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POLICIES FOR SUSTAINABLE URBAN DESIGN AND RELEVANT LESSONS FOR HONG KONG

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Abstract
Sustainable urban design is widely considered a promising approach to deal with the multifarious array of social, economic and environmental problems in urban agglomerations. Sustainable design principles and policies helps to improve social inclusion, mobility, accessibility and various urban problems and thus enhances the overall quality of life in cities. But what will be the appropriate policies for sustainable urban designs are yet to be addressed. If, policies are identified than worldwide researchers, urban planners, urban designers and policy makers can easily use them for making urban area sustainable. So, the aim of this paper is to explore the sustainable urban design policies. To cite an example of how cities can use the explored policies, relevant lessons for Hong Kong is briefly described. Literature review and case study are the main source of information of this study. This paper is divided into three chapters; in its first chapter emergence and definition of sustainable development and sustainable urban design is described, in its second chapter policies for sustainable urban design explored and in the third chapter relevant lessons for Hong Kong are narrated.
Keywords: Sustainable urban design, Policies, International experiences, Lessons for Hong Kong.

1. EMERGENCE OF SUSTAINABLE DEVELOPMENT

The term sustainable development emerged gradually over couple of years. It is the product of environmental movement which was started in 1962 through the publication of a book 'silent spring'. After Passing 25 year's sustainable development got its definition through the publication of the world Commission report 'Our Common Future' on Environment and Development in 1987 and then after

passing more 13 years it got further attention through setting UN Millennium Goals in 2000. In this millennium goal UN identifies eight goals to achieve by 2015, including eradicating hunger and poverty and achieving environmental sustainability. However, the latest initiative of sustainable development is United Nations conference on climate change in 2009, commonly known as the Copenhagen Summit.

From 1962 to 1980 sustainable development was not in its own name but it was in the form of environment and development. The environmental movement lunched through the publication of a book named silent spring in 1962. It was written by Rachel Carson and published by Houghton Mifflin on 27 September 1962. The book inspired widespread public concerns and pollution of the environment. Silent Spring facilitated the ban of the pesticide DDT[1] in 1972 in the United States. The book documented detrimental effects of pesticides on the environment, particularly on birds. Carson said that DDT had been found to cause thinner egg shells and result in reproductive problems and death. She also accused the chemical industry of spreading disinformation, and public officials of accepting industry claims uncritically. The environmental movement in 1962 leads United Nations seventh Conference on Human Environment at Stockholm in 1972. Considering the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment, this conference prepared an action plan for the human environment. The environmental movement from 1962 to 1972 gradually impose the concept of sustainable development and finally the term sustainable development got its foundation during the year 1980 through the United Nations eighth conference on Human Environment.

The term sustainable development got its definition in the year 1987. In this year The Brundtland Commission, formally the World Commission on Environment and Development (WCED), was created to address growing concern "about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development." In establishing the commission, the UN General Assembly recognized that environmental problems were global in nature and determined that it was in the common interest of all nations to establish policies for sustainable development. In the same year Brundtland commission published a report 'Our common future' and brings environmental and sustainability issues to the fore. In this report the definition of sustainable development is given. This report deals with sustainable development and the change of politics needed for achieving that.

After formation of the definition of sustainable development the earth summit and the parallel Global Forum in Rio 1992 further spotlights on sustainable development and boosted environmental politics.

[1] DDT (from its trivial name dichlorodiphenyltrichloroethane) is one of the most well-known synthetic pesticides.

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The issues addressed in earth summit included: systematic scrutiny of patterns of production — particularly the production of toxic components, such as lead in gasoline, or poisonous waste including radioactive chemicals and alternative sources of energy to replace the use of fossil fuels which are linked to global climate change as well as new reliance on public transportation systems in order to reduce vehicle emissions, congestion in cities and the health problems caused by polluted air and smog and the growing scarcity of water. An important achievement was an agreement on the Climate Change Convention. Another agreement was to "not carry out any activities on the lands of indigenous peoples that would cause environmental degradation or that would be culturally inappropriate". The Convention on Biological Diversity was opened for signature at the Earth Summit, and made a start towards redefinition of money supply measures that did not inherently encourage destruction of natural ecoregions and so-called uneconomic growth.

Afterwards, the Second United Nations Conference on Human Settlements (Habitat II) in 1996 is another milestone of sustainable development. The conference theme was 'adequate housing for all' and 'ecological sustainable development in an urbanization world'. The outcomes of the Conference are the Istanbul Declaration and the Habitat Agenda which constitute a framework where human settlements development is linked to the process of realizing human rights in general and housing rights in particular. UN millennium summit took place in 2000 at the United Nations headquarters in New York City. The Millennium Declaration was adopted during the Millennium Summit by the world leaders who attended, striving to "free all men, women, and children from the abject and dehumanizing conditions of extreme poverty." By the end of the Summit, the Millennium Declaration's eight chapters were drafted, Values and Principles; Peace, Security and Disarmament; Development and Poverty Eradication; Protecting our Common Environment; Human Rights, Democracy and Good Governance; Protecting the Vulnerable; Meeting the Special Needs of Africa; Strengthening the United Nations.

