

Building Design to Foster a Quality and Sustainable Built Environment

Invitation for Response Document 2009

Your views are welcome!



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- 1.1 Hong Kong has one of the world's densest urban environments. Our "built environment" — where most of Hong Kong's 7 million people live — represents only 24% of our territory, just under 260 sq. km. This leads to many advantages. Transport is efficient. We have easy access to an impressive array of services. But many of us also live in high-rise buildings with inadequate amenities of space, natural airflow and greenery. Our quality of life, public health and resource management would be directly affected, for better or worse, by the conditions of the built environment. Our built environment is one of the factors influencing our quality of life, and our building design in relation to the surroundings is one of the most important elements to influence our built environment. To implement better public policy regarding building design would directly contribute to attaining a quality and sustainable built environment.
- 1.2 Phenomena attributable to building design are all around us. One is the "canyon effect" created by closely packed high-rise buildings. Narrow streets create traffic and pedestrian congestion. Furthermore, little room would be left for public space for community interaction. Another is the visual permeability and blockage of natural air corridors caused by building blocks, e.g. the wall effect of tower blocks. High density of high-rise buildings may lead to the build-up of heat and pollution because of poor airflow in-between. Buildings also account for a substantial consumption of energy and other resources. This is associated with greenhouse gas emissions and other pollution issues. The resultant running cost is of course another dimension to the issue.
- 1.3 Addressing these issues is an important goal of public policy. There are a variety of alternatives for improving building design. In this document, we take the opportunity to invite public participation in considering what approaches are favourable and appropriate to our community.
- 1.4 This Invitation for Response (IR) document represents the start of the public engagement on **Building Design to Foster a Quality and Sustainable Built Environment**. This exercise is undertaken by Hong Kong's Council for Sustainable Development, and will extend from 20 June 2009 until end of October 2009. In this IR document, you will find information on potential solutions and how these solutions will, if implemented, affect our built environment and eventually our living quality. Key discussion points include how to promote sustainable building design, and how to balance the associated economic, social and environmental implications. One must acknowledge that there is no magic solution that can solve all the issues without cost, be it pecuniary or otherwise. Consideration of what solutions are to be adopted is thus a balancing process. Pros and cons of potential solutions need to be weighed before reaching a decision. Your opinions and views will therefore be vital in helping us analyse and weigh these solutions with a view to identifying the proper solutions for these key policy issues.



1.5 The Council recognizes that there are wide ranging issues that influence our built environment. However, it has agreed to focus the scope of this engagement to the three areas of sustainable building design (i.e. building separation, setback from narrow streets, and greenery), balancing provision of certain building features against the resultant increase in building height and bulk, and energy efficient building design. The Council has recognized that, in recent years, there are increasing public concern on the impact of building design on our quality of life, such as air quality, visual harmony and community interaction. The Council has also taken note of such other ongoing initiatives taken by the Government as the progressive review of the Outline Zoning Plans, review of the Urban Renewal Strategy and heritage conservation etc. and concurred that this engagement will focus on the design of buildings within their own site boundary at this stage, rather than on a city and district planning level as a whole.

1.6 I encourage you to study this document and the supplementary information we will provide in the course of the public engagement in which briefings, forums, workshops and other engagement events, etc. will be staged. Your active participation in these events would be an affirmation of our shared commitment to improving our built environment. You are also welcome to visit our dedicated website for further information on the subject and coming events.

1.7 On behalf of the Members of the Council for Sustainable Development, I would like to thank you in advance for sharing your opinions and in joining many others in shaping a sustainable world class city. I look forward to seeing and hearing from you in the coming months.

Bernard Chan,

Chairman, Council for Sustainable Development



- 2.1 The Council for Sustainable Development (the Council) is embarking on its fourth public engagement exercise on the issue of **“Building Design to Foster a Quality and Sustainable Built Environment”**. As in previous rounds (which addressed: *Urban Living Space, Solid Waste Management, Renewable Energy, Population Policy and Air Quality*), the Council has set out the background to the issue in this **Invitation for Response (IR) Document** in preparation for an extensive round of community outreach and engagement. The public engagement exercise will commence on June 20th 2009 and will run until the end of October 2009.

Background

- 2.2 Hong Kong has one of the world's densest urban environments. Our “built environment” — where most of our 7 million people live — represents only 24% of our territory, just under 260 sq.km. This leads to many advantages. Transport is efficient. We have easy access to an impressive array of services, and we have set aside a significant amount of land as country parks. Despite these positive attributes, there have been increasing calls in our community for greater attention to urban greening and the quality of the public realm.
- 2.3 In recent years, concerns have surfaced in the community regarding the aggregate impact of bulky and tall buildings on the quality and sustainability of our built environment. The “canyon effect” created by closely packed high-rise buildings contributes to reduced airflow, creates traffic and pedestrian congestion, and limits the space for community interaction. The “wall effect” caused by bulky buildings in close proximity to one another also blocks views and natural air flow. Together these may contribute to the build-up of heat (“the urban heat island effect”) and pollutants.
- 2.4 Another important factor to consider is the significant energy consumption of our buildings, which is well understood to be associated with indirect greenhouse gas emissions and air pollutant, both areas of community concern.

Focus of the Public Engagement

- 2.5 The Council has recognised that there are increasing public concern in recent years on the impact of building design on our quality of life, such as air quality, visual harmony and community interaction. The Council has also taken note of other ongoing initiatives by the Government, such as the progressive review of the Outline Zoning Plans, review of the Urban Renewal Strategy and heritage conservation etc.
- 2.6 There are many opportunities to improve the quality and sustainability of our built environment through building design. Options include the introduction of sustainable design guidelines for wider separation of buildings, building setback from narrow streets and introduction of greening requirements in larger-scale developments. Consideration is also given to the various factors that influence the bulk and height of buildings, in particular the existing gross floor area (GFA) concession policies and practices related to the provision of essential, green and amenity features, and the means to improve the energy efficiency of Hong Kong’s building stock.
- 2.7 As with all sustainability issues, building design changes are associated with many possible **pros and cons, and trade offs for our community to consider**. These have been introduced in the document, but neither these nor the options presented represent an exhaustive list of the possible solutions or the complex **social, economic and environmental** factors. Design considerations that influence our buildings and built environment are wide-ranging, and include issues related to Site and Neighbourhood, Energy and Climate, Materials and Waste, Water Conservation, and Indoor Environment as well as the associated technologies, design solutions and management strategies in each area. Whilst the importance of these broader considerations is well recognised, the entirety of this issue would be a substantial undertaking for a single public engagement exercise.

Accordingly, the Council for Sustainable Development has limited the scope of engagement to focus on the **design of buildings within their own site boundary**, and in particular with the following three questions:

- How to achieve sustainable design in terms of building separation, setback from narrow streets and greenery?
- How to balance the need for essential, green and amenity features of buildings against building height and bulk?
- How to improve energy efficiency of buildings through more effective design?

The Engagement Process and Key Stakeholders

- 2.8 The Council has established an inclusive and transparent process to engage stakeholders in dialogue, information sharing and decision-making. A wide range of community, business and other organisations and members of the public have been, and will continue to be, engaged by the Council to help it evaluate sustainable development issues. The Engagement Process comprises five stages as follows: a) identifying the priority areas, b) preparing an IR document, c) community engagement with independent collection and analysis of the community's views, d) reporting of community's views and the Council's recommendations to Government, and e) Government response and action.
- 2.9 By providing stakeholders with the relevant information and engaging them in discussion during public forums, the Council's public engagement process can help the community better understand and debate the issue. The Council has found from past rounds of engagement that the public views that emerge from such an informed, open and participatory process are more balanced and provide a credible input to report to Government to facilitate its subsequent policy formulation.

- 2.10 Key stakeholders for the engagement include members of the public, building owners, tenants and occupants, professionals and related institutions of the built environment, developers, business groups and chambers of commerce, academics, NGOs and green groups, students and Legislative and District Councilors.

Our Buildings and Built Environment — Characteristics and Influencing Factors

- 2.11 **Hong Kong prides itself in surpassing New York to become a model "vertical city"** as characterized by its typical high-rise forms, vertical malls and multi-storey mixed-use towers. At a recent skyscraper forum held in October 2008 in New York, it was widely agreed that Hong Kong has realized the 20th century dream of New York's architects and delivered the vertical city vision. While tall buildings and high density provide function and efficiency, such development may also lead to the formation of "walls" of buildings, narrow and overcrowded roads and streets, poor urban air ventilation, high levels of roadside air pollution, limited public amenity, and a concrete rather than a green environment.
- 2.12 **Buildings accounted for almost 90% of Hong Kong's electricity consumption** in recent years and represent a major portion of our community's carbon footprint, and are a contributor to our air quality and therefore our health. When we consider also the potential for cost savings from reduced energy bills, we can quickly realize that building energy efficiency is a key sustainable development issue.
- 2.13 There are a **wide range of policies and practices that shape the design of buildings** in Hong Kong, ranging from statutory planning i.e. the Hong Kong Planning Standards and Guidelines, Urban Design Guidelines, the Buildings Ordinance (BO) and subsidiary legislation such as the Buildings (Planning) Regulations, to a range of best practice and guidance notes, particularly those related to the provision of green and amenity features in

buildings. Where applied, these policies and practices work in concert to influence particular design parameters on individual building sites, and thus the bulk and height of buildings. A complete discussion of these is not possible in this Executive Summary or indeed in the full IR document. However the broad considerations have been introduced.

- 2.14 One of the key aspects introduced is the impact of **GFA concessions related to the provision of essential, green and amenity features**, and the existing Practice Notes issued to guide the incorporation of such features into our buildings. This has taken place as part of a pragmatic and evolutionary approach to meeting the needs of our community. Many desirable and practical features have been incorporated into buildings as a result. However, more recently concerns have arisen related to the aggregate impacts of concessions under these provisions, and the increase in bulk and height of certain building developments.
- 2.15 The pros and cons associated with the GFA and site coverage concessions for certain essential, green and amenity features in buildings are discussed in detail in the IR Document. On the positive side, the policies provide for necessary and desirable features in buildings without excessively reducing the areas of flat units and other facilities; add value to the property for building's owners /occupiers by enriching the facilities of the building and enhancing convenience for owners/occupiers; provide more social amenity for owners/occupiers, and in certain cases may improve energy efficiency and reduce energy bills. On the downside, GFA concessions may lead to increases in the height or bulk of a building, which may bring about negative impacts to neighbouring residents depending on the setting of the building and interrelation with other buildings. However, in respect of energy efficiency in buildings under the existing policies, building developers or owners may lack the incentive to incorporate energy efficient design or installations or continually enhance the energy efficiency of their buildings, as these features are not common attractions to potential flat owners and may result in increase in management fees for their maintenance.

- 2.16 There is also a significant need to create more energy efficient buildings. In the near future, the Government will legislate for the mandatory implementation of the Building Energy Codes. The Government has also recently launched funding schemes to provide financial incentives for carrying out energy-cum-carbon audits and energy efficiency improvement projects in existing buildings. The community is asked to consider what other means to reduce energy consumption by promoting energy efficient building design should be encouraged and how.
- 2.17 These pros and cons must be considered to create a balanced, transparent and flexible system that allows our built environment to continue to develop in a sustainable manner. More detail is provided in the full IR document to help the readers understand the finer details of the issue, along with some examples of the approaches being taken in other countries to address similar issues.

Possible New Solutions

- 2.18 With a view to addressing public concerns over the issues regarding our built environment, a number of options are proposed under the three major aspects each with several sub-solutions as outlined below. Once again these are explained in detail in the IR document along with an introduction of the associated pros and cons, and policy considerations.
- **Sustainable Building Design Guidelines:** a) separation of buildings in certain large developments; b) provision of building setback in certain developments on narrow streets; and c) enhancing the amount of greening in building developments
 - **Control on GFA Concessions:** a) reviewing GFA concessions for mandatory building features; b) reviewing car-parking provisions; c) reviewing the incentives for dedicating areas for public passageway and road widening;



d) reviewing GFA concessions for other features; e) evaluating the need for a cap on GFA concessions; and f) reviewing the practices and legal framework for granting certain GFA concessions

- **Energy Efficient Building Design and Installations:** a) energy efficient building design features that should be incorporated; and b) potential mechanism to encourage their uptake

2.19 There are costs and benefits associated with these options. For *Sustainable Building Design Guidelines*, building separation and setback would improve air flow and better pedestrian environment respectively but may also impact on development potential, design flexibility, etc. Greenery may increase capital and maintenance costs, etc but would improve microclimate and offer a pleasant environment. Likewise for *Control on GFA Concessions*, while addressing the building bulk and height problem, it may lead to a reduction in total GFA resulting in reduction in total saleable area, lower incentives to provide desirable features, etc. Similar considerations also apply to *Energy Efficient Design and Installations*, which may increase capital and maintenance costs of buildings but would help reduce energy consumption and thus pollution.

Questions for Stakeholders

2.20 The issue of Building Design to Foster a Quality and Sustainable Built Environment is a complex one with broad sustainability considerations. While the IR document outlines some of the major issues, it is in no way exhaustive. The Council welcomes views from all stakeholders, and anticipates that comments may both directly respond to the issues highlighted in this document as well as broader issues related to building design to foster a quality and sustainable built environment. In Section 6 of the IR document, the Council has posed some open-ended questions to stimulate discussion under the following overarching questions:

- a. What do you consider to be the most important characteristics of a quality and sustainable built environment and why?
- b. What are your views on the proposed sustainable building design guidelines?
- c. What are your views on the review of the existing GFA policies and practices?
- d. How should building energy efficiency be encouraged?
- e. What is your willingness to pay for building features that are conducive to attaining a quality and sustainable built environment?
- f. Which of the following approaches do you consider appropriate as the way forward —
 - (i) **status quo** — the current approach towards building design be maintained; or
 - (ii) **moderate change** — progressively introducing development control over the provision of essential, green and amenity features, e.g. by reducing the rate of GFA concessions for certain features and capping the total amount of GFA concessions; or introducing other incentives, e.g. accreditation/recognition schemes; or
 - (iii) **major change** — introducing more stringent controls over development, e.g. by doing away with GFA concessions for certain building features; imposing a stringent cap on overall GFA concessions; requiring mandatory adoption of the *Sustainable Building Design Guidelines* as well as provision of energy efficient features.



Welcoming your Views

2.21 Please let us have your views by end October 2009 through the following channels:

E-mail: comments@susdev.org.hk

Website: www.susdev.org.hk

Mail: Sustainable Development Division, Environment Bureau, M/Floor,
Murray Building, Garden Road, Central, Hong Kong.

For further information you may call the Public Engagement Hotline:
2776 0866 (For information only, not for the collection of views.)

2.22 A significant number of public engagement events will also be staged across Hong Kong including regional forums, partner events, stakeholder briefings and roving exhibitions. Participation is strongly encouraged. Information about events can be found at: www.susdev.org.hk.



3.1 Why is building design important for a quality and sustainable built environment?

- 3.1.1 Since the dawn of mankind, we have been interacting with our natural environment. However, buildings and the built environment have long since replaced the natural environment as the most important element in the setting of our daily activities. People, built environments and our cities have become inseparably linked and formed organic entities.
- 3.1.2 The international community has been aware of the need to protect and develop our planet in a sustainable way since the late 1980s. As a subtext of this sustainability concept, we aspire to develop Hong Kong into a world class city with **a quality and sustainable built environment that is well balanced for the needs of the present and the future from the economic, social and environmental perspectives.**
- 3.1.3 The design of our buildings is a key contributor to the quality and sustainability of our built environment. The factors that relate to the design of our buildings are varied and wide-ranging, and include¹ :

Site and Neighbourhood — the goal is to reduce the impacts of the building on its surroundings and the surroundings on the building e.g. by improving the separation and interconnectivity between buildings; considering the way in which the use of the site/layout influences micro-climate, wind velocities and temperatures around the building (urban heat island effect); provision of neighbourhood amenities, public services and recreational facilities; respect for cultural heritage; overshadowing and view protection; opportunities for site greening; enhancement of ecology and biodiversity; landscaping; and air, water, noise and light pollution.

Energy and Climate — the increasingly accepted goal is to create buildings which are energy efficient and low carbon in nature. Key design considerations include the building shape and orientation; size and type of glazing; wall and roof insulation; shading; natural ventilation; day-lighting and permeability, to ultimately create “passive low energy” buildings. At a service level, we aim to achieve energy efficiency of air-conditioning, ventilation, lighting, lift, escalator, water heating and other systems, and to maintain effective controls and metering provisions to help users monitor and control their energy consumption. Increasing emphasis is also being placed on the incorporation of on-site renewable energy (solar heating, photo-voltaic panels, wind, etc) and ultimately to consider the “embodied energy”, i.e. the energy used in the manufacture, transportation and installation of building materials. Recently the Government has introduced a carbon audit charter and a set of carbon audit guidelines for the purpose of conducting carbon audits on buildings. This will assist building owners and occupiers to undertake a carbon footprint (calculate the total amount of carbon associated with their direct, indirect and business related (e.g. transport) carbon emissions)².

