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<b>Author(s)</b>	<b>Ma, Kin-wing; 馬建榮</b>
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**DISSERTATION**

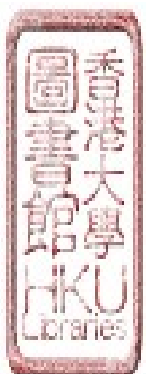
**A study of Hong Kong reclamation policy and its environmental  
impact**

submitted by

**Ma Kin Wing**

A dissertation submitted in partial fulfillment of the requirement for  
the Degree of Master of Science in Environmental Management  
at The University of Hong Kong

**May 2014**



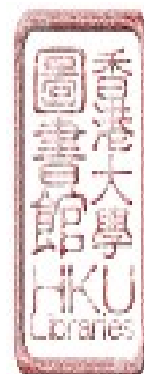
## DECLARATION

I declare that this dissertation represents my own work conducted for the purposes of this Msc in Environmental Management programme. All significant data of analysis used in this dissertation from other sources has clearly been identified as such. The dissertation has not been previously included in a thesis, dissertation or report submitted to the University or to any other institution for a degree, diploma or other qualifications.



Signed: \_\_\_\_\_

Ma Kin Wing (Date): 29- May-2014

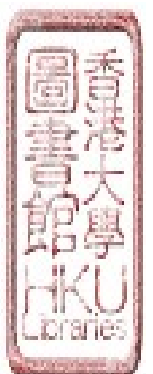


## ABSTRACT

Reclamation plays an important role in land supply of Hong Kong in various parts of territory to meet the demand for business, housing, infrastructural facilities, and ever increasing populations. Since 1852, Hong Kong has successfully expanded 6,824 hectares of the land since the first reclamation project, with about 6% of land in Hong Kong came from reclamation. Major reclamation projects in Hong Kong included Victoria Harbour Reclamation, Hong Kong International Airport Core Development Programme, and the present largest infrastructural facilities Hong Kong-Zhuhai-Macau Bridge. The government policy for reclamation in the colonial period was regarded as executive-led and lack of public participation. The situation has a significant change after the resumption of sovereignty by China in 1997. Public engagement, such as district forum has been the usual practice for the government to involve the public in reclamation and planning projects. Environmental issues brought by reclamation include the release of contaminants from dredging process, disruption of marine environment and ecosystem, polluting the surrounding water and air, and irreversible damage on the coastline and harbour. The study aims at (1) examining the reason for Hong Kong being so dependent on reclaiming land to increase the land supply for development; and the policy making and implementation process in the Hong Kong Government before and after 1997 in face of the changing political environment; (2) describing the major reclamation projects in the Hong Kong history; (3) studying the environmental impact brought by reclamation in Hong Kong and the related law and governing ordinances; and (4) suggesting alternative ways to increase the land supply in Hong Kong in the near future under the concept of sustainable development. It is concluded that reclamation will still be the easiest option adopted by the government to obtain land resources outside the Victoria Harbour. Community



based urban planning should be continued in land use planning policy for allowing people to engage in the process so that harmonious and sustainability can be achieved.

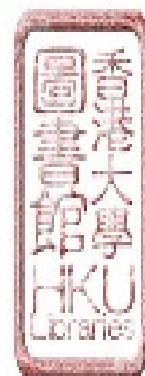


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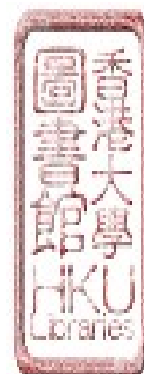
I would also like to express my hearty thanks to all my teachers from the School of Biological Sciences, Kadoorie Institute, Faculty of Law and Engineering for their teaching and guidance.

Last but not least, I would like to thank my girlfriend, Natalie Au, for her love and encouragement during the entire period of my study.



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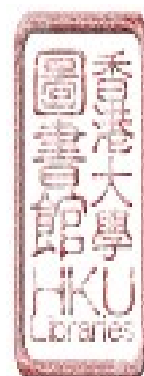
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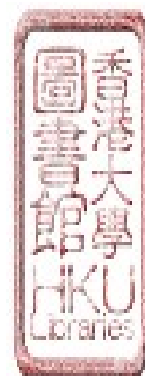
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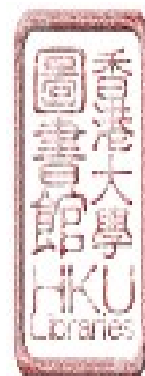


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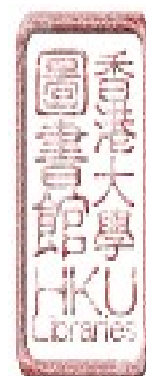
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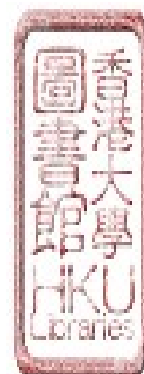
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## LIST OF ABBREVIATIONS

ADSCOM	Airport Development Sub Committee
CBD	Central Business District
EIA	Environmental Impact Assessment
EIAO	Environment Impact Assessment Ordinance
HKAQO	Hong Kong Air Quality Objectives
HKPSG	Hong Kong Planning Standard and Guidelines
LDC	Land Development Policy Committee
LECL	Lower Chemical Exceedance Level
MILU	Multiple Intensive Land Use
NDA	New Development Area
NIMBY	Not-in-my-back-yard
PADS	Port and Airport Development Strategy
PAHs	Polycyclic aromatic hydrocarbons
PBDEs	Polybrominated diphenyl ethers
PCBs	Polychlorinated diphenyls
PCDDs	Polychlorinated dibenzodioxins
PERT	Programme Evaluation and Review Technique
PHO	Protection of the Harbour Ordinance
SHP	Small House Policy
SHRUG	Study on Harbour Reclamations and Urban Growth
SO <sub>2</sub>	Sulphur dioxide
SPH	Society for the Protection Harbour
TAPs	Toxic Air Pollutants
TBT	tributyltin
TDS	Territorial Development Strategy
UCEL	Upper Chemical Exceedance Level
URA	Urban Development Authority



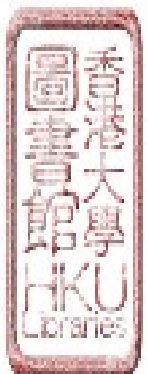
# CHAPTER 1

## INTRODUCTION

Hong Kong has a huge population of 7 million and is featured by its hilly geographical location, so there is always shortage of land supply for housing and development. For the ever increasing population, land reclamation has been the most prominent strategy for the Hong Kong Government to boost the land resources. Since 1852, Hong Kong has successfully expanded more than 6,824 hectares of land in the first reclamation project (Legislative Council Panel on Development, 2011).

Before the 1980s, protests against sea reclamation and environmental protection campaigns were not popular among the public. Reclamation works could be easily carried out by government departments and several reclamation projects had been implemented. In the mid-1980s to 1990s, the West Kowloon, Central-Wan Chai and airport core reclamation programmes were the projects of top priority.

Starting from the 1990s, several reclamation projects were carried out continuously to meet the need of infrastructure development and economic growth. The Airport Core Programme involved the formation of 1,669 hectares of land for the new airport and Tung Chung New Town. On the other hand, the awareness of preserving the Victoria Harbour amongst people in Hong Kong began to rise. The Planning Department launched a new round of reclamation in the area between the Hong Kong-Macau Ferry Pier in Sheung Wan and the Typhoon Shelter in Causeway Bay. The Central Reclamation Phase 1 and 2 and Wan Chai Reclamation Phase 1 reclaimed a total of 32.3 hectares of land. The Wan Chai Reclamation Phase 2 originally involved the

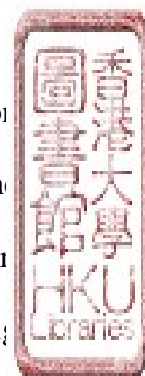


reclamation of 48 hectares of land along the waterfront for infrastructure, residential housing and development of hotels. Restricted by the Protection Harbour Ordinance (Cap.531) enacted on 30 June 1997, the Wan Chai Phase 2 and Central Phase 3 works were forced to downsize the reclamation scale to 28.5 hectares and 18 hectares respectively.

After the handover of Hong Kong to China, there has been growing opposition to sea reclamation in Hong Kong. In October 1999, the former Chief Executive, Tung Chee-hwa planned to follow the ‘Principle of Sustainable Development’ and downsize the reclamation plan in response to the environmental concern of the public. On 9<sup>th</sup> January 2004, the Court of Final Appeal approved the Protection Harbour Ordinance and also listed 3 principles which have profound impact on the reclamation project in Hong Kong (Harbour-front Enhancement Committee, 2004). The Hong Kong Government also set up the Harbour-front Enhancement Committee to give advice on the policies related to Victoria Harbour Reclamation and engage the views of different stakeholders.

Apart from Victoria Harbour Reclamation to increase the land supply, the government has changed the strategy to reclaim land outside Victoria Harbour due to the strong public aspiration of protecting it as a natural heritage and the enactment of the Harbour Ordinance.

The general public and environmentalists have generally opposed the reclamation projects carried out both around or outside the Victoria Harbour because all the projects works involve destruction of the harbour and environment. However, reclamation is still unavoidable for the limited land resources and ever-increasing



populations in coming years.

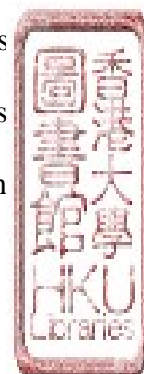
In view of the arguments in reclamation, the reclamation projects and policies in Hong Kong will be analysed in this study and its impact on the environment regarding different aspects will also be discussed.

## **1.1 AIMS AND OBJECTIVES**

The objectives of this study are to analyse the government policy formulation process on land reclamation, and to identify the major factors and decision criteria. The study will put more emphasis on the policy formulation process and implementation because they determine how to control the land use and planning and it has always been a controversial topic in Hong Kong. Also, the objectives of my study are to analyse the current environmental impact of land reclamation and suggest possible measures to solve the land use problems except the last resort to reclamation.

## **1.2 METHODOLOGY**

The study is based on the documentary research methodology which involves collecting data and information from relevant academic papers, reports, books government surveys and published statistics. Also, information about the latest reclamation policies will be collected from the government departments and non governmental organizations.



## **CHAPTER 2**

# **RATIONALE FOR HONG KONG TO BE DEPENDENT ON RECLAMING LAND TO INCREASE LAND SUPPLY FOR DEVELOPMENT**

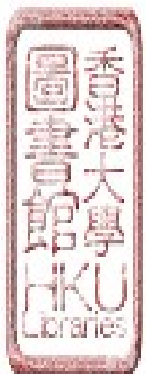
In this dissertation, it is very important to examine the reason for Hong Kong being so dependent on reclaiming land to provide the land for development in the past and continuous to be an important option in government policy to boost the land supply for development. The main reasons are described briefly as follows:

### **(1) Geographical characteristics and land:**

Hong Kong has a large number of steep hills, islands and lowland areas are rather limited. As a result, this greatly limits the supply of developable land, and only less than 25% of the land in Hong Kong is zoned for development. Urban land is extremely valuable (Ng, 2011). Historically, Hong Kong had to be self sufficient, large reserves of land had to be kept for recreation, agriculture, and other water catchment areas. Land usage in Hong Kong – woodland, grassland, and wetland covered 66.6% (Planning Department, 2012).

### **(2) Huge and ever increasing population:**

Hong Kong population has reached more than 7 million in 2011, with 7,071,576 (Census and Statistics Department, 2011). Hong Kong Government projection of resident population is estimated to reach 8.47 million by mid-2041 (Census and Statistics Department, 2012).

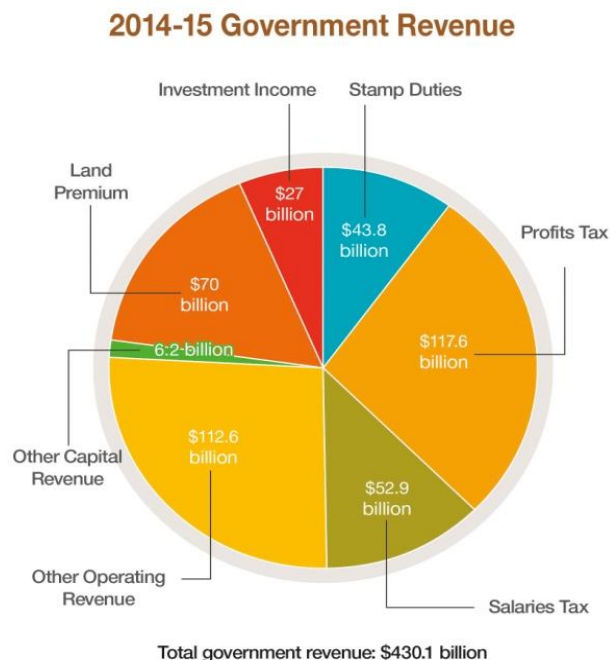




(3) Hong Kong Government depends on land sales revenue policy:

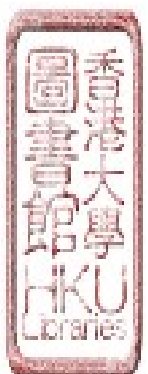
The Government generates the majority of its land revenue from initial leases. In order to extract the maximum revenue from land development, about 75% land-lease revenue comes from initial auctions and grants (Ng, 2006). In 2014-2015 Government budget revenue, land premium is the third largest source of revenue, amounting 70 billion, after profit tax and other operating revenue.

**Figure 1: 2014-15 Government Revenue (Sources: Hong Kong Government, 2014)**

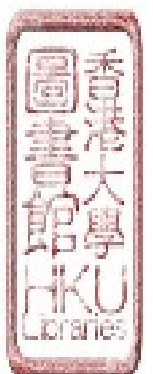


(4) Reclamation is considered as an important option to obtain land resources

Based on the recent study of “Enhancing Land Supply Strategy”, six land supply options are considered by the government to expand the land supply in Hong Kong, including land rezoning, land resumption, redevelopment, reuse ex-quarry sites, rock cavern development, and reclamation. However, the government has regarded rezoning, redevelopment, and land resumption as challenging as it involves long process, and will trigger local resentment (Civil Engineering and Development Department and Planning Department, 2013). Financial Secretary John Tsang



recently made it clear that land reclamation will still be an option as land reclamation is efficient, relatively cheaper (as compensation to the indigenous residents is not needed) and can be used for designated purposes. The government has the full right to use reclaimed land (China Daily, 2014).

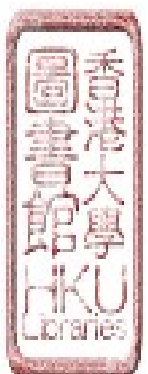


## CHAPTER 3 ANALYTICAL FRAMEWORK OF PUBLIC POLICY FORMULATION

Before going into the details, it is necessary to have clearly defined the term ‘public policy’ and to identify different model types relating how the reclamation policy of Hong Kong has been formulated and implemented.