Some 10 years after the Rio Earth Summit, the United Nations World Summit on Sustainable Development (WSSD), also known as Earth Summit II or Rio +10, took place in Johannesburg, South Africa in 2002. The summit in Johannesburg also included a huge number of delegates representing nations, business interests and non-profit environmental and development/citizen/social justice groups. Various key issues were addressed, including: Poverty; Water quality and availability; Cleaner energy; Health; Good governance; Technology; Production and Consumption; Oceans and Fisheries and Tourism. UN millennium summit was followed by the World Summit five years later, which took place from 14 September to 16 September 2005 and resolve to take concrete measures with a view to ensuring effective follow up to the outcome of the Millennium Summit and the other major UN

conferences and summits in the four following areas: Development; Peace and collective security; Human rights and the rule of law and Strengthening of the United Nations.

However, the latest initiative towards sustainable development is United Nations conference on climate change in 2009, commonly known as the Copenhagen Summit, was held at the Bella Centre in Copenhagen, Denmark. This conference considered Climate change as one of the greatest challenges of the present day. The main points of the accord are keeping the rise in global temperatures to no more than 2 degree Celsius and large industrialized countries must provide plans for cutting carbon emissions by January 30th, 2010 as well as prevent deforestation and developing countries to be provided with incentives to use clean energy.

TABLE 1 – SUSTAINABILITY TIMELINE

YEAR	SUSTAINABILITY INITIATIVE
1962	Rachel Carson publishes Silent Spring.
1972	Club of Rome: The Limits to Growth report
1972	UN Conference on the Human Environment: The Declaration of the United Nations Conference on the Human Environment is adopted in Stockholm and the concept of sustainable development receives international attention.
1980	IUCN/UNEP/WWF: The World Conservation Strategy report
1987	Montreal Protocol and International agreement reached to limit the use of substances harmful to the ozone layer.
1987	World Commission on Environment and Development, better known as the Brundtland Commission, publishes Our Common Future.
1992	UN Conference on Environment and Development
1993	World Conference on Human Rights
1994	International Conference on Population and Development
1995	World Conference on Social Development
1995	World Conference on Women
1996	UN Conference on Human Settlements (Habitat II)
1997	Kyoto Climate Change Protocol sets greenhouse gas emission reduction targets.
1997	EarthSummit + 5, or Rio + 5, reviews Agenda 21 progress in the past five years; despite some progress, participants are deeply concerned" that the overall trends had got worse since 1992.
1999	President's Council on Sustainable Development (PCSD) CitNet National Town Meeting for a Sustainable America
2000	UN Millennium Goals: UN identifies eight goals to achieve by 2015, including eradicating hunger and poverty and achieving environmental sustainability.
2002	World Summit on Sustainable Development (WSSD)
2005	Kyoto Protocol ratified and Counties who contribute to at least 55% of the 1990 CO2 emission ratify the protocol.
2009	United Nations conference on climate change Considered Climate change as one of the greatest challenges; keeping the rise in global temperatures to no more than 2 degree Celsius and large industrialized countries must provide plans for cutting carbon emissions by January 30th, 2010 ; prevent deforestation and developing countries to be provided with incentives to use clean energy.

Source: Prepared by the authors after literature review

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2. DEFINITION OF SUSTAINABLE DEVELOPMENT AND SUSTAINABLE URBAN DESIGN

Sustainable urban design emerged from the term Sustainable Development. Since the Conference on Human Environment in Stockholm in 1972, the word "sustainable development" is the center of the environment and development debate. It can be defined as: “the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.” This is the most commonly accepted definition of sustainable development in the world today. This definition appeared in 1987 when the United Nation’s World Commission on Environment and Development published its famous report entitled “Our Common Future.” According to the report sustainable development contains two key concepts:

- The concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

This report also suggests defining the goals of economic and social development in terms of sustainability in all countries - developed or developing, market-oriented or centrally planned. Interpretations will vary, but must share certain general features and must flow from a consensus on the basic concept of sustainable development and on a broad strategic framework for achieving it. This report also mentions development as a progressive transformation of economy and society. A development path that is sustainable in a physical sense could theoretically be pursued even in a rigid social and political setting. But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation.

The emergence of sustainable urban design offers some promises. It is a holistic approach to the crises of the environment makes for a reliable connection between nature and culture. It needs to ensure ecologically balanced urban environments for present as well as future generations. Sustainable design also offers city planners and architects the insights with which to create liveable places that emphasize continuity in human habitation and interconnectedness between people and places. Sustainable design requires a comprehensive and integrated understanding of a city's unique human and environmental resources. It identifies strategies that look at a community's on site natural resources as integral aspects of the design. It also integrates natural systems with human patterns and celebrates continuity,

uniqueness and place making. Sustainable urban design is an integrated ecological or biological modelling technique that carefully addresses to balance the relationships between human activities and environmental systems. There are three areas of sustainability; social progress, environmental responsibility and economic development (Figure 1). There is not a clear division of the groups, and on the contrary, they are an important part of the others. Sustainability is a complex phenomenon that represents the simultaneous presence of those aspects.

