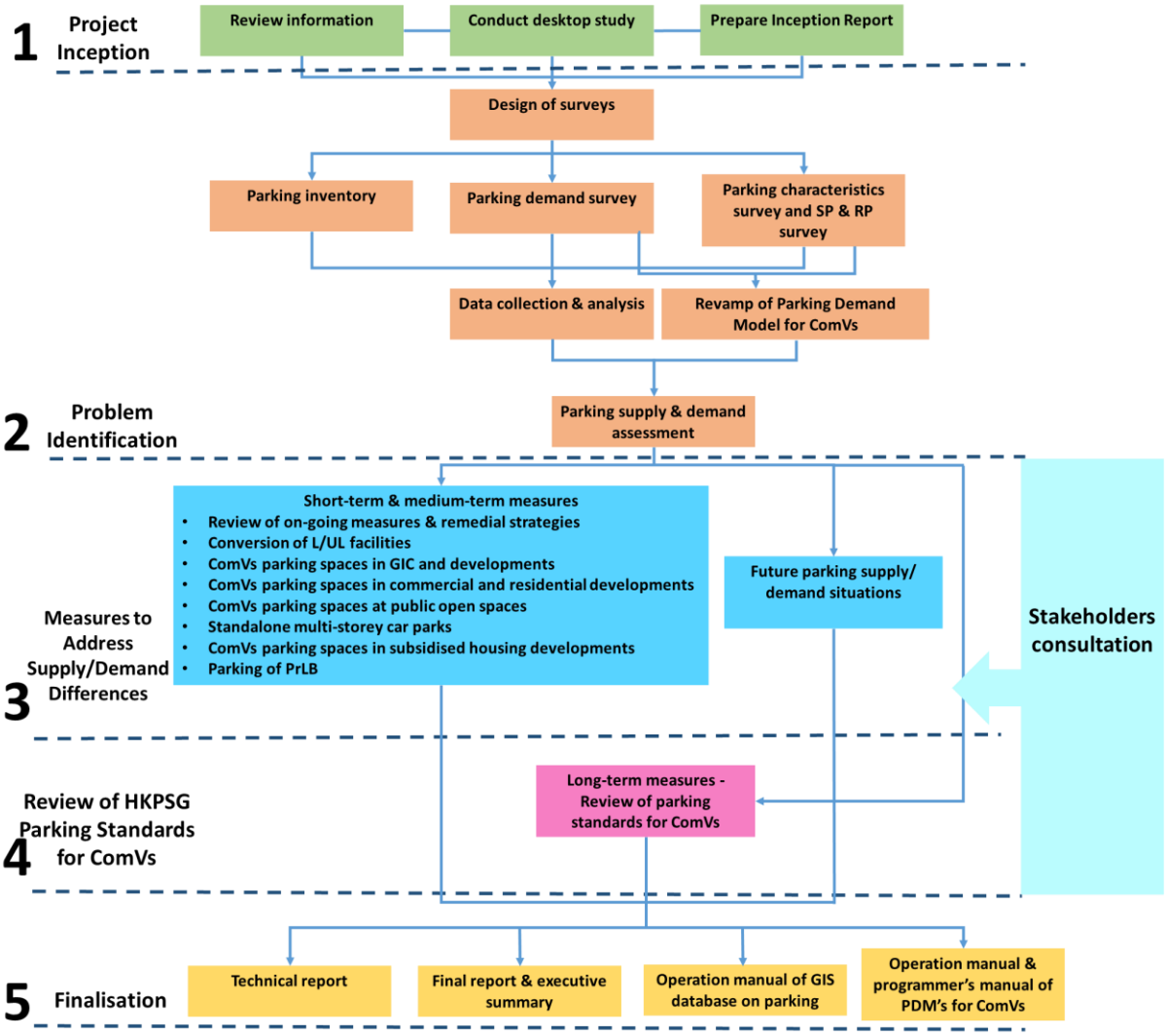
GVTCS 2011	Survey on Goods Vehicle Trip Characteristics 2011
HKPSG	Hong Kong Planning Standards and Guidelines
L/UL	Loading/ Unloading
LandsD	Lands Department
LGV	Light Goods Vehicle
MHGV	Medium/Heavy Goods Vehicle
NDA	New Development Area
NFB	Non-franchised Bus
NTE	New Territories East
NTW	New Territories West
OFSP	Off-street Parking Inventory
ONSP	On-street Parking Inventory
PB	Private Bus
PC	Private Car
PDM	Parking Demand Model
PDS	Parking Demand Study
PDS-2	Second Parking Demand Study
PDZ	Planning Data Zone
PlanD	Planning Department
POS	Public Open Space
PU/DO	Pick-up/Drop-off
STT	Short Term Tenancy
T/M	Taxi/Mini-bus
TCS 2011	Travel Characteristics Survey 2011
TD	Transport Department

2 STUDY PROCESS AND TASK

2.1 Introduction

2.1.1 The study process consists of performing several inter-related major tasks. The study approach and process are shown in **Exhibit 2.1**. The details and results of the main study tasks have been reported in a series of working papers and technical notes.

Exhibit 2.1: Study Process and Task



2.1.2 Major tasks of the study process are briefly presented in this Section.

2.2 Data Collection

2.2.1 Relevant data were collected from various government departments and data sources. Surveys were also carried out to quantify and evaluate the existing parking facilities and to characterise parking demand for modelling and analysis. The data sources include previous studies and database. Surveys were carried out in various forms and consisted mainly of interview surveys, questionnaire surveys, field observation and field count surveys.