The term “public policy” covers different and very broad aspects of our lives. It may include a government decision, a government activity, or a specific proposal to achieve certain goals in a society. There are different academic definitions of the term ‘public policy’. Hogwood and Gunn (1984) defined policy as “series of more specific decision, sometimes in a rational sequence and is typically generated by interactions among many, more or less consciously related, decisions”. From the above definitions, it can be understood that the aim of policymaking is to solve social problems by government decisions but policymaking is a complex and far-reaching process that involves many individuals, groups and institutions. The land reclamation policy is no exception subject to complex process and involves a large number of legislative and administrative activities aimed at resolution of real problems. Koeing (1986) defines public policy as “consisting of legislation, executive orders, rules, and regulations, which are formal articulations of decisions and programs. All are statements of governmental intention that direct the activities undertaken for their effectuation”. Knoepfel et al. (2007) defines public policy as “to resolve a public problem that is identified as such on the governmental agenda”.

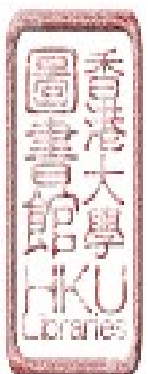
Apart from investigating on how scholars define public policy, Theodoulou and Cahill (1995) generalized the important elements of public policy that are presented in most of the definitions. Firstly, it is necessary to distinguish between what government



intend to do and what they actually do, regarding the importance of governmental inactivity. Secondly, public policy is associated with the government in all levels. Both formal and informal factors are equally important. Thirdly, public policy should be pervasive and not confined to legislation, orders execution, rules and regulations. Fourth, public policy is an intentional course of action which encompasses its goals and objectives. Finally, public policy is an ongoing process with subsequent actions of implementation, enforcement and evaluation.

The above definitions provide different conceptual meanings of public policy and it should be further explored and analyzed in order to have better understanding. In this dissertation, it is important to point out the role of public policy facilitates and analyse the policy making process. Resources are scarce in our society and public policy serves as a resolution to distribute the conflicting claims on these resources. Thus, policy does provide direct benefits to citizens. Theodoulou and Cahn (1995) stated that studying public policy allows for an overview of the workings of the whole political system, including a concern with political institutions and the informal elements of the political process, such as interest groups and public opinions. Also, the future problems will be handled in a more efficient and rational manner because the process of formulating and implementing new policies will be more effective and appropriate.

With clear definitions of public policy, it is easier to explain how it can be used to solve public problems. Knoepfel et al. (2007) based his discussion on the theory of Gusfield (1981). He stated a clear distinction between ‘social problems’ and ‘public problems’. The difference is public problems representing an extension of social problems that are debated within an emerging political agenda. In the context of land reclamation, it is first emerging from a social problem because there are insufficient spaces for



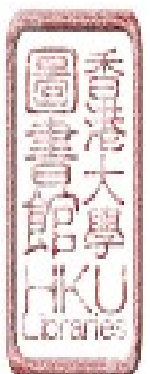
housing and urban development arising from geographical constraint increasing population in Hong Kong. However, the effect of land reclamation is broad and involves different interests of the public. The controversy lies on “how and where to find extra lands for development”. The solution to the problem has become policy problems as it is already subject to governmental remedy and on the political agenda. It is suggested that Knoepfel’s framework of public problems and public policy can be used to explain the land reclamation and land development.

There are numerous definitions and meanings associated with the term of ‘public policy’. In this dissertation, Knoepfel’s framework of public policy, which is regarded as the academic basis, will be used to explain the framework of public problems and public policy. Knoepfel et al. (2007) identified the three elements as regards to define a problem of public as:

- (1) The constitution of a demand arising from social groups
- (2) The development of a controversy or public debate
- (3) The existence of a conflict between organised social groups and political authorities

Based on the public policy framework of Knoepfel, when a public problem exists, it will be transferred from the social sphere to public sphere throughout the policy process which is divided into the following stages:

- (1) Emergence and perception of problem
- (2) Agenda- setting phase
- (3) Policy formulation
- (4) Policy implementation



## (5) Policy evaluation

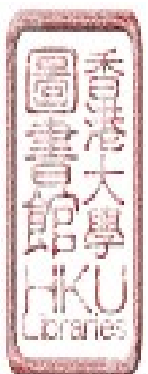
The agenda-setting arises from a significant number of social problems exist which draw the attention of governmental officials in the means by which those officials learn about conditions. Knoepfel et al. (2007) stated that the emergence and perception of problem involves a problem or situation which calls for the government's solution from the collective need of the public. Agenda-setting phase could be considered as a process for the filtering of problems. Policy implementation includes all activities and administrative decisions that are undertaken by appropriate government agencies in order to convert new laws and programs into practice. The policy implementation stage will influence the actual policy outcome if a policy is not put into effect or executed and controlled inefficiently. Policy evaluation involves programme delivery monitoring and evaluation of its success. It is important to collect information about the policy goals being met and provide information which can be used for future policy-making.

## 3.1 CONSTITUENT ELEMENTS OF A PUBLIC POLICY

The complex process of public policy formulation makes it necessary for us to understand the constituent elements of a public policy. Knoepfel et al. (2007) stated that the constituent elements of a public policy comprise the followings:-

### (1) A solution to a public problem

The purpose of a public policy is to resolve a social problem that are politically recognized and serve as a channel to communicate between the authority and



different sectors of the public. This element is defined when there is a socially unsatisfactory situation in which the resolution is subject to action by the public sector.

(2) The existence of target groups at the root of a public problem

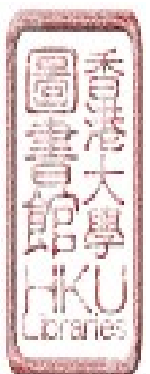
All public policy aims to solve a public problem of particular target groups by affecting the behavior of policy actors. The actors include political-administrative actors who are vested with public authority, the actors whose behavior is politically defined as the indirect cause of a problem, the end beneficiaries of a policy, and the third party groups who are indirectly affected by the policy.

(3) Intentional coherence

A public policy is created with a given direction and the decisions or actions taken are connected. A public policy should not be a coincidence of measures aims at same target groups but should be taken and connected to each other with legislator's intention to solve the problems that have already been identified in specific fields. In other words, it should have clear policy goals to solve the identified problems in a society.

(4) The existence of several decisions and activities

A public policy is characterized by a group of actions that go beyond the level of the single or particular decision but fall short of a "general social movement". As mentioned previously, a public problem is accompanied by the identification of social groups followed by government's legislation and its application. Thus public policies are collective decisions and activities.



(5) Intervention Programme

A public policy should involve a group of decisions or programmes which are more concrete and specific. On the other hand, an intervention programme or a proposed plan that is specific to one or more authorities without outcome cannot be considered in itself as a public policy.

(6) The key role of public actors

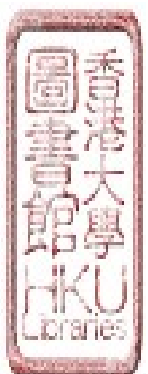
The decisions and actions taken by public or private actors can only be regarded as public policy when its involvement is belonged to the political-administrative system and on legal rule. If these criteria are not fulfilled, a group decision will be considered as 'corporative' or 'private policy'.

(7) Existence of formalised measures

A public policy aims to achieve goals and objectives which intend to affect the behaviours of groups or individuals. In this sense, a public policy assumes the existence of a concrete implementation phase for the measures decided on.

(8) Decisions and activities that impose constraints

Knoepfel et al. (2007) argued that the decisions made by political administrative or legitimate authority are less coercive in nature than in the past. Thus, many public interventions are currently implemented by means of contractual procedures between the state and public authorities.





### 3.2 THEORY OF POLICY FORMULATION

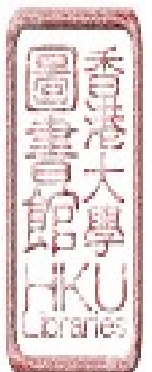
Political scientists attempt to provide a framework and model to simplify the social phenomenon in the study of public policy process. A problem arrives on the agenda does not mean that the government will ensure to resolve the problem effectively. Policy formulation is generally related to how a proposal or supportable course of action is adopted for dealing with problems. According to Theodoulou and Cahn (1995), policy formulation is a two-step process. First, it is a general decision to be made to deal with a problem. Second, it involves the drafted proposal and identified objectives to be adopted by decision makers or actors. In other words, “policy making” and “decision making” are closely related as certain provisions and decisions are to be adopted by various actors involved in the policy formulation process, including interest groups, legislators, various departments and executive branch.

In the subsequent paragraphs, the discussion of policy formulation will focus on the rational models which help us to understand the steps involved in making a decision.

#### **(A) Rational model**

Hogwood and Gunn (1984) mentioned Herbert Simon (1957a, 1957b, 1960) and Charles Lindblom (1959) are important scholars in the rational approach of policy analysis, and their approaches will be discussed in this paper.

Rational model of decision making is derived from economic concept of cost-benefit analysis in which policy makers consider values simultaneously with options and select out options design to fulfill those objectives. As to Simon’s ideal-type model, the



following are the important elements involved in rational policy-making:

(1) Information gathering

Rational policy makers usually identify all the present and potential problems as well as the opportunities relevant to its mission. In other words, it gathers all information before taking action.

(2) Identifying all options

In rational policy making process, all alternatives or options would be considered in response to a perceived problem or opportunity.

(3) Assessing the consequences of options

In Simon's rational model, the policy maker would identify all the costs and benefits of all policy options in order to know what would happen if certain policy option was to be adopted.

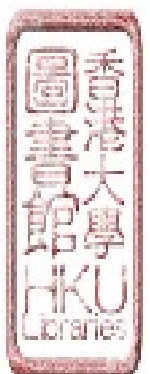
(4) Comparing and evaluating all the consequences

Simon's rationality is concerned with the evaluation of the consequences of policy options by attaching values and preferences to each policy's consequence.

(5) Choosing the preferred option

Having considered all the information, problems, opportunities, possible policy responses and consequences of policy options, the maximizing policy making process is able to be achieved by rational decision makers.

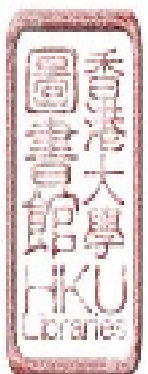
In Simon's model of rational policy making, he sets out the way of relating values to



the consequences of options but does not regard the importance of means-ends relationship method in public policy making because there are limitations of means-end scheme. Firstly, it is impossible to determine whether one policy choice is better or worse than another or even a policy maker does not know whether he has made a right choice if there are no prior values or objectives to judge his decisions. Secondly, it is impossible to separate the means from the ends in actual situation. In other words, policy makers usually set priorities in values or use the most appropriate means to achieve the desired ends in order to test whether it is a ‘good public policy’.

Compared with Herbert’s rational model, Lindblom (1959) set up an ideal-type model and rational decision making, which might be called the rational-comprehensive method. In Lindblom’s rational model of public policy, it includes the following characteristics in public policy formulation:

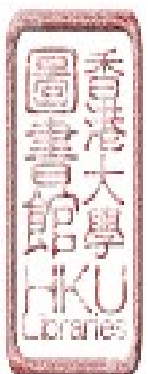
- (1) Values and objectives are well clarified and defined before analysing different policies (Problem identification)
- (2) The governing values and objectives are ranked by the policy-maker according to their importance
- (3) All relevant options or means of achieving these objectives are well identified
- (4) All consequences and costs of these options are evaluated
- (5) Compare the consequences of each option with other options



(6) Choose the option or combination of options which would maximize the value of decision maker

There are criticisms about the models of rational policy-making because it is unrealistic or impracticable. Firstly, it does not require policy makers to have perfect knowledge in the process of policy making and provide a blueprint for action in the assumption of rationality model. Moreover, the rationality models require the decision-maker to acquire a comprehensive understanding of knowledge at the present situation. However, there are many external and unpredictable factors, as well as limitation on human intellectual capacity which may affect the anticipated consequences of the future situation are not taken into account in the policy formulation process. In other words, it is unrealistic and impractical for decision makers to achieve in policy formulation. Also, the main shortcoming of rationality models lies in the part of 'value'. The value judgment of decision maker tends to be more subjective but not objective. With such inadequacy, the ideal type rational model does not guarantee the desirability of the values which fit into the factual assumption made and reflect the reality.

In contrast to the ideal type rational model, the descriptive model is derived from the natural human activity and pattern in the real world. In this sense, it is a model to describe reality in terms of deviations from perfect rationality. Allison (1999) rational model is based on the occurrence of the Cuban missile crisis and was formulated in 1962. The Allison rational theory "denotes behavior is consistent, value-maximizing choice within specified constraints and behavior that is appropriate to specified goal in the context of a given situation". This type of rational action makes the rational decisions reduced to a simple matter of selecting a set of given choices. Each set of choice has its given consequence and the decision makers will rank the set of choice



which can yield the maximized utility in accordance with the consequences. The Allison's model of rational action includes the following important concepts:

(1) Goals and Objectives

The interests and values are translated into a “payoff” or “utility” function, which represents the desirability or utility of alternative sets of consequences. The decision maker is expected to be able to rank in order of preference in accordance with the result of consequences of a particular action.

(2) Alternatives

A rational decision maker must choose among a set of alternatives in accordance with the problems. The alternative courses of action must be differentiated from other alternatives.

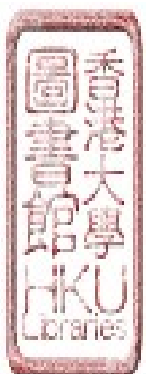
(3) Consequences

A set of consequences or outcomes of choice is attached to each alternative to ensure decision maker can estimate the consequences if that alternative is chosen.

(4) Maximizing choice

A decision maker would rank the alternatives and choose the highest ranking among the alternatives in policy formulation.

The Allison rational model considers the reality when compared with Lindblom ideal type model in policy formulation. Hogwood and Gunn (1984) further mentioned the shortcomings of rational policy-making based on the scholar of Herbert Simon. A Simon believed policy-makers seek to be rational but they are bounded by



‘psychological’ and ‘organizational’ factors in actual decision making. Herbert pointed out five important factors which affect the actual decision-making behaviour.

(1) Psychological limitation

Rational policy makers are often confined to lack of full knowledge, skills and the value-consistency in policy formulation. The incompetence would affect policy maker’s powers of cognition and calculation in rational policy formulation.

(2) Different values arising from the public

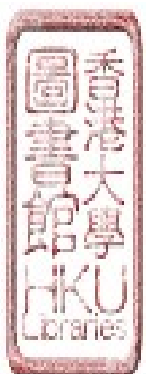
Public policy formulation is related to people values collected by policy makers from the society. Each policy option has different combinations of values as differences are to be allowed to weight their values in different ways. It is represented that there is no ‘rational’ way of resolving a conflict of interest.