FIGURE 1 – THEORETICAL MODEL OF URBAN SUSTAINABILITY
Source: Lamb, 2011

However, sustainable urban design is the exercise of determining the physical landscapes of settlements to make places for people and to make high-quality connections between places and buildings for safe movement of people. At the time of place making for people, it must respect and enhance the natural environment and use resources efficiently so that it can meets the needs of the present generation without compromising the ability of future generation to meet their own needs. There are three aspects of sustainable design which are; environmental sustainability, economic sustainability and socio cultural sustainability. Environmental Sustainability considers the environmental impact of human activities and suggests not exceeding the carrying capacity of the Earth and the life of its inhabitants is not endangered. Economic Sustainability incorporates to build a strong, stable and sustainable economy which provides prosperity and opportunities for all. It is a production process that satisfies the present level of consumption without compromising future needs. Socio cultural sustainability intends to improve the wellbeing of people in present and future generations and also refers to sustaining cultural diversity.

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3. TYPES OF POLICY IN SUSTAINABLE URBAN DESIGN

3.1. Sustainable urban design, new urbanism

As the idea of sustainability was developed over the years in parallel to the transformation of social concerns on our living environment, emerging concepts of sustainable urban design were also developed through repetitive self-examinations and redirections of preceding urban design movements. One of leading theory and practice of sustainable urban design at the moment is New Urbanism; it was emerged out of criticism on the postwar urban planning influence.

New Urbanism first emerged in United States in the 1980s and continued to push new ways of community design, real estate development and urban planning. This movement was disseminated by individual practitioners and academicians for a decade, and became a body of organization called the Congress for the New Urbanism (CNU) in 1993. Its foundation text, the Charter of the New Urbanism says:

> *We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice (the Charter of the New Urbanism).*

The Charter and several literatures on New Urbanism reveal its main targets as the promotion of walk-able neighborhood, balanced community, and transit-oriented development; they were naturally came to the vital position while urban sprawl, social segregation, and functional planning appeared as controversial issues in our living environment since 1970s and 1980s (Dutton, 2000 and Robbins, 2004). It is observed from the targets of New Urbanism that this movement is not mere design challenges but drastic restructuring of urban form and people's life style. The recognizable body of organization and formulation of the Charter help to promote the idea and to collaborate with local governments in holistic development process including the restructuring of public policies. Robbins points out this aspect and says:

> *Much of suburbia is the product of codes and conventions. The New Urbanism rewrites these codes and conventions to restructure the nature of urban and suburban development. New Urbanist codes are a series of ordinances that regulate everything*

from the masterplan to the streetscape, the building types and distribution to the architectural design of all building types. (Robbins, 2004)

Because New Urbanism is an urban design practice, it tackles issues of urban form, land use, and land development pattern in its master plan as basic concerns. Additionally, it is also involved into the design of public space, landscape, and building types. As it is written in the Charter, New Urbanism even covers historical preservation and green building. This movement goes beyond conventional extent of urban design, and integrates holistic concerns of our living environment from aspects of environmental, economical, social, and cultural.

Widely-known movements of sustainable urban design such as Smart Growth and Compact City approach to the reconstruction of our living environment in similar way to New Urbanism. This paper will list up and analyze public policies of sustainable urban design which are being practiced in the world with those leading movements described above. For the sake of presentation, the policies were categorized into five groups according to the elements of urban design, namely; Buildings, Streets, Public Space, Urban Landscape, and Transport. Those policies are categorized, but are surely interrelated each other in their physical form as well as reachable effect of sustainable contribution to our living environment.

The explored policies and indicators under the above mentioned urban design elements are listed below (Table 2).

TABLE 2 – POLICIES THAT CAN BE USED TO FACILITATE SUSTAINABLE URBAN DESIGN

ELEMENTS OF URBAN DESIGN	SUSTAINABLE URBAN DESIGN POLICES
Buildings	- Control of development density - Policy of mixed use program - Control of building volume and building type - Policy of green building concept
Streets	- Policy of walk-able neighborhood (cycling) - Improvement of accessibility to the public transportation hub - Introduction of pedestrian-only streets - Introduction of street trees, street furniture, and public art
Public Space	- Policy to provide adequate and various public open space - Policy of designing accessible public open space - Policy to promote green infrastructure - Policy of introducing permaculture to public open space
Urban Landscape	- Policy to promote low impact urban landscape design - Policy to promote xeriscaping / water-conserved landscape / zeroscaping, etc - Policy of designing timeless urban landscape
Transport	- Policy of designing or re-designing on-street parking areas - Introduction of Underground Highway - Policy of designing Greenways - Policy of discouraging highway design along the waterfront - Extensive designation of Promenade - Designing more lanes/roads for public transport and High Occupancy Vehicle lanes

Source: Prepared by the authors after literature review

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3.2. Policies related to buildings

- **Control of development density**

In parallel to the mass production and dissemination of cheap automobiles after World War II, construction of low density single family detached houses were the preferable housing option for the growing middle class in North America and some other places. Urban sprawl led by low density development as well as segregation of residential from commercial and industrial development led by zoning ordinance became an issue of reconsideration while sustainability became inevitable concerns for our living environment in the recent years.

- **Policy of mixed use program**

Certain degree of high density development and mixed land use were revalued as sustainable urban form that economically and socially enhance vibrancy at the area due to a diversity of commercial and leisure activities as well as a diversity of different population group. The policies also encourage efficient use of urban infrastructure due to concentration of people and activities.