Materials and Waste — the use of “green materials” is becoming increasingly important, as is the enhancement of systems to maximise waste reduction and recycling. This is important across the full life cycle of buildings and starts with good design, and then use of innovative construction practices, e.g. off-site “pre-fabrication” of walls (rather than on-site “in-situ” pouring of concrete). Flexible design should be used to reduce internal demolition and rebuilding over the building’s lifetime. Increased emphasis is being placed on the use of recycled, non-harmful, low energy, reusable and recyclable

¹Source: environmental sustainability issues associated with the design and construction of new buildings as addressed by BEAM (Building Environmental Assessment Method), Hong Kong’s voluntary and most widely used building assessment and certification scheme (www.hk-beam.org.hk)

²Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for buildings (Commercial, Residential or Institutional Purpose) in Hong Kong - http://www.epd.gov.hk/epd/english/climate_change/ca_guidelines.html

building materials. Another important design factor is the provision of space and facilities for “at source” waste separation and recycling by building occupants.

Water Conservation — water consumption and wastage is heavily dependent on design of our buildings. Inclusion of water saving devices (faucets, showers, toilets, etc), recycling / reuse of grey-water (from bathing and washing) and rainwater, and water metering and leak detection, can all help to optimize the use of water, which is an increasingly scarce resource. Site drainage, effluent management, low-maintenance native plants, and efficient irrigation systems can further reduce the water footprint of a building.

Indoor Environment — the goal is always to create a safe, healthy and comfortable home or workplace for the occupants. Key design considerations include: thermal comfort, indoor temperature, humidity and air movement, natural ventilation, day-lighting and views, indoor air quality, avoidance or removal of outdoor and indoor pollutants, health and hygiene in plumbing, drainage and refuse collection systems, indoor noise, acoustics and vibration, accessibility for the young, aged and people with disabilities, and amenities for building users and public.

3.1.4 Whilst the importance of these factors is well recognised, to examine all of them in any single public engagement exercise would be too substantial, complex, and simply impracticable. Accordingly, the Council for Sustainable Development has decided to focus the scope of engagement on the design of buildings within their own site boundary, and in particular with the following three questions:

- How to achieve sustainable design in terms of building separation, setback from narrow streets, and greenery;

- How to balance the need for essential, green and amenity features of buildings against the increase in building height and size that they create; and
- How to improve energy efficiency of buildings through more effective and sustainable design

Figure 1 — The scope of this round of public engagement

This public engagement focuses on the design and layout of buildings within their sites, and the impacts they have on the quality and sustainability of the neighbourhood.



3.1.5 Every one of us is affected by these aspects of our built environment in our daily lives, although we may not be consciously aware of it. For example, you may feel hot downtown. This may be a result of high density of high-rise buildings with little separation in-between, or the heat of reflected sunlight from buildings. On the other hand, you may also have experienced

the pleasure of walking on a wide pavement with trees along the way in a breeze. All those good and bad feelings can be attributed to the design of buildings. To attain a quality and sustainable built environment, we may start with reviewing our current policies on building designs. This is, however, not as simple and straight-forward as it may seem. We must acknowledge that various policies on building designs have **economic, social and environmental dimensions**. These were highlighted in a recent Legislative Council paper of December 19, 2008, which forms a basis for this discussion, and has been further developed in this document³.

- 3.1.6 First of all, building design would affect construction cost hence people's affordability in owning or renting units. Besides affecting the price/rent of units, it would also have impact on the recurrent maintenance and management costs. Government revenue from land sales, land premium and property taxes is also on the list. This is the economic dimension.
- 3.1.7 On the social dimension, recreational facilities in buildings would provide residents with space for interacting with their family members, neighbours, and the community as a whole. Greater separation, setback and greenery in building may enhance the neighbourhood and improve the quality of the public realm.
- 3.1.8 Without doubt, building designs would have environmental implications. Greenery is one aspect. The bulk and height of buildings, and separation between them would be influencing factors of city ventilation, air quality and energy consumption. One may quickly link air quality with our health. Yes, it would in turn affect the health bill of Hong Kong people, with the related social and economic implications.

- 3.1.9 All these implications are therefore inter-linked. We will examine them in detail in this IR document to provide all the relevant information (e.g. backgrounds, current law and practice, implications, overseas experience, etc) and different options (including pros and cons, costs, implications, etc) for you to understand the complex issues involved and make informed choices. Definitions of some common terms are included in the appendices, and two key definitions for the "Built Environment" and "Sustainable Built Environment" are included in the boxes below.

The "*Built Environment*" refers to the man-made surroundings that provide the setting for human activity, ranging from large-scale civic surroundings to personal space. It addresses the design, management and use of these man-made surroundings and their relationship to the human activities that take place within them. This engagement exercise will focus on the design and features of buildings.

A "*Sustainable Built Environment*" is a built environment that is well balanced for the needs of the present and the future from the economic, social and environmental perspectives.

3.2 What is the aim of this public engagement exercise?

- 3.2.1 In recent years, the Government has been implementing measures to address the public's concerns over the quality and sustainability of our built environment, e.g. application of urban design guidelines and incorporation of Air Ventilation Assessments during the planning and development

³For reference see: <http://www.legco.gov.hk/yr08-09/english/panels/dev/papers/dev1219cb1-396-5-e.pdf>

process, progressive reviews of the Outline Zoning Plans to introduce building height restrictions and reductions in development intensity and imposition of more precise development parameters on Government land sale sites, a Feasibility Study on Urban Climatic Map and Standards for Wind Environment, etc. To further the goal of attaining a quality and sustainable built environment, the Government now collaborates with the Council⁴ to gauge the public's views on policies regarding building design in this public engagement exercise.

3.2.2 The Council was established in 2003 to promote sustainable development in Hong Kong. In pursuit of this, the Council has previously engaged the community on several important issues, namely Urban Living Space, Renewable Energy, Solid Waste Management, Population Policy, and Better Air Quality, and has incorporated the public's views into its recommendations to the Government to help shape its policies.

3.2.3 In summary, the purpose of this public engagement exercise is to stimulate community discussion on how a quality and sustainable built environment may be achieved through building design and collect opinions on the various proposals to enhance buildings with a view to enhancing our city's broader sustainability. This involves a thorough consideration of how to best design and develop our buildings to satisfy our present economic, social and environmental needs and those of the future with due regard to the associated trade-offs/costs.

3.3 How does the engagement process work?

3.3.1 As the involvement of stakeholders is a key element of sustainability, the Council has designed and implemented a broad-based, inclusive and transparent process to engage key stakeholders in dialogue, information sharing and decision-making. A wide range of community, business and other organisations and members of the public have been, and will continue to be, engaged by the Council to tackle the challenges of sustainable development issues in different areas affecting our lives. The Engagement Process comprises five key stages as summarised below:

- 1) Identifying the priority areas — the Council defines the priority area and convenes an expert Support Group to assist it in framing up the issue and engaging the community;
- 2) Preparing an IR document to invite public responses - being the basis of a wide public consultation, the IR document aims to educate the community about the priority area, present information and ideas on how the relevant issues may be addressed, and introduce the pros and cons of various suggested improvement measures in the economic, social and environmental dimensions;
- 3) Collecting views and opinions by directly engaging the wider community through a series of open and interactive public forum and events, and outreach through mail, E-mail and other electronic media, as well as through a wide range of bodies and organisations;
- 4) Independent analysis of the community's views and preparation of a report putting forward the community's views and the Council's recommendations on the way forward to Government; and
- 5) Government's response and action to close the loop.

⁴See Appendix 1 for Terms of Reference and Membership of the Council and its Sub-committee.



3.3.2 By providing stakeholders with the relevant information and engaging them in discussion with one another during public forums, the Council's public engagement process can help the community better understand and debate the issues in question. The Council has found from past rounds of engagement process that the public views that emerge from such an informed, open and participatory process are more balanced and provide a credible input to report to Government to facilitate its policy formulation.

3.3.3 For this round of engagement process, the public engagement exercise will be coordinated by an independent consultant (the Business Environment Council) who will oversee the various engagement events, and an independent reporting agency (Public Policy Research Institute of the Hong Kong Polytechnic University) who will help the Council collect and analyse stakeholder views. Throughout the engagement exercise, the Council is further supported by a Support Group⁵ comprising of experts in various aspects relating to built environment and sustainable development. In this way, the Council ensures that all views and comments are well informed, equally respected, and are impartially recorded, analysed and reported.

3.4 Who are the stakeholders for this public engagement?

3.4.1 The factors that influence the quality and sustainability of our built environment are highly complex and affect everyone in our community, in particular —

- **Members of the public in Hong Kong** — Subject to perhaps the most extreme exceptions, we all live, work, or carry out daily activities in buildings of some sort, be it public housing or private developments, self-owned or otherwise.

The built environment is shared by each and every one of us. We would like to know your personal views on the impacts of buildings on you and your neighbourhood and what measures you feel should be taken to address them. We would also like to know what aspects of the built environment you believe should be improved and why this is important to you, and to what extent you are willing to bear the cost in terms of land premium, property price, or rental, or change in building height and bulk, impacts on air ventilation and visual view, congested road and passages etc., in exchange for improved quality and amenity features in a building.

- **Building owners, tenants and occupants** — You are the users of buildings and your views are the most relevant as any design and features of buildings would directly affect your quality of life. Furthermore, you may have invested or may be planning to invest in a flat or commercial units. Changes in approach to our built environment may have financial implications, which you would wish to consider.
- **Professionals and related institutions of the built environment** — By professionals, we mean all those who are involved in the planning, design, construction, servicing, management, maintenance, etc. of buildings. As you apply your professional knowledge in your daily work, your views are strongly encouraged as well as your support in helping to educate the lay public about the challenges and opportunities we face in delivering a quality and more sustainable built environment and the importance of this public engagement program. We need to shape an achievable vision for the future and this requires a clear perspective on what is technically and financially possible, as well as the social and environmental value of new measures that might be taken.

⁵ Terms of reference and membership of the Support Group are listed in Appendix 1.



- **Developers** — Any future policy changes in this area will inevitably impact on your future mode of operation and design choices, and your views on possible measures to enhance the quality and sustainability of our built environment is important to the sustainability of those measures from the economic, social and environmental perspectives.
- **Business groups and chambers of commerce** — As a business group or individual businessman, how do you see future changes in our built environment would affect your business(es) or the investment environment of Hong Kong? What improvements do you want to see and what costs are you willing to pay for these improvements?
- **Academics** — We need views from a broad and independent perspective on this issue and a non-exhaustive list of areas includes: urban planning, urban design, architecture, building services, economics, environment, landscape design and public policy.
- **NGOs and Green groups** — Your views are invaluable to us to provide perspectives concerning social and environmental considerations as built environment have great impacts on social life of modern humanity and the natural environment.
- **Students at all levels of education** — Your views are valuable as you more legitimately represent the views of our future generations and you will be significantly influenced during your lifetime by the outcomes of any changes.
- **Legislative and District Councilors** — You represent the voice of different sectors of the public. Your views which are formed after exposure to a wide variety of public sentiment are invaluable for attaining a better quality of living in Hong Kong.

3.5 Structure of this IR Document

- 3.5.1 This IR document serves as the key resource to inform and educate stakeholders on the core issues and influencing factors affecting our built environment. In presenting the information, we hope to stimulate discussion and help stakeholders to contribute their views after weighing the pros and cons of different options. The remainder of this document is structured as follows :
- **Section 4** — Information on the existing situation in our built environment, the factors and existing policies and practices that shape our buildings and the challenges we face. We also outline some of the key trade-offs to help you better understand and be able to provide informed responses to this invitation.
 - **Section 5** — Discussion points on possible solutions to these challenges, in the areas of building design guidelines that support sustainable urban living space, control on GFA concessions for certain features, and the promotion of energy efficiency in building designs.
 - **Section 6** — Questions for stakeholders on the characteristics of a quality and sustainable built environment, the balance between buildings and their neighbourhoods, energy efficiency and costs, benefits and willingness to pay.
 - **Section 7** — Details of how to participate in this engagement exercise.
- 3.5.2 Appendices include membership and terms of reference of the Council, glossary of terms, additional information and a list of reference materials and useful links.

4 Our Buildings and Built Environment - Characteristics and Influencing Factors

4.1 Introduction

4.1.1 In this section the Council sets out to provide:

- An overview of the key characteristics of the building design which constitute our built environment, and the focus of this public engagement exercise
- Background of the established policies and practices in Hong Kong related to the control of our built environment
- A closer look at the pros and cons associated with the development of our built environment
- Examples of local and international initiatives to deliver a quality and sustainable built environment

4.2 What are the characteristics of our built environment?

4.2.1. Buildable land is scarce in Hong Kong – some 43% of Hong Kong's land is country parks, while built-up areas account for only 24%. In past decades, we sought to maximise the use of scarce land resources by increasing building height and bulk, and the overall density of developments to accommodate the needs of a fast-growing population, for quality, safe, and affordable housing and workplaces.

4.2.2. Hong Kong prides itself in surpassing New York to become a model "vertical city" as characterized by its typical high-rise forms, vertical malls and multi-storey mixed-use towers. At a recent skyscraper forum held in October 2008 in New York⁶, it was widely agreed that Hong Kong has realised the 20th century dream of New York's architects and delivered the vertical city vision.

4.2.3. While we must recognise these achievements, they are not delivered without certain challenges and where the vision gets pushed too far, certain negative impacts arise. While a single tall building may provide function and efficiency, dense clusters of development lead to the formation of 'walls' of buildings, narrow and overcrowded roads and streets, poor urban air ventilation, high levels of roadside air pollution, limited public amenity, and a concrete rather than a green environment.

4.2.4. Maximising the development potential of the sites has also taken precedence over energy efficient design in many of our buildings, which inevitably increase the amount of electricity we use, the pollution we create, and the bills we have to pay – particularly for air conditioning. Many of our properties are exposed to the summer sun with little or no shading to reduce the amount of heat entering through walls and windows. The compact nature of building designs and the close proximity of buildings, which arise from the need to maximise the efficient use of building sites, also means that we don't take full advantage of natural ventilation and breezes for cooling, further increasing our dependence on air conditioning.



⁶ Visit the Website of the New York based The Skyscraper Museum for more information: http://www.skyscraper.org/EXHIBITIONS/VERTICAL_CITIES/.

Figure 2 - Illustrates the characteristics of our existing built environment:



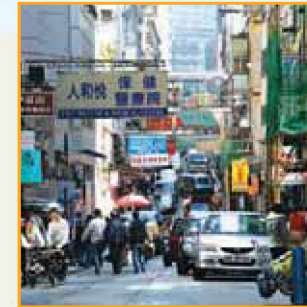
Hong Kong has been praised as a model of "Vertical City" which surpasses New York



Hong Kong is a city famous for its dynamic lifestyle and vibrancy



Narrow streets - Limited opportunity for urban greening or social amenity at ground level



Traffic and pedestrian in conflict



Canyons - narrow streets and pavements, high walls and a poor pedestrian environment



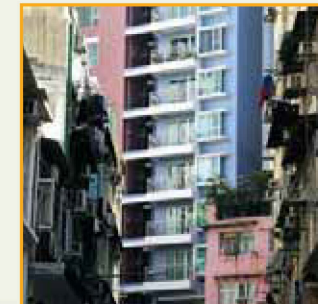
Affordable, efficient and comfortable public transport system



Most people enjoy having their homes, workplaces, schools, and facilities for social and other activities conveniently located and nearby each other



Wall-like barriers causing negative visual impact and reducing air flow



Impact on neighbouring buildings, through overshadowing and glare

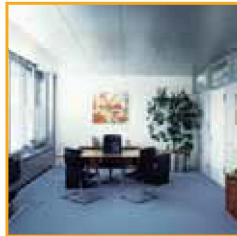
4.2.5. Buildings account for almost 90% of the electricity consumption in Hong Kong and are therefore our most significant contributors to greenhouse gas emissions. Reducing building energy use is a critical component of our community's response to the global challenge of climate change. Electricity generation also affects our air quality and therefore our health, with electricity generation being the largest source of air pollution in Hong Kong. On this point alone, the importance of energy efficiency is a matter of significant public concern. When we consider also the potential for cost savings from reduced energy bills, we can quickly realise that energy efficiency is a primary concern for our sustainable development. Many solutions have emerged in recent years and some of these are illustrated in Figure 3 below.

Figure 3 – Possible solutions to reduce energy consumption

Some examples of how money can be saved through energy conservation...