2.2.2 The data collected are used in the Study through several ways, including the development of parking demand model (PDM). Apart from quantitative data, qualitative data are also obtained through a series of trade consultation. The data collected as well as views and opinions from trades are recorded and analysed.

2.3 Update of Parking Inventory

2.3.1 The parking inventory developed in PDS-2 is currently maintained by TD with regular update. The existing parking inventory consists of the following categories:

- On-street Meter Parking Inventory;
- On-street Non-metered Parking Inventory; and
- Off-street Parking Inventory.

2.3.2 Since the nature of On-street Metered Parking Inventory and On-street Non-metered Parking Inventory are similar, they are grouped into one category. Together with On-street Taxi/Mini-bus Stand Inventory as well as Off-street Parking Inventory, there are three categories defined in GIS-P. The existing inventory of parking and loading/unloading facilities are stored in a spatial format in GIS-P so that the parking information can be analysed and updated using the GIS technique:

- On-street Parking Inventory (ONSP);
- Off-street Parking Inventory (OFSP);
- On-street Taxi/Mini-bus Stand Inventory (T/M).

2.3.3 For the off-street parking sites surveyed under this Study, the parking inventory for OFSP was checked and updated. The parking inventory for STT car parks was also updated according to the results from the Parking Survey for STT Sites in 2018 and 2019. In addition, a new type of parking inventory named as Brownfield Site was also added to the OFSP in the GIS-P.

2.3.4 Brownfield sites are currently providing a significant number of non-designated parking spaces for ComV. In this Study, the brownfield sites used for ComV parking were firstly identified by overlaying the brownfield site inventory in GIS format provided by Planning Department (PlanD) with the aerial photos obtained from the Lands Department (LandsD). Brownfield sites that are greater than 1,000 m^2 were reviewed site-by-site for identifying whether they are used for ComV parking. The proportion of site area that are utilised to provide parking spaces were estimated so as to provide an estimation of parking supply in the brownfield sites.

2.4 Development of Parking Demand Model

2.4.1 Parking supply refers to the number of spaces available for vehicle parking and L/UL, whereas parking demand refers to number of vehicles in need of a space for parking and L/UL during a specified time period. Parking demand is classified into two main categories: ownership-related and usage-related. As far as ComV parking is concerned, ownership-related parking refers to the parking of the ComV when they are not in use or in service. On the other hand, usage-related parking refers to the parking of the vehicles when they are operating or in service. For ComV, such activities mainly relate to the delivery of goods or passengers and hence are considered as "L/UL" activities that generally cover the time when goods are being loaded/unloaded, and any associated waiting and/or idling time.

2.4.2 The main objective of the model is to estimate the difference between demand and supply of ComV parking spaces and L/UL bays by district in various design years. Once the differences have been identified, remedial measures should be developed and proposed. The model could also provide the technical rationale for recommending district specific measures to improve the parking and loading/unloading situation in future.

2.4.3 The aggregate parking demand for each district is based on regression analysis to establish the relationship between the number of licensed vehicles by Planning Data Zones (PDZs) and the set of independent variables such as population of a specific age group and employment places.

2.4.4 It is evident from GVTCS 2011 that there is a significant proportion of cross-district parking demand for ComV and therefore the registration addresses alone would not be adequate to represent the actual parking locations of ComV. Given that it is not practical to know the parking location of all ComV in the territory, parking distribution factors are required to establish the relationship between its registration address and parking location. From survey data, sufficient samples of registration address and parking location of various types of ComV were obtained to derive the distribution of parking location by 18 districts.

2.5 Assessment of ComV Parking Situations in Base and Design Years

2.5.1 The assessment on existing and future parking problems is conducted via parking characteristics analysis, parking demand model and trade consultation.

Parking characteristics analysis

2.5.2 Unlike PC, ComV night-time parking demand cannot be directly attributed to a particular type or types of development having L/UL demand. For example, a GV serving a residential building at day time does not necessarily mean that the residential building should provide night-time parking space for the GV.

2.5.3 It is noteworthy that even if a ComV is owned by a company, it does not mean that the company can provide a ComV parking space. According to survey conducted in this study, close to 50% ComV drivers were tasked by their company to find a space to park their ComV. With the parking characteristics data at hand, existing and future parking problems can be better assessed.

Parking demand model

2.5.4 In order to assess the night-time as well as day-time situations of parking or L/UL activities, parking demand model developed consist of two sub-models:

- Ownership-related Parking Demand Model; and
- Usage-related Parking Demand Model.

2.5.5 As the parking characteristics for GV and coaches/light buses are quite different, the sub-models are further split into models for GV and coaches / light buses i.e.:

- Ownership-related Parking Demand Model for GVs, including van-type LGV, non-van type LGV, MHGV (excluding container vehicles),
- Ownership-related Parking Demand Model for coaches/light buses
- Usage-related Parking Demand Model for GVs
- Usage-related Parking Demand Model for coaches/light buses

2.5.6 Parking and loading/unloading situations of each district could be assessed using the comparison of supply of and demand for parking facilities.

Trade Consultation

2.5.7 As the representatives of ComV drivers and companies, the views from the trade conferences and union groups would undoubtedly help identify existing and future parking problems. Various consultation sessions were organised to gauge the views from trade in order to draw up measures to alleviate ComV parking problem.

2.5.8 Based on assessed existing and future parking situation, the Study has recommended a strategy for addressing the difference between the existing and future supply of and demand for ComV parking spaces, at both territory level and district level, taking into account the existing measures currently adopted by the Government.