- **Control of building volume and building type**

A very basic control policy of building volume is by FAR (floor ratio area) that specifies buildable floor area in relation to the size of a lot. Addition to FAR control, normally local building codes or zoning plan further specify individual building volume for the sake of community health and safety. Those guidelines specify height restriction, building setback, shadow line, building distances, and so on, in order to secure natural light, ventilation, and privacy which contribute to our desirable living condition. Some policies also specify building type; for example, it specifies alignment of the front edge and building height to ensure continuous shop front along the district shopping corridor.

- **Policy of green building concept**

LEED, green building rating system developed in United States, now recognized internationally, provides third-party verification that a building was designed and built using strategies intended to improve performance of energy savings, water efficiency, CO2 emissions reduction, and so on. Applying this comprehensive green building rating system into urban design practice might be difficult, but some partial ideas of green building concept such as solar panel installation, green roof, and building materials can be good policies of sustainable area development.

In relation to the discussion of group installation and individual installation, some of green building concepts such as waste water treatment could be more efficient and thus sustainable by managing them in neighborhood-base rather than by single buildings.

3.3. Policies related to streets

- **Policy of walk-able neighborhood (cycling)**

The idea of walk-able neighborhood is a very comprehensive concept that contributes to sustainable environment in many different levels. The concept aimed at very fundamental restructuring of existing urban form and life style that we have formulated since the postwar period. In specific terms, the concept rejects 'urban sprawl' and 'functional zoning', and seeks alternative urban form and land use pattern, namely, 'compact city' and 'mixed land use'.

The concept of walk-able neighborhood achieves proximity of living and working, which replaces preceding life style of commuting from suburbs to urban area by individuals' automobile. A neighborhood will be designed in the way that residents are able to access to local shopping area, leisure facilities, local schools, and so forth by walking or cycling. Residents are also able to access to the transit hub easily for the sake of cross-town traveling.

Success of walk-able neighborhood requires firstly a better transit network throughout the city, which assure efficient and comfortable traveling in the city without relying on private automobiles. With focus on a neighborhood itself, better achievement of the concept is affected by, but not limited to: land use mix, street connectivity, residential density, access to mass transit, shade or sun in appropriate seasons, street furniture, and traffic volume and speed.

The walk-able neighborhood as well as its consequent compact urban form contributes to environmental sustainability by promoting efficient use of infrastructure, reduction of energy consumption from daily traveling, and encouragement of use of public transportation. The concept, in views of economical and social sustainability, also promotes vibrant commercial activities and livable street life around the neighborhood.

- **Improvement of accessibility to the public transportation hub**
- **Introduction of pedestrian-only streets**
- **Introduction of street trees, street furniture, and public art**

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Those policies listed above as sustainable intervention to streets are all aimed at creating livable and well-functioning walk-able neighborhood. They can be assessed by simple indicators such as; 'the number of population living within 400 meter walking distance from the public transportation hub', 'the total length of pedestrian-only streets in an area', and 'number of items (street tree, street furniture, and public art)'.

3.4. Policies related to public open space

- **Policy to provide adequate and various public open space**

It is no doubt that public open space should be adequately provided because of the ever growing population and ever worsening environmental problems in many cities and regions. But land resource is too scarce for public open space, especially in high density area like CBD. To solve this problem, many cities and regions adopt the policy that new developments are able to gain certain times of floor area as a bonus for the provision of public open space. This kind of policy helps to increase the area of public open space in high density district. Hence the heat island effect can be reduced, and more social interaction in public open space can be encouraged.

Various provision of public open space is also important. People are of different ages, classes, cultures, and abilities. Sustainable design of public open space should be able to satisfy the needs of diverse people. In Australia, under the national guideline for urban design, many cities have their own strategies for providing assorted public open space. Like developing a system to identify the size, location, theme, etc, to make sure that the community has adequate combination of public open space.

- **Policy of designing accessible public open space**

Not all the public open space is really public because the access for people to visually see it and physically get there is blocked. In some cities or region, the waterfront is privatized by expensive residential development. This derives the public's right to enjoy the waterfront and becomes a negative force for sustainable urban design as it breaks the natural continuous corridor of coastline. In san Francisco Bay Area, where the coastline is a symbol of its character, have a policy to establish the a continuous shoreline band of about 100 feet wide to make sure the waterfront is truly accessible by common people.

- **Policy to promote green infrastructure**

Originated in 1990, green infrastructure arouses people's awareness about the importance of natural landscape of open space to sustainable urban design. The American green space designer Frederick

Law Olmsted once wrote, "No single parks, no matter how large and how well designed, would provide the citizens with the beneficial influences of nature." Green infrastructure's focal point of interconnected public open spaces is just what Mr. Olmsted wanted to say. Policy boosting well connected public open spaces can bring great promotion to sustainable urban design. The connection between public open spaces like green way, sidewalks, trails, linking parks can encourage people to walk and bike instead of driving to a public park from home and consequently consume less energy and emit less pollutant. Also, from social and economic perspectives, such linking public open spaces can buffer the impact and reduce the management cost of floods, storm water and transportation.