(3) Organizational limitations

Organizational impediment is one of the constraints in rational policy making. Modern organizations tend to involve a high degree of division of labour and specialization of function. This might create a problem since different aspects of a problem are handled by organizational sub-units. Coordination of their problem-solving efforts is usually less than perfect. As a result, decision makers would look at problems through narrower departmental ‘spectacles’ rather the look at problems thoroughly in policy making.

(4) Cost limitation

Rational policy making is often bounded by the resources limitations. In other words, it costs to be rational, in terms of time, energy and money.



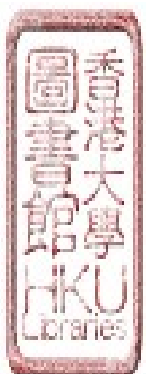
(5) Situational limitations

Rational policy-makers cannot make decision alone without considering past experience, powerful vested interests in the present, and people's expectations concerning the future.

**(B) Main characteristics of real-life policy-making theory by Lindblom**

Rational models have been criticized as impracticable and unrealistic as previously mentioned. Hogwood and Gunn (1984) also mentioned scholar Lindblom's descriptive, real-life policy-making, model as developed in his writings. In other words, this model was developed in response to the observed deviations from the ideal-type model of rationality. The main characteristics of real-life policy-making are as follows:

- (1) Policy makers often avoid deliberating thoroughly their objectives in policy formulation. This may create conflicts rather than agreement from existing problems.
- (2) Policy makers tend to make small adjustment to existing policies rather than making a new change when the existing policies fail to cope with current problems.
- (3) Existing social problems are not solved once and for all. Policy making is regarded as continual measures to tackle the ever increasing social issues.
- (4) Most policies are usually formulated by the interaction of many influential people operating in a power network rather than by individuals or single units.



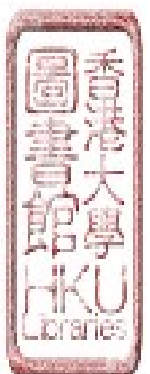
- (5) Policy formulation is a bargaining, negotiating and compromising process among different stakeholders. In other words, a policy formulated is not necessarily the best policy but it is a compromised policy based on the views of the majority.

To sum up, the above rational model of policy making reflects special characteristics of the American and modern political system which encourages both the formulation and the implementation of policies determined through consultations with interest groups and the general public. It also sets a basic framework for public participation in the policy making process today.

### **3.3 THEORY OF POLICY IMPLEMENTATION**

Knoepfel (2007) defines policy implementation as “the set of processes after the programming phases that are aimed at the concrete realisation of the objectives of a public policy”. This definition does not include the regulatory provision from government and administrative authority, but it is related to our execution or application in the public administration. The above definition of implementation consists of three important elements:

- (1) Policy implementation is the set of decision and activities that are carried out by the public and private actors who belong to the public administrative authority.
- (2) The existence of ‘policy network’ functions as contacts between the public administrative authority, other stakeholder administrative services, target groups and beneficiaries and third-party groups.





- (3) The existence of concrete, general or individual decisions from public administrative authority to tackle the issues of target groups.

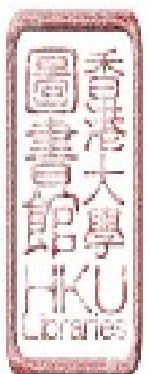
Having clearly defined the policy implementation and stated its characteristics, we examine various theories from social sciences disciplines to understand more about policy implementation and to improve the effectiveness of implementation in the subsequent paragraph.

#### **(A) Top-down perspective theory in policy implementation**

The problems of translating policy into actions and the effectiveness of public policy can be explained by the ‘top-down’ or policy-centered approach. Barrett and Fudge (1981) argued that the policy-action relationship needs to be regarded as a process of interaction, negotiation taking place over time, those seeking to put policy into effect and those upon whom action depends. The effectiveness of policy implementation depends on four basic elements:

- (1) Clear goals or objectives of what to do
- (2) Sufficient resources
- (3) Ability to marshal and control the required resources in order to achieve the goals
- (4) Communication and monitoring the performance who carry out the tasks

The tables below are sourced from Knoepfel (2007) to show the difference between the ‘top- down’ and ‘bottom-up’ visions of policy implementation.



**Table 1: Differences between the ‘Top-Down’ and ‘Bottom-Up’ Visions of Policy Implementation**

<b>Implementation approaches</b>	<b>‘Top-down’ vision</b>	<b>‘Bottom-up’ vision</b>
<b>Starting point of analysis of policy implementation</b>	Decisions taken by political administrative authorities	Activities of actors of the implementation network at local level
<b>Process for identifying the main actors of the public policy</b>	From the top and public sector down to the bottom and private sector	From the bottom (street level) to the top with simultaneous consideration of public and private actors
<b>Criteria for the evaluation of the quality of policy implementation</b>	Regularity (conformity, legality) of implementation procedure Efficacy: extent of realisation of formal objectives of the public authority	Do not have clearly defined criteria Eventual level of participation of actors involved Eventual degree of conflict in implementation

The above table summarises the differences between the classical ‘top-down’ implementation theory and the concepts of implementation in present society. Nowadays, policy implementation in democratic places is likely inclined to ‘bottom up vision’, which includes the consideration of socio-political processes and base on the interest of the public and private actors involved. In the civil protection of Victoria Harbour, it is a great change in the Hong Kong Government policy implementation a



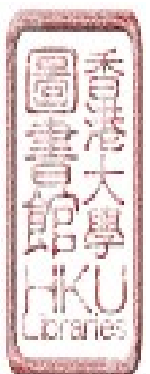
it has gradually shifted from the ‘top-down’ perspective and focus more on the interaction between the public authority and the Hong Kong citizens.

### **(B) Structural approaches of policy implementation**

Policy implementation is closely related to policy design and organizational design when it comes to the principles of ‘good organization’. Hogwood and Gunn (1984) specified two large subjects, “planning of change” and “planning for change” which are seen as models in policy implementation within an organization. “Planning of change” occurs when change takes place within the organization or is largely within the organization’s control as to direction, pace, and timing. This type of policy implementation is more appropriate to the relatively bureaucratic organizational forms and a hierarchical structure. “Planning for change” occurs when change takes place is externally imposed by other organizations or by environmental forces and the change process is difficult to predict and control. The policy implementation of this type, on the other hand, is more appropriate to a quite different organizational structure and fast-changing environment. It is more suitable to situations when implementing a sequence of changing policies over time rather than to design a specific structure for a one-off programme. However, the implementation of this type is often not easily carried out within the public sector because of the hierarchy structure of many governmental agencies, the demands of accountability, and the requirement to show consistency over time between comparable policies.

### **( C ) Procedural and managerial approach of policy implementation**

Procedural approach of policy implementation involved scheduling, planning, and control. Hogwood and Gunn (1984) highlighted the policy implementation stage in the



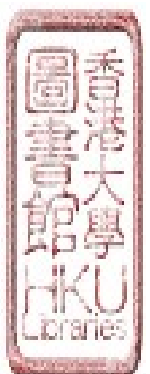
three sequential steps below after problems are clearly identified:

- (1) Designing a programme with task sequences, clear objectives, performance standards, cost, and timing.
- (2) Executing the programme by mobilizing appropriate staff, funding, resources, procedures and methods
- (3) Implementing the programme in appropriate scheduling, monitoring, and should have control devices and corrective actions if any deviations occurs.

Similar to procedural approach, the managerial approach focuses on network planning and control. It provides a framework within projects which can be planned and controlled, the identifying tasks to be accomplished and to be performed in logical sequence. Hogwood and Gunn (1984) argued that network planning is very useful in day-to-day management at the planning stage as a network can provide clear responsibilities of each part of the project and draws the attention to project interdependence. The most popular and sophisticated forms of networking programme since mid-1960's has been the Programme Evaluation and Review Technique (PERT) which allows for accurate estimates of the duration of each tasks, monitoring all activities, resources allocation and preventing any events that would delay the whole projects. Although managerial approach emphasised the importance of control in policy implementation, it is also necessary to negotiate and maintain consensus among different parties in practice. This is related to the next part on the discussion of behavioural approach in policy implementation.

#### **(D ) Behavioural approach of policy implementaion**

The behavioral approach assumes that people are often resistant to change in the polic

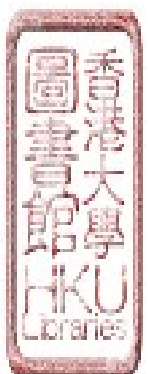


implementation (Hogwood and Gunn, 1984). There are factors which generalize about some of the sources of resistance to change involved in implementing policies. Individuals or groups may fear about the effects of a proposed change and the political effects in response to the new policy implementation. Fears can be caused by changes in relative power positions and adapt to new challenges, including having to learn new skills, assume new responsibilities, and meet better standards. In most previous experiences, the failure of introduction of new policies was caused by the inadequate consultation which triggers serious disruptions and greater fears of a new policy. The organizational effects of implementing a new or altered policy may subject to strong public opposition, especially if anticipated effects include greater size of bureaucratic structures, reduced personal or agency autonomy.

To avoid or minimize the resistance of new policy implementation, behavioural approach suggested that full information should be provided at an early stage about the proposed or anticipated changes, including the reasons and objectives involved. In addition, there should be extensive consultation with affected parties and participative decision-making where possible. This approach suggests a model which suits the modern society where successful policy implementation should not be without extensive public engagement and participation.

### **3.4 MODELS OF THE POLICY PROCESS**

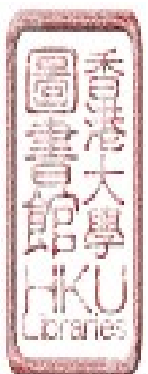
As previously mentioned about the theory of policy formulation and policy implementation, Fisher (2007) defines “policy formulation involves identifying and crafting a set of policy alternatives to address a problem, and narrowing that set o



solutions in preparation for the final policy decision”. Once the policy makers have settled upon a policy design to carry out the goals, the different actors in the policy process will turn their attention to the policy implementation. It is important to understand policy implementation because it is a main feature in the policy process and can provide better ways for policy makers to learn about the better ways to put policies into effects from the implementation problems. Implementation studies have emphasised the factors that are likely to affect the implementation success. In this dissertation, it is necessary to know that public policy process is influenced by the existing environment and also influences the environment in which it operates. Birkland (2001) pointed out that “policy environment contains the features of the structural, social, political, and economic system in which public policy making takes place”. The structural features of politics include the structure of the government, constitutional framework, traditional and legal structures that establish the rules of policy making.

The social aspect of the policy environment includes the factors of population composition and social structure. With an increasing number of populations and demand for more public participation in Hong Kong, it is expected to see the increasing demand for policies designed to address the need of the society. In addition, the greater diversity of opinions will lead to different types of policy and demands.

The economic environment includes the distribution of wealth, capital, economy growth, inflation, and most importantly, the types of policies a government makes. Birkland (2001) argued that “the policies a government makes are often of the overall wealth of the economy, because the amount of resources available to government (through taxes and through its ability to compel behaviors without gravely negative economic consequences) is influenced by current and continued growth and

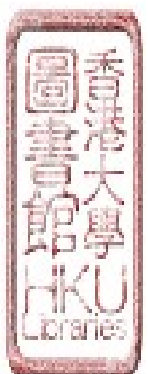


prosperity”.

Public policy choices are influenced by the economy. At the same time, the policy decision of government also influences the economic environment. The relationships are reciprocal to each other. The political environment encompasses the attitudes towards the government, which includes how we feel about the government, public problems, and the effectiveness of government in successfully dealing with problems. The public attitudes to government is very important in making public policy because the legitimacy of democratic political system is largely depends on electoral system which reveals people trusts to the government. Also, political culture, which includes what people think and how they participate in politics, is an important part of the political environment. In Hong Kong, key elements of our political culture include a strong belief in freedom of expression, political equality, and the rule of law. Political culture is similar to public attitudes which have a substantial influence on the successful of policy making process.

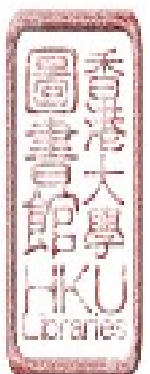
### **3.5 POLICY FORMULATION AND IMPLEMENTATION IN HONG KONG**

Scott (2010) suggested that “the significant features of the colonial system of policy formulation and implementation were: minimal basic functions provided by the government; social policy provision by non-governmental organizations; policy formulation within very restricted circles; and top-down policy implementation with focus on outcome rather than process”. Policy formulation in Hong Kong is dominated by an executive-led government, which means that bureaucrats play an important role



in public policy making and resources allocation. The government's policy formulation was carried out in-house in the Government Secretariat. More often, policies would be devised after an extended conversation and memorandum conducted between the most senior civil servants in the Secretariat.

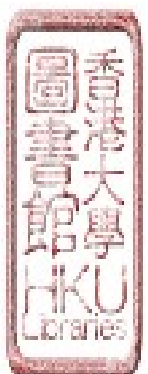
In the past, policy consultation took place by green paper and committees with prominent figures appointed by the administration. Subsequently, a white paper stating the definitive policy would then be issued and approved by the Legislative Council. In addition, the major organizational characteristic was that the executive-led government where the executive was vested owns the power to constitute the legislature. As a result, the legislature was dominated by pro-government political members. It is expected that the executive will use its power to form a pro-government legislature. The term "executive-led" has been widely used in Hong Kong in the context of policy-making before 1997, and especially before 1985, when the governor and the members of Executive Council occupied an extraordinary role in policy formulation (Scott, 2010). It is therefore, the government-initiated bills and budgets were easily passed in the LegCo up to the mid-1980. Before the handover, the government viewed policy implementation as a matter of targets which was only particular concern with the process of how these targets were achieved. This reflects the attitude of traditional colonial government, focusing on the efficiency and cost-effectiveness, but there was little consultation with those whom the policy was designed to benefit. Ng (2006) pointed out that "the bureaucratic had enjoyed a relatively large degree of autonomy in making decisions by following standardised practices and procedures without much need to consult with, or respond to lobbying by, stakeholders". It also clearly revealed that policies and plans made by the government were generally speedily executed.





After the handover of sovereignty in 1997, Scott (2010) pinpointed that the following features of policy formulation and implementation after 1997: “Policy-making was constrained by economic circumstances; policy co-ordination was adversely affected by the introduction of the Principal Officials Accountability System; the consultative system broke down and the growth of civil society organizations made policy implementation more difficult”. Since 1997, the political system has gone through a reform with new type of political system based on a more symmetric power relationship among branches of government in Hong Kong. The main reason was that the roles and power of the Chief Secretary for Administration and Financial Secretary were being affected in the Principal Officials Accountability System. Under this system, the Directors of Bureaus act more independently and there had been less co-ordination with other bureaus. As a result, the policies formulated among political executives were poorly-coordinated and did not work together to formulate coherent policy. Since July 2002, the political appointment system which allows the Chief Executive to appoint senior and bureau secretaries, undersecretaries, and political assistant has been adopted. This reform was mainly to response the policy failures of the previous period, resolve the mismatch between the senior civil servants and bureau secretaries, and to put political accountability on them. The introduction of the Principals Officials Accountability System by Chief Executive Donald Tsang was to increase the coordination in policy formulation and to make policy implementation more effective. Scott (2010) argued that although the Principals Officials Accountability System is highly competent in administering policies, it is still very difficult to gain public acceptance for new policies as the departments are more autonomous and less co-ordinated in policy implementation.