2.6 Develop Measures to Address Parking Problems Identified

2.6.1 The Assignment is a study that covers the whole of Hong Kong, the focus of mitigation measures concentrates on strategic issues related to parking and L/UL activities. The Study has formulated parking mitigation measures aiming to set the direction for consideration by the local authorities in developing local measures to improve the parking situations.

3 STUDY FINDINGS

3.1 Introduction

3.1.1 Based on the data collected under the Study, this section provides analysis on the data collected and summarises the key findings of the existing and future parking situations. Recommendations put forth under this study will be based on the findings with a view to addressing the problem in an evidence-based approach.

3.2 Changes of Fleet Size and Parking Spaces for ComV

3.2.1 **Table 3.1** summarises the vehicle fleet size and parking supply in Parking Demand Study (PDS) in 1994, PDS-2 in 2000 and this study in 2018. Total fleet size of ComV in Hong Kong was peaked in 1994 at around 80,000 vehicles. ComV fleet size reduced to about 64,000 in year 2000 and then increased moderately to about 68,000 in 2018.

3.2.2 For ComV parking spaces (excluding container vehicle parking spaces), the number increased from 42,000 in 1994 to about 52,000 in year 2000. In 2018, total parking spaces was reduced to less than 42,000 according to the parking inventory (GIS-P) kept by TD.

3.2.3 It is noteworthy that there are ComV operating overnight and parked outside Hong Kong and therefore fleet size does not equal to the parking demand in the territory. On the other hand, the non-designated parking spaces (e.g spaces in brownfield sites) could only be estimated but not ascertained. According to the survey conducted in this Study, the brownfield sites for ComV parking are concentrated in the New Territories, in which Yuen Long District contains the largest number of sites for ComV parking, following by North, Sai Kung and Tuen Mun. In total, it is estimated that around 6,300 parking spaces can be provided for ComV parking in brownfield sites in the territory.

Table 3.1: Vehicle Fleet Size and No. of Parking Spaces in Hong Kong

Vehicle Type	1994 (PDS)[#]			2000 (PDS-2)[#]			2018 (This study)		
	Vehicle included as part of the study	Licensed Vehicles	Parking Spaces	Vehicle included as part of the study	Licensed Vehicles	Parking Spaces	Vehicle included as part of the study	Licensed Vehicles*	Parking Spaces[&]
Goods Vehicles	Yes	75,600	39,900	Yes	57,297	48,792	Yes	57,272	36,700
Container Vehicles	Yes			No	13,516	12,992	No	8,150	5,408
Coach	Yes	4,200	2,100	Yes	6,200	2,900	Yes	7,629	4,847
Private Light Bus	No	N/A		No	2,051	N/A	Yes	3,346	N/A

Data Source:
[#] PDS-2 Final Report
* Monthly Traffic and Transport Digest by TD
[&] TD's parking inventory and parking spaces in brownfield sites

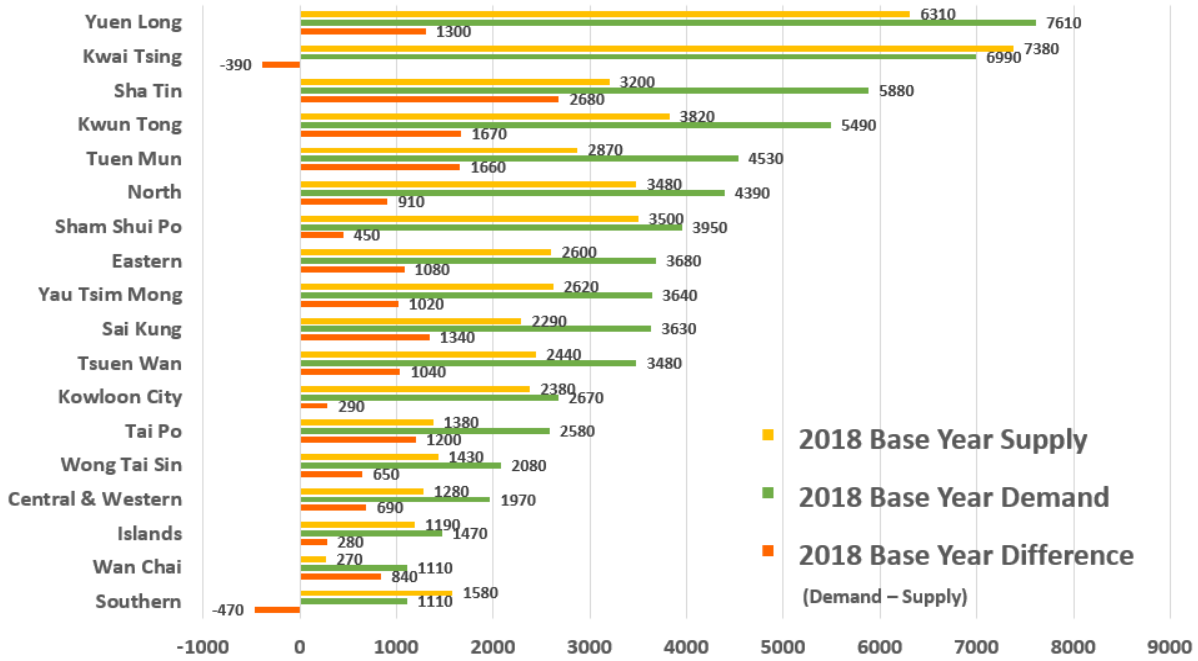
3.3 ComV Parking Situations in Base and Design Years

3.3.1 As a parking study that covers the whole of Hong Kong, the Study concentrates on strategic issues related to parking and loading/unloading activities.