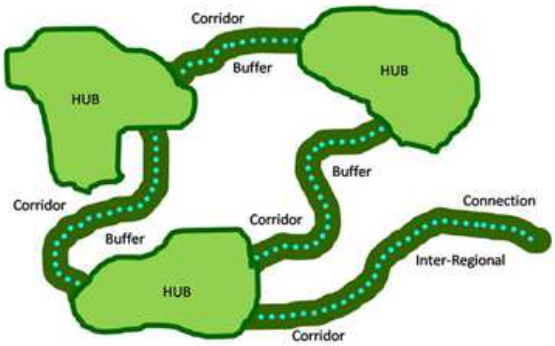

FIGURE 2 – GREEN INFRASTRUCTURE NETWORK

- **Policy of introducing permaculture to public open space**

Permaculture is a design concept for sustainable land use aroused in the 1960s. David Holmgren put it as:

> *A system for creating consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fiber and energy for provision of local needs. It is a vision of permanent (sustainable) human culture based on permanent (sustainable) agriculture.*

Introducing this method into public open space can make the place more intriguing and funny by providing edible and perennial plants like fruits trees, grapevines, berry bushes, etc. (Kazimee, 2002) This approach can also improve the landscape and streetscape because of the more diverse horticulture. It is a methods promoting sustainability in triple aspects. Environmentally, as part of the green structures, the vegetation is helpful to reduce urban heat, clean the air and conserve water resource; socially, permaculture attracts people to take part in the urban farming, hence the utilization rate of public open space is increased and social interaction can be encouraged; Economically, this approach assists localize the food provision which reduce the additional cost of food imports.

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3.5. Policies related to urban landscape

Sustainable urban landscape means more than just beauty. It needs to be low impact and be able to represent the character of a city.

- **Policy to promote low impact urban landscape design**

One of the policies that can promote low impact urban landscape design is the policy to urge Low Impact Development (LID). Low Impact Development is a holistic approach to manage storm water runoff. When storm water running on the unsustainable landscape of building roofs, sidewalks, etc, it will bring all the waste to the waterway, including animal waste. Landscape design with the assistance of low impact development can smartly avoid this from happening and remain the water source clean. Permeable pavement can be an example. This practice allows water to run around the materials. In North Carolina, US, serious of policies together stimulate the permeable paving approach, like "soils must have infiltration capacity of at least 0.52 in/hr permeability". By developing low impact landscape, the hazard causing by floods can be mitigated, the water resource can remain clean which is a must for public health.

FIGURE 3 – PERMEABLE PAVING

- **Policy to promote xeriscaping / water-conserved landscape / zeroscaping, etc.**

Different from landscaping, xeriscaping (alternative terms are water-conserved landscape, zeroscaping, drought-tolerant landscape, etc) has an emphasis on reducing water consumption in landscape irrigation by using plants which require less water or conserve water, like cactus, as well as other possible techniques. Policies promoting xeriscaping can maintain the beauty of landscape without wasting too much water. Confronting the climate change, xeriscaping can sustain the unforeseen droughts. Locating in the desert, the city of Denver, US, encourage xeriscape landscapes throughout the service area.

- **Policy of designing timeless urban landscape**

From social and cultural perspective, sustainable urban landscape should be timeless to represent the cities' characteristics. So the policies for preserving the historical environment are helpful to maintain

the original color of a community. However, conservation may be difficult because our environment is facing the challenge of climate change and urbanization. Not to mention the man-made and natural disasters which unexpectedly bring deadly effects to the landscape. As a result, the renovation and restoration policy of urban landscape is crucial for the landscape to sustain socio-economic changes and natural challenges. Take Kobe as an example. The city had been rebuilt for several times throughout the urbanization history because of economic expansion and earthquakes. But the landscape of Kobe has not changed too much as it can coordinate the new development with the old built environment through its urban landscape policies.

Outdoor advertisement control policy can also prevent the landscape character from distorted by incompatible appendages. When we walk along the streets in Hong Kong, what we see are not the building façade, but the giant advertisements. Those outdoor advertisements not only cover the real landscape, but some of them also are energy consuming, like flashing light advertisement. Controlling the size, location, materials and so on of these outdoor advertisements can help the city to stay what it is and reduce the use of energy like electricity.

3.6. Policies related to transport

- **Policy of designing or re-designing on-street parking areas**

In many cities, on-street parking is a very serious yet extensive problem which slows down the vehicular flow and leads to congestions, especially in places around the central business district (CBD) at peak hours. However, the problem does not only occur in the abovementioned situation, but it also occurs in areas which people go for entertainment, like Lan Kwai Fong in Hong Kong and Northbridge in Perth. Therefore, designing or re-designing designated areas for the imposition of on-street parking bans for both commercial and entertainment situations are necessary.

FIGURE 4 – ON-STREET PARKING

By designing or redesigning on-street parking areas, it is expected that congestion problem which leads to air pollution and wastage of fuels, such as petroleum, diesel and natural gases, can be eliminated.

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Also, in a social point of view, re-designing of such on-street parking spaces can increase the vibrancy of the vehicular flow and discourage pedestrians to jaywalk. Consequently, the risks of jaywalking accidents can be reduced and road safety can be enhanced.