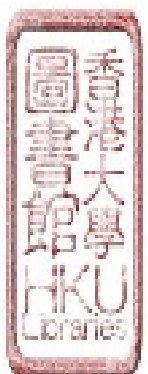
There are three aspects in policy implementation, including policy instruments



strategies of implementation and evaluation of policy implementation according to Scott (2010). Policy instruments are defined as “the wide range of methods that governments use to achieve their objective. Economic policy instruments have been one of the methods used by the Hong Kong Government in the reclamation policy. The Hong Kong Government has relied heavily on land sales as a major source of revenue. Ng (2006) explained the reason behind - “the government of Hong Kong has not played an active role in directing industrial growth and development”. Because there are significant vested interests of the government in the land market, it has a natural bias towards the government policy which emphasizes property development, land sales and land use infrastructure development. Policy implementation also involves how to manage and complete the programme in policy instrument once the government has chosen to implement. Under the British rule, the top-down implementation characterized the main way of policy implementation within the Hong Kong civil service in order to achieve policy goals. The top-down approach and the nature of political system enable policy-makers to have more time and space to consider whether or not to take action to problems. After 1997, the introduction of Principal Officials Accountability System resulted in less co-ordination between government departments. In addition, the civic engagement appears to have slowed down both the process of policy formulation and of implementation.

### **3.6 PLANNING OF LAND USE AND RECLAMATION IN HONG KONG**

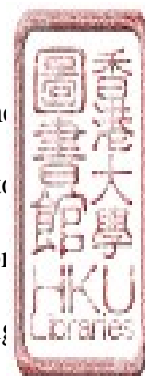
Since 1939, the government first enacted the Town Planning Ordinance and established the Towning Board to outline the development plan for Hong Kong



However, the government stopped the plan due to the occupying of Japan in 1941. The most prominent land use planning was carried out by the British town planner, Patrick Abercrombie, regarding the basic development principles of the Hong Kong's development for the coming 50 years.

From 1960s, the Public Works Department was responsible for the land use planning in Hong Kong. Apart from the Public Works Department, the Town Planning Board and the Land Development Planning Committee were other important consultative organizations to carry out urban development planning. The aim of setting up the Land Development Planning Committee was to co-ordinate all land use planning work within the government and between the Public Works Department. While the Town Planning Board was responsible for the formal statutory planning process and long-term government land use policy, at that time, urban planning was emphasized at three levels, including Colony Outline Plan, Statutory Outline Zoning Plan and Departmental Plans. Statutory Outline Plan was the major planning plan carried out under the Town Planning Ordinance (Bristow, 1991). Central and Shatin were two major areas for development under the statutory plan during the year. Departmental plan was required internally by the government, which covers the development of Tsuen Wan, Tsing Yi, Castle Peak, and Yuen Long. Colony Outline plan was to research the possible areas for development under the growing pressure and demand for land use. Tai Po, Junk Bay were the two main areas under the plan.

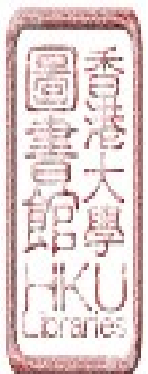
During 1970's, the appointment of a new Secretary for the Environment took over the responsibility of the government's Land Development Policy Committee in order to enhance the role it was expected to play in land use planning. The Lands Division under the new Environment Branch was responsible for carrying out town planning



and reclamation matters in Hong Kong. Also, a New Territories Development Department was established within the Public Works Department to carry out planning of three new towns of Tsuen Wan, Sha Tin, and Tuen Mun.

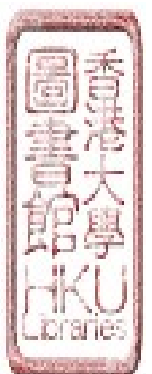
In 1980s, town planning in Hong Kong was composed of the territorial, sub-regional and district plans. Territorial Plans mainly included Hong Kong Planning Standards and Guidelines (HKPSG) and Territorial Development Strategy (TDS). The HKPSG is a government manual of current land planning standard and guidelines. It is mainly concerned with district and local criteria for site reservation, location factors and site requirements. It is “an important source of reference on government policies for land use planners in the preparation of statutory and departmental plans and project planning beliefs” (Lands Department, 1984). Territorial Development Strategy was to formulate a long-term land use and transportation strategy for Hong Kong to accommodate the population and economic growth in 1980s. Sub-regional plans included four main categories: Structure Plans, Statutory Outline Plans, Outline Development Plans, and Layout Plans. Structure Plans served as link between the Territorial Development Strategy and local plans in order to translate territory-wide goals into sub-regional objectives. Statutory outline plans are areas zoned for residential, commercial, industrial, and open space under the Town Planning Ordinance of the Town Planning Board. Outline Development Plans are the plans prepared within the framework of the statutory outline zoning plans by the Urban Area Development Organization to indicate more specific use of the sites. Layout plans were the action plans to be formed for public and private development covered by outline zoning plan and outline development plan.

In 1990s, the Civil Engineering Department and the Planning Department were mainly



responsible for the planning and execution of infrastructural projects. Until 2004, the Civil Engineering and Development Department was established to replace the Civil Engineering Department and Territory Development Department.

At present, the Planning Department under the Development Bureau is responsible for urban planning in Hong Kong. It is also correlated with the Town Planning Board. The Town Planning Board membership comprises the Chairman, the Vice-chairman, official members and non-official members who are appointed by the Chief Executive. In addition, The Harbour-front Enhancement Committee was established by the government to act as the channel for the public to express their opinions towards land use planning and the development of the Victoria Harbour.



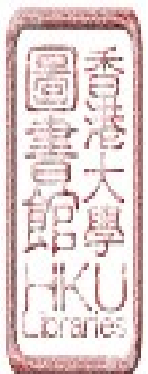
## **CHAPTER 4**

### **FORMULATION OF RECLAMATION POLICY IN 1980s**

#### **4.1 PREVIEW**

In the late 1970's and the early 1980s , Hong Kong was under tremendous pressure for exploring new developable land for economic growth since China implemented its economic reforms and Hong Kong became an important gateway into the China market. In addition, the rapid population growth in Hong Kong, with the population figure climbing from 5,000,000 in 1981 to 5,500,000 had prompted the government to undertake a strategic development plan for the whole territory (Ho, 2004). The 1980's was also a high time of harbour reclamation due to the economic restructuring from the labour-intensive manufacturing to the service industry demanding for land in the central business area (Ng and Cook 1997).

The blueprint of 1980's reclamation focused on land in districts such as the northwestern part of Hong Kong Island, West Kowloon, Tsuen Wan and Kwai Chung, and the re-planning of urban transport and environment. Reclamation was the means to reduce increasing population pressure and meet economic development needs. In the mid-1980s, the Hong Kong Government started the Territorial Development Strategy and adopted port expansion as the key element to stimulate economic growth. Different types of land use planning, including the housing demand, the development of industrial land, the construction of office buildings and hotels, started from mid 1980s onwards. From 1985, the Government had carried out extensive studies and identified nine developable areas, namely, Green Island off the the west coast of Hong



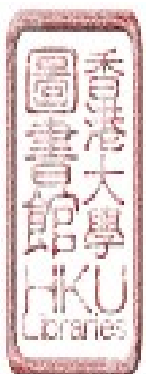
Kong Island, West Kowloon, East Lantau, Lau Fau Shan, Tsim Bei Tsui, Yuen Long, Wu Kai Sha and Tseung Kwan O (Ho, 2004). Also, the Government devised further studies and offered two development options which can support the growth of population based on population distributions: (1) Extensive development of Northwest New Territories (population capacity- 480,000 people) and the areas west of the harbour (capacity-370,000 people); and (2) Extensive development of the areas west of the harbour (population capacity-900,000 people) (Ho, 2004). Of the two options, the West Kowloon and the Central-Wan Chai reclamation projects were two top prioritized development areas in the mid 1980's. In the end of 1980's, the Airport Core was the reclamation project of the largest scale, with 1,248 hectares of land reclaimed in the programme.

## **4.2 MAJOR STUDIES ON THE RECLAMATION DEVELOPMENT PROJECTS IN 1980'S**

In 1980s, the Hong Kong Government undertook a planned approach in reclamation in order to identify the suitable location and ensure that the reclamations meet the genuine needs of the urban development. There were four study plans devised by the government and described below: (Civil Engineering Department, 1995)

### **(1) Study on Harbour Reclamations and Urban Growth (SHRUG 1983)**

The study examined the impact on water quality, tidal flows and port operations on further reclamations in Hong Kong Harbour, including at West Kowloon, Green Island, South East Kowloon, and Central and Wan Chai



## (2) Territorial Development Strategy (TDS 1984)

The Territorial Development Strategy was proposed by Executive Council 1984 and the major proposed reclamation areas included were West Kowloon, Green Island, Hung Hom Bay, Central and Wan Chai, and Aldrich Bay. The West Kowloon reclamation recommended reclamation of 340 hectares of land along the West Kowloon waterfront from Lai Chi Kok in the north to Yau Ma Tei in the south for transportation, industrial and residential purpose. The Green Island reclamation provided a total land area of 186.6 hectares to improve the planning and extend district open spaces within Kennedy Town. The Aldrich Bay Typhoon Shelter Reclamation reclaimed 24.25 harbour areas in order to provide new lands for housing development, schools and open spaces.

## (3) Port and Airport Development Strategy (PADS 1989)

This study recommended the relocation the airport to Chek Lap Kok and has been the largest reclamation project in Hong Kong and will be further discussed in next section.

## (4) Metroplan (1991)

This study produced a strategic framework for restructuring the Metro area following the relocation of airport from Kai Tak to Chek Lap Kok.

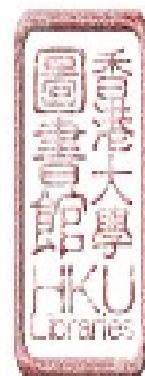
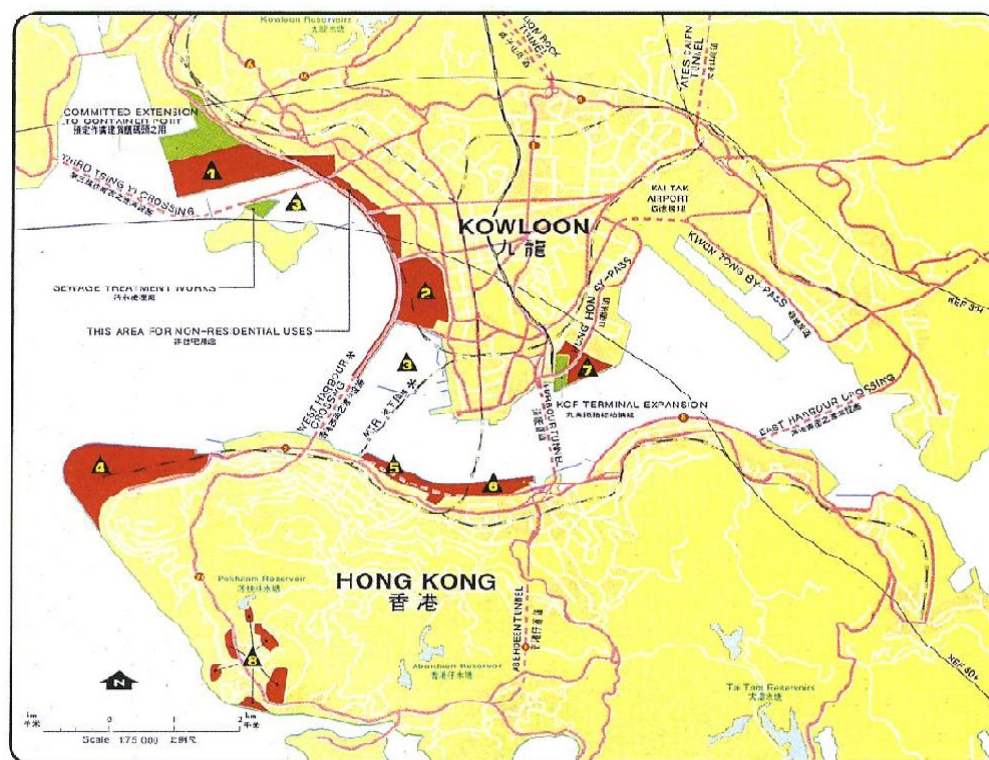




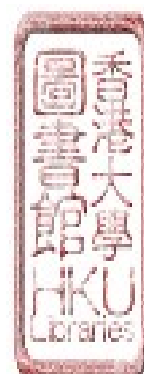
Figure 2: Preliminary reclamation plan of Hong Kong's core region in 1980's

(Source: Ho, 2004)



LEGEND 圖例

- |   |                  |   |
|---|------------------|---|
| Strategic growth areas  | 策略性增長區           | ▲ New typhoon shelter (alternatives under investigation)<br>新避風塘 (可供選擇之地區在考慮中)                      |
| Trunk road & route number   | 公路及編號            | ▲ Green Island Reclamation - for 200 000 persons<br>青洲填海區 — 可容二十萬人                                  |
| Railway - MTR   | 地下鐵路             | ▲ Central Reclamation - for new commercial offices & govt./cultural uses<br>中環填海區 — 供新商業辦公室及政府/文娛用途 |
| Railway - KCR   | 九廣鐵路             | ▲ Extension of Wanchai Reclamation - for 60 000 persons<br>新灣仔填海區 — 可容六萬人                           |
| Aircraft noise exposure forecast contour - 10 & above             | 飛機噪音預計度等量線：三十及以上 | ▲ Hung Hom Bay Reclamation - for commercial/govt. & for 17 000 persons<br>紅磡灣填海區 — 供商業/政府用途並可容一萬七千人 |
| MAJOR DEVELOPMENT PROPOSALS:<br>主要發展計劃                            |                  | ▲ For 16 000 persons<br>可容一萬六千人   |
| ▲ Possible future extension to container port<br>貨櫃碼頭之可能擴展區       |                  |   |
| ▲ West Kowloon Reclamation - for 90 000 persons<br>西九龍填海區 — 可容九萬人 |                  |   |

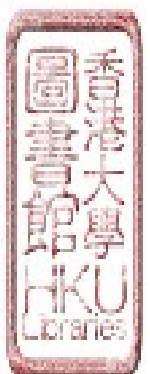


**Figure 3: 1985 Preliminary urban development strategy on population and transport network expansion (Source: Ho, 2004)**



#### **4.3 CASE STUDY: CHEK LAP KOK RECLAMATION AND AIRPORT CORE DEVELOPMENT PROGRAMME (1988-89)**

In 1980s, the Hong Kong Government presented a number of proposals on both sides of Victoria Harbour and Hong Kong's port in order to handle much higher volumes of sea and air cargo. By 1981, various studies from the Territorial Development Strategy (TDS) proved that there was a need to improve the port and airport facilities in a more determined manner to meet long-term needs. At that time two airport scenarios were assumed, one was to build a new airport at the western harbour entrance between





Lamma Island and Cheung Chau and the second option was to carry out reclamation at Chek Lap Kok Island for the new airport (Ho, 2004).