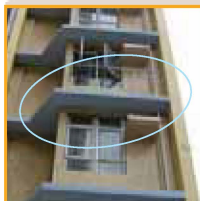


Use shading devices and high-performance glass to optimise natural daylight into buildings to reduce energy usage

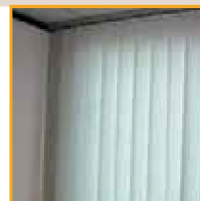


Innovative lighting systems, including blinds and wall light fixtures, further optimise the use of natural and artificial light, thus lowering energy usage and reducing cooling loads

External sunshades and sunshade curtains reduce solar heat gain and increase overall comfort of the living space floor



External sunshades



Sunshade curtain



Double-glazed glass curtain wall

4.2.6. Our overall goal of course is to enhance the positive features of our built environment and create a quality and sustainable built environment. Our efforts must lead to better connectivity, whether at ground level or through elevated pedestrian networks, reduced air pollution, more public space to enhance vibrancy and social amenity. Greening should enhance our neighbourhoods and the buildings themselves should be designed in a manner to fit in and enhance the environment and offer higher levels of user amenity.

4.3 What are the established policies and practices that influence our built environment?

4.3.1 As our city and economy have matured, aspirations of our community have changed. While previous generations focused on meeting their basic needs in terms of accommodation, employment and social welfare by maximising development potential and ensuring that a basic infrastructure was provided (i.e. a balance of residential and commercial development, schools, hospitals, recreational facilities, fire stations etc), the present generation's aspiration has shifted towards a better quality of life in harmony with the environment or a quality and sustainable built environment as we refer to it in this exercise.

4.3.2 Hong Kong's existing policies, legislation, guidelines and practices concerning the built environment have evolved to take account of the changing needs of our community. This public engagement exercise is focused on the policies that shape buildings and their direct neighbourhood. There are, however, broader policies and practices that guide urban planning in Hong Kong, ranging from planning and development policies to implementation of the Hong Kong Planning Standards and Guidelines, from town planning prescribed by Outline Zoning Plans to the conditions specified in individual land lease. While these are all relevant to a broader discussion of the built environment in Hong Kong, the focus of this engagement exercise is on the policies and practices that directly impact upon building design and thus our built environment. These include:

- Buildings Ordinance (Cap. 123) (BO), and the Building (Planning) Regulations (Cap. 123 sub. leg. F) (B(P)R);
- Practice Notes for Authorized Persons and Registered Structural Engineers (PNAPs) and Joint Practice Notes (JPNs); and
- Regulatory regime and policies to promote energy efficiency in buildings (such as the voluntary Building Energy Codes)

Sections 4.3.3 to 4.3.10 below set out how these control regimes have sought to facilitate the provision of essential facilities as well as green and amenity features in our buildings, whilst sections 4.3.11 to 4.3.15 describe the promotion of energy efficiency.

What measures facilitate the provision of essential facilities, green and amenity features in buildings?

- 4.3.3 Building development in Hong Kong is under the statutory control of the BO. The BO and other subsidiary legislation such as the B(P)R, provide regulations, guidelines and set detailed statutory controls enforced by the Buildings Department over the construction of buildings in Hong Kong.
- 4.3.4 With the objective to allowing flexibility in building design under special circumstances, the BO provides discretionary power for the Building Authority (BA), namely the Director of Buildings, to grant gross floor area (GFA) and site coverage (SC) concessions for the provision of certain essential facilities, green and amenity features in buildings.

GFA – Simply put, GFA is the area contained within the external walls of a building measured at each floor level (including any floor below the level of the ground), together with the area of each balcony in the building. (For a detailed definition, please see section 23(3)(a) of the B(P)R.)

Readers should note that this GFA (of a building) is not with the same as what is referred to as the GFA of flats in the context of flat sale.

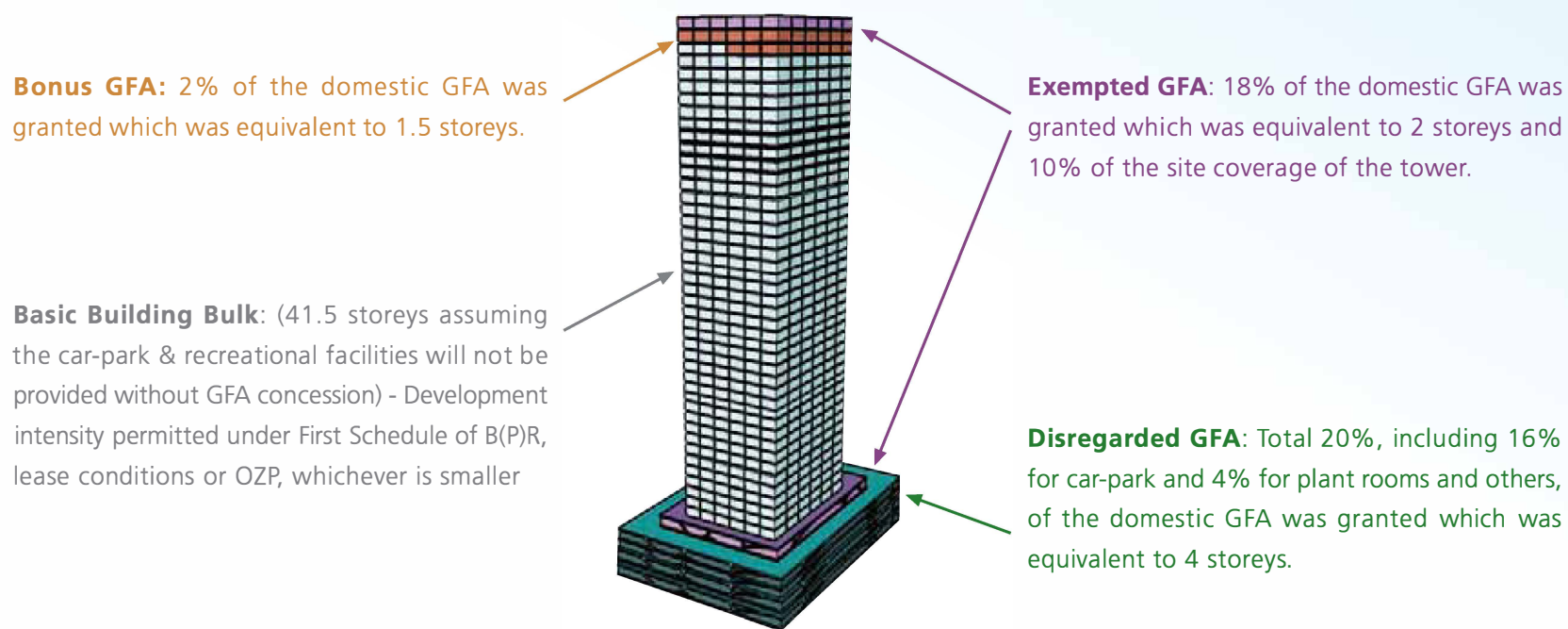
GFA concessions – The floor area of certain building features that are allowed to be discounted from the maximum GFA of a development. There are three existing types of GFA concessions, namely disregarded GFA, exempted GFA, and bonus GFA, as illustrated in Figures 4, 5 and 6. Simply put, the greater the GFA concession, the larger the total floor area that can be built, resulting in a taller and bulkier building which may create an impact on the quality of our built environment, especially the neighbourhood area.

SC – The portion of a lot covered by buildings or structures.

4.3.5 There are three types of GFA concessions, namely a) **disregarded** b) **exempted** and c) **bonus GFA**⁷. These are explained in more detail in Figures 4, 5 and 6 below. If approved for concession, the area occupied by the concerned features will not be included within the calculation of the maximum GFA

allowed (details on the eligibility of features and associated GFA and SC calculations are set out in various PNAPs available on the Buildings Department's website).

Figure 4 – Three types of GFA concessions and how they affect building bulk and height



Remark: GFA concessions granted in this example is based on the BD's study findings on an average building among the 54 cases of Residential Zone 1 (as defined in Chapter 2 of the HKPSG, which covers the highest density of residential development and applies to districts well served by high capacity public transport systems such as rail station or other major transport interchange).

⁷ GFA Concessions via "disregarded GFA" (covered under section 23(3)(b)/23A of the B(P)R), "exempted GFA" (covered under section 42 of the BO) and "bonus GFA" (covered under section 22 of the B(P)R).

Table 1 - Examples of three types of GFA concessions

Types of GFA Concessions	Features for consideration of GFA Concessions	
	Mandatory Features	Green and Amenity Features
Exempted GFA	<ul style="list-style-type: none"> • Fire refuge floors • Swimming pool filtration plant room if a swimming pool is provided 	<ul style="list-style-type: none"> • Green features include balconies, wider common corridors, sunshades, sky gardens, podium gardens, acoustic fins, utility platforms, mail delivery room with mailboxes, wing walls, wind catchers & funnels, non-structural prefabricated external walls and noise barriers • Recreational facilities • Pipe ducts • Covered gardens/play areas • Horizontal screens/covered walkways • Larger lift shaft areas • Miniature logistic service room in a multi-storey residential building • Counters, kiosks, office stores, guard rooms and lavatories for watchmen and management staff • Voids over prestige entrances of main common lobbies
Disregarded GFA	<ul style="list-style-type: none"> • Electricity & mechanical rooms (e.g. water tanks, electrical switch rooms, meter rooms, pump rooms, etc) • Lift machine rooms for the fireman's lifts and disabled's lifts • Refuse storage & material recovery chambers/rooms • Telecommunication and broadcasting equipment rooms 	<ul style="list-style-type: none"> • Car-parks • Air conditioning plant rooms including boiler rooms • Horizontal area of staircases & lift shafts through floors where GFA is disregarded
Bonus GFA		<ul style="list-style-type: none"> • Surrender of land at ground level for road widening • Dedication of set-back areas at ground level for public passage (street widening)



Figure 5 - Examples of three types of GFA concessions

(a) Exempted GFA — Adding amenity features and green features enhances occupants' living environment. However, at the same time, these facilities and features also add bulk and height to the buildings, which may have adverse impacts on the streetscape as well as immediate neighbourhood.

(b) Disregarded GFA — Floors of car-parks make parking facility available to occupants, and plant rooms house air-conditioning and building services equipments. However, these additions may result in taller buildings.

Green Features



Balconies



Wider common corridors



Sky gardens



Mail delivery rooms



Podium gardens



Utility platforms

Amenity Features



Residents' clubhouses



Covered walkways



Void of shopping arcade



Stacked up car-parks under buildings



Generator room



Sprinkler fixed & fire services booster pump room



Refuse storage and material recovery chamber

(c) Bonus GFA — Public passageway and building setback, for the purpose of passage and street widening, increase air flow, improve urban environment, allow greenery and amenity installation, but they bring about increase in building height, bulk or site coverage.



Building Setback - Dedication at ground level for street widening



Public Passageway - HSBC Headquarters on Queen's Road Central is one of the most well known examples in HK

4.3.6 To promote the development of green and innovative buildings, the Buildings Department, Lands Department and Planning Department issued two Joint Practice Notes (JPNs) in 2001 and 2002 respectively. The twelve green and innovative features covered by the JPNs are presented in the following box. These features may, subject to specified conditions, be exempted from GFA and SC calculations.

4.3.7 Members of the public should note that while GFA concessions may be granted, they are not necessarily free. Subject to land lease conditions, payment of a land premium may be required for those features in the JPNs that are part of individual flats and for the exclusive possession and enjoyment of the owners and residents (i.e. balconies, utility platforms and non-structural prefabricated external walls).

Green and Innovative Features Covered by Joint Practice Notes 1 & 2

- Communal sky gardens (including those located in refuge floors);
- Communal podium gardens;
- Non-structural prefabricated external walls;
- Utility platforms;
- Noise barriers;
- Communal sky gardens for non-residential buildings;
- Balconies* (must be open on at least 2 sides);
- Wider common corridors and lift lobbies*;
- Acoustic fins*;
- Sunshades and reflectors*;
- Wing walls, wind catchers and funnels*;
- Mail delivery rooms with mailboxes*

* The cumulative GFA exemption for these features is subject to a cap of 8% of the total permitted GFA



Figure 6 – Examples showing the effect of various GFA concessions on height and bulk of building

Residential Zone 1 (Highest Density)



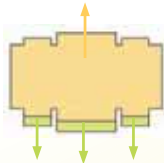
Without GFA Concession — 41.5 storeys assuming the car-park & recreational facilities will not be provided without GFA concession



With GFA Concession — 49 storeys including 5 storey podium of car-park & recreational facilities located below the tower

Tower Floor Plan

Cream yellow represents the site coverage of the tower WITHOUT GFA Concession



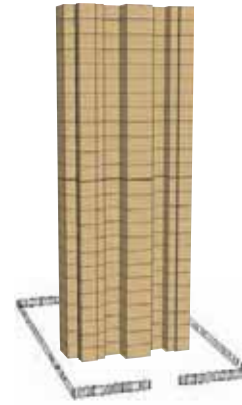
With GFA Concession - Green represents 10% increase in the site coverage of the tower

Total 40% of GFA concessions above permitted domestic GFA was granted and it resulted in an increase of 7.5 storeys and 10% of the site coverage of the tower

Remark : GFA concessions granted in these examples are based on the Buildings Department's study findings on an average building of each residential zone among the 77 residential cases and 20 non-residential cases (see Table 2 in Appendix 3 for details).

— Exempted GFA — Bonus GFA — Disregarded GFA

Residential Zone 2 (Medium Density)



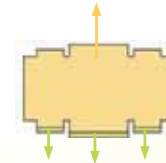
Without GFA Concession — 25 storeys assuming the car-park & recreational facilities will not be provided without GFA concession



With GFA Concession — 33 storeys including 7 storeys of car-park, recreational facilities & plant rooms located below the tower

Tower Floor Plan

Cream yellow represents the site coverage of the tower WITHOUT GFA Concession



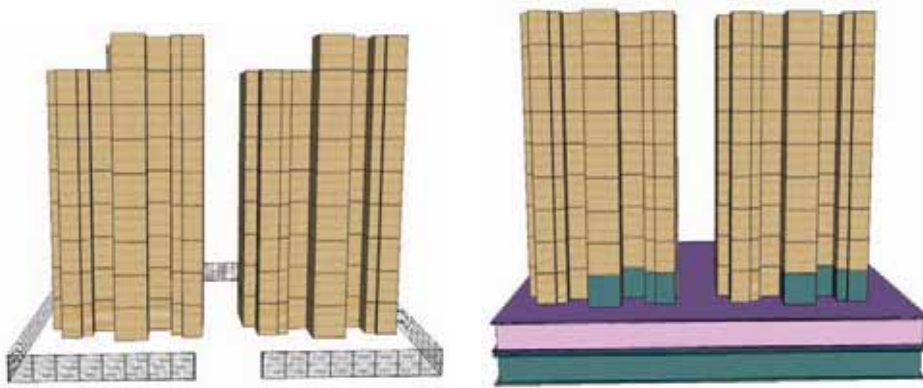
With GFA Concession - Green represents 5% increase in the site coverage of the tower

Total 70% of GFA concessions above permitted domestic GFA was granted and it resulted in an increase of 8 storeys and 5% of the site coverage of the tower

Remark : GFA concessions granted in these examples are based on the Buildings Department's study findings on an average building of each residential zone among the 77 residential cases and 20 non-residential cases (see Table 2 in Appendix 3 for details).

— Exempted GFA — Disregarded GFA

Residential Zone 3 (Lowest Density)

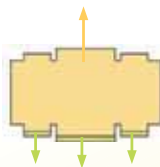


Without GFA Concession — 8.5 storeys assuming the car-park & recreational facilities will not be provided without GFA concession

With GFA Concession — 11 storeys including 2 storeys car-parks & recreational facilities located below the tower

Tower Floor Plan

Cream yellow represents the site coverage of the tower WITHOUT GFA Concession



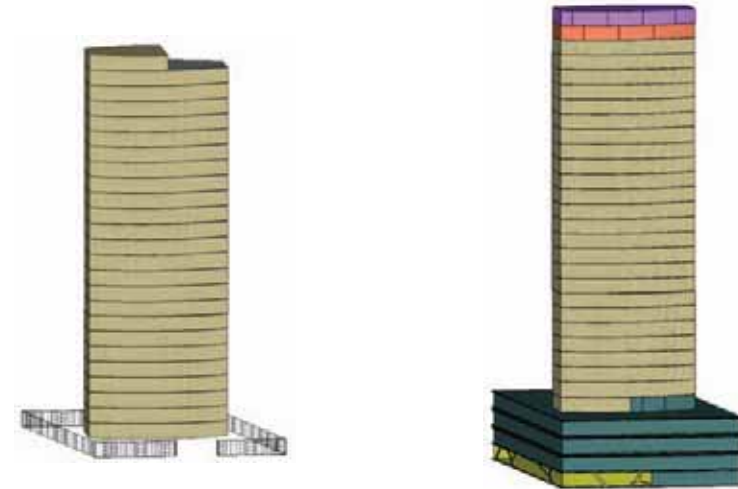
With GFA Concession - Green represents 5% increase in the site coverage of the tower

Total 59% of GFA concessions above permitted domestic GFA was granted and it resulted in an increase of 2.5 storeys and 5% of the site coverage of the tower

Remark : GFA concessions granted in these examples are based on the Buildings Department's study findings on an average building of each residential zone among the 77 residential cases and 20 non-residential cases (see Table 2 in Appendix 3 for details).