The effectiveness of the policy can be indicated by 'the number of vehicles travelling on the particular road per hour in originally congested time' and 'users' satisfaction through questionnaires from drivers, pedestrians and shop owners on the two sides of the streets, which are indicators to reflect the vehicular flow and road user satisfaction respectively.

- **Designing of "Idle-Free Quiet Zones"**

In order to achieve sustainability in transport aspect, transport safety should be taken care of, and 'design for safety' should be of utmost important leading to transport safety. Therefore, designing "Idle-free Quiet Zones" for long-working-hour drivers to take rests is very important upon transport sustainability.

By designing designated points or stops, which require vehicles to switch off the engines, for drivers of public transport vehicles and logistic trucks, not only can it enhance transport safety, but it can eliminate the idling problem, lessen energy uses, save fossil fuels, reduce greenhouse gas emissions and improve air conditions. Also, with the drivers gathering together and stopping their vehicles in designated places, the commercial activities can be boosted with bigger influx and eliminated noise as "idle-free quiet zones" require switching off of engines and the low-frequency rumble generated by the engines can be eliminated.

The effect of this measure can be evaluated by 'the number of traffic accident rates relating to public transport vehicles and logistic trucks' and 'air pollution indices of the quiet zones before and after the implementation of the policy'.

- **Introduction of Underground Highway**

One of the key highlights in sustainable urban design is highway design in the city. As highways and roadways actually take up a lot of land on the ground level, more and more governments have introduced the policy to build underground highway to replace the originally on-ground roadways, no matter through re-construction, re-routing or expansion of major roads.

The Boston government has implemented the policy by designing and undergoing the Big Dig project, which was officially names as the Central artery/Tunnel Project (CA/T) to reroute the Central Artery (Interstate 93). The project includes the design of two underground highways, which includes a 5.6-

kilometer long underground highway as the new Interstate 93 and a new tunnel to the Logan International Airport respectively.

FIGURE 5 – UNDERGROUND HIGHWAY

Though it is costly to design and construct, by putting the highways underground, more land can be used alternatively, as public parks, cultural corridors and recreational grounds. Ecologically, as wider roads can be constructed underground, the congestion problem can be improved. As a result, less gas is emitted and thus more fossil fuels are saved.

- **Policy of designing Greenways**

In the context of sustainable urban design, it is excellent to have either a set of connected parks, country parks and public spaces in the urban city to maintain a pleasant and green environment for the citizens living in the urban area.

Some concepts derived from greenways, for example tree-planting along the roads or green buffer zones on one side of the roads, are usually adopted by urban designers to include more green elements into the transport infrastructure. Such a long piece of land used for pedestrian walking, cycling, relaxation and recreation can either be provided upon an urban plan or generated from the rerouting former railway or highway on the ground level.

FIGURE 6 – GREENWAYS

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Apart from the fact that greenways can act as the 'green lung' of the area, it can also enhance social interactions between citizens, especially the elderly people as they can gather, walk and take a rest in the greenway. Furthermore, it can act as a famous and impressive vista in the city.

- **Policy of discouraging highway design along the waterfront**

A government can prevent the design of waterfront highway by imposing guidelines or even ordinances, such as including it into *Protection of the Harbour Ordinance*. By prohibiting the design of coastal roadways, the waterfront/riverside can be used for alternative purposes which can enable the public to access and enjoy the waterside without the need of owning and driving a vehicle along the waterfront highway.

Also, as waterfront able to be accessed by the public is a good place for the nurture of cultural inspiration and enhancement of cultural exchanges among different artists, street performers and various people from the cultural circles. Additionally, the policy also helps in achieving environmental sustainability as it improves water quality as soluble particulates generated by vehicles running on waterfront highways are eliminated from dissolving into the sea water.

The effectiveness of implementing this policy to discourage waterfront highway can be assessed by the measured water quality of the nearby water and the percentage of coastline being used as publicly accessible areas, such as public parks, promenades and esplanades.

- **Extensive designation of Promenade**

With a policy to discourage the designing of waterfront highways, it is also important to have supporting policies to design more promenades along the seashores and riversides.

FIGURE 6 – PROMENADE

Citizens and residents of the city can either walk or ride on bikes to promenade and travel along the waterfront while motoring vehicles are prohibited to run along the promenades. By establishing or designing more promenades, and making promenades easier to be accessible by cycling and walking

from nearby public transportation hub, the waterfront can be utilized and enjoyed by the general public. On the other hand, promenades can also become hotspots to promote tourism and the businesses along the promenade can be benefited to achieve economic sustainability.

- **Designing more lanes/roads for public transport and High Occupancy Vehicle lanes**

In order to encourage public transport and reduce total emission of gases on the roads, in the urban design context, more exclusive lanes and roads should be designed for public transport, such as bus-only lanes. Many cities, including Hong Kong, have already implemented the bus-only lane system in highways at peak hours. However, not all systems in the cities are comprehensive enough to prevent public-transport-led congestion on roads. People living in the city may switch back to ride on their private cars rather than taking public transport if riding on public transport needs a great deal of queuing or waiting time, or the routes of public transport are so poorly planned that congestions occur frequently. As more bus-only lanes can provide exclusive use for public transport and reduce the chances of being stuck in congestions, designing a more extensive and sophisticated bus-lane system can effectively enhance efficiency of public vehicles, prevent social inconvenience and induced anxiety of citizens, encourage public transport, save fossil fuels and improve air conditions.