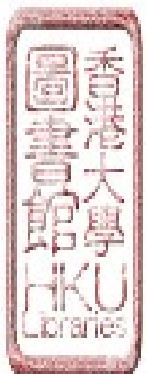
In 1988, the government started to conduct the Port and Airport Development Strategy Study (PADS). The studies covered the long-term need for port, airport facilities and the associated transport infrastructure and urban development.

The Port and Development Strategy Studies (PADS) are designed to achieve the following aims (Land and Works Branch of Hong Kong Government, 1989):

- (1) meet the forecast port and air traffic growth in Hong Kong up to 2011
- (2) ensure that all new port, airport, associated industrial and residential facilities, transport links and other infrastructure will be incrementally provided according to an integrated and cohesive plan
- (3) form the heart of future major Government development programmes to enhance and sustain the stability and prosperity of the Territory

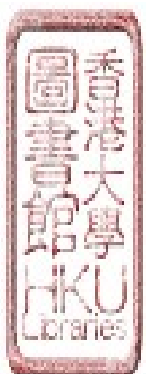
Following the October 1989 PADS study, the New Airport Office was established under the Secretary for Works. The New Airport Office was responsible for producing a Master Development Programme and setting out the target date for the completion of various activities covering matter such as environmental impact assessments, design of works, reclamation process, land assembly and contracts tendering. Moreover, the Airport Development Sub Committee (ADSCOM) of the Land Development Policy Committee (LDC) was established under the chairmanship of the Chief Secretary.

On 11 October 1989, the administration announced the decision and estimated the cost of the port and airport works, together with the other infrastructure at HK\$127 billion.



(Ho, 2004). In the following year 1990, the Provisional Airport Authority was established to undertake the responsibility for airport planning, construction works, financing the operation and management of the new airport. Most importantly, the Chinese and British governments signed the Memorandum of Understanding Concerning the Construction of the New Airport in Hong Kong and Related Questions on 3 Sep 1991 (Ho, 2004). A new airport site was selected at Chek Lap Kok and the land for the airport was formed primarily by using the excavated materials and marine sand for reclamation. Ten large development projects were in the Airport Core Programme, including a new airport at Chek Lap Kok, West Kowloon Reclamation, Central and Wanchai Reclamation related to the Airport Railway, Route 3, North Lantau Expressway, West Kowloon Expressway, Western Harbour Crossing, Airport Railway, Lantau Fixed Crossing, and Tung Chung Development Phase 1.

The Chek Lap Kok Airport Core Programme had been the largest reclamation project in Hong Kong, with three quarters totally 1,248 hectares of land had been reclaimed and the remaining quarter comprised the land area of Chek Lap Kok and Lam Chau Islands (Li, 2010). In addition, the reclamation projects included 67 hectares for Tung Chung New Town, 334 hectares for the West Kowloon Reclamation, and 20 hectares in Central and Western District (Ho 2004).



#### **4.3.1 AIRPORT CORE DEVELOPMENT PROGRAMME: WEST KOWLOON RECLAMATION PROJECT**

The West Kowloon Reclamation study was one of the airport core programme which was carried out in 1983 before the implementation of the Airport Core Programme. It aimed to alleviate the congested residential area on the Kowloon Peninsula, with 159,000 populations was projected to house in the study. In 1984, the Executive Council approved the West Kowloon Reclamation project which began at Tsim Sha Tsui and extended northwards to cover of Yau Ma Tei, Cheung Sha Wan and Mei Foo to reclaim 334 hectares of land from the sea for development (Ho, 2004). The project had enlarged the size of Kowloon Peninsula by one-third and 120 hectares of reclaimed land was used to build the new transport network to the new airport-West Kowloon Expressway, Airport Railway and the connection to the West Harbour Tunnel. Another 50 hectares of reclaimed land was used for the construction of public and social facilities and the remaining was used for public open space, new housing, and for the Cheung Sha Wan Wholesale Market.

The West Kowloon Reclamation Project was implemented in three phases which was undertaken by the Civil Engineering Department and the Territory Department in 1990. The first phase of the project included the 68-hectare New Yau Ma Tei Typhoon Shelter and the last phase involved the reclamation of 13 hectares at the Southern end of West Kowloon.

Environmental Impact of the project included the dredging of 34 million cubic meter of marine mud and the use of 69 million cubic metres of fill material, which pose threat to the water quality and marine ecology of Victoria Harbour. The toxin material



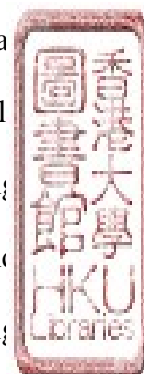
locked in the sediment might become active again during the dredging eventually consumed by marine life and humans in the food chain, according to Dr. Michael Lam Hon Wah, the pollution scientist, of City University of Hong Kong (South China Morning Post, 2010). At the same time, the government had to ensure that the project is complied with environmental laws and the impact of noise and air pollution can be minimized.

The major West Kowloon Reclamation projects were all completed by mid-1997, while the all the remaining minor projects were finished by the 2003.

#### **4.3.2 AIRPORT CORE DEVELOPMENT PROGRAMME: CENTRAL AND WAN CHAI RECLAMATION PROJECT**

The Central and Wan Chai Reclamation Feasibility Study was devised by the Urban Area Development Office of Territory Development of Hong Kong. It aimed at preparing a Development Plan and extension area to Central Business District (CBD) and with supporting plans covering reclamation, drainage, transport, road layouts, land use, landscape, urban design, and development staging (Civil Engineering Department, 1995).

The Central and Wan Chai reclamation reclaimed totally 108 hectares of land along the waterfront in five phases. The main objective of the Central and Wan Chai reclamation was to construct the Airport Railway's Hong Kong Station, the Central Wan Chai Bypass, the Island Eastern Corridor Link and the MTR North Hong Kong Island Line and expand the business district of Central (Ho, 2004). The Central and Wan Chai Reclamation which involved the most controversial issue in Hong Kong



reclamation will be discussed in the next chapter.

#### **4.3.3 AIRPORT CORE DEVELOPMENT PROGRAMME: NORTH LANTAU RECLAMATION PROJECT - TUNG CHUNG NEW TOWN PHASE ONE**

The North Lantau development project was planned by the government to provide a support community for the new Chek Lap Kok Airport and a new place to further accommodate the increasing populations. The project reclaimed 67 hectares of land, and provided public and private housing for increasing population (Hong Kong Government, 1991). The Tung Chung area was early planned by the government to be the target area for residential development at that time in order to provide homes for about 160,000 people. The Tung Chung East and Tung Chung West reclamation projects which are connected to the early North Lantau project will be further study in chapter six.

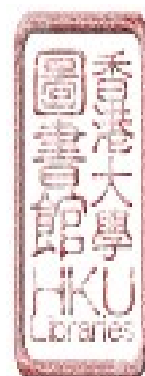
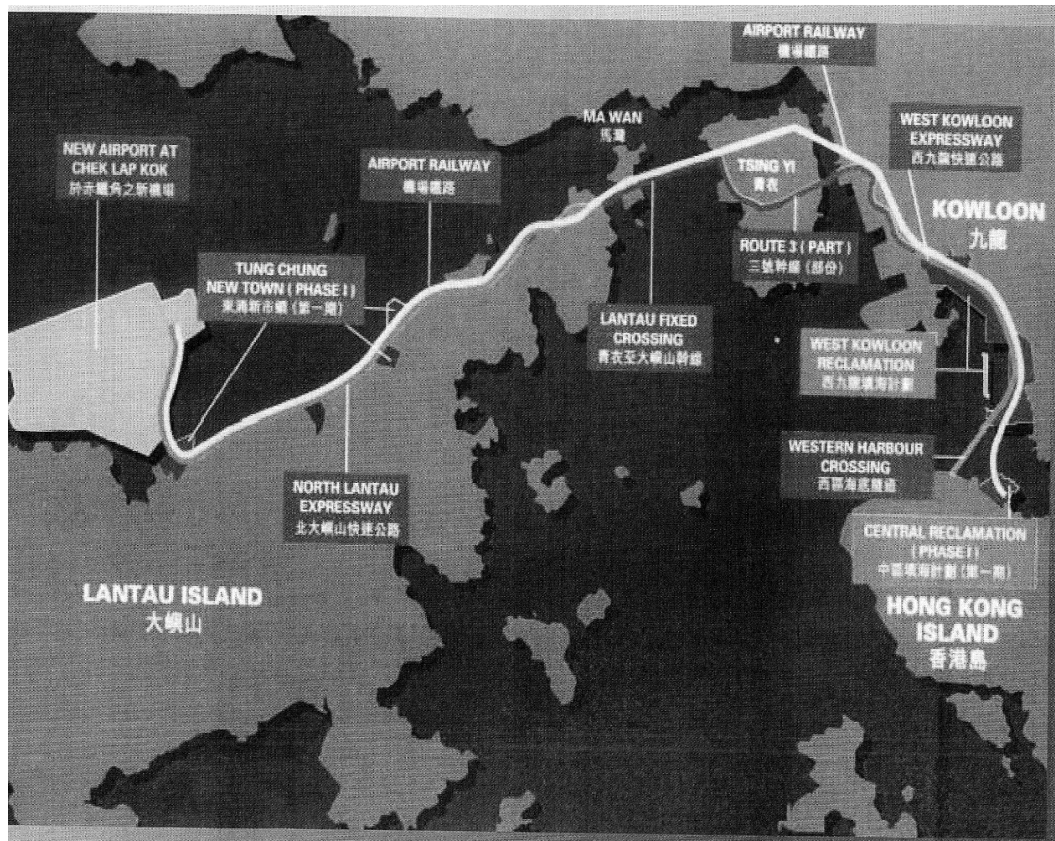


Figure 4: Locations of Airport Core Development Programme (Wong, 2011)





## **CHAPTER 5**

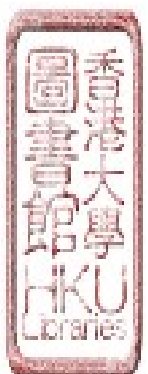
### **FORMULATION OF RECLAMATION POLICY IN 1990's**

#### **5.1 PREVIEW**

As the economic growth was soaring in 1980's and the Hong Kong economy was restructuring from manufacturing to a tertiary industry, more land was needed to accommodate the business and financial activities that contribute to the economy. Reclamation around the Victoria Harbour was regarded as the most efficient way to provide new lands for business and financial district development. Ng (2006) argued that land reclamation can create land out of uninhabitable areas and the resistance from the public is minimal. Besides, reclamation not only can avoid political confrontations with existing residents, but also increase government revenue. The government adopts a strategy of developing new land by reclamation rather than redeveloping built-up areas because urban land sales from reclaimed land are much more valuable, with averaged US\$3872 per square metre (Ng, 2011). While the government planned more reclamation to supply more land at the heart of Victoria Harbour in 1990's, the emergence of civic society and raising awareness of environmentalist made it more political and difficult for the government to carry out reclamation projects.

#### **5.2 POLICY OF HARBOUR RECLAMATION IN 1990's**

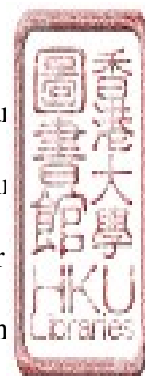
Since the early years of British rule, the government has utilized reclamation as a means of coping with the shortage of urban land and ever increasing populations. The shortage of urban land is mainly due to the geographical constraints, with wood land



grass land, and wet land covering 66.6% of total areas in Hong Kong (Planning Department, 2012). The coastal area of the Victoria Harbour has been heavily reclaimed particularly as it expands the land in the central business district for thriving commercial and trading activities (Lee et al., 2013).

Aside from shortage of land, the government was under development pressure in searching for extra land in the central business district because of the accelerated economic growth of China and the restructuring of Hong Kong's economy since 1980s. With the continued demand for transportation and infrastructure needs, reclamation has been claimed to be a necessary policy to boost the land supply. Another reason for the Hong Kong Government to reclaim lands around two coasts of Victoria Harbour is that the land sales revenue has been a major source of revenue. Since 1985, a majority of land-lease revenue was generated from initial leases and this arouses the government's desire to develop new land by reclamation rather than redevelopment. The land prices for commercial uses increased rapidly when the government has developed its position as international financial centre from 1980's onwards. In other words, the government policy obtained more revenue when the land was sold and developed for commercial purpose rather than industrial use. Under this government policy, Victoria Harbour reclamation has been the source to increase new land supply to accommodate the expanding economic hub functions of Hong Kong (Ng and Cook, 1997).

Besides, the private sectors and various biggest landlords have always played an important role in the planning and development for the close working relationship in Executive Council. It is necessary for the government to work closely with developer and bankers related to land development interest as the taxes from estate developmen



and investment from banking constituted 50 per cent of profit taxes collected by Inland Revenue Department from 1991 to 1995 (Ng and Cook, 1997).

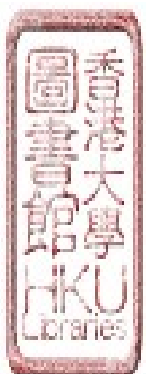
After 1997, the government had been pushed to scale down the harbour reclamation and modified the mode of harbour planning for the changing political environment and rising of civic society. This can be characterised by increase in the number of protest activities and target government failures since 1997 (Cheng, 2013). Under the era of Tung Chee Wah management, the protection of and scaling back the reclamation plan from Victoria Harbour had already firmed in his Policy Address (Hong Kong Government, 1999a).

### **5.3 VICTORIA HARBOUR RECLAMATION PROJECT IN 1990's**

In the 1990s, the government started to propose a massive reclamation plan around the Victoria Harbour. The planning department has published a paper from Advisory Council on Environment to generalize the reason of the need to reclaim in the Victoria Harbour. The following are the proposed planning reclamation contexts (Planning Department, 1995):

#### **(1) To Accommodate Population Growth**

Existing and committed developments have the capacity to accommodate about 6.5 million people, and land is required to accommodate an additional population between 1 to 1.6 million in long-term.



## (2) New Transport and Infrastructure

The road/rail transport networks of the Territory have to be extended to meet demands arising from daily commuting traffic flows, economic growth in the Pearl River Delta and the related development of new port and airport facilities.