■ Exempted GFA ■ Disregarded GFA

Non-domestic Building

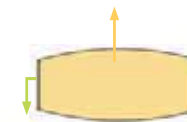


Without GFA Concession — 24.5 storeys assuming the car-park & recreational facilities will not be provided without GFA concession

With GFA Concession — 31 storeys including 4 storeys of car-parks & shops located below the tower

Tower Floor Plan

Cream yellow represents the site coverage of the tower WITHOUT GFA Concession



With GFA Concession - Green represents 1% increase in the site coverage of the tower

Total 37% of GFA concessions above permitted domestic GFA was granted and it resulted in an increase of 6.5 storeys and 1% of the site coverage of the tower

Remark : GFA concessions granted in these examples are based on the Buildings Department's study findings on an average building of each residential zone among the 77 residential cases and 20 non-residential cases (see Table 2 in Appendix 3 for details).

■ Exempted GFA ■ Bonus GFA ■ Disregarded GFA

- 4.3.8 The policies on GFA concessions have evolved and been refined from time to time to meet the development needs of Hong Kong. Together these policies and practices have led to a mode of development, where new developments incorporate a wide range of desirable, green and amenity features (see Figure 7 below). The benefits of these features to the occupants are numerous, and include improved personal and communal space, balconies, sky gardens, improved lift lobbies and mail-rooms, and car parking facilities. Maintaining these facilities adds value to the property, which provides long-term economic benefit. Similarly, energy efficient features such as solar shadings and utility platforms help reduce energy bills.
- 4.3.9 There are also a range of sustainable design considerations that are supplemental to the existing policy framework, in particular, setback of buildings on narrow streets would improve ventilation at street level. Under the existing policy, a bonus GFA concessions of 5 times and 2 times of the area dedicated at the ground and upper floors respectively for setback and public passageways would be granted to the development.
- 4.3.10 These benefits, however, need to be balanced with the associated impacts of the building – through increased building bulk and height – on the neighbourhood and public realm contributing to the quality of life of the broader community. Striking a balance on the degree of development requires clear community consensus.

What measures are already in place to enhance the energy efficiency of buildings?

- 4.3.11 Between 1998 and 2002, the Electrical and Mechanical Services Department (EMSD) launched four voluntary Building Energy Codes (BECs) prescribing the minimum energy performance standards for lighting, air conditioning, electrical and lift & escalator installations. In 2003, EMSD launched a fifth code – the Performance-based Building Energy Code, which set out an alternative approach to demonstrate compliance with the energy efficiency requirements through assessment of the total energy efficiency performance of a building. The EMSD also launched the Hong Kong Energy Efficiency Registration Scheme for Buildings in 1998 to provide recognition to buildings and premises that comply with the voluntary BECs.
- 4.3.12 Given the limited adoption of the Energy Efficiency Registration Scheme by the private sector, the Government launched a public consultation on the mandatory implementation of the BECs from December 2007 to March 2008. With the overwhelming support from the community, the Government plans to introduce a legislative proposal to the Legislative Council in 2009 to mandate the implementation of the BECs. While this will set out minimum legal standards for energy efficiency performance of fixed building services installations in buildings, it is important to consider what more should be done to encourage energy conservation in buildings.

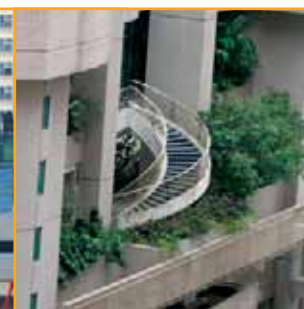
Figure 7 - New mode of development in Hong Kong incorporating a wide range of desirable essential facilities, green and amenity features

Wider Sidewalk & Green Buffer



Building setback from the property line of the tower at the ground level provides a wider sidewalk and allows a green buffer between pedestrians and the street.

Podium Garden



The provision of podium garden can have many advantages. Not only does it enhance the amenity of a building, allow more daylight and better ventilation, improve visual impact, it also provides a landscape area for recreational uses by the occupants.

4.3.13 The Government promulgated in July 2008 a set of carbon audit guidelines for buildings to facilitate the users and managers of buildings to calculate the amount of greenhouse gas emitted as a result of the operation of their buildings and to explore rooms for improvement. To encourage different sectors of the community to carry out carbon auditing and to implement measures to reduce carbon emissions of their buildings, the Government launched a "Green Hong Kong • Carbon Audit" campaign in the same year.

4.3.14 Building insulation also plays an important role in promoting energy efficiency of buildings. The main piece of legislation in place is the Building (Energy Efficiency) Regulation (Cap. 123 sub. leg. M), which controls the amount of heat transferred through the external walls and roofs of commercial or hotel buildings (known as the Overall Thermal Transfer Value (OTTV)) to reduce the energy needed for air-conditioning. In the case of a building tower the OTTV should not exceed 30W/m^2 , whilst for a podium the OTTV should not exceed 70W/m^2 . The use of sunshades may be excluded from GFA calculations to encourage improved OTTV performance. Moreover, the provision of balconies and utility platforms promoted under JPNs 1 and 2 may also help improve the energy efficiency of buildings.

4.3.15 In his 2008 Policy Address the Chief Executive, Mr. Donald Tsang, reaffirmed his commitment to meet the climate change challenge through enhancing energy efficiency, using clean fuels, relying less on fossil fuel and promoting a low carbon economy – an economy based on low energy consumption and low pollution. To mobilise joint effort from the community, \$150 million has been reserved under the Environment and Conservation Fund (ECF) to subsidise building owners to conduct energy-cum-carbon audits, which help calculate energy consumption and greenhouse gas emissions of buildings with a view to identifying improvement opportunities. Taking account of the considerable capital investments involved in energy efficiency projects, a further \$300 million has been reserved under the ECF to subsidise such projects.

4.4 What are the pros and cons of the existing approaches?

4.4.1 Our built environment is a shared resource, and we all place a variety of needs on it. However, as in most situations, the resources available in our built environment to meet the needs of our community are limited. Sometimes, competing needs arise which we must consider and balance carefully. It is important for us to consider these when we debate measures related to building design to foster a quality and sustainable built environment. To stimulate discussion, the pros and cons of the existing approaches for incorporating green and amenity, and energy efficiency features are outlined below.

4.4.2 Pros:

- Well established and provide certainty to developers and respect development rights
- Provide for necessary features in buildings without adding excessively to the development cost
- Provide value to building's owners and occupiers – by enhancing the quality of the building
- Improvement to the local environment
- Provide increased social amenity for owners/occupiers
- May slightly improve energy efficiency and reduce energy bills

4.4.3 Cons:

- Increase in GFA and hence the height or bulk of a building may bring about negative impacts to the environment, pedestrians and neighbouring residents depending on the setting of the building and interrelation with other buildings.

- Under the current policies and practices, building developers or owners may lack the incentive to incorporate energy efficient design or installations or continually enhance the energy efficiency of their buildings, as these features are not common attractions to potential flat owners and may result in increase in management fees for their maintenance.
- Benefit to broader community is limited.

Background Information

In the report of the Independent Committee of Inquiry on the Grand Promenade incident published in April 2006, the Committee opined that while the Government's policies for encouraging green and innovative buildings and more amenities, facilities and public space were praiseworthy, they undermined the control over the height, bulk and density of buildings by the granting of GFA concessions.

4.5 What do other countries do to achieve a quality and sustainable built environment?

4.5.1 In the following section we look at some international approaches to promote quality and sustainability attributes that we may aspire to achieve. It is clear from looking at high-density cities overseas, such as New York, Tokyo and London, that we are not alone in the pursuit of a sustainable built environment.

Building Separation

4.5.2 In cities such as Beijing, Chengdu and Guangzhou in the Mainland, there are the mandatory requirements of limiting the maximum length of closely packed high-rise buildings together with required minimum separation between building clusters for maximising solar accessibility, which would otherwise lead to the phenomenal "wall effect". Such requirements also serve to mitigate the urban heat island effect. For blocks facing rivers and the like, there may also have mandatory requirements imposed to restrict that only "point towers" are permissible together with required minimum separation between towers for protection of view corridor. There are slight variations between different cities but these requirements in general help to prohibit excessive "wall effect" both from visual and air ventilation perspectives.

4.5.3 In Shanghai, mandatory measures are imposed to guide the maximum length of continuous building mass facing street. It is required that buildings with height less than or equal to 24 meters, and with length of building façade of 80 meters or more, have to be separated by a minimum of 6 meters.

Building Setback

4.5.4 Building setback enhances the quality of the pedestrian environment in the urban area:

- In Tokyo, building setback requirements are mandatory and are enforced with reference to the width of roads nearby as well as zoning control.
- In many major cities in the Mainland, similar setback control is also adopted on a mandatory basis.

- In the City of New York, zoning requirement mandates "initial setback distance" according to the abutting street width. The city also controls building bulk so as to safeguard street exposure to the sky. Building setback does not only increase sky exposure, but also enhances air movement along streets, which helps to flush out or dilute polluted air caused by emissions from vehicles and other emission sources such as restaurants, light-industrial operations, and city support infrastructure such as ventilation shafts and refuse collection points and stations.
- In Singapore, incentive mechanisms are in place to enhance the quality of the pedestrian environment at ground level, especially in major public areas. There is incentive to exclude the covered area for public space along pedestrian network at the ground level from GFA computation, if certain criteria are met. The covered area can be in the form of urban verandah at the pedestrian level.

Urban Greenery

4.5.5 Almost all countries and cities recognise the value of more greenery. Not only does greenery improve urban climatic condition, mitigate the heat island effect, improve air quality and local ecology, it also provides visual, educational, and recreational amenity value. To encourage urban greenery, some places impose mandatory measures and others provide incentives. For example:

- In Tokyo, Japan, since April 2001, their Green Rooftops Initiatives make it mandatory for a new building to have at least 20% of its rooftop green if the building sits on a site larger than 0.1 ha (and for public facility site larger than 250sq.m.). As of January 2005, 54.5 ha of rooftops have been greened, i.e. approximately 20 ha per year in the initial period. That is approximately 80 soccer pitches per year!

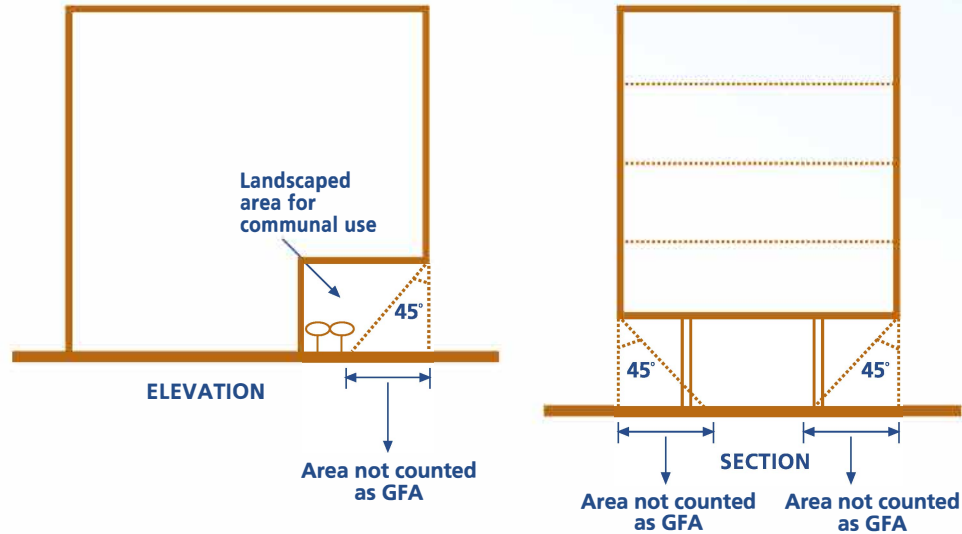
Figure 8 - Green rooftops in Japan (Source: Ronald Lu and Partners)

The purpose of encouraging roof greenery is to improve visual impacts and enhance a building's amenity. Roof greenery also reduces energy use and heat load of a building, and improves the micro-climate of the environment.



- In various major cities in the Mainland, the Building Code in general mandates greenery at a rate of not less than 30% for all new residential development sites in the new districts. In old urban areas, given the spatial constraints, the stipulated minimum site coverage of greenery is about 20-25%. Research has indicated that in Shanghai, if the site coverage of greenery in the urban area reaches 23% or above, the heat island effect will be lowered by about 0.6 degree Celsius.
- In Singapore, incentives are in place to encourage more generous provision of covered landscaped communal areas and greenery at the ground level in residential developments. Such landscaped areas at the ground level that are shaded by a structure or a floor or overhang above can be exempted from GFA calculation. The maximum area to be exempted is defined by a 45-degree line taken from the edge of the overhead projection, and the communal landscaped areas within this 45-degree line must be unenclosed and accessible for communal use.

Figure 9 - GFA exemption of covered landscaped communal areas on G/F in Singapore (Source: Singapore Urban Redevelopment Authority)



Singapore also uses guidelines to promote sky-rise greening. Floor area of covered sky terrace, defined by the 45-degree line taken from the outer edge of the building, is exempted from GFA calculation. To further encourage provision of larger sky terraces, additional GFA exemption, subject to a cap of 20% of the area of the floor plate, is given to the residual area that form part of the sky terrace but fall outside the 45-degree line provided that the sky terrace areas within the 45-degree line occupy at least 60% of the floor plate, and at least 60% of the perimeter of the sky terrace floor is kept open with low wall. Studies in Singapore demonstrate that sky-rise greenery helps to create a more pleasant and softer cityscape. For inaccessible roof gardens, it shows that rooftop vegetation can cut annual energy consumption by 0.6% and reduce air-conditioning load of the buildings by 17%. For accessible roofs, they provide additional space for individual relaxation and social gathering, in addition to the environmental benefits such as reducing ambient temperature by up to 4 degrees Celsius, as well as improving air quality of the atmosphere and help in storm-water retention, which is a common problem in heavily developed urban areas.

- In the United States, City of New York's High Performance Building Guidelines requires new public buildings to plant at least one tree on the site for approximately 100sq.m. of impermeable surface.



5

Possible Solutions for Hong Kong and Discussion Points

5.1 Introduction

With a view to addressing public concerns over the issues regarding our built environment, a number of options under the three major aspects, namely:

1. *Sustainable Building Design Guidelines*, 2. *Control on GFA Concessions*, and 3. *Energy Efficient Building Design and Installations* are set out below for discussion.

5.2 Sustainable Building Design Guidelines

5.2.1 The Government is considering a number of measures to promote additional sustainable building design guidelines, in particular:

- a) separation of buildings in certain large developments;
- b) provision of building setback in certain developments on narrow streets; and
- c) enhancing the amount of greening in building developments.

These proposed measures are introduced in more details below.

Building Separation

5.2.2 It is proposed that buildings on large development sites and those with long continuous frontage should be separated such that there are suitable separation between buildings to provide good air ventilation by neighbouring buildings. Related measures to improve building permeability (i.e. holes, notches or other such open sections of the building) should also be encouraged. Such features would also improve the flow of air through and around the building, and improve the air quality in the surrounding neighbourhood.

5.2.3 The broader benefit of this proposal would be to enhance the pedestrian environment, improve the visual permeability of neighbouring buildings, and helping to reduce the temperature in the neighbourhood.

5.2.4 We must consider how this might be achieved and any potential downside, e.g. a reduction in design flexibility, scale of development and the development potential of the land, and a reduction in the roofed over area allowable for the building leading to reduction in flexibility in spatial design if separation between buildings is to increase.

5.2.5 As shown in Figure 10, it is proposed that for site areas greater than two hectares or with continuous building width of greater than 60 metres, an intervening space equivalent to 20% to 33.3% of the total frontage area of the building or buildings would be required.