3.3.2 The investigation of parking and L/UL situations is based on the comparison of supply of and demand for these facilities. The territorial and district-based parking supply and demand in base year and design years have been summarised and reviewed. Parking supply refers to the number of spaces available for vehicle parking and L/UL, whereas parking demand refers to number of vehicles in need of a space for parking and L/UL during a specified time period. For night-time parking, the parking demand model shows that the supply to demand ratio of night-time parking spaces was 0.75 in base year 2018 in territorial level for ComV. The ratios are estimated to be deteriorating in design years 2021, 2026 and 2031 with a ratio of 0.69 in 2031. For daytime L/UL condition, the model indicates that, in general, the L/UL supply to demand ratio for GV was 1.03 while that of coaches/light buses was 0.33 in 2018. The L/UL situation is expected to be more or less the same in design years 2021, 2026 and 2031.

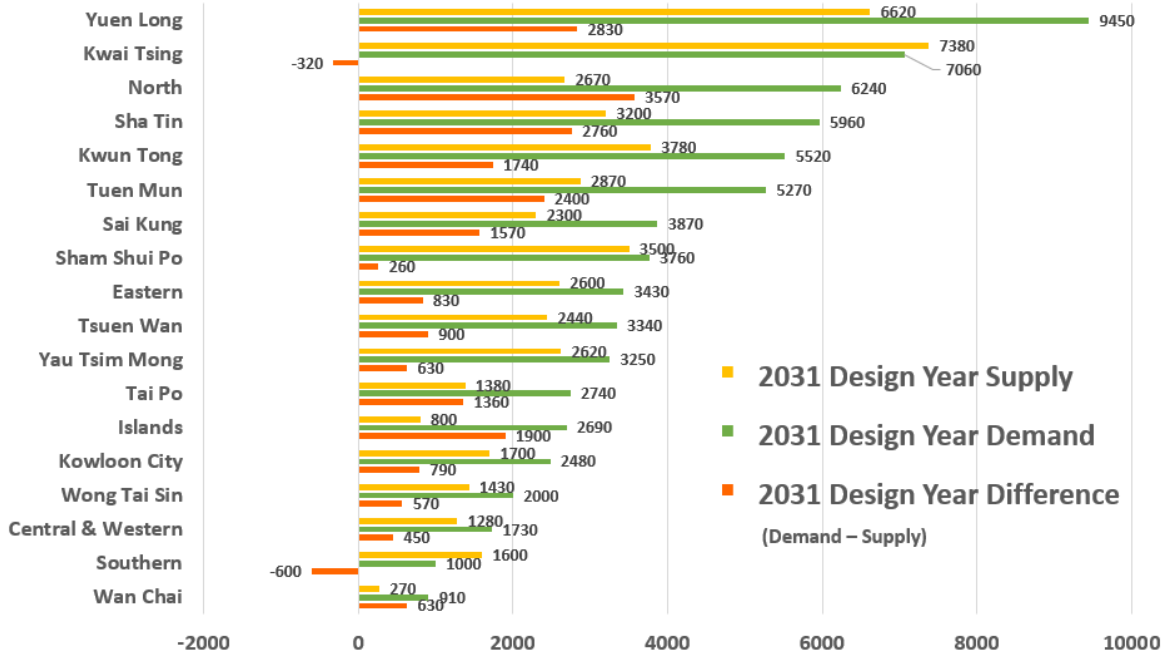
3.3.3 **Exhibit 3.1** shows the base year night-time ComV parking situation by district based on the parking demand model developed and TD's parking inventory. From the exhibit, Yuen Long is the district with the highest ComV parking demand. The finding is supported by the concentrated ComV parking in brownfield sites in Yuen Long and the industrial activities in Yuen Long industrial and rural area. Kwai Tsing is the district with the second highest ComV parking demand. This could be attributed to the concentrated logistic activities of container terminal in Kwai Tsing and the industrial activities in Kwai Chung industrial area.

Exhibit 3.1: ComV Parking Situation in Base Year by District



3.3.4 **Exhibit 3.2** shows the night-time ComV parking situation by district in design year 2031, Yuen Long and Kwai Tsing are expected to remain the districts with greatest parking demand. However, the order of difference changes from Sha Tin, Kwun Tong and Tuen Mun in 2018 to North, Yuen Long and Sha Tin in 2031.