## (3) To Meet New Land Use Needs

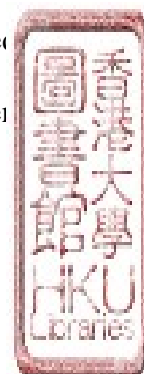
Whilst the intention remains to continue with the new town development programmes, additional lands has to be provided around the Victoria Harbour for the growth of hub functions, such as expansion of business activities, development of new tourists and cultural facilities, and development of new housing located in convenient proximity to the major employment centres.

## (4) Restructuring the Metro Area

About four million people live in the Metro area which provides 80% of all jobs. Large parts of this area are still very densely populated, and such places as Mong Kok and Yaumatei have become worn out over many years. A basic aim of Metropolis is to 'thin out' such areas and restructure the city. The action is being taken by government bodies such as the Housing Authority, the Housing Society, the Land Development Corporation and private developers.

## (5) Clearing Environmental Black Spots

The proposed reclamations have the potential for eliminating highly polluted 'black spots' in areas where there are weak tidal flows e.g. Kowloon Bay and Tsuen Wan Bay



#### (6) Westward shift of Port Activities

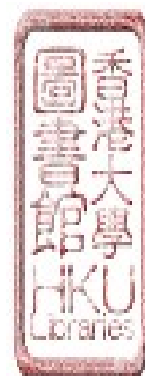
New port facilities need to be constructed on reclamations at Kwai Tsing and North Lantau to keep pace with the demands generated by economic growth. Consequently, port facilities will shift westwards. The inner harbour from Central to Lei Yue Mun, will apart from areas used for domestic navigation and shipping purposes, become primarily a water amenity zone, providing an attractive setting for adjoining city areas.

#### (7) New Waterfront Promenades

A basic principle of Metroplan is to bring the city to the harbour and the harbour to the city. Many parts of the city are currently inaccessible to people due to the obstruction of access to the waterfront by various kinds of development. The new reclamations will remedy this situation by making it possible to progressively develop up to 33km of well landscaped waterfront promenades.

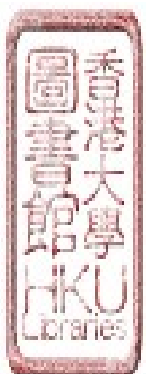
#### (8) Improving City Design

Hong Kong is becoming well known as a “City of Vision” based on the development of new buildings of bold design. All the new reclamations have been planned to create new layouts of comprehensive design offering yet more opportunities for developers and architects to reinforce the visual appeal of the city along the broad stretches of the harbour, thus enhancing the image of Hong Kong as a leading world city.



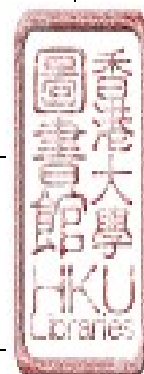
## 5.4 THE METROPLAN 1991

In 1991, the colonial government proposed to reclaim a total of 2,200 hectares of land under the Metroplan which outlined the city's long-term development strategies. There were seven reclamation projects in the harbor and other proposed medium and longer term harbour reclamation projects in 1995:



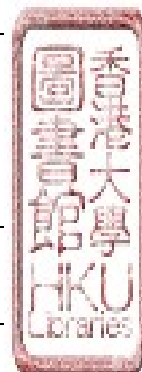
**Table 2: Seven Reclamation Projects in the Victoria Harbour (Source: Planning, Environment and Lands Branch, 1995)**

Reclamation Area (ha)		Functions
(a) Central Reclamation Phase I	20	<ul style="list-style-type: none"> <li>-Airport Core Programme (ACP) project.</li> <li>-To provide land for the construction of the Hong Kong Station of the Airport Railway and the western portion of the Central-Wanchai Bypass.</li> <li>-To provide land for the expansion of the Central Business District.</li> <li>-To be completed in June 1997.</li> </ul>
(b) Central Reclamation Phase II	5.3	<ul style="list-style-type: none"> <li>-To provide land for five commercial development sites.</li> <li>-To be completed in December 1996.</li> </ul>
(c) Wanchai Reclamation Phase I	7	<ul style="list-style-type: none"> <li>-To provide land for building an extension to the Hong Kong Convention and Exhibition Centre.</li> <li>-To be completed by January 1997.</li> </ul>
(d) Aldrich Bay Reclamation	18	<ul style="list-style-type: none"> <li>-To provide land for housing 23,000 people and sites for open spaces and community facilities to meet shortfalls in adjoining built up areas.</li> <li>-To be completed by August 1997.</li> </ul>
(e) Belcher Bay Reclamation	10	<ul style="list-style-type: none"> <li>-To provide land for construction of the Belcher Bay Link which will form part of the Western Harbour Crossing connection.</li> <li>-To be completed by early 1997.</li> </ul>
(f) West Kowloon Reclamation	340	<ul style="list-style-type: none"> <li>-ACP project.</li> <li>-To accommodate other ACP projects, including West Kowloon Expressway, Airport Railway, Western Harbour Crossing.</li> <li>-To provide land for housing 91,000 people and improving the environment in the adjacent areas.</li> <li>-To be completed in October 1996.</li> </ul>
(g) Stonecutters Island Naval Base at the South Shore of Stonecutters Island	12	<ul style="list-style-type: none"> <li>-To provide land to build a naval base for the future People's Republic of China navy</li> <li>-To be completed in early 1997.</li> </ul>



**Table 3: Proposed Medium and Longer Term Harbour Reclamation Projects for General****Urban Use (Source: Planning, Environment and Lands Branch, 1995)**

Reclamation Area (ha)		Functions
(a) Central Reclamation Phase III	30	-Start time under review. Completion at end of 2000. -To provide land for the Central-Wanchai Bypass and the Airport Railway overrun tunnel expansion for the relief of traffic congestion in the Central Business District.
(b) Wanchai Reclamation Phase II	48	-To start in 1998 for completion in 2002. -To provide land for the completion of the Central-Wanchai By-pass, public cargo working area and waterfront promenades.
(c) Green Island Development – Advanced Reclamation by Public Dumping	37	-To provide land for Route 7 for the improvement of traffic conditions in the western part of Hong Kong Island. -To provide a better alternative use of construction waste. -To start in mid 1996 for completion in 2003.
(d) Green Island Development – Stage 1 Reclamation and Reprovisioning of Waterfront Facilities	29	-To provide waterfront facilities affected by the subsequent phases of the reclamation. - To start in late 1998 for completion in 2002.
(e) Green Island Development – Remaining Reclamation	110	-To provide land for housing 124,000 people and facilitate urban renewal in the Western District. -Implementation programme to be determined by the outcome of the TDS Review and relevant feasibility studies.
(f) Tsuen Wan Bay Further Reclamation	30	-To provide land for public housing people and other community facilities to facilitate the restructuring of built-up areas. -To start in 2000 for completion by 2003.
(g) Kowloon Point Development	48	-To provide a new commercial/residential/cultural focal point for Kowloon.



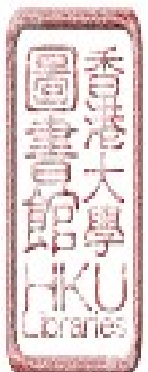


		-To provide land for the extension of major roads and passenger rail links from Tsim Sha Tsui to West Kowloon Reclamation. -A feasibility study will commence in late 1995 to establish its viability.
(h) South East Kowloon Development	300	-To provide a new development site comprising the Kai Tak Airport site and the adjacent urban areas for housing 285,000 people and 110,000 jobs. -To provide land to help environmental improvement in adjoining old built up areas and to reduce water pollution in Kowloon Bay. -To provide a new typhoon shelter and cargo working area. -A feasibility study will commence in late 1995 to establish the scope of detailed works.

## 5.5 THE HARBOUR PROTECTION MOVEMENT AND PROTECTION OF THE HARBOUR ORDINANCE

Prior to 1990's, when civic activism and environmental protection were not popular, sea reclamation seemed to provide a solution to increase the supply of land. Protest against sea reclamation was rarely heard in those days (Education Bureau, 2008). Under this favorable political arena, public enjoyed the rapid economic growth in the 1970s and 1980s. Little attention was paid to the related issue on harbor front development. In addition, as previously mentioned in chapter 2, the executive-led harbor front management was a top-down approach of land use planning which can minimize the process of public engagement and participation.

In early 1990, the colonial government continued to propose a large reclamation project which would result in the loss of 50 per cent of the total cover area of the

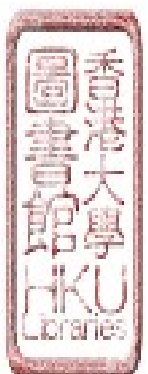


harbour (Lee et al., 2013). Until 1995, some environmental groups and professional groups started to criticize the massive reclamation and advocate the importance of protecting the Victoria Harbour. The Society for the Protection Harbour (SPH), a non-political organization, was set up by activists Miss Christine Loh and Mr. Winston Chu to conduct the “Save our Harbour Campaign” in 1996. In May the same year, a signature campaign was conducted against the reclamation plans for the sea off Kowloon Bay, Wan Chai and Stonecutters Island (Lee et al., 2013). While Loh was an elected legislator at that time, she introduced the Harbour Protection Ordinance which was successfully passed in the legislature in June 1997.

The Protection of the Harbour Ordinance has been regarded as legal weapons and has also featured the uprising of civil society in Hong Kong. The Ordinance has established a statutory principle recognizing harbour as a public asset and a natural heritage of Hong Kong people and no one can reclaim the harbour under exceptional circumstances. Also, all public officers and public bodies must follow the principles stipulated in the PHO before reaching a decision on any harbour reclamation works. Given the special power by this Ordinance, any unnecessary project was stopped to carry out in the Victoria Harbour.

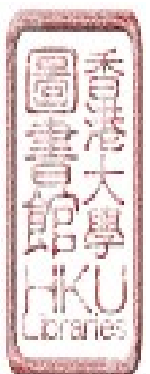
The Section 3 of the Protection of the Harbour Ordinance provides that (Hong Kong Government, 1999b):

- (1) “The harbour is to be protected and preserved as a special public asset and natural heritage of Hong Kong people, and for that purpose there shall be a presumption against reclamation in the Hong Kong harbour.” (Cap. 531 Section 3(1) )

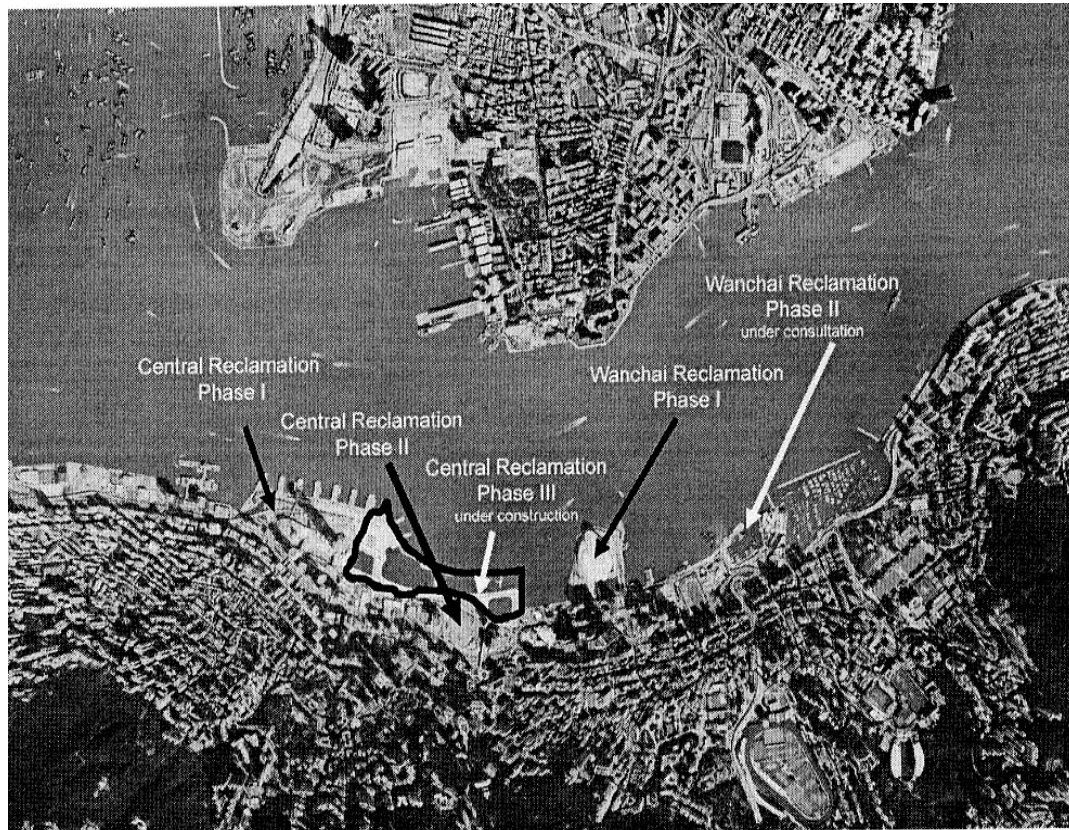


(2) “All public officers and public bodies shall have regard to the principle stated in sub-section (1) for guidance in the exercise of any powers vested in them.” (Cap. 531 Section 3 (2) )

The legislation of Protection of the Harbour Ordinance is not only a milestone in Hong Kong harbour protection, but also becomes a legal basis to challenge the government in reclaiming harbour issues. After the handover, strong objection to reclamation plans is continuously growing among political parties, professional groups, environmental groups and the general public. Professional groups including the Hong Kong Institutes of Engineers, Architects and Surveyors all opposed to the government reclamation plans and requested to reduce the area of reclamation by more than 70 per cent (Lee et al., 2013). In 1998, the Society for the Protection of Harbour led numerous conservation groups and even the private developers to jointly protest against the proposal of sea reclamation at Kowloon Bay and Central, Wanchai Reclamation Projects. At that time, Christine Loh proposed to amend the ordinance which extends the protection area from the entire central harbour area of Green Island to Lei Yue Mun. Due to strong social opposition and lack of support from major political parties, the government was forced to withdraw the project and review the reclamation proposal. In 1999, the former Chief Executive announced to downsize the reclamation plan for the Harbour and to follow the ‘Principle of Sustainable Development’ as a major request of the public (Hong Kong Government, 1999a). At the same year, the government proposed the minimum reclamation option to reduce 40 per cent of reclaimed area and 96 per cent for commercial purpose to the LegCo Panel on Planning, Lands and Works (Lee et al., 2013).