Figure 10 – Building Separation

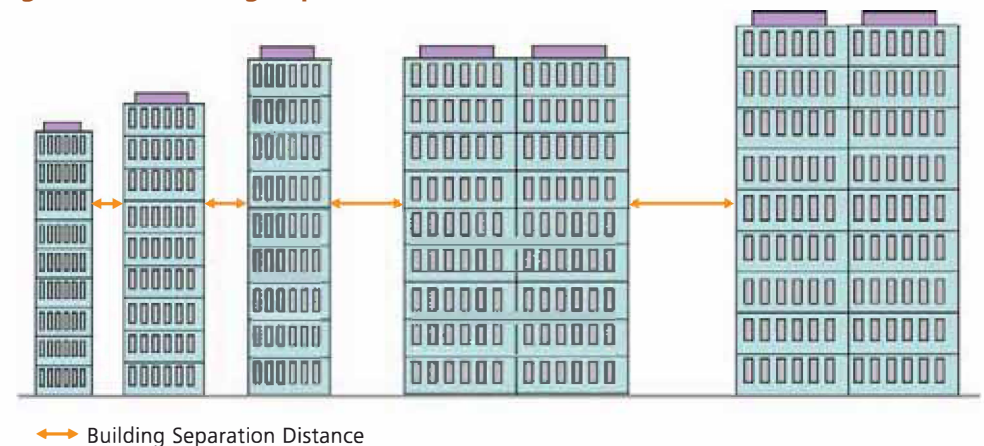


Table 2 - The pros and cons of Building Separation

	Pros (Benefits)	Cons (Costs)
Economic	<ul style="list-style-type: none"> • Better air quality helps mitigate health problems and hence reduces medical care costs • Allow for high quality housing opportunities • Enhance property value • Enhance the image of the city, hence help attract more overseas investments 	<ul style="list-style-type: none"> • Reduction in design flexibility, scale of development or development potential of the land • The supply of property market may be affected if fewer units are available
Social	<ul style="list-style-type: none"> • A better street environment • More room for pedestrian movement • Creating a communal space 	<ul style="list-style-type: none"> • Rigid rules on building separation might hamper innovative design
Environment	<ul style="list-style-type: none"> • Space for trees and planters • Improve air circulation and air quality • Improve visual permeability, enhance natural light and ventilation in or between buildings 	<ul style="list-style-type: none"> • May result in taller or bulkier buildings

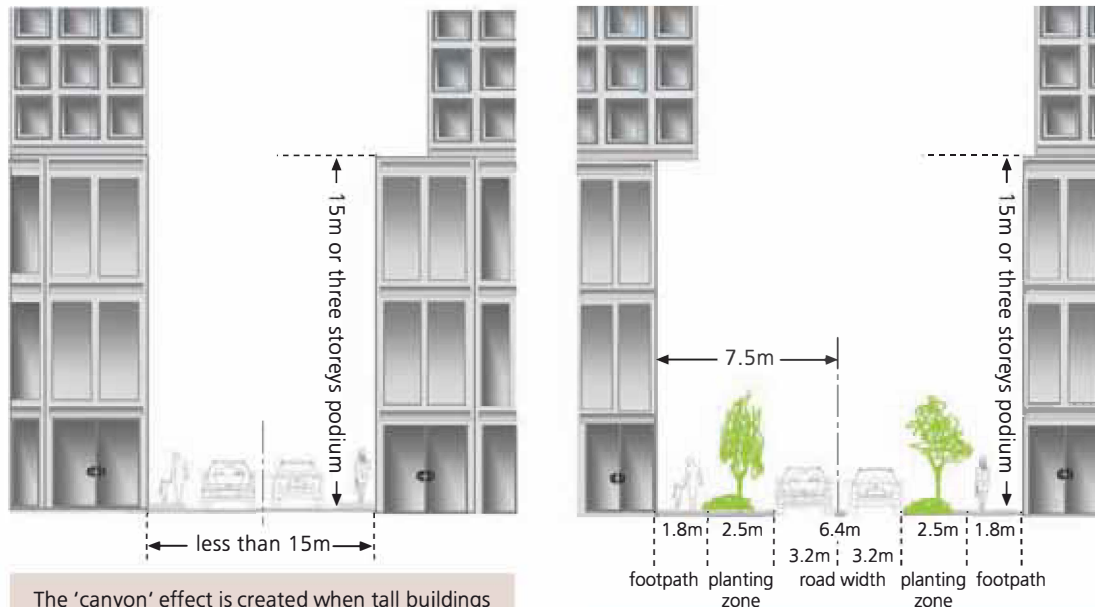
Building Setback

5.2.6 This would open up the street canyon, provide a larger pavement, enhance air ventilation and improve the pedestrian environment as well as mitigate urban heat island effect. Narrow streets with no building setback at all are not desirable for the health of the community as they lead to air stagnation and also put pedestrians in direct physical conflict with vehicles in rush hours.

5.2.7 While setting back buildings will bring about clear benefits, we must consider how this might be achieved and any potential downsides including the impact on development potential, flexibility of building design as well as impact on building bulk and height if bonus GFA is granted for compensation.

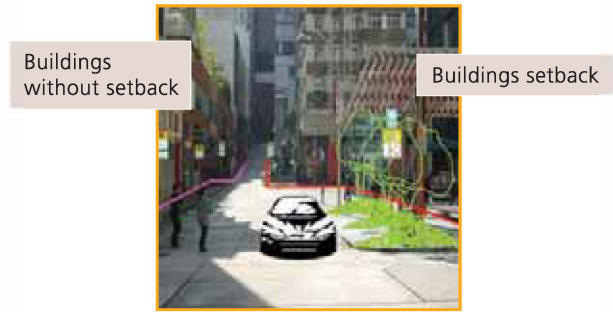
5.2.8 As shown in the Figure 11, it is proposed that on streets less than 15-metre wide, new building developments measured from ground level to a height of 15 metres should be set back to provide a space with a width of not less than 7.5 metres measured from the centre line of the street.

Figure 11 – Building Setback



The 'canyon' effect is created when tall buildings are abutting narrow streets which results in poor air ventilation, high temperatures, poor pedestrian environment generally. In addition, narrow footpaths often cause pedestrians to step into the road.

Building setback can improve the flow of air either through or around the building, enhance air quality in the neighbourhood, and provide safety and better environment for pedestrians.



Building setback allows provision of public open spaces for the use of ...



Dense urban setting often results in air pollution and congested street environment, which put our health and safety at risk. Building setback, on one hand, enhances air ventilation, mitigates urban heat island effect, and provides open space for landscaping and recreational use, it may allow increase in building height since setback area could be compensated.

Table 3 - The pros and cons of Building Setback

	Pros (Benefits)	Cons (Costs)
Economic	<ul style="list-style-type: none"> • Better air circulation helps mitigate health problems and hence reduces medical care costs • Enhance the image of the city, hence attracting more overseas investments 	<ul style="list-style-type: none"> • Loss of revenue (e.g. rent of shops) generated from lower floors • Property owners may be responsible for maintenance and insurance costs on the "setback public area" for the access of the general public
Social	<ul style="list-style-type: none"> • A better street environment • More room for pedestrian movement and more public space • Provide adequate sight lines for motorists at corner plots 	<ul style="list-style-type: none"> • Rigid rules on building setback might hamper innovative and flexible design
Environment	<ul style="list-style-type: none"> • Improve air circulation and air quality • Enhance natural light and ventilation to street level • Facilitate landscaping in front of buildings, thus providing pedestrians a buffer from the vehicular traffic, improving the streetscape and providing space for outdoor activities • Allow for future road widening where necessary • Building structure projecting above the setback at ground level, if provided for, can provide protection to the pedestrians at ground level against the elements 	<ul style="list-style-type: none"> • May result in taller or bulkier buildings

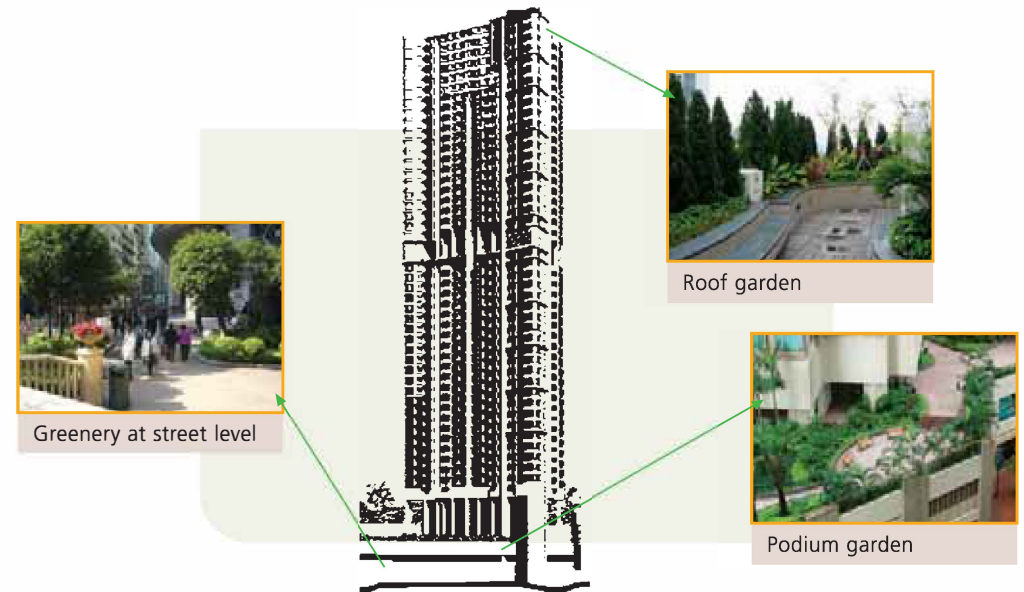


Site Coverage of Greenery

- 5.2.9 It is proposed that greenery should be provided according to the site area of a development as a way to improve the local environment.
- 5.2.10 Greenery on different levels of buildings (ground level, podia and rooftops) reduces the internal heat gain, and also provides a pleasant external environment in which to relax. At ground level, greenery may be used to separate roads and people, thereby improving safety and comfort. Studies have shown that even modest increases of greenery in urban areas may reduce the temperature in urban areas by up to 1 degree Celsius (based on a study in Canada of the impact of adding 6% additional greenery). Green roofs may also reduce the temperature inside the top floor of buildings by up to 4-5 degrees Celsius⁸.
- 5.2.11 While site greenery may add tremendous value, consideration should also be given to the cost of maintaining the plants and adequacy of site drainage, and ensuring that consequential damage to buildings does not occur. In particular, the introduction of measures to ensure long-term maintenance responsibility for the greenery should also be considered.

5.2.12 As shown in Figure 12, it is proposed that greenery should be required for sites larger than 1,000 sq.m., and that fixed planting areas equivalent to 20% to 30% of the site areas should be provided, including greenery at ground, podium and roof levels.

Figure 12 – Site coverage of greenery



⁸ Data is drawn from the HKSAR Government's Architectural Services Department's Study on Green Roof Application in Hong Kong, February 2007.

Table 4 - The pros and cons of Greenery

	Pros (Benefits)	Cons (Costs)
Economic	<ul style="list-style-type: none"> • Reduce build-up of the "heat island effect" and hence reduce air conditioning costs • Greenery around your property can increase its value • Greenery can have a positive influence on customer retail behavior, attracting more visitors and hence benefit local businesses • Green roofs can help protect roofing membranes and extend the life span of a conventional roof • Create green jobs to boost employment 	<ul style="list-style-type: none"> • Increased capital costs (e.g. greater structural / weatherproofing needs) • Increased maintenance costs (landscape gardening, watering, etc) • Conflict may occur between urban tree planting and underground utilities • Increased water use as irrigation is required unless a rain water collection system is installed
Social	<ul style="list-style-type: none"> • A cooler, more pleasant and shaded environment as public space • Visually pleasing (when in bloom) • Has vast health and aesthetic significance for people as greenery can make them healthier and happier • Provide a wide range of educational, recreational and inspirational values 	<ul style="list-style-type: none"> • Lush greenery is not always welcomed because of fears of avian flu or obstruction of shop fronts
Environment	<ul style="list-style-type: none"> • Mitigate the urban heat island effect (reduce air conditioning energy consumption and associated pollution and carbon emissions) • Increase local biodiversity and wildlife • Vegetation and trees in particular moderate the urban climate by having shaded buildings and paved surfaces • Create a favorable microclimate for urban dwellers by decreasing noise and solar irradiation • Enhance air quality by producing oxygen and absorbing carbon dioxide • Vegetation and green spaces help reduce storm water runoff 	<ul style="list-style-type: none"> • Increased use of water and fertilizers and pesticides, etc (i.e. increased energy and associated pollution and carbon emissions) • Use of pesticides, herbicides and chemical fertilizers may contaminate air and water

Issues for consideration

Making building separation, building setback, and greenery mandatory is clearly one of the options. Voluntary adherence to the guidelines would be another approach.

While the Government will encourage the construction of new buildings in accordance with such guidelines if the latter approach is adopted, there will be no guarantee on the adoption of the guidelines if no other requirements or incentives are put in place. One option may be to require the implementation of the guidelines as a condition for granting GFA concessions for the amenity and green features in future.

Government may require the implementation of only some of the above measures as a prerequisite for granting GFA concessions for certain items (e.g. enhancement of greening in building development in return for GFA concessions for sky gardens) or, as a more stringent approach, implementation of all the three measures in return for the granting of any GFA concessions. Recognition may also be given to buildings adopting sustainable design practices by providing them with good ratings and distinguished labels in the building environmental performance assessment and accreditation schemes.

Meanwhile, as part of those ongoing measures to promote sustainable built environment, the Planning Department is conducting an Urban Climatic Map and Standards for Wind Environment Feasibility Study. The Feasibility Study will provide more scientific data for formulating the application criteria of the above proposed design features.

5.3 Should we change existing GFA concession policies?

- 5.3.1 Another purpose of this public engagement is to determine whether control on building bulk and height should be imposed through an adjustment of the existing policies related to the granting of GFA concessions, with a view to obtaining a balance between the well-being of occupants of buildings and their neighbourhood.
- 5.3.2 If it is the community consensus to apply more controls over GFA concessions, there are several options in which GFA concessions may be controlled. These are briefly explained below along with the pros and cons of the each option.



Reviewing GFA concessions for mandatory building features

5.3.3 Examples of mandatory features in buildings include: refuse storage and material recovery rooms on each floor, fire refuge areas, and space occupied solely by machinery or equipment (such as pump rooms, electrical switch rooms, telecommunication and broadcasting equipment rooms, etc). These features are considered essential in modern buildings and developers are required to provide them up to specified minimum dimensions. These features currently enjoy GFA concessions under legal requirements or administrative guidelines. One possible GFA control option is to cancel the GFA concessions for these mandatory features. The following lists the pros and cons of this approach:

Pros (Benefits)	Cons (Costs)
<ul style="list-style-type: none"> • Reduce building height or bulk • Potential reductions in overall construction costs, since the building is smaller 	<ul style="list-style-type: none"> • Possible reduction in the total saleable or leasable area of the building • Future maintenance of the plants or machinery may be hindered, as space for such facilities would likely be provided with the minimum dimensions so as to "save" GFA for other features • Reduction in development potential of the site, and potentially land premiums, which may impact public revenue • If a development is to provide the same GFA for mandatory features without GFA concessions, each unit owner/occupier may have to carry a large share of both the construction and maintenance costs. In other words, the usable area exclusively enjoyed by individual owners may reduce

Reviewing car-parking provisions

5.3.4 Ancillary car parks⁹ and related features such as loading and unloading areas as well as access ramps are currently disregarded from GFA calculations under the B(P)R, as they are required under the Hong Kong Planning Standards and Guidelines (HKPSG) or individual lease conditions. The accessibility of the development as well as the demand for car-parking spaces for meeting the demand of car owners and various business and trade activities has been taken into account. This GFA concession may however lead to a significant increase in the height of buildings. This can be equivalent on average to an additional 3.5 storeys for a 49 storey building, depending on the overall scale and nature of development (see also Table 5 and Figure 13 below).

5.3.5 The following list the pros and cons of reducing or removing GFA concessions for car parks :

Pros (Benefits)	Cons (Costs)
<ul style="list-style-type: none"> • Reduction in building height or bulk, which may bring about a better urban environment and benefit the neighbourhood • May place a control on car ownership, which in turn may positively impact roadside air pollution and public health • Release the ground floor or other lower floors for more attractive uses to improve streetscape • Reduce overall construction and maintenance costs as fewer car parking spaces are provided 	<ul style="list-style-type: none"> • Convenience of building occupants may be compromised • Fewer carparking facilities may induce more illegal parking on streets that will aggravate traffic congestion and result in more noise and environmental problems

⁹ Ancillary car parks -- car parks which are part of a development, often in the form of a podium.

5.3.6 Another option to reduce building bulk and height, without compromising the required parking provisions, could be the construction of underground car parks. However, it will likely bring about increased construction costs for excavation and overcoming structural constraints. The energy consumption (e.g. for ventilation and artificial lighting) arising from operating an underground carpark will also be higher.

5.3.7 It is worth noting that in parallel to this public engagement, the Transport Department is undertaking a study to review the HKPSG requirements for the provision of car parks for private residential developments. It is anticipated that this study will be completed in late 2009.