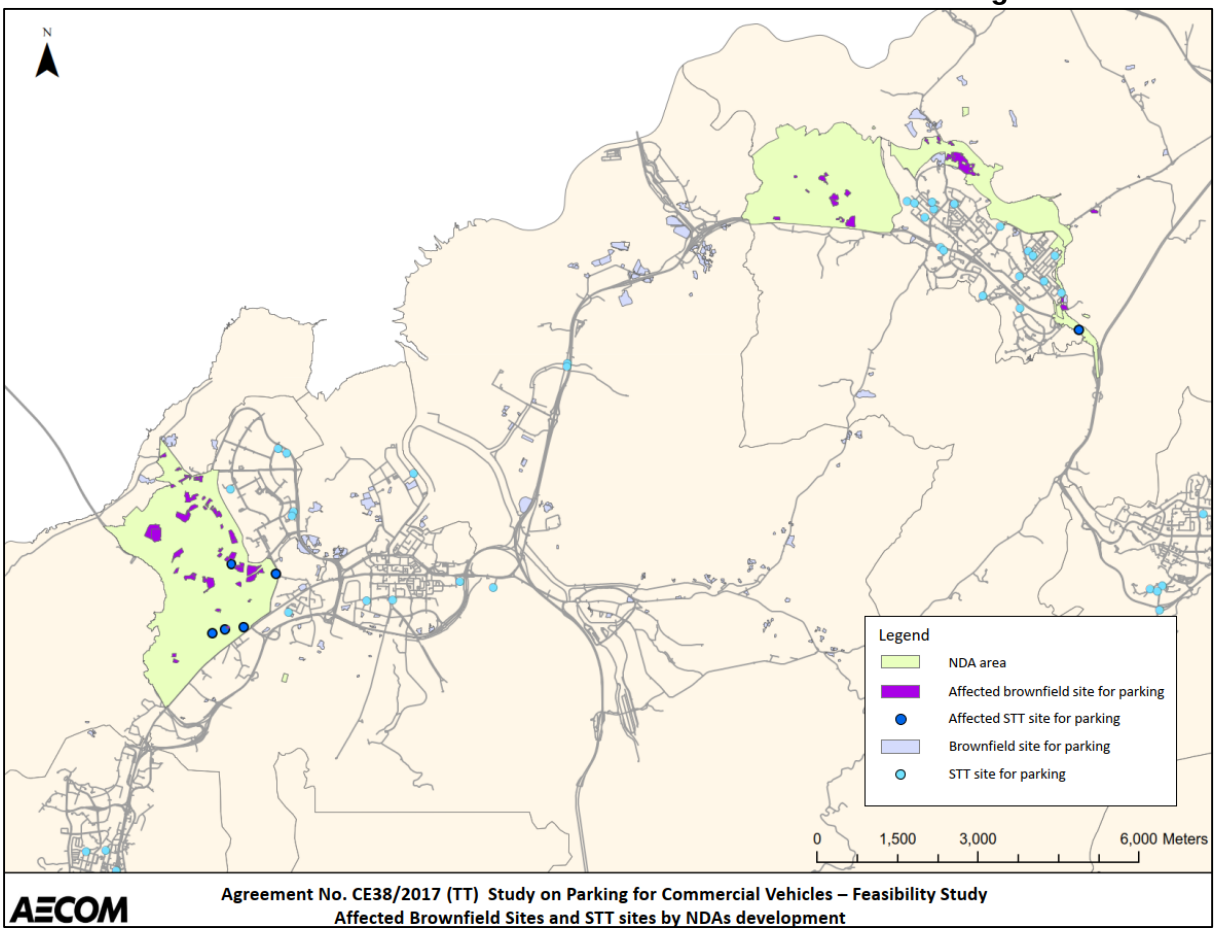
Exhibit 3.2: 2031 Forecast ComV Parking Situation by District



3.3.5 The forecast indicates that there would be a continued shortage of ComV parking in all the districts, except in Kwai Tsing and Southern, with an overall supply to demand ratio decreased from 0.75 in base year to 0.69 in 2031 if the current parking strategies and standards remain status quo. Districts with difference increased more than 500 include North, Isands, Yuen Long, Tuen Mun and Kowloon City. Other districts with demand greater than supply include Sai Kung, Tai Po, Sha Tin and Kwun Tong. The districts expected to have improvements would be Yau Tsim Mong, Eastern, Central & Western, Wan Chai, Sham Shui Po, Tuen Wan and Wong Tai Sin.

3.3.6 **Exhibit 3.3** shows the affected brownfield sites and STT sites by New Development Areas (NDAs) in the NTE and NTW. The exhibit also indicates that many brownfield sites and STT sites that are currently providing parking spaces are located within proposed NDA in the New Territories, including Kwu Tung North / Fanling North NDA and Hung Shui Kiu / Ha Tsuen NDA.

Exhibit 3.3: Affected Brownfield Sites and STT Sites for Parking in NT



3.3.7 **Table 3.2** shows the estimated statistics on brownfield sites with parking spaces that are within the boundary of NDAs. In total, close to 1,400 ComV parking spaces in brownfield sites are expected to be displaced.

Table 3.2: Number of Brownfield Sites Expected to be Affected by NDA

District	No. of site	No. of LGV parking space	No. of MHGV parking space	No. of coaches/light buses parking space	Total No. of ComV parking space
North	23	214	379	305	898
Yuen Long	47	120	212	170	502
Total	**70**	**334**	**591**	**475**	**1400**

3.3.8 **Table 3.3** shows the estimate of STT sites for parking which are within the boundary of known development projects. In total, more than 780 ComV parking spaces in STT car parks will be displaced.

Table 3.3: Number of STT Sites Expected to be Affected by Development Projects

District	No. of site	No. of LGV parking space	No. of MHGV parking space	No. of coaches/light buses parking space	Total No. of ComV parking space
Kowloon City	5	289	52	394	735
Kwun Tong	2	31	0	6	37
Yuen Long	5	9	0	0	9
Total	**70**	**329**	**52**	**400**	**781**

4 REMEDIAL MEASURES

4.1 Introduction

4.1.1 The night-time parking provision for ComV is estimated to decrease from base year 2018 to design years 2031, with districts in New Territories experiencing higher difference in demand and supply than districts in Kowloon and Hong Kong Island.

4.1.2 The remedial measures in PDS and PDS-2 paved the ways in planning, management, and technology to manage the parking demand and supply. The review of the previously proposed measures provided a reference for formulating remedial measures in this Study. In view of the hard fact that land resources are limited in Hong Kong, coupled with the need to cater for competing land use demand to match the community and economic development, it is considered difficult to meet the anticipated ComV parking demand through conventional practices like STT as suggested in PDS-2 or privately owned brownfield sites.