Moreover, the concept of High Occupancy Vehicle (HOV) Lanes can also be adopted to tackle congestion problem. The HOV lane policy, allowing only vehicles carrying two or more persons per vehicle to use the roads, have been designed and adopted in various countries, like the United States, Spain, Australia, New Zealand and the United Kingdom.

FIGURE 7 – HIGH OCCUPANCY VEHICLE LANES

It has been proven very successful in discouraging one-man-car drivers to drive on the roads and reducing accident rate. Some car owners even organize carpooling system via the internet to pick up passengers nearby in order to fulfill the requirement of using the HOV lanes. In conclusion, designing HOV lanes in roadways and the induced act of the road users can help achieving sustainable development, ecologically, economically and socially.

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4. RELEVANT LESSONS FOR HONG KONG

In the following paragraphs, we are going to illustrate some ideas which we think should be implemented in Hong Kong in order to make the city more sustainable by implementing policies in the context of urban design.

First of all, it is suggested that upon the design of new towns in Hong Kong, the policy of having walk-able neighborhood should be adopted in order to discourage the use of motoring vehicles when commuting around the new town community territory.

Furthermore, for both developed and developing new towns, it is recommended to design safe and sophisticated cycling networks within the new towns, or even from the new town to nearby districts, to promote cycling as their desired mean of transport. The policies of walk-able neighborhood and cycling community can be facilitated by designing wider pedestrian sidewalks and introducing public biking system by the government.

FIGURE 8 – CYCLING NETWORKS

Next, it is highly recommended for the HKSAR Government to redesign the use of streets and public spaces in a way which can improve accessibility, community connections and social interactions. It is suggested that greening of public open spaces and promotion of street performance and public art in the open spaces can utilize the open spaces in an environmentally, economically and socially sustainable manner. The Government can facilitate the implementation by providing some pedestrian-only streets for extra public spaces, acting as a coordinator to bring in cultural artists and plan for the spaces of these people, designing the settings of street furniture and sculptures, and designing paths for tourists to walk through.

Another immediate urban design issue which has to be tackled by the government is the way how to conserve the urban environment upon redevelopment and revitalization.

FIGURE 9 – IMMEDIATE NEIGHBORHOOD

The urban landscape and environment should be taken care of by controlling development height and density to fit into the 'immediate neighborhood' and designing or preserving the buildings in the community to keep the sense of community and sense of belonging to the old districts in Hong Kong. Design of the buildings, decision of the new building use and preservation of building elements are very crucial aspects which the government should have an eye on in the urban design context.

Moving to a broader view on urban design, it is suggested that underground highways should be introduced in the transport design in the urban areas in order to make more rooms for alternative uses, such as recreational uses, public open spaces and greenways. The HKSAR Government can provide guidelines to the Transport Department and the relevant design departments to assess on the possibility to put highways underground or on the seabed level to conserve the seashore and urban landscape, as well as to enable the public to promenade along the waterfront, especially the harbor front of the Victoria Harbor. Finally, after the analysis of the overseas example, it is strongly advised for the Government to provide green infrastructures and greenways along the roadways. With designing some low impact development elements into the green spaces along the roads, the environment can be further enhanced and flooding can be prevented to achieve a better landscape and urban environment for the citizens.

The abovementioned policies are only the crucial steps which we believe are effective in achieving sustainable development in the urban design perspective. As developing sustainable urban design is a long-term issue which has to be done with persistence over decades, the policies mentioned are just the initiative steps to achieve ecological, economical and social sustainability.

REFERENCES

Ammons, D. (2007), *Seattle Voters Say "NO!" to Rebuilding Waterfront Highway*, The Campaign for a Free & Clear Lakefront, retrieved October 18, 2011 from <http://foreverfreeandclear.org/node/3669>.

Apple Daily (2009), *82-km Cycling Track around the New Territories costs HK$2.2 billions*, retrieved October 18, 2011 from

<http://hk.apple.nextmedia.com/template/apple/art_main.php?iss_id=20090422&sec_id=4104&subsec=11867&art_id=12667063>.

Blog City (2010), *Desolate Wedding Card Street*, retrieved October 27, 2011 from <http://blogcity.me/blog/reply_blog_express.asp?f=4XBWIJ7NSK59805&id=164479&catID=&keyword=&searchtype>.

Boston by foot (2010), *The Rose Fitzgerald Kennedy Greenway*, retrieved October 27, 2011 from <http://www.bostonbyfoot.org/tours/Rose_Kennedy_Greenway>.

Carmona, M., Magalhães, C. and Hammond, L. (2008), *Public Space: the Management Dimension*, London: Routledge.

Danish Architecture Centre (2008), *Madrid: Changing Behavior towards Sustainable Transportation*, retrieved October 18, 2011 from <http://sustainablecities.dk/en/city-projects/cases/madrid-changing-behaviour-towards-sustainable-transportation>.

Dutton, J.A. (2000), *New American urbanism: re-forming the suburban metropolis*, Milano: Skira.

Farr, D. (2008), *Sustainable Urbanism: Urban design with nature*, Hoboken: John Wiley & Sons, Inc.