Table 5 - Reviewing car-parking provisions

Floor area for the provision of car-parks can be excluded from GFA. However, based on the Buildings Department's study over 97 buildings, it shows that the GFA concessions granted for car-parks take up much GFA (see table below).

	Average Amount of GFA Concessions Granted in relation to Total GFA (%)	Disregarded GFA for Car-parks in relation to Total GFA (%)
Residential Zone 1	40%	13%
Residential Zone 2	67%	42%
Residential Zone 3	57%	32%
Non-Domestic Buildings	37%	12%

Figure 13 - Removing GFA concessions for car-parks

Removing GFA concessions for car parks will reduce the bulk and height of a building. However, since the provision of car-parking spaces has been stipulated in the HKPSG, removing GFA concession for car-parks may result in a reduction of area for saleable floors for occupancy or other non-domestic features.



Remark: These scenarios only indicate some of the possibilities of removing GFA concession for car-parks on the building height. The actual implication will heavily hinge on the architectural design and market factors, e.g. the developer may choose to keep the existing building height by reducing the site coverage of the domestic towers by 1.5%.

GFA concessions granted in this example is based on the Buildings Department's study findings on a case of residential zone 1.

Adjusting the incentive for dedicating areas for public passage or road widening

- 5.3.8 Concessions, known as bonus GFA, are also presently available for buildings that include area for setback from the roadside dedicated for public passageways or street widening. This is a compensation for the building for dedicating or surrendering part of the site area to improve pedestrian comfort and mobility. Such dedication also improves the airflow and quality of the environment around the building and is highly desirable. But given the value of ground floor space, it is only fair to make compensation to developers for forgoing development rights.
- 5.3.9 For these features, bonus GFA is granted for the ground floor and also, but to a lesser extent, for other floors¹⁰. As with the other control options, it is important for the public to determine whether the benefits of road widening and public passageway are to be recognized and whether the amount of bonus GFA granted therefore should be adjusted.
- 5.3.10 As described previously, improving the pedestrian environment is of great benefit to the community. Nevertheless, if the incentive is reduced or removed, developers may be less motivated to surrender space at ground level. While this may serve to control the height of buildings, it would possibly act as a disincentive to street widening for public purpose which would bring about improvement of air ventilation and the streetscape.

Reviewing GFA concessions for other features

- 5.3.11 The incorporation of green and amenity features in our built environment is generally desirable. However, certain features (*e.g. sky-gardens, balconies, residents' club houses, mail delivery rooms with mailboxes, voids over prestige entrances of main common lobbies, larger lift shaft areas, and facilities for watchmen and building management staff*) mainly benefit building occupants. They improve their immediate environment and social amenity, but not that of the broader neighbourhood.
- 5.3.12 GFA concessions for these features, similar to other features, also lead to an increase in the total GFA and hence building height or bulk, which while providing comfort and convenience to the occupants, may adversely affect the neighbourhood.
- 5.3.13 Balancing the incorporation of these features through the award of GFA concessions is important. Consideration of whether to make certain features accountable for GFA calculation or to apply a GFA cap (an upper limit) on the total amount of GFA concessions (as described below) for these features must be made.
- 5.3.14 Overall, removing these GFA concessions would have the following benefits:
- Reduction in building height or bulk
 - Reduced overall construction costs, since the building is smaller



¹⁰ Under the B(P)R, bonus GFA up to five times of the dedicated surrender areas is granted as an incentive for the surrender of ground floor space and two times for other floors, subject to a cap of 20% of the total GFA.

5.3.15 Other pros and cons of removing these GFA concessions will depend upon whether these facilities are provided in the building or not. See Tables 6 and 7 below.

Table 6 - Reviewing GFA concessions for other features – Impacts of providing other features WITHOUT GFA concessions

	Where the facilities are provided without GFA concessions	Where the facilities are not provided without GFA concessions
OVERALL		
Property costs and values	<ul style="list-style-type: none"> • More expensive building management fees since the saleable areas will be reduced, and hence each flat may have to carry a large share for the costs and more facilities to maintain • Greater property value in the future, since occupants benefit from the facilities and amenities provided 	<ul style="list-style-type: none"> • Less expensive building management fees with fewer facilities to maintain • Lower property value in the future, since occupants do not benefit from the facilities and amenities provided
Land use and income to the public purse	<ul style="list-style-type: none"> • Lower development potential for the site, since some of the originally saleable area will be used for the provision of such facilities • More buildings (and land) needed overall to provide the same amount of saleable space. More infrastructure maybe required as some remote areas may need to be developed to provide such space 	<ul style="list-style-type: none"> • Higher development potential for the site since all the permissible area could be retained for sale • Less buildings (and land) needed overall to provide the same amount of saleable space



Table 7 - Reviewing GFA concessions for other features – Impacts of having and not having other features

	Impacts of having the facilities	Impacts of not having the facilities
SPECIFIC FEATURES		
Car-parking facilities	<ul style="list-style-type: none"> • More noise / congestion / pollution from cars since car-parking encourages people to drive and the user/occupant of such facilities would bear the management fee • More convenient for occupants/ visitors who are car owners 	<ul style="list-style-type: none"> • Less noise / congestion / pollution from cars since lack of car-parking discourages people from driving • Less convenient for occupants/ visitors who are car owners • Fewer carparking facilities may induce more illegal parking on streets that will aggravate traffic congestion and result in more noise and environmental problems
Communal sky gardens and podium gardens	<ul style="list-style-type: none"> • More amenity for the residents • Improved local environment from reduced heat island effect, better air circulation and pollution dispersal • A greener environment in the local neighbourhood, helping to reduce the heat island effect • Greater life cycle environmental impacts from increased water and resources use to maintain the facilities • Higher costs for maintaining the facilities 	<ul style="list-style-type: none"> • Less amenity for the residents • Degraded local environment from intensified heat island effect, reduced air circulation and pollution dispersal • Less life cycle environmental impacts since water and resources not needed to maintain the facilities • Lower building management costs
Balconies and utility platforms	<ul style="list-style-type: none"> • More space and amenity for residents • Lower energy bills and less pollution created where enhanced shading and natural ventilation reduce the need for air conditioning, and utility platforms enable clothes drying without the need of using drying machine 	<ul style="list-style-type: none"> • Less space and amenity for residents • Higher energy bills and more pollution created where lack of shading and natural ventilation increases the need for air conditioning
Sunshades, reflectors and wind catchers	<ul style="list-style-type: none"> • Lower energy bills and less pollution created where enhanced shading and improved natural ventilation reduce the need for air conditioning 	<ul style="list-style-type: none"> • Higher energy bills and more pollution created where lack of shading and natural ventilation increases the need for air conditioning
Wider corridors and lift lobbies	<ul style="list-style-type: none"> • More space, better accessibility and functionality for residents • Greater building management costs from maintaining and operating the facilities (for light/ventilation etc.) 	<ul style="list-style-type: none"> • Less space, poorer accessibility and functionality for residents

Capping GFA concessions

- 5.3.16 A further policy mechanism proposed on control of GFA concessions would be the use of a cap (an upper limit) on individual types of GFA concessions; or as a means to provide more flexibility in the design of new buildings, an overall cap on GFA concessions.
- 5.3.17 Capping the cumulative impact of GFA concessions may control the height and bulk of buildings while retaining a degree of flexibility and incentive to provide building features and facilities that improve the living standards of occupants. It is important to consider however that indiscriminately limiting the GFA concessions may discourage the provision of some desirable facilities or features, and when projected to the broader scale, may lead to other sustainability challenges in the form of urban sprawl.
- 5.3.18 Consideration could be given to applying a cap only to sites of higher development density e.g. buildings with 12 storeys or above if of a residential nature. There could also be separate caps for domestic, mixed and non-domestic developments. Ultimately, the Council seeks the views of the community on whether caps should be considered, and the manner (as a statutory or administrative control) in which they should be applied.
- 5.3.19 For reference, recent Government studies have suggested overall caps for GFA concessions (excluding bonus GFA and car parks) in the range of 25%-35% (of the overall GFA for the building) for domestic/composite developments and 20-30% for non-domestic buildings. These are recommendations drawn from recent Government studies. Please see Table 2 in Appendix 3 for rationale.

Proposed changes to the existing GFA concession regime

- 5.3.20 **Statutory "Modification Power" and GFA Concessions** – Currently, the BA utilises the "modification" power under section 42 of the BO to grant certain GFA concessions for building projects, where in his/her opinion special circumstances render it desirable to permit by notice in writing modifications of the provisions of the Ordinance.
- 5.3.21 This is a general power not specifically designed for GFA concessions, and the BA uses such power to grant "exempted GFA" concessions for green and amenity features (e.g. balconies and sky gardens). However, for other items such as "disregarded GFA" concessions for car parks or plant rooms, the BA has been explicitly empowered under regulations 23(3)(b) and 23A of the B(P)R to exercise discretion to disregard those areas from GFA calculation. Similarly, for the granting of "bonus GFA", it is governed by regulation 22 of the B(P)R.
- 5.3.22 A move to grant GFA concessions for green and amenity features on a legal basis may provide the BA with a more formal basis and guidance in exercising his future discretion. On the downside, this may decrease flexibility and lengthen the process of future adjustments of the GFA concession policies.
- 5.3.23 Consideration on whether any new measure or cap described above should be applied through an administrative method, that is through the modification (discretionary) powers of the Director of Buildings (the BA) or whether a new piece of legislation requiring mandatory compliance with a GFA cap should be promulgated is a matter for public discussion.
- 5.3.24 As mentioned previously, an administrative mechanism allows for greater flexibility, but is open to interpretation, and may provide less certainty to the community in terms of the final GFA of a development. Conversely, a mandatory approach would provide certainty, but would lack flexibility.

5.4 Energy efficient building design and installations

5.4.1 Apart from promoting building energy efficiency through enhancing the energy efficiency level of building services installations, we see potential in exploring alternative means of reducing energy consumption by promoting energy efficiency in building design. A wide array of energy efficient building design features is available locally and internationally. Example of design features or installations, which may be applied in Hong Kong, are summarised as follows:

Lighting

- Enhanced use of daylight through building windows with appropriate use of shading and low energy transmitting glazing to reduce internal heat gain;
- Use of light shelves (i.e. horizontal device or "shelf" that bounces direct sunlight off the ceiling and deeper into the interior spaces) to reduce need for artificial lighting;

Air-conditioning

- Use of shading devices (i.e. fixed or movable devices located inside or outside the glazing to control direct or indirect solar gain);
- Thermally efficient window frames;
- Low emissivity glass;
- Ground-sourced heat pumps;
- Ice storage and adsorption chillers;
- Water-cooled chillers;
- District cooling;

Other energy saving design features and installations

- Energy efficient pumps and motors;
- Building management/control systems;
- Landscape shading (i.e. use of trees or major landscaping elements to provide beneficial shading);
- Rooftop greening (i.e. to reduce heat absorbed by the roof);
- Non-absorbing roofing (i.e. roof covered by light-coloured or reflective membranes for absorbing less heat);
- Thermal massing of the building/selection of materials;
- Wall and roof insulation;
- Passive solar designs such as wing walls to induce natural ventilation; and
- Low-heat absorptive coatings and paints.



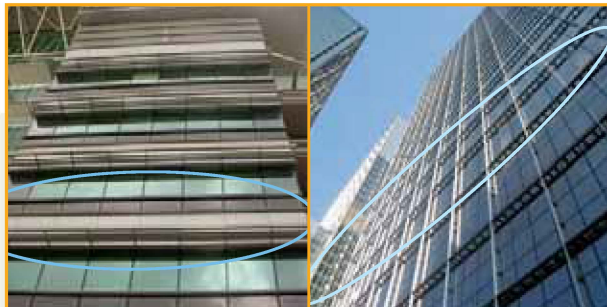
Figure 14 – Energy efficient building design and installations



Enhanced use of daylight through building windows



Rooftop solar photovoltaic panels can convert solar energy to electrical energy for the building



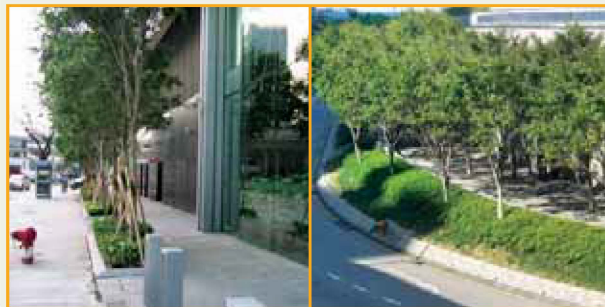
Use of shading devices - fixed or movable, located inside or outside the glazing, can control direct or indirect solar gain



Non-absorbing roofing – roof covered by light-coloured or reflective membranes - absorbs less heat



Rooftop greening reduces heat absorbed by the roof



Landscape shading - use of trees or major landscaping elements to provide beneficial shading

5.4.2 In addition, integration of renewable energy devices in buildings could also help reduce reliance on fossil fuel and thereby reduce the emission of greenhouse gases.

5.4.3 In common with other green features, GFA concessions may be applied as a means to further promote energy-efficient building designs. As considered in the previous texts on overall GFA caps, the community should consider such concessions as part of an overall and balanced consideration. Other mechanisms may also be applied to achieve the same or similar ends. These are briefly described below.

5.5 Considerations for these possible policy options

5.5.1 Incorporation of green, amenity and energy efficient features into buildings are desirable from many perspectives as highlighted above. They may however lead to an increase in building height or bulk and adversely impact the neighbourhood by reducing visual permeability, and causing overshadowing.

5.5.2 Balancing between the incorporation of these features and the associated trade-offs/costs is an important issue for the community to discuss. In this document, we have introduced the existing situation in Hong Kong, some of the potential design approaches and control mechanisms.

5.5.3 While control on GFA concessions is one approach, it is certainly not the only approach and other mechanisms may be applied. Consideration of whether to make certain features mandatory and accountable for GFA calculations or to apply a GFA cap (a limit) on the amount of GFA (as described above) for these features must be made. The Council wishes to engage all stakeholders in this discussion in order to be able to make an appropriately balanced recommendation to the Government at the end of this public engagement exercise.



5.5.4 Overall, consideration must be given to whether and which features should become mandatory requirements and hence reduced or no GFA concessions should be granted, and what measures may be applied to encourage voluntary provision of certain building features, and whether granting of GFA concessions is the most effective means.

5.5.5 Trying to balance such scenarios gives rise to a variety of considerations, which we must weigh up carefully in order to offer an acceptable way forward. There are various approaches to consider :

Approach 1 – Status Quo - We continue to incentivise the provision of essential facilities, green and amenity features in our building developments and continue to grant GFA concessions without additional development controls. We note that many stakeholders are mindful of the increase in building bulk and height in our city and have raised concerns over air ventilation, public health, the urban heat island effect etc. The control over building developments will be manifested through the existing means of planning and building control, such as the review of OZPs and stipulation of development restrictions.

Approach 2 – Moderate change - We progressively introduce moderate development controls over the provision of essential facilities, green and amenity features in our building developments. For example, we reduce the rate of GFA concessions for certain features and impose a cap on the total amount of GFA to be granted. This would serve to reduce building height and bulk, and would still allow green and innovative features to be incorporated. As indicated earlier in this document, a certain amount of saleable area of the development would be used to accommodate the features if the same level of such features is to be provided. Alternatively, new developments may be provided with fewer desirable building features without GFA concessions as incentives were progressively reduced. This of course would be market-led, and certain compromises to land development and property value, quality and sustainability would be inevitable. Other incentive and disincentive mechanisms could be applied such as accreditation/recognition

scheme, modification of land premiums, GFA concessions for adopting Sustainable Building Design Guidelines or providing energy efficient features, and construction levies. Moreover, as most of Hong Kong's population lives on only 24% of the territory, consideration may be given in allowing higher development intensity in the urban fringe or rural areas so as to relieve the development pressure on the already dense urban areas.

Approach 3 – Major change - We implement more stringent control parameters over development, say, doing away with GFA concessions for certain building features and imposing a stringent cap on overall GFA concessions and requiring mandatory adoption of the Sustainable Building Design Guidelines as well as provision of energy efficient features. While providing benefits to the neighbourhood as building bulk and height will be reduced, development potential of our scarce land may not be maximised, and reduction in development density may put pressure on our community to increase urban density in previously lower density areas. This may result in less desirable features in properties or alternatively if these features are still to be provided, people may need to pay more for these properties in comparison to the existing situation.