4.1.3 Based on the projected parking situations assessed under this study, remedial measures set out in three directions are recommended. Among various measures, some of them are already being implemented as on-going measures of the Government, for examples, providing on-street night-time parking spaces and encouraging schools to allow school buses to park within schools after school hours. In the meantime, some remedial measures have not been applied in Hong Kong but there is potential for implementation.

4.1.4 In light of the above findings, this study formulated various remedial measures to alleviate the problem under three directions as tabulated in **Table 4.1**:-

Table 4.1: Summary of remedial measures

Direction	Measures
Increase Supply of Parking Spaces	Update of HKPSG parking standards
	Provision of public parking spaces in public vehicle park for ComV
	Designating suitable on-street locations as night-time parking spaces for ComV
	Provision of parking spaces under flyovers
	Provision of on-street PU/DO facilities for coaches
	Specifying the provision of a minimum number of ComV parking spaces in suitable STT sites
Fully Utilise Existing Spaces	Introduction of Shared-use parking spaces
	Opening up ComV parking and L/UL spaces for night-time public parking
	Encouraging schools to allow school buses to park within schools after school hours
	Making use of technology to increase enforcement efficiency
	Disseminating Real-time parking vacancy information
Preserve ComV Parking Spaces	Reprovision of existing parking spaces in STT sites in future developments
	Formulating strategy to accommodate existing ComV parking spaces in brownfield sites

4.2 Increase Supply of Parking Spaces

Update of HKPSG Parking Standards (The following suggestions regarding the updates of HKPSG and the introduction of shared-use parking spaces have been accepted. The Government has promulgated the revised parking standard in August 2021.)

4.2.1 According to the surveys conducted under the study, the previous LGV parking standard cannot match with the assessed LGV demand in subsidised housing. Besides, the previous standard covers only LGV and MGV whilst subsidised housing would generate parking demand for other types of ComV, including PrLB, coach and HGV.

4.2.2 The HKPSG is a Government manual of criteria for determining the scale, location and site requirements of various land uses and facilities. However, the effect of increase in ComV parking provision through change of parking standards in HKPSG cannot be emerged in a short period of time taking into account the planning, design and construction time required.

4.2.3 The technical approach to assess whether the standards for L/UL bays still match the operational requirements for various developments is using the number of L/UL demand as the observed dependent variable to correlate with various development parameters as independent variables. The unit used in computing L/UL bays number in various land use/development type is as shown in **Table 4.2**.

Table 4.2: Unit Used in Computing L/UL bays number

Land Use / Development Type		Unit used
Domestic	Subsidised housing	No. of block per 1 L/UL bay
	Private housing	No. of flat per 1 L/UL bay or No. of block / per 1 L/UL bay
Non-Domestic	Education	No. of L/UL bay/school
	Medical	No. of L/UL bay/hospital or clinics
	Retail	No. of GFA / per 1 L/UL bay
	Office	No. of GFA / per 1 L/UL bay
	Retail Market	No. of stall / per 1 L/UL bay
	Hotel	No. of rooms / per 1 L/UL bay
	Industrial	No. of GFA / per 1 L/UL bay

4.2.4 Survey results from sampled buildings indicate that, taking into account a 10% variation in L/UL demand and 50% of L/UL bays in industrial development for ComV parking, current HKPSG requirements on L/UL space provision, except for subsidised housing, are in general still valid.

4.2.5 A questionnaire survey was conducted in this Study to investigate the ComV night-time parking demand, including parking locations and types of car park. The survey data indicate that for privately owned GVs, almost 100% of the privately owned vehicles' parking decision are made by the drivers. For company owned vehicles, close to 50% parking decision are made by the drivers. Another key finding from the survey is that about 70% of the commercial drivers are living in the subsidised housing.

4.2.6 **Table 4.3** shows the proposed ComV parking standards for subsidised housing. In order to facilitate the implementation of inter-changeability in subsidised housing developments, it is proposed to unify the parking standards for public rental and subsidised saleable housing. The proposed standard for LGV parking is 1 parking space per 260 flats, excluding "one person / two persons" flats. It is also proposed to provide 2 L/UL bays per housing block, which should also be used for overnight parking to address the parking demand of Coach/Bus & M/HGV.

Table 4.3: Proposed ComV Parking Standard for Subsidised Housing

Type of Development	Vehicle Type	Proposed Standards
Public Rental Housing and Subsidised Saleable Housing	Non-van-type LGV & PrLB	1 shared-use space per 260 flats*
	Coach/Bus & M/HGV	2 shared-use L/UL bays per block, all of which should be for overnight parking with due consideration of the site constraint and local situation

*Note: One person/Two persons" flats is excluded from the parking provision for ComV for subsidised housing

Provision of Public Vehicle Park for ComV

4.2.7 According to the questionnaire survey, 64% of ComV drivers parked their vehicles near their residence or at STT sites. It indicated that a significant portion of the companies cannot provide parking spaces for their ComV. On the other hand, ComV drivers considered the distance between car park and residence would be the most significant factor for them to choose the parking location. In light of the above, a centralised hub providing very large amount of ComV parking spaces (e.g. >500 ComV spaces) is therefore not recommended as it is not attractive to ComV drivers, especially if the hub is not close to residential area.