**Figure 5: Five phases of reclamation in the harbour area (Source: Ng, 2006)**

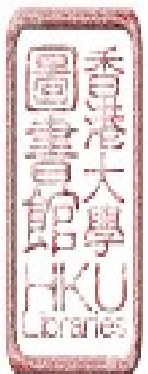


## **CHAPTER 6**

### **FORMULATION OF RECLAMATION POLICY IN YEAR 2000 AND AFTER**

#### **6.1 PREVIEW**

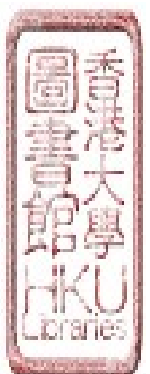
After year 2000, there has been strong aspiration of protecting Victoria Harbour as a natural asset, the government has been very cautious in carrying out reclamation. Land created by reclamation has significantly declined, from about 500 to 700 hectares every five year to 84 hectares in 2005 to 2009 (Civil Engineering and Development and Planning Department, 2013). As mentioned in the previous chapter, policy formulation and implementation belong to the executive-led and top-down nature by which the whole policy-making process was carried by the executive-led government with efficiency. What are the factors affecting the government to open the policy formulation and implementation process by engaging the public? The civil protection of Victoria Harbour is a turning point in the Hong Kong Government policy-making procedures as it has gradually shifted from the ‘top-down’ perspective and focused more on the interaction between the public authority and the Hong Kong citizens. The harbour protection campaign did not only raise public awareness of harbour issues, but also successfully developed a civil society where people learnt they can demand the government to become more accountable, transparent and responsive in policy formulation and implementation (Lee et al., 2013). Civil engagement has been widely adopted and practice in Hong Kong government’s policy making and implementation nowadays in order to actively involve citizens in public governance. Lee et al. (2013) further explained that civil engagement should include the following elements:



- To inform the public with balanced and objective information and to assist them in understanding the problem, alternatives, opportunities and solutions
- To obtain feedback on analysis alternatives and decisions
- In involving citizens, a government would work directly with the public throughout the process to ensure that public concerns are understood and considered
- To act a public partner in each aspect of decision making and identification of the preferred solution
- To empower citizens' power to make final decision in the policy formulation and implementation process

## **6.2 CIVIL ENGAGEMENT PROCESS IN RECLAMATION POLICY**

Since the enactment of Harbour Protection Ordinance and the government losing the court case to the Society for Protection of the Harbour (SPH) in 2003, the government had to reconsider a number of developments involving Victoria Harbour reclamation. The High Court ruled that the Town Planning Board's wrongly interpreted of Section 3 of the Protection Harbour Ordinance and should only carry out harbour reclamation projects unless they are overriding public interest. This prompted the government to change the attitude from making the decision alone to being inclusive of more public opinions. In 2003, the half-million protest march marked the rising of civil society and demanded the government to introduce a more inclusive public policymaking process. In response to the public demand for more engagement in policy making, the government set up a tripartite advisory committee, the Harbour-front Enhancement

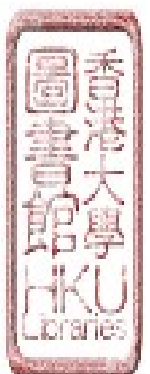




Committee, with members drawn from the government, the private sector and civil society organizations (Cheng, 2013). The principal task of Harbour-front Enhancement Committee is to provide suggestions and advice regarding construction on both shores of Victoria Harbour, and conduct public engagement activities (Harbou-front Enhancement Committee, 2010). The committees had conducted five public forums in 2005 in the development of Wan Chai Development Phase 2. Apart from the Wan Chai Reclamation Phase 2, the Harbour-front Enhancement Committee was also the consultative body of the Kai Tai Zoning Plan approved in 2002. A three-stage public engagement was adopted between year 2004 and 2006 and the new Outline Zoning Plans were approved in 2007 (Planning Department, 2007). Cheng (2013) commented that the participatory planning process of Kai Tak Review was historic and unprecedented because it is the first time the government officials and public can plan the project together. During Tsang administration, he had quick picked up the rhetoric of the activists such as envisioning and consensus building in its engagement activities (Cheng, 2013).

In 2007, the Court of Final Appeal emphasised the Victoria Harbour is a ‘special asset’ and a ‘natural heritage’ and reassured any works of reclamation should fall under the constraints of the Protection of the Harbour Ordinance in the judgement. The government can only carry out reclamation and development projects outside the Victoria Harbour.

Due to the constraint in harbour reclamation, the government proposed to build up an abundant land reserve by reclaiming land outside Victoria Harbour that set out in the Chief Executive C.Y. Leung 2013 Policy Address (Hong Kong Government, 2013a). The Planning Department also carried out the “Enhancing Land Supply Strategy

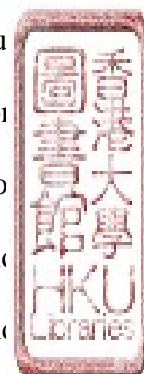


Reclamation Outside Victoria Harbour and Rock Cavern Development” study and two stages of public engagement process. The study suggested total area of the five near shore reclamation sites with 600 hectares, including Lung Kwu Tan, Siu Ho Wan, Sunny Bay, Tsing Yi Southwest, Ma Liu Shui. In addition, the study suggested 3 sites as pilot schemes of Rock Cavern Development, including Diamond Hill Fresh Water and Salt Water Service, Sai Kung Sewage Treatment Works, and Sham Tseng Sewage Treatment Works (Civil Engineering and Development Department and Planning Department, 2013a).

Public engagement exercise has been an important element in the formulation and implementation of government’s reclamation policy nowadays and will still be the resolution to resolve the conflict on reclamation project in the future.

### **6.3 CASE STUDY: LAND RECLAMATION OUTSIDE VICTORIA HARBOUR-25 PONTENTIAL RECLAMATION SITES PLANNED BY GOVERNMENT**

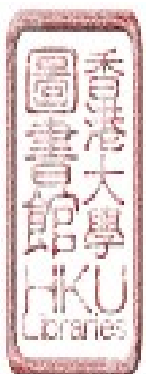
The government has used multiple means to enhance the land supply in Hong Kong, however, reclamation outside Victoria Harbour is one of the many options now the government can use due to the reclamation banning in the Harbour area. In 2012, the government has chosen 25 possible reclamation sites and they were divided into four categories (comprising artificial islands, reclamation to connect islands, reclamation upon artificial or disturbed shoreline and reclamation on sites close to natural but not protected shoreline) (Development Bureau, 2012). Although the 25 sites can avoid reclamation projects in statutory protected areas, such as fish culture zones and





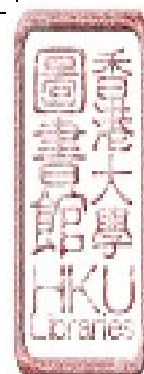
Victoria Harbour to boost the land supply in Hong Kong, green groups have great concern about the environmental impacts such as reduce in the coral habitat and fish species brought by the project (Green Power, 2012). According to the final report of “Reclamation Outside Victoria Harbour and Cavern Development 2014” published in Chinese version, the government has chosen 5 areas for future reclamation, including Siu Ho Wan, Sunny Bay, Tsing Yin Southwest, and Ma Liu Shui (Civil Engineering and Development Department, 2014).

According to the report, Siu Ho Wan is near the airport and can link up with major trunk road and infrastructure. The Sunny Bay can be developed as an entertainment and business region which will foster the economic development and tourism of Lantau and Hong Kong. The Tsing Yi Southwest can be developed as a new Container Terminal 10 and the Ma Liu Shui can be developed as a residential site.



**Table 4: Twenty five reclamation sites suggested by government (Source: Green Power, 2012)**

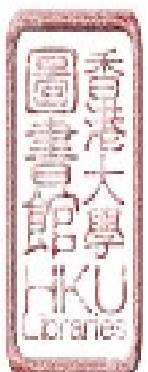
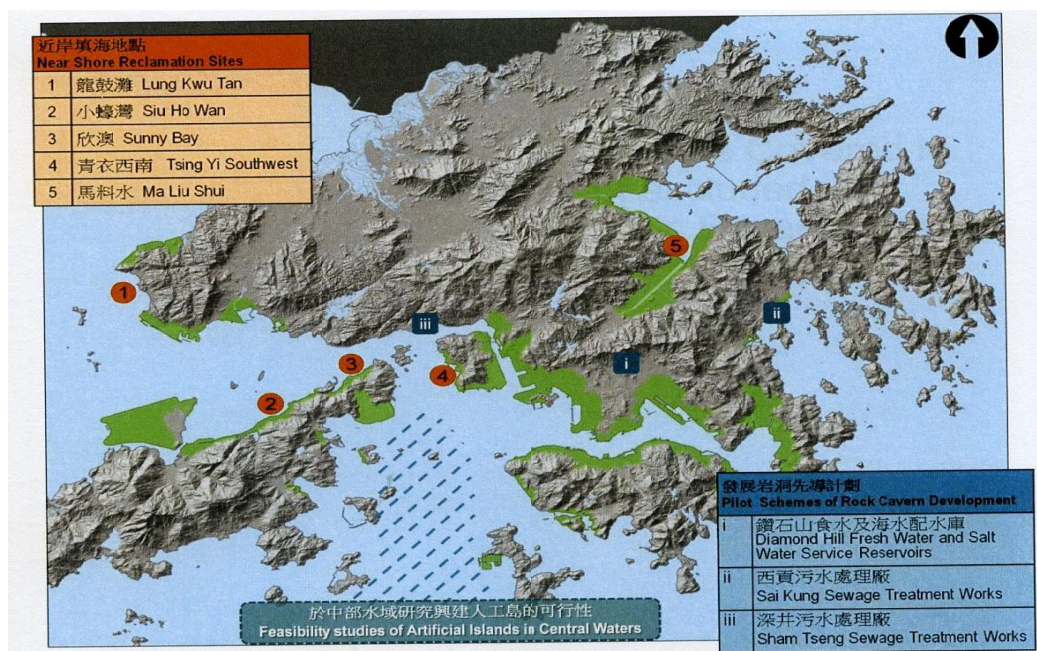
	Type	Possible Reclamation Site	Reclamation area
1	Artificial Land	Hei Ling Chau West	Large > (100 ha)
2		South Cheung Chau	Large
3		Lamma North	Large
4	Reclamation to Connected Islands	Peng Chau-Hei Ling Chau	Large
5		Eaufort Island	Large
6	Reclamation upon Artificial or Disturbed Shoreline	Tuen Mun Area 40	Medium (>33-99 ha)
7		Tuen Mun Area 27 (Sam Shing)	Small (>10-29 ha)
8		Tsing Lung Tau	Small
9		Siu Ho Wan	Large
10		Sunny Bay	Medium
11		Southwest Tsing Yi	Large
12		Silver Mine Bay South	Small
13		Tai Po Industrial Estate	Small
14		Tai Po Kau	Medium
15		Ma Liu Shui	Medium
16		Sandy Bay	Small
17		Lamma Quarry	Small
18		Tesung Kwan O East	Medium
19	Reclamation upon Natural but not Protected Shoreline	Lung Kwu Tan	Large
20		Tai Lam Chug	Medium
21		Silver Mine Bay North	Small
22		Shuen Wan	Small
23		Wu Kai Sha	Medium
24		Tseung Kwan O Area 131	Small
25		Shek O Quarry	Small



**Figure 6: Twenty five reclamation sites suggested by government (Source: Green Power, 2012)**



**Figure 7: Five potential reclamation sites proposed by government (Source: The University of Hong Kong Social Sciences Research Centre, 2014)**

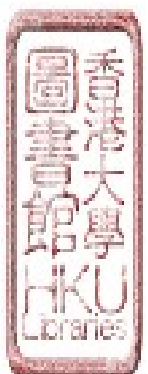


### **6.3.1 CASE STUDY: TUNG CHUNG EAST AND WEST PROPOSED RECLAMATION**

In 2012, the Planning Department and the Civil Engineering Department have jointly devised the study of extending Tung Chung area. It includes the proposed of 120 hectares of reclamation in Tung Chung East to house around 110,000 populations and provide 38,000 residential flats, and the Tung Chung West to provide 14 hectares of land for development and conservation balance, such as building eco-trails to connect the internal Tung Chung areas (Planning Department and Civil Engineering Department and Development, 2013b). Other facilities such as two new MTR stations, promenades, town parks, cycling tracks can also be provided by the planning project (Legislative Council Panel on Development, 2013).

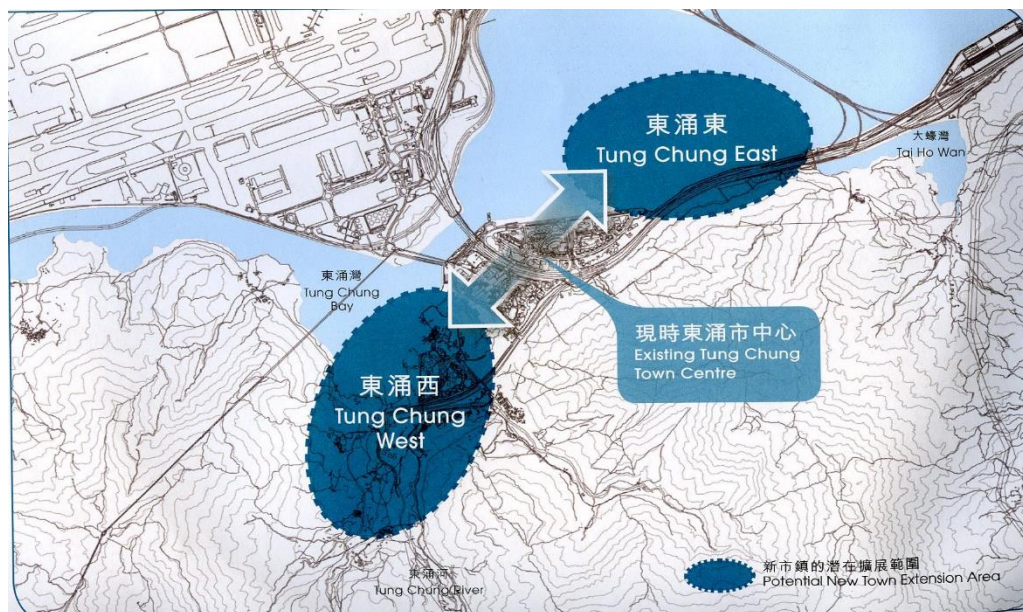
The feasibility of enlarging the Tung Chung area has considered the below reasons mentioned by the two departments after first stage of engagement (Civil Engineering and Development Department and Planning Department, 2013b):

- (1) Meeting housing demand
- (2) Improving connectivity and transport infrastructure
- (3) Providing balanced allocation of community facilities and open space
- (4) Promoting economic development through commercial activities and tourism
- (5) Adopting sustainable urban design in living environment
- (6) Preserving heritage and ecological value of Tung Chung West





**Figure 8: Tung Chung East and Tung Chung West reclamation plan proposed by government (Source: Civil Engineering and Development Department and Planning Department, 2013b)**



### 6.3.2 HONG KONG- ZHUHAI-MACAU BRIDGE RECLAMATION PROJECT

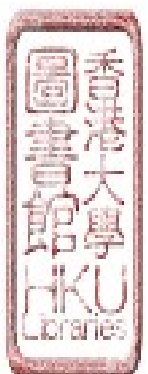
The Hong Kong-Zhuhai-Macau Bridge is one of the largest infrastructural projects among three places, Hong Kong, Zhuhai, and Macau in the Pearl River Delta Region, which included in the National High Speed Road Network Planning. It includes four major projects, including the Main Bridge, Hong Kong Boundary Crossing Facilities, Zhuhai Boundary Crossing Facilities, and Macau Boundary Crossing Facilities. Early in 1997, the Planning Department of Hong Kong appointed MVA Consultants to conduct a study on new cross-border road connections and the study forecasted the bulk of traffic flow between Hong Kong and Mainland up to the year 2020 would be in the eastern part and the bridge project is not an urgent need (Li, 2003). In 2001, the



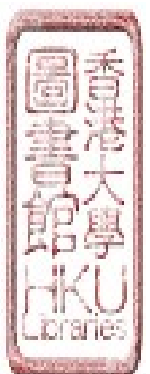
Chairman of the Hopewell Group of Hong Kong proposed to build a bridge to link Hong Kong's International Airport, Macau, and Zhuhai on the west side of the Pearl Estuary so as to strengthen Hong Kong's position as the air and sea transport hub of South China (Li, 2003). The proposal is known as "Central Alignment" and sometimes referred to as the "Single Y-shaped" Bridge with two landing points in Zhuhai and Macao on the western side of the Bridge. In December 2010, the Director of Hong Kong-Zhuhai-Macau Bridge Authority signed the Contract for Design and Build of Tunnel and Artificial Islands of the Hong Kong -Zhuhai - Macau Bridge Main Bridge with a contract price of 13.1 billion yuan. It was regarded as the core and the most critical part of the Main Bridge project. The bridge will be built across the mouth of the Pearl River Delta comprising a total length of approximately 42km, of which approximately 30km will be in mainland and approximately 12km will be within Hong Kong territory (Hussain et al., 2011). The link will also comprise of border facilities on reclaimed land in Zhuhai and Hong Kong, with 30km of sea-crossing road, 5 km of immersed tunnel, two artificial islands, and 2 km of at-grade road and 2 km of cut and cover tunnel (Hussain et al., 2011).