5.5.6 In considering how we may pursue a balanced and sustainable development, we must consider the range of policies that may be applied to achieve our goals. These include, but are not limited to the policy options put up in sections 5.3 and 5.4. As mentioned in this sub-section, other mechanisms to achieve our desired objectives exist, and these should also be considered. These include:

- Other fiscal incentives – may be applied where recurrent incentive is required, such as maintaining desirable greenery around buildings or continuing to maintain and operate energy efficient plant and equipment
- Land Premiums may be adjusted to reflect reduced value of developable space
- More comprehensive planning controls may be applied on building height and development intensity

6

Questions for Stakeholders

6.1 To stimulate thinking and discussion, we raise the following questions for stakeholders :

Characteristics that define a quality and sustainable built environment:

- a. What do you consider to be the most important characteristics of a quality and sustainable built environment and why?
- b. Should green and sustainable building design features be made mandatory?
 - If yes, whether all or some of the existing features should be made mandatory; and how could these be applied to new buildings?
 - If not, what measures or incentives should be adopted to promote the uptake of such features?
- c. What are your views on the proposed guidelines for separation between buildings, setback of buildings abutting narrow streets, and provision of greenery according to site area?
- d. When considering a trade-off between the bulk and the height of a building, should we try to strike a balance of both, or give priority to one or other of the two aspects?
- e. Do you have any concerns related to the design of buildings and their ability to deliver a quality and sustainable built environment?
- f. If yes, what would you wish to see done about these concerns?

The conflict in providing GFA concessions for desirable environmental and social features and controlling tall and bulky buildings:

- a. How can we resolve the conflict that arises when we grant extra GFA for the provision of essential, green and amenity features in buildings, and the public concerns about building height and bulk?
- b. Should we continue to grant GFA concessions for such features? If yes, what should we do to control building height and bulk?
- c. Are there any features you feel that should not be awarded with GFA concessions, and if so, why?
- d. What other considerations or controls would you wish to see placed on the award of GFA concessions?
- e. Should a limit (a cap) be placed on the total amount of GFA concession to be granted?
- f. Should GFA concession continue to be controlled administratively (i.e., as a discretionary power) or by a statutory (mandatory) requirement?
- g. Do you feel emphasis should be placed on other means to control building design such as alternative incentives and disincentives e.g. land premium adjustments, fiscal incentives/levies?

In relation to energy efficiency:

- a. What energy efficient building design features should be encouraged and promoted?
- b. How should such energy efficient building designs be promoted?
- c. Should GFA concessions for green and amenity features also include concessions for energy efficiency or renewable energy features?

Costs, benefits and willingness to pay:

As described in previous sections, greater sustainability in the built environment may mean a higher capital and maintenance costs for buildings. However, the community at large will benefit from improved social amenity (communal and recreational facilities, improved pedestrian environment etc) and improved environment (more greenery, reduced urban temperature, greater energy efficiency, better air quality, and improved waste management and recycling etc).

- a. How can wider appreciation and support for such measures be promoted in the building industry and among the general public?

Green features may cost more to install than their non-green alternatives. However certain green features (particularly those related to energy, water and waste) may lower building operating costs resulting in cost savings in the longer term.

- b. Do you believe that only features that will generate economic benefits should be included in buildings?
- c. Would you be willing to bear the additional recurrent cost of green features that provide environmental or social benefits?

- d. Are you willing to pay more for green or amenity features in buildings either through purchase or rental prices? For example if a flat costing HK\$6,500 per sq. ft. was to increase in price to accommodate the green features, by how much would you be willing to pay extra (nothing, 1%, 2%, 5%, 10%, more than 10%)
- e. What other factors would influence your willingness to pay?

Way Forward:

- a. In Section 5.5.5, we introduce three possible scenarios : "Status Quo", "Moderate Change" and "Major Change" as possible approaches to address the issues laid out in the IR document. Which, if any, of these scenarios do you prefer ? And why ?

7

Responding to this Document

- 7.1 This IR document has been prepared to assist members of the community to understand the various factors that influence the quality and sustainability of our built environment.
- 7.2 You are not limited to providing a written response based on this document alone, and we strongly encourage you to participate in the ongoing engagement process and share your views with others.
- 7.3 Outlined below are the various channels that you may use to get involved and to provide your views :

Responding By Mail

You may write directly with your views to the following address:

Sustainable Development Division
Environment Bureau,
M/Floor, Murray Building,
Garden Road, Central

Responding by E-mail : comments@susdev.org.hk

Visit the Council's Dedicated Website

The www.susdev.org.hk website includes a **discussion forum** for you to share your views with other members of the community.

Sharing your views at one of the following events:

Community Outreach — In coming months, the Council will organise a number of events providing an opportunity for you to further participate and share your views on measures that we might propose to foster a quality and sustainable built environment. Details of the upcoming events will be posted on the Council's website: www.susdev.org.hk

In addition to events run by the Council, a number of events will be organised with the support of other organisations. These again provide opportunities for you to extend your views through the institutions and associations of which you are a member. See www.susdev.org.hk for details of known events planned by other organisations.

Important Notice — Quoting your views

Please note that the Council for Sustainable Development would wish, either in discussion with others or in any subsequent report, whether privately or publicly, to be able to refer to and attribute views submitted in response to this IR document.

Any request to treat all or part of a response in confidence will be respected, but if no such request is made, it will be assumed that the response is not intended to be confidential and the Council may disclose or publish all or part of the views received and disclose the identity of the source.

Hotline

If you have any questions about the Building Design to Foster a Quality and Sustainable Built Environment Public engagement process, or how to submit your views, you can also contact our Hotline at Tel: 2776 0866.

Please note, the Hotline is for information and support only, and will not be used as a channel to collect views.

Where to Go for More Information

In addition to the Hotline, relevant links to useful resource documents and to websites of key Government departments and non-government organisations that may be helpful are listed out at Appendix 4.

Appendices



Membership and Terms of Reference of the Council for Sustainable Development, its Strategy Sub-committee and Support Group

Council for Sustainable Development

Terms of Reference —

- a. To advise the Government on the priority areas it should address in promoting sustainable development;
- b. To advise on the preparation of a sustainable development strategy for Hong Kong that will integrate economic, social and environmental perspectives;
- c. To facilitate community participation in the promotion of sustainable development in Hong Kong through various means, including the award of grants from the Sustainable Development Fund; and
- d. To promote public awareness and understanding of the principles of sustainable development.

Membership —

- Chairman: Mr Bernard Charnwut Chan, GBS, JP
- Members : Mr Chan Siu-hung; Ms Christine Fang Meng-sang, JP; Professor Ho Kin-chung, BBS; Mr Benjamin Hung Pi-cheng; Mr Michael Lai Kam-cheung, MH, JP; Professor Lam Kin-che, SBS, JP; Mrs Miranda Leung Chan Che-ming; Mr Victor Li Tzar-kuoi; Dr Lo Wai-kwok, MH, JP; Professor Poon Chi-sun; Mr Sin Chung-kai, SBS, JP; Mr Tai Hay-lap, BBS, JP; Ms Iris Tam Siu-ying, JP; Dr Andrew Lee Thomson; Professor Stephen Wong Siu-lun, SBS, JP; Secretary for the Environment*; Secretary for Transport and Housing*; Secretary for Development* and Secretary for Home Affairs*

* or Permanent Secretary

Strategy Sub-committee

Terms of Reference —

- a. To assist the Council for Sustainable Development with the formulation of a Sustainable Development Strategy for Hong Kong;
- b. To engage stakeholders and the community and implement a consultation programme as agreed by the Council for Sustainable Development with a view to ensuring that the Sustainable Development Strategy is inclusive and widely accepted by the community; and
- c. To report regularly to the Council for Sustainable Development on progress with the formulation of the Sustainable Development Strategy.

Membership —

- Chairman: Ms Christine Fang Meng-sang, JP
- Members : Mr Chan Siu-hung; Dr Lawrence Chau Kam-chiu; Mr William Bruce Hicks; Mr Henry Ho; Professor Ho Kin-chung, BBS; Professor Lam Kin-che, SBS, JP; Mrs Miranda Leung Chan Che-ming; Mr Victor Li Tzar-kuoi; Dr Lo Wai-kwok, MH, JP; Professor Poon Chi-sun; Mr Sin Chung-kai, SBS, JP; Ms Iris Tam Siu-ying, JP; Dr Andrew Lee Thomson and Dr Ray Yep Kin-man

Support Group on Building Design to Foster a Quality and Sustainable Built Environment

Terms of Reference —

- a. To compile an "Invitation for Response" ("IR") document, with reference to the information provided by previous reviews and consultancy studies, together with appropriate reference to local and international experiences;
- b. To design and implement the public involvement stage of the engagement process for public discussion of the IR document and related issues;
- c. To present the IR document to the public and facilitate interactive discussion by stakeholders with a view to building consensus; and
- d. To receive and collate responses from stakeholders, with a view to making proposals to the Strategy Sub-committee and Council for Sustainable Development.

Membership —

- Convenor: Professor Bernard Lim Wan-fung, JP
- Members : Mr Kenneth Chan Jor-kin; Mr Chan Kim-on; Mr Jonathan Chan Pok-chi; Mr Paul Chong Kin-lit; Dr Hung Wing-tat; Mr Michael Lai Kam-cheung, MH, JP; Professor Lam Kin-che, SBS, JP; Dr Law Chi-kwong; Dr Man Chi-sum; Ir Otto Poon Lok-to, BBS; Ms Ann So Lai-chun; Mr Mike Wong Chik-wing; Mr Wong Kam-sing; Representative from Development Bureau; Representative from Environment Bureau and Representative from Buildings Department



Appendix 2

Glossary of Terms and Definitions

Term	Definition
Air ventilation	Flow of air into and out of premises and the air that is being circulated within the premises.
Air Ventilation Assessment (AVA)	The Planning Department commissioned the "Feasibility Study for Establishment of Air Ventilation Assessment System" in 2003. The Study was completed in 2005. AVA methodology and guidance for applying AVA to major Government project were outlined in a Technical Circular jointly issued by the then Housing, Planning and Lands Bureau and the then Environment, Transport and Works Bureau. Moreover, design guidelines for improving air ventilation have also been incorporated into the Hong Kong Planning Standards and Guidelines. Major governmental projects which have been assessed by the AVA system included the planning of the Kai Tak Development and the Central Waterfront.
Amenity features	Amenity features are loosely defined as those elements of design that whilst not statutory are desirable to improve the standard and quality of a building or development project. These include residents' clubhouses, horizontal screens, podium gardens in residential buildings, management offices, etc.
Balcony	Balcony is one of the green features promoted under JPN 1 to improve lighting and ventilation to the flats and provide outdoor space for greening and exercise in individual flats. Being a projecting slab of not less than 1.5m, it also acts as sunshades and hence help reduce energy consumption for air-conditioning. The amount of GFA concession of this feature is subject to the criteria that the summation of areas per residential unit is 2m ² or 4% of the usable floor space of the unit whichever is the greater subject to a maximum of 5m ² .

Term	Definition
BEAM Society	A non-profit organisation comprising over 170 individual and corporate members from both private and public sectors with the mission to improve the environmental performance of buildings across their life cycle; provide healthier, higher quality, more durable and efficient working and living environments for building occupants; contribute significantly towards sustainable development in Hong Kong; build capacity in the industry to move quickly towards; educate the Hong Kong community to the concepts of eco-efficiency and sustainability; and extend these sound practices beyond Hong Kong, and into the Asia Pacific region.
Bonus GFA	Regulation 22 of the Building (Planning) Regulations (Cap. 123 sub. leg. F) stipulates that if the dedication of set-back area for public passage or surrender of land for road widening at ground level is consented/acquired by the Government, bonus GFA equals to five times the area dedicated/surrendered or less than 20% of the permissible plot ratio, whichever is the less may be granted in return for the private area dedicated/surrendered to the public. The Building Authority may also in return for dedication of an area within or through a building at ground level or other floor levels for public passage allow the concessions by way of granting modifications of the relevant B(P)R provisions.
Buildable area	Buildable area means the portion of a lot within which a building/structure may be built, bounded by the required setbacks.
Building bulk	It is generally used to describe the size and volume of a building or development, and its relationship to the boundary of the site on which it is located, and to other buildings and open areas in the surrounding area. There is no statutory definition under the BO or other legislation.

Term	Definition
Building Energy Codes (BECs)	<p>Since 1998, the Electrical and Mechanical Services Department has issued five sets of BECs, four of them are prescriptive in nature, setting the minimum energy efficiency performance requirements of four key types of fixed building services installations - lighting, air-conditioning, electrical and lift and escalator, and one performance-based BEC, which sets out an alternative approach to demonstrate compliance with the energy efficiency requirements through assessment of the total energy efficiency performance of a building. The BECs can be downloaded at http://www.emsd.gov.hk/emsd/eng/pee/eersb.shtml.</p> <p>The Government concluded a public consultation in March 2008 on the proposed mandatory implementation of the BECs. With the public support received over the proposal, the HKSAR Government is preparing a legislative proposal on the mandatory implementation of the BECs.</p>
Built environment	<p>It refers to the man-made surroundings that provide the setting for human activity, ranging from the large-scale civic surroundings to personal places. It addresses the design, management and use of these man-made surroundings and their relationship to the human activities which take place within them.</p>
Building Environmental Performance Assessment and Accreditation Schemes (BEPAS)	<p>Guidelines used by different countries for stating sustainable building design requirements. For example, LEED® Rating System is used in the United States, CASBEE in Japan, Green Mark in Singapore, and the Evaluation Standard for Green Building in Mainland China.</p>
Building height	<p>According to the Buildings Ordinance, the maximum vertical distance between the natural or finished ground level at any point of any part of a building and the finished roof height at its highest point, ignoring any antenna, aerial, chimney, flagpole or the like. Building height restrictions on Outline Zoning Plans may be stipulated in terms of number of storeys, metres, or metres above the Hong Kong Principal Datum ("mPD").</p>

Term	Definition
Building layout	<p>An arrangement or a plan, especially the schematic arrangement of parts or areas of a building.</p>
Building separation	<p>Separation of buildings in development sites by intervening spaces for purposes such as enhancement of airflow, building design, and living environment.</p>
Building setback	<p>Setting back buildings from the site boundary at pedestrian level for developments adjoining streets for purposes such as enhancement of better airflow, pedestrian environment, and living environment.</p>
Capital cost	<p>Costs incurred on the purchase of land, buildings, construction and equipment to be used in the production of goods or the rendering of services. In other words, the total cost needed to bring a project to a commercially operable status. However, capital costs are not limited to the initial construction of a factory or other business.</p>
Climate change	<p>Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". The UNFCCC makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes.</p>

Term	Definition
Carbon footprint	It is a measurement of the impact that the activities of an individual, building, organisation, event or city have on the environment, quantified in terms of the amount of greenhouse gases that they produce.
Construction Industry Council	A statutory body established on 1 February 2007 with members from professional bodies, research organisations and specialist business associations in the construction industry. Members include 350,000 individual professionals and 23,000 construction firms.
Disregarded GFA	It is stipulated in regulations 23(3)(b) and 23A(3) of the Building (Planning) Regulations (Cap. 123 sub. leg. F) that the Building Authority may disregard any floor space that he is satisfied is constructed or intended to be used solely for a number of features such as parking of motor vehicles, refuse storage chambers, material recovery chambers, access facilities for telecommunications and broadcasting services, back-of-house facilities in hotels, or other supporting facilities as may be approved by the Building Authority.
Energy efficiency	Using less energy to provide the same level of service or output without degradation of performance. An increase in energy efficiency occurs when either energy inputs are reduced for a given level of service or output, or there is increased output or enhanced services for a given amount of energy inputs.
Engagement process	The process that actively engages the stakeholders and the community at large to participate, share views and put forward suggestions on the issues discussed in the study.
Environment and Conservation Fund	The Environment and Conservation Fund was established in 1994 under the Environment and Conservation Fund Ordinance (Cap. 450) to provide financial support for educational, research and other projects and activities in relation to environmental and conservation matters.

Term	Definition
Essential features	Essential features refer to those basic facilities which are essential for the proper functioning of buildings. These include pipe ducts, lift machinery rooms, fire services installations, material recovery rooms, fire refuge floors, air-conditioning plant rooms, car-parks, etc.
Exempted GFA	Section 42(1) of the Buildings Ordinance (Cap. 123) stipulates that where in the opinion of the Building Authority special circumstances render it desirable he may, on receipt of an application therefore and upon payment of the prescribed fee, permit by notice in writing modifications of the provisions of this Ordinance. The Building Authority uses such power to grant GFA concessions for certain features, including green and amenity features and areas not at ground level dedicated for public passage. Examples include balcony, voids, etc.
Fire refuge floor	According to the Code of Practice for the Provision of Means of Escape in Case of Fire 1996, fire refuge floors should be provided in all buildings exceeding 25 storeys in height, at not more than 20 storeys and 25 storeys respectively for industrial and non-industrial buildings from any other refuge floor, or above the street. It acts as a safe place for a short rest before people continue to escape downwards. It also acts as a place of assembly for people to wait for rescue in case the staircases cannot be used.
Fossil fuels	They are the fossil sources, i.e. carbon or hydrocarbons found in the earth's crust. It is generally accepted that they formed from the fossilized remains of dead plants and animals by exposure to heat and pressure in the Earth's crust over hundreds of millions of years. Fossil fuels are non-renewable resources because they take millions of years to form, and reserves are being depleted much faster than new ones are being formed. Concern about fossil fuel supplies is one of the causes of regional and global conflicts. The production and use of fossil fuels raise environmental concerns. A global movement toward the generation of renewable energy is therefore under way to help meet increased energy needs.