4.2.8 With a view to addressing existing ComV parking problem and the subsequent traffic impact**,** provision of public parking spaces is considered to be a pragmatic approach. Following the "**single site, multiple uses**" principle which was introduced by 2017 Policy Address, public parking spaces could be incorporated in GIC facilities and POS projects, thereby minimising the need for standalone car parks while increasing efficiency of the site.

4.2.9 This Study identified 8 potential locations[2] in line with the "single site, multiple uses" Principle" to incorporate public vehicle park with ComV parking provision to address ComV parking demand in the vicinity. An initial screening of various potential POS sites capable of accommodating a ComV park (either aboveground or underneath the POS) was undertaken to create a shortlist of candidate sites. 2 GIC facilities and 6 POS sites are recommended with preliminary planning and technical assessments conducted.

4.2.10 This study conducted preliminary planning and technical assessments for the two proposed joint-user multi-storey public vehicle park and 6 public vehicle parks underneath public open space projects. Other preliminary assessments include traffic impact review, broad brush assessment for drainage and sewerage, water and utility, geotechnical, visual and landscape, environmental and heritage impact.

[2] 8 identified potential sites are located at 1) Ma On Shan; 2) Tin Shui Wai; 3) West Kowloon, 4) Hung Hom; 5) To Kwa Wan; 6) Tung Chung; 7) Tuen Mun; and 8) Shau Kei Wan.

4.2.11 Based on the criteria shown below, the sites selected which are being taken forward by the Government as potential parking sites for further planning and technical assessments were listed in **Table 4.4**.

- Parking demand estimate / analysis by site
- Planning considerations
- Environmental considerations
- Impact on surrounding traffic
- Construction difficulty

Table 4.4: Potential Public Vehicle Park for ComV Being Taken Forward by the Government

No.	Project	Type
1	Amenity Complex in Area 103, Ma On Shan	GIC facilities
2	Leisure and Cultural Complex Project at Tin Yip Road, Tin Shui Wai	GIC facilities
3	Open Space cum Car Park at To Wah Road, West Kowloon	Public Open Space
4	Sports Centre and Open Space at Aldrich Bay, Shau Kei Wan	Public Open Space

4.2.12 It is estimated that around 400 ComV parking spaces can be provided by the 4 proposed sites. The 4 sites proposed under the study alone are not able to address the existing ComV parking problem. The Government is recommended to provide more public parking space at strategic locations to further alleviate the difference in demand and supply.

Short-term Measures to Increase ComV Parking Spaces

4.2.13 The study also recommends the following measures to increase the supply of ComV parking spaces. These measures could increase the provision of overnight parking spaces for ComV in a short period of time.

- Designating suitable on-street locations as night-time parking for ComV
- Provision of parking spaces under flyovers
- Provision of on-street PU/DO facilities for coaches
- Increasing the minimum number of ComV parking provision in STT sites

4.3 Fully Utilise Existing Spaces

Introduction of Shared-use Parking Spaces

4.3.1 "Shared-use" parking refers to permitting the use of a parking space by more than one types of vehicle with similar dimensions to maximising utilisation of the parking space. Taking into account the typical size of licensed ComV in Hong Kong, it is proposed to set 2 types of "shared-use" parking spaces for LGV / PrLB and M/HGV / Coach/Bus. The proposed dimension for shared-use parking spaces is shown in **Table 4.5**.

Table 4.5: Shared-use Parking Spaces Dimension

Type of shared-use spaces	Length (m)	Width (m)	Minimum Headroom (m)
"Shared-use" for LGV and light buses	8	3.5	3.6
"Shared-use" for coaches/buses and M/HGV	12	3.5	4.7

4.3.2 The proposed shared parking has the merit of providing flexibility to cater for variable parking demand of different types of vehicle, thereby minimising idling of parking spaces. As subsidised housing would generate parking demand for various types of ComV owing to the fact that around 70% of ComV drivers reside in subsidised housing, there is a case to introduce dimensional standards for "shared-use" of parking spaces on top of the existing dimensional standards for parking spaces and L/UL bays.

Opening Up of ComV parking and L/UL Spaces for Public Parking

4.3.3 Various types of developments provide only ancillary L/UL spaces but not ComV parking spaces to address the L/UL demand generated from the developments in day time in general. There will be substantial supply of ComV parking spaces if these L/UL spaces can be used for parking of ComV in non-operating hours (e.g. night-time). From the land use compatibility perspective, among all the developments types, it is considered that L/UL spaces of industrial and commercial developments would be suitable for opening up. It is therefore recommended opening up L/UL spaces as well as a portion of the ancillary CV parking spaces of new industrial and commercial developments for night-time public parking for ComV.

4.3.4 Other potential measures which can improve the utilisation of spaces for ComV parking are:

- Encouraging schools to allow school buses to park within schools after school hours
- Making use of technology to increase enforcement efficiency
- Disseminating real-time parking vacancy information for ComV Parking

4.4 Preserve ComV Parking spaces

4.4.1 Unlike PC parking spaces which are mainly incorporated in permanent development, a considerable amount of ComV parking spaces are located in open area. STT parking was recommended in PDS-2 as a remedial measure for parking of GV. In light of the more severe competing land use in recent years, more and more STT sites are vacated by the Government to make way for permanent development. Furthermore, ComV parking spaces displaced cannot always be replenished.

4.4.2 Brownfield sites, which are defined as primarily agricultural land in the New Territories which has been formed and occupied by industrial, storage, logistics and parking uses according to the "Study on existing profile and operations of brownfield sites in the New Territories" conducted by the Planning Department, also contains

considerable parking spaces for ComV due to the industrial nature of brownfield sites. As developing brownfield sites has been a consensus of the society at large, the displacement of ComV parking spaces in brownfield sites is considered inevitable.