Geough, U. M., Newman, D. and Wrobel, J. (n.d.), *Model for Sustainable Urban Design with Expanded Sections on Distributed Energy Resource,* Sustainable Energy Planning Office Gas Technology Institute, retrieved September 18, 2011 from <http://www.necsc.us/docs/ORNL_Design_Final.pdf>.

Holmgren, D. (2002), *Permaculture Principles and Pathways beyond Sustainability,* Hepburn Victoria: Holmgren Design Services.

Jerke, D., Porter, D.R. and Lassar, T.J. (2008), *Urban Design and the Bottom Line,* Washington D.C.: Urban Land Institute.

Kazimee, B.A. (2002), *Sustainable Urban Design Paradigm: Twenty Five Simple Things to Do to Make an Urban Neighborhood Sustainable*, In: Brebbia, J.F. et al. (ed.) *The Sustainable City II: Urban Regeneration and Sustainability*, Southampton: WIT, pp 31-42.

Kwan, J. and Varaiya, P. (2005), *Effectiveness of High Occupancy Vehicle (HOV) Lanes in the San Francisco Bay Area*, retrieved October 26, 2011 from <http://paleale.eecs.berkeley.edu/~varaiya/papers_ps.dir/HOV.pdf>.

Lamb, H. (2011), *On July 21, Sustainable Development Explained*, retrieved May 05, 2012 from <http://gulagbound.com/18048/sustainable-development-explained/>.

Leblanc, S. (2007), *On December 31, It's Official: Boston's Big Dig Will be Done,* The Washington Post, retrieved October 26, 2011 from <http://www.washingtonpost.com/wpdyn/content/article/2007/12/25/AR2007122500600.html?nav=hcmoduletmv>.

Lee, M. (2001), *Meditations on the Point*, retrieved October 26, 2011 from <http://www.visuallee.com/weblog/2001_04_01_archive.html>.

Martokusumo, W. (2006), *Sustainable Urban Design Revisited,* Environmental Technology and Management Conference held at the Bandung, West Java, Indonesia, retrieved September 20, 2011 from <http://www.ar.itb.ac.id/pa/wp-content/uploads/2009/03/sustainable-urban-design-revisited.pdf>.

Massachusetts Department of Transportation (2010), *The Central Artery/Tunnel Project – The Big Dig – Project Background,* retrieved October 28, 2011 from <http://www.massdot.state.ma.us/Highway/bigdig/projectbkg.aspx>.

Metropolitan Transportation Authority (2010), *NYC Bus Rapid Transit Project,* retrieved October 28, 2011 from <http://www.mta.info/mta/planning/sbs/whatis.htm>.

Natural Resources Canads (2009), *Idle-Free Zone for Commercial Vehicles,* retrieved October 18, 2011 from <http://oee.nrcan.gc.ca/transportation/business/idling/truck-stop-idle-free-zone.cfm?attr=16>.

Perthnow (2010), *Revellers Ignore Northbridge Entertainment District Parking Ban*, retrieved October 18, 2011 from <http://www.perthnow.com.au/news/western-australia/revellers-ignore-northbridge-parking-ban/story-e6frg13u-1225837613828>.

Polèse, M. and Stren, R. (ed.) (2000), *The Social Sustainability of Cities: Diversity and the Management of Change*, Toronto: University of Toronto Press.

Robbins, E. (2004), New Urbanism, In: Robbins, E. & El-Khoury, R. (ed.) *Shaping the City: Studies in History, Theory and Urban Design*, New York; London: Routledge.

Schwietzke, R. (2005), *Interstate 93 Tunnel in Boston, Part of the Big Dig,* retrieved October 18, 2011 from <http://www.flickr.com/photos/rene-germany/15571970/>.

The Congress for the New Urbanism (n.d.), retrieved October 21, 2011 from <http://www.cnu.org/>.

Thomson, C. (2010), *Parking Ban for Northbridge Party Nights,* WAToday, retrieved October 28, 2011 from <http://www.watoday.com.au/wa-news/parking-ban-for-northbridge-party-nights-20100122-mpmp.html>.

UN documents (1987), *Our Common Future, Chapter 2: Towards Sustainable Development,* retrieved September 15, 2011 from <http://www.un-documents.net/ocf-02.htm>.

United Nations (1983), *Process of Preparation of the Environmental Perspective to the Year 2000 and Beyond General Assembly Resolution 38/161*, retrieved September 15, 2011 from <http://www.un.org/documents/ga/res/38/a38r161.htm>.

Wikipedia (n.d.), *New Urbanism*, retrieved October 21, 2011 from <http://en.wikipedia.org/wiki/New_Urbanism>.

Wikipedia (n.d.), *Permaculture*, retrieved October 14, 2011 from <http://en.wikipedia.org/wiki/Permaculture>.

Wikipedia (n.d.), *Permeable Paving*, retrieved October 13, 2011 from <http://en.wikipedia.org/wiki/Permeable_paving>.

Wikipedia (n.d.), *Walkability*, retrieved October 21, 2011 from <http://en.wikipedia.org/wiki/Walkability>.

Wikipedia (n.d.), *Xeriscaping*, retrieved October 15, 2011 from <http://en.wikipedia.org/wiki/Xeriscaping>.