Term	Definition
GFA cap	It refers to the limit on the amount of GFA concessions that may be granted in a development.
Green buildings	Buildings that are designed, operated, maintained and demolished in such a way that they reduce the overall impact of the built environment on human health and the natural environment by efficiently using energy, water and other resources; protecting occupant health and improving employee productivity; and reducing waste, pollution and environmental degradation.
Greenhouse gases	Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H ₂ O), carbon dioxide (CO ₂), nitrous oxide (N ₂ O), methane (CH ₄) and ozone (O ₃) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO ₂ , N ₂ O and CH ₄ , the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF ₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).
Gross floor area (GFA)	Building (Planning) Regulation (B(P)R) 23(3)(a) stipulates that subject to B(P)R 23(3)(b), gross floor area is the area contained within the external walls of a building measured at each floor level (including any floor below the level of the ground), together with the area of each balcony in the building which shall be calculated from the overall dimensions of the balcony (including the thickness of the sides thereof).
Gross floor area (GFA) concessions	Generally refers to disregarded GFA, exempted GFA, and bonus GFA.

Term	Definition
Hong Kong Energy Efficiency Registration Scheme (HKEERSB)	The Electrical and Mechanical Services Department has operated the HKEERSB since 1998 to promote the voluntary compliance of the BECs by providing recognition to building venues and installations that have complied with the standards. Up to April 2009, 2351 registration certificates were issued under HKEERSB to 974 building venues involving 2521 installations.
Hong Kong Planning Standards and Guidelines (HKPSG)	A Government manual of criteria for determining the scale, location and site requirements of various land uses and facilities. This manual is applied in planning studies, preparation/revision of town plans and development control.
Land premium	It means any sum, other than Government rent, required to be paid to the Government as a condition or in consideration of (a) the grant, or renewal of a Government lease; (b) consent to the assignment of a Government lease or of any rights under a Government lease; or (c) the extension or variation of a Government lease.
Non-structural prefabricated external walls	This is one of the green features promoted under JPN 1 to improve the quality of construction and to reduce construction waste. This is an external wall system which components are produced off-site and do not form part of the structural system of the parent building. Currently, the maximum thickness of the wall to be exempted from GFA calculation is 300mm.
Operation cost	The expense of maintaining property (e.g. cost for building services/ management services, paying property taxes and utilities and insurance); it does not include depreciation or the cost of financing or income taxes.
Outline Zoning Plan (OZP)	The statutory land use planning framework that provides guidance on the development and redevelopment plan within a certain area in Hong Kong.

Plant rooms	A room used to house large machinery (plant), such as air-conditioning equipment. Under Building (Planning) Regulation 23(3)(b), the Building Authority may disregard plant rooms or floor spaces occupied solely by machinery or equipment for lift, air-conditioning, heating system or any other similar services in the GFA calculation. Only the minimum amount of GFA necessary for accommodating and maintaining the services and commensurate with the development would be allowed to be disregarded.
Plot Ratio	For purposes of the Building (Planning) Regulation, the plot ratio shall be obtained by dividing the gross floor area of the building by the area of the site on which the building is erected.
Public amenity	They are any tangible or intangible benefits of a property, especially those which increase the attractiveness or value of the property or which contribute to its comfort or convenience and are available for public use.
Renewable energy	Energy which is derived from natural processes and is replenished constantly. Major types of renewable energy sources include: <ul style="list-style-type: none"> • Solar energy • Wind energy • Energy from waste • Biomass energy • Hydro energy • Geothermal energy • Ocean energy

Term	Definition
Residents' clubhouse	Residents' clubhouse is an amenity feature promoted under PNAP No. 229. It accommodates recreational facilities such as swimming pools, tennis courts, fitness equipments, function rooms, etc. It should be operated and controlled to ensure its exclusive use by the owners and residents including their bona fide visitors. The amount of GFA concession to be granted for this facility should not be greater than 5% of the domestic GFA of the development.
Sky garden	This is one of the green features promoted under JPN 1 and 2 to provide space for greening and recreational space for residents. Being open on the sides and with a headroom of not less than 4.5m, it improves air flow between buildings and microclimate at street level if provided at lower level. The maximum number of sky gardens in domestic buildings and non-domestic buildings equals to the total number of storeys divided by 15 and 20 respectively.
Stakeholders	Community-at-large including the professional, non-government organizations (NGOs), schools, businesses, district organizations, interests and/or pressure groups relevant to the issues for engagement and individual members of the public.
Street canyon effect	The condition, brought about by narrow streets with high-rise buildings on both sides, leading to narrow pavement and a poor pedestrian environment.
Sustainable building	see definition of "sustainable built environment" and "sustainable development"
Sustainable built environment	A sustainable built environment is a built environment that is well balanced for the needs of the present and the future from the economic, social and environmental perspectives.

Term	Definition
Sustainable development	According to the World Commission on Environment and Development, Sustainable development means development that meets the needs of the present without compromising the ability of future generations to meet their own needs. "In simple terms, sustainable development for Hong Kong means finding ways to increase prosperity and improve the quality of life while reducing overall pollution and waste; meeting our own needs and aspirations without doing damage to the prospects of future generations; and reducing the environmental burden we put on our neighbours and helping to preserve common resources" ("1999 Policy Address"). It means an integration of the needs for economic and social development with that to conserve the environment.
Urban Climatic Map and Standards for Wind Environment Feasibility Study	The Planning Department appointed the Chinese University of Hong Kong to launch the Study in 2006 with the main objective of formulating an Urban Climatic Analysis Map, an Urban Climatic Planning Recommendation Map and pedestrian wind standards for Hong Kong. The current AVA System would also be refined. The Hong Kong Government will examine the feasibility of the Study recommendations after completion of the study in 2010.
Urban heat island	Urban heat island is a metropolitan area which is significantly warmer than its surrounding rural areas. The main cause of the urban heat island is modification of the land surface by urban development and waste heat generated by energy usage. The urban heat island effect occurs when city temperatures run higher than those in suburban and rural areas, primarily because growing numbers of buildings have supplanted vegetation and trees. Moreover, human activity itself generates heat.

Term	Definition
Utility platform	It is one of the green features promoted under JPN 2 to provide space for drying clothes and to reduce energy consumption for drying machines. The amount of GFA concession of this feature is subject to the criteria that the maximum are per residential unit is 1.5m ² .
"Wall effect"	It is generally used to describe the result of uniform high-rise developments forming an impermeable "wall". Factors bringing about wall effect include the design, layout, orientation and shapes of the buildings, plot ratio, site coverage, shape of the site, climatic changes, and air current arising from traffic. There is no scientific definition/criteria for wall effect.

Appendix 3

Three Existing Types of GFA Concessions: Disregarded GFA, Exempted GFA and Bonus GFA

To supplement the main text of the IR document we have prepared Table 1 below, which provides a summary of the GFA concessions presently applied in Hong Kong on a disregarded, bonus or exempted basis, and some of the key considerations in granting these concessions:

Table 1 - Summary of GFA Concessions

Disregarded GFA	Bonus GFA
<p>Floor space to be used solely for features such as:</p> <ul style="list-style-type: none"> • Parking and loading and unloading of motor vehicles • Refuse storage chambers • Access facilities for telecommunications and broadcasting services • Back-of-house facilities for hotels • Other supporting facilities as approved by the BA 	<ul style="list-style-type: none"> • Where private area is dedicated for public passage or road widening at ground level (for example as set-back area), bonus GFA may be up to five times the area surrendered or 20% of the plot ratio, whichever is less • Where private area is dedicated for public passage within or through a building, bonus GFA may be up to five times the dedicated area at ground level and two times at other levels, but not exceeding 20% of the permissible plot ratio
Exempted GFA	
<p>Up to 5% (in normal circumstances) of the domestic GFA may be granted for amenity features that, whilst not statutory, help improve the standard and quality of a building or development by:</p> <ul style="list-style-type: none"> • encouraging effective building management - for example mail room, counters, kiosks, stores and guard rooms • enhancing the quality of life for residents and users - recreational facilities for residents and occupiers such as podium roof gardens and play areas, squash courts, indoor swimming pools and function rooms • discouraging unauthorized building works - such as space and mounting fixtures for air-conditioning, satellite dishes, security gates, clothes-drying racks and anti-burglar bars • improving environmental compatibility with the neighbourhood - such as prestige entrances, horizontal screens (to protect against weather and falling objects), and projections (e.g. thicker walls) that improve energy efficiency <p>Furthermore the BA may also:</p> <ul style="list-style-type: none"> • allow site coverage to vary and exclude certain areas from the GFA calculations for innovative designs such as setting back a building for its full height from a site boundary abutting on a street • exclude space occupied solely by machinery or equipment (such as lifts, air-conditioning, heating systems or similar) • exclude the twelve Green and Innovative features of building design covered in Joint Practice Notes 1 and 2 (see <i>Box 2</i>) 	

To assist readers of this IR document to better understand the impact of these GFA concessions on our buildings the Buildings Department undertook a study of 97 buildings of varied types. The findings of this study are reported in Table 2 for reference:

Table 2: Effect of various GFA concessions on height and bulk of buildings

	Residential Zone 1 Highest Density	Residential Zone 2 Medium Density	Residential Zone 3 Lowest Density	Non-domestic
	Effect of the GFA Concessions on Building Height & Bulk (equivalent to # of storey increase)	Effect of the GFA Concessions on Building Height & Bulk (equivalent to # of storey increase)	Effect of the GFA Concessions on Building Height & Bulk (equivalent to # of storey increase)	Effect of the GFA Concessions on Building Height & Bulk (equivalent to # of storey increase)
Bonus	1.5 storeys	n/a	n/a	1 storey
Disregarded (Carparks)	3.5 storeys	4 storeys	1 storey	3.5 storeys
Disregarded (Plant Rooms, etc other than carparks)	0.5 storey	1 storey	0.5 storey	1 storey
Exempted (Green / Amenity Features)	2 storeys & equivalent to 10% of the site coverage of the tower	3 storeys & equivalent to 5% of the site coverage of the tower	1 storey & equivalent to 5% of the site coverage of the tower	1 storey & equivalent to 1% of the site coverage of the tower
Overall Cumulative Effects	Equivalent to 7.5 storeys and 10% of the site coverage of the tower	Equivalent to 8 storeys and 5% of the site coverage of the tower	Equivalent to 2.5 storeys and 5% of the site coverage of the tower	Equivalent to 6.5 storeys and 1% of the site coverage of the tower

Based on recent Government studies, it was proposed that an overall cap for GFA concessions (excluding bonus GFA and car parks) in the range of 25%-35% be considered for domestic/composite developments and 20-30% for non-domestic buildings. An inter-departmental working group of the Government proposed the above quantum alternatives by evaluating the appropriate compression of the "reasonable maximum" for the GFA concessions, excluding bonus GFA and the disregarded GFA for car-parks, in order to strike a proper balance between the benefits of essential, green and amenity features and the impact of the associated building bulk and height on neighbourhood. The "reasonable maximum" refers to the maximum amount of the GFA concession of all of the reasonable cases out of the 97 sample cases, where the features are provided in accordance with the current criteria. The upper ends of the proposed ranges of quantum alternates correspond to the reasonable maximum while the lower ends corresponds to a reduction of about 30% from the reasonable maximum.

Appendix 4

Relevant Background Information and Studies

Building Energy Efficiency

- **Hong Kong Energy Efficiency Registration Scheme for Buildings**

<http://www.emsd.gov.hk/emsd/eng/pee/eersb.shtml>

- **Background Brief on Building Energy Efficiency**

<http://www.legco.gov.hk/yr07-08/english/panels/ea/papers/ea0128cb1-647-14-e.pdf>

- **Public Consultation on the Mandatory Implementation of the Building Energy Codes**

http://www.enb.gov.hk/en/resources_publications/policy_consultation/files/BEC_Consultation_Document_English.pdf

<http://www.legco.gov.hk/yr07-08/english/panels/ea/papers/ea0526cb1-1595-4-e.pdf>

- **Hong Kong Sustainable Technology Net**

<http://sustech.emsd.gov.hk/>

GFA Concessions

- **Existing Gross Floor Area (GFA) Concessions**

http://www.devb-plb.gov.hk/eng/business/pdf/191208_Annex_eng.pdf

- **Calculation of Gross Floor Area and Non-accountable Gross Floor Area**

<http://www.bd.gov.hk/english/documents/pnap/Pnap013.pdf>

- **Exclusion of Floor Areas for Recreational Use**

<http://www.bd.gov.hk/english/documents/pnap/Pnap229.pdf>

- **Dedication of Land/Area for Use as Public Passage**

<http://www.bd.gov.hk/english/documents/pnap/Pnap233.pdf>

- **Green and Innovative Buildings**

<http://www.bd.gov.hk/english/documents/joint/JPN01.pdf>

- **Second Package of Incentives to Promote Green and Innovative Buildings**

<http://www.bd.gov.hk/english/documents/joint/JPN02.pdf>

- **Development Control Parameters**

<http://www.bd.gov.hk/english/documents/joint/JPN04.pdf>

Sustainable Building Design

- **Proposed Sustainable Building Design Guidelines**
http://www.devb-plb.gov.hk/eng/business/pdf/191208_Annex_eng.pdf
- **General Development and Implementation of Sustainable Building Design in Architectural Services Department**
<http://www.archsd.gov.hk/english/reports/e3118.pdf>
- **Sustainable Building Design in Architectural Services Department**
http://www.science.gov.hk/paper/ArchSD_AWilson.pdf
- **Building Environmental and Sustainable Design Approach to Housing Developments**
<http://www.housingauthority.gov.hk/haconf2002/download/papers/pryau2.pdf>
- **Policies on Sustainable Urban Development and Green Buildings**
<http://www.legco.gov.hk/yr06-07/english/counmtg/motion/cm0523-m1-prpt-e.pdf>
- **Sustainable Architecture**
<http://www.arch.hku.hk/research/BEER/sustain.htm>
- **Sustainable Buildings - Design**
http://www.hkie.org.hk/docs/events/2006/RoadShow/Eco-friendly%20Building/2_Sustainable%20Buildings.pdf
- **Study on Green Roof Application in Hong Kong**
http://www.devb-wb.gov.hk/FileManager/EN/press_releases_and_publications/publications/Green%20roof%20study_final%20report.pdf

Other Relevant Reference/Websites

- **Council for Sustainable Development**
<http://www.susdev.org.hk>
 - **Council Report on the Better Air Quality Engagement Process**
<http://www.susdev.org.hk/en/councilreport.htm>
 - **Council Report on the Public Engagement Process on Population Policy**
http://www.susdev.org.hk/archive/en/pdf/Council_Report_e.pdf
 - **Council Report on the Engagement Process of Sustainable Development**
<http://www.susdev.org.hk/archive/archive/en/Report/index.html>
- **Green Building Challenge (GBC) - Canada**
<http://greenbuilding.ca>
- **HK Beam Society**
<http://www.hk-beam.org.hk>
- **Leadership in Energy and Environment Design (LEED) - USA**
<http://www.usgbc.org>
- **Professional Green Building Council**
<http://www.hkpgbc.org>

Partner Organisations



聖公宗(香港)中學委員會有限公司
Anglican (HongKong) Secondary School Council limited



BEAM Society
香港環保建築協會



香港中文大學
The Chinese University of Hong Kong



香港城市大學
City University
of Hong Kong



香港科技大學
THE HONG KONG UNIVERSITY OF
SCIENCE AND TECHNOLOGY

THE UNIVERSITY OF HONG KONG 香港大學
faculty of architecture 建築學院



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



綠色力量
GREEN POWER



香港浸會大學
HONG KONG BAPTIST UNIVERSITY



Hong Kong General Chamber of Commerce
香港總商會 1861



香港房屋委員會
Hong Kong Housing Authority



HONG KONG
HOUSING SOCIETY
香港房屋協會



LINGNAN UNIVERSITY OF HONG KONG



樹仁大學
SHUEN CHAN UNIVERSITY



Lingnan 嶺南大學
University



PGBC
環保建築專業協會

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(in no particular order)

Building Design to Foster a Quality and Sustainable Built Environment

Invitation for Response Document 2009

Your views are welcome!

- Building Separation
- Building Setback
- Greenery
- GFA Concessions
- Energy Efficiency



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