4.4.3 The ComV parking spaces displaced in STT and brownfield sites would undoubtedly aggravate the ComV parking problem in Hong Kong. It is recommended that the Government should adopt the following measures to minimise the loss of ComV parking spaces in both STT and brownfield sites under the current administrative framework and formulate a long-term plan for dealing with ComV parking spaces in both STT and brownfield sties.

Reprovision of parking spaces in STT sites

4.4.4 By the end of 2018, there are a total of 194 STT car parks in Hong Kong providing about 6,600 ComV parking spaces.

4.4.5 Noting that more and more STT sites are taken back for permanent developments, the parking spaces displaced, no matter ComV or PC spaces, may create a parking problem in the vicinity. It is therefore suggested that the Government provide public ComV parking spaces in suitable GIC facilities or POS in accordance with the "single site, multiple uses" principle to minimise the impact brought by the loss of ComV parking spaces in STT sites.

Formulation of strategy to accommodate ComV parking in brownfield sites

4.4.6 As discussed in **Section 3**, many brownfield sites for parking will be affected by NDA. Unlike STT sites, some parking spaces at brownfield sites may serve as a part of logistics operations and are not opened for public parking. The reprovision of ComV public parking spaces by the Government may not be an effective way to address the demand in this regard. According to "Study on existing profile and operations of brownfield sites in the New Territories" conducted by the Planning Department, logistics operations in brownfield sites usually require fast processing of goods and large storage space as well as frequent traffic of container vehicles/trucks and L/UL of goods at the site. Spacious and horizontal working spaces with convenient L/UL and parking are required. It is recommended that the Government should formulate a more comprehensive and consolidated strategy to address the ComV parking spaces displaced in brownfield sites since many of the brownfields sites displaced are falling within the NDA in which the Government has more control of the development strategy over them.

4.4.7 Meanwhile, multiple studies conducted / being conducted by the Government including "Study on existing profile and operations of brownfield sites in the new territories" by Planning Department or "Study on Land Requirements for Modern Logistics, Port Back-up and Vehicle Maintenance Industries" by Transport and Housing Bureau, aim to identify various requirements for development of brownfield sites. It is recommended that the holistic strategy for brownfield development should take into account the parking demand generated from the displaced parking spaces in brownfield sites and draw up solution (e.g. multi-storey buildings for

brownfield operations) to address the parking demand generated from the development of brownfield sites.

4.5 Regular Review of ComV Parking Situation

4.5.1 Various measures have been recommended above to address ComV parking problem identified in this study. A regular review is recommended for continuous formulation and implementation of measures to address ComV parking problem.

Territorial parking study

4.5.2 As overall ComV parking patterns will change continuously with land use developments, economic growth and goods and services consumption patterns, there is a need for a regular territorial parking study to comprehensively review the issues pertinent to existing and future parking needs, to assess parking related problems, and to recommend measures to address the problems identified.

4.5.3 The Parking Demand Study (PDS-1), completed in 1995, set the direction for future parking strategies in Hong Kong while the Second Parking Demand Study (PDS-2), completed in 2002, identified existing and future parking and loading/unloading problems and to recommend remedial measures to address these problems.

4.5.4 The economy of Hong Kong changes rapidly and hence generates new parking concerns from time to time. The past experience of conducting territorial parking study as when required will not be able to address new parking issues in a timely manner. It is therefore recommended that territorial parking study should be conducted at regular intervals.

Review of HKPSG parking standards

4.5.5 In view of the ever-changing socio-economic situation, the parking demand for various types of vehicle and development also change from time to time, timely adjustment of the parking standards is therefore required. It is proposed to review the HKPSG parking standards at a regular interval.

5 CONCLUSION

5.1 Conclusion

5.1.1 This report is the culmination of the results obtained through all the major tasks performed under this Study. The study process, findings and recommendations of these tasks have been discussed in the earlier sections of this report. In summary, they are:

- Data collection and Consultation
- Review and Update of Parking Inventory
- Development of Parking Demand Model
- Problem identification
- Formulation and Recommendation of Remedial Measures

5.1.2 The territorial and district-based parking supply and demand in base year and design years has been summarised and reviewed. Parking supply refers to the number of spaces available for vehicle parking and L/UL, whereas parking demand refers to number of vehicles in need of a space for parking and L/UL during a specified time period. For night-time parking, the parking demand model shows that the supply to demand ratio of night-time parking spaces was 0.75 in base year 2018 from territorial level for ComV. The ratios are estimated to be deteriorating in design years 2021, 2026 and 2031 with a ratio of 0.69 in 2031. For daytime L/UL condition, the model indicates that, in general, the L/UL supply to demand ratio for GV was 1.03 while that of coaches/light buses was 0.33 in 2018. The L/UL situation is expected to be more or less the same in design years 2021, 2026 and 2031.

5.1.3 In light of the difference of supply of and demand for ComV parking spaces, this study established three directions, namely 1. Increase Supply of ComV Parking Spaces, 2. Fully Utilise Existing ComV Parking and L/UL Spaces and 3. Preserve ComV Parking Spaces, and formulated various remedial measures under these directions to alleviate the difference. Nevertheless, the Government needs regular in-depth study and resources to formulate and implement these measures in a coordinated manner. A regular review is therefore recommended for continuous formulation and implementation of measures to address ComV parking problem.