As one of major infrastructure projects in Hong Kong, the Hong Kong-Zhuhai-Macau Bridge will be located on a 150 hectares reclaimed land. The project involves reclamation of 130 hectares of lands from open waters off the northeast of Hong Kong International Airport and construction of a numbers of buildings and transport facilities on the artificial island to provide passenger and cargo facilities. The remaining 20 hectares of reclaiming land is for the southern landfall of the Tuen Mun -Chek Lap Kok Link (Highways Department, 2012).

The reclamation carried out in Hong Kong has a lot of impacts on environment in



different aspects. In air pollution aspect, fugitive dust is generated from various construction activities (excavation, stockpiling, barging, infrastructure works) and vehicular emission from road traffic. In noise pollution aspect, the cumulative noise arises from Hong Kong Bridge Crossing Facilities and Hong Kong Link Road, such as mechanical equipment used for construction, which includes excavators, trucks, hydraulic breakers, concrete equipment and the noise produced by the traffic travelling around the reclamation sites. It also involves the potential contaminants released into waters during dredging, such as metals, ammonia, trace organic contaminants. In addition, the dredging activities generate a variety of wastes, including dredged marine sediment, chemical waste, and general refuse. Furthermore, the reclamation works affect the ecological habitat around the construction site. For instance, it causes the habitat losses in the subtidal and intertidal zones, as well as terrestrial habitat loss of developed area of grassland and shrubland even though the report claimed the ecological habitats are low (Highways Department, 2003). Most importantly, the major impact is the loss of habitat for the Chinese White Dolphins. All the other impacts mentioned here are typical for any major reclamation projects.



## **CHAPTER 7**

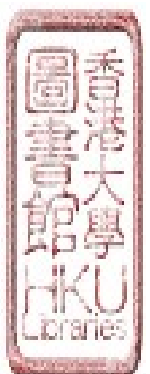
### **RECLAMATION AND ITS ENVIRONMENTAL IMPACT**

#### **7.1 PREVIEW**

Reclamation produces valuable lands around harbour areas and has played a significant role in urban development of Hong Kong. It provides lands for economic development, roads, infrastructural facilities, and waterfront parks for leisure activities. However, reclamation land from sea has become a controversial issue when conservation groups and environmentalists are concerned about the scale of proposed reclamation plan and its impacts on the environment. The significant impacts on environment include the damage of natural heritage and marine ecosystems, water pollution, and disruption of the coastline. Although there is a Protection Harbour Ordinance to restrict the reclamation work in Victoria Harbour, the Government has been suggesting 25 reclamation sites to avoid statutory protected areas.

#### **7.2 THE EXISTING ORDINANCE AND LAW REGULATING THE ENVIRONMENTAL IMPACT OF RECLAMATION IN HONG KONG**

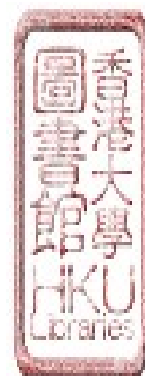
Reclamation activities have significant impact on environment in different aspects and there are different ordinance and law governing and control those adverse effects on environment.





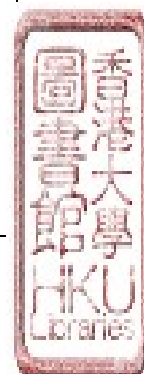
(1) Cap. 499 Environmental Impact Assessment Ordinance (Hong Kong Government, 1998)

Firstly any designated projects listed in Cap.499 Environmental Impact Ordinance Schedule 2 and 3 are required to undertake environmental impact assessment (EIA) and Get the Environmental Permit before the commencing of the project. The details are listed as below (EPD, 2012). It aims to avoid, minimize, and control the adverse impacts on environment.



**Table 5: SCHEDULE 2 - Designated Projects Requiring Environmental Permits**

Category	Designated Projects
c - Reclamation, hydraulic and marine facilities, dredging and dumping	<p>C.1 Reclamation works (including associated dredging works) more than 5 ha in size.</p> <p>C.2 Reclamation works (including associated dredging works) more than 1 ha in size and a boundary of which(<i>a</i>) is less than 500 m from the nearest boundary of an existing or planned---</p> <ul style="list-style-type: none"> <li>(i) site of special scientific interest;</li> <li>(ii) site of cultural heritage;</li> <li>(iii) bathing beach;</li> <li>(iv) marine park or marine reserve;</li> <li>(v) fish culture zone;</li> <li>(vi) wild animal protection area;</li> <li>(vii) coastal protection area;</li> <li>(viii) conservation area;</li> <li>(ix) country park; or</li> <li>(x) special area;</li> </ul>



(2) Cap. 127 Foreshore and Sea Bed (Reclamations) Ordinance (Hong Kong Government, 1997a)

Under this ordinance, any person who considers that he is affected by the reclamation proposal can lodge an objection in accordance with section 6

(3) Cap. 531 Protection of the Harbour Ordinance (Hong Kong Government, 1999b)

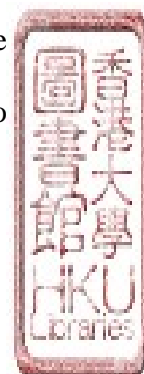
It was enacted in 1997 in order to protect and preserve the harbour by establishing a presumption against reclamation in the harbour. The section 3(1): “The harbour is to be protected and preserved as a special public asset and a natural heritage of Hong Kong people and for that purpose there shall be a presumption against reclamation in the harbour”.

(4) Cap. 131 Town Planning Ordinance (Hong Kong Government, 1997b)

Reclamation proposals and with associated land uses are governed under the relevant Outline Zoning Plans for the public inspection in accordance with the Town Planning Ordinance. It provides the functions of protecting the environment and promoting conservation as some areas are refrained from reclamation, such as country park, green belt, and designated coastal protection areas.

(5) Cap 358 Water Pollution Control Ordinance (Hong Kong Government, 1997c)

It aims to control the water pollution in waters of Hong Kong. In 1997, the water quality objective for the Victoria Harbour Control Zone was set up in order to monitor the water quality in Victoria Harbour.



(6) Cap 311 Air Pollution Control Ordinance (Hong Kong Government, 1997d)

It aims to limit and control the contamination of air in Hong Kong to safeguard the health and well-being of the community.

### **7.3 RECLAMATION IMPACT ON MARINE ENVIRONMENT AND MARINE ECOSYSTEM**

Land reclamation can have adverse effect on the marine environment and marine ecology from dredging works. With the new technology, the reclamation is no longer limited to filling rocks and soils in the reclamation area. Instead, marine dredging has become the most frequently used methods in sea reclamation nowadays. Dredging is defined as raising material from the bottom of a water-covered area to the surface and pumping it over distance (Herbich, 2000). The dredging process execution can basically be divided into four phases which were explained clearly by Bray (2008) and these four phases are:

#### **(1) Dislodging of the in-situ material**

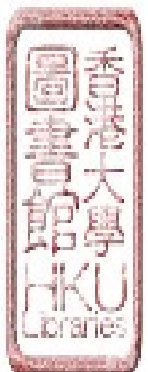
The first phase process to remove the whole volume en masse.

#### **(2) Raising of the dredged material to the surface**

The second phase is to dislodge dredging materials towards the water surface either mechanically or hydraulically.

#### **(3) Horizontal transport**

The third phase is to transport the excavated material from the dredging area to the site



for further treatment.

#### (4) Placement or further treatment

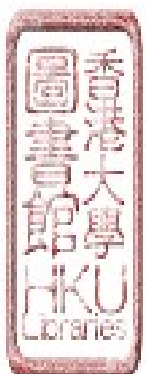
The final phase of a dredging project is to relocate excavated material to its final destination. There are different options for dredging material relocation, such as beach nourishment, wetland creation, and relocation at sea.

Bray (1997) summarized the processes of dredging projects by the following features:

- (1) relocation of large quantities of material
- (2) compact soil
- (3) undistributed soil layers
- (4) low contaminant
- (5) significant layer thickness
- (6) non-repetitive dredging activity

The Convention for the Protection of the Marine Environment of the North East Atlantic (2008) investigated the land reclamation activities normally take place along the coast and near-shore marine habitats, such as sandbanks, estuaries, mudflats, salt marshes, and halophytic habitats, as well as species. Also, reclamation from sea can cause permanent loss of marine habitats and influence habitat types of coastal and terrestrial origin such as sand dunes and freshwater bodies.

Bray (2008) pointed out that the dredging and reclamation operation can have both direct and indirect effects on the marine ecosystem. Direct effects include the removal of habitat. For example, coral would not be able to survive due to high turbidity which

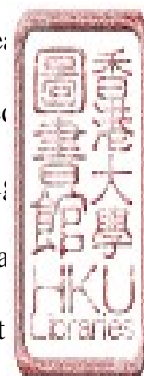


arises from reclamation activities. Indirect effects include the release of contaminated sediments from the dredging operation that may also cause harm to human health, such as the risk of acute toxic effects.

Schipper (2009) proved that dredging works in the Dutch coastal zone produced disposal sediment at sea which enhanced concentrations of suspended particulate matter that may interfere with food intake of filter-feeding benthic organisms and the benthic community. In addition, harbour disposal sediments contain persistent organic pollutants, including polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), tributyltin (TBT), polybrominated diphenyl ethers (PBDEs), polychlorinated dibenzodioxins (PCDDs), heavy metals, which can biologically accumulate in aquatic species and affect human health.

Mostafa (2012) studied the dredging operations and land reclamation impact on biological resources from physical and chemical environment. The study showed the major alterations of environment including suspended sediments, sedimentation, chemical release, and dissolved oxygen level reduction. The biological impacts of marine sediments extraction are the disturbance and removal of benthic infauna and epifauna.

In Hong Kong, dredging and dumping operations in reclamation process caused irreversible damage to the fishing areas and ecologically important habitat in sea waters. Ng and Cook (1997) mentioned that the amount of marine sand dredged between 1995 and 2000 was estimated to be 260 million cubic metres. This dredging works made heavy metals deposited in the seabed, thereby polluting the harbour area. According to the 2011 environmental impact assessment (EIA) report of the project



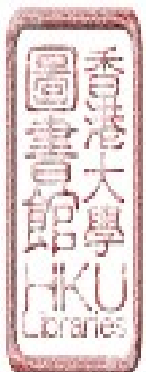
of Wanchai Phase 2 and Central-Wanchai By-pass, there were significant impacts on marine ecological resources in the reclamation works. From the assessment report, the following are the direct and indirect impacts of the projects (Environmental Protection Department, 2011):

**(1) Direct Impact:**

- Permanent loss of approximately 12.7 hectares of soft bottom seabed and subtidal habitat along the Wan Chai and North Point Shoreline for land reclamation
- Temporary loss of approximately 2.4 hectares of soft bottom seabed and subtidal habitat for the temporary typhoon shelter
- Temporary loss of approximately 0.4 hectare of soft bottom seabed and subtidal habitat at the eastern end of Wan Chai Shoreline for temporary reclamation
- Temporary loss of approximately 1 km long artificial intertidal habitat due to reclamation
- Permanent loss of approximately 850 m long artificial intertidal habitat for temporary reclamation

**(2) Indirect Impact**

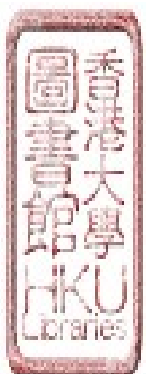
- Potential indirect impacts to the marine habitats and the associated fauna would include changes in water quality due to dredging activities of seabed sediment
- Dredging and reclamation activities would temporarily elevate the suspended sediment level and create sediment plumes. Benthic epifauna could be susceptible to the effects of increased sediments load



- Sediments in the projected area are contaminated with heavy metals and organic pollutants. Turbulence caused by dredging activities could release these substances to the water column.
- Inorganic nitrogen and phosphorous may also increase during dredging activities. High levels of nutrients of seawaters can cause rapid increase in phytoplankton where algae boom occurs.
- During the marine construction works, increased marine traffic and noise generated from construction plant and dredging activities could cause disturbance to the associated water birds.

The building of Chek Lap Kok Airport and its associated infrastructure works depend on suction dredged for marine sand at the sea bed in the Southeastern waters of Hong Kong. Leung and Morton (1995) proved the dredging activities, including survey, pre- and post-dredging activities at the designated areas of sea bed, have reduced the species richness, abundance and diversity of both the *Gastropoda* and *Bivalvia*. *Gastropoda* and *Bivalvia* are shell-bearing mollusca which are excellent dredging monitors of dredging operations (Leung and Morton, 1995). The survey showed that there had been a 60% decline in both species richness and abundance of both the *Gastropoda* and the *Bivalvia* in the southeastern waters of Hong Kong. In addition, the Port and Airport Development Strategy (PADS) involved a disposal of more than 330 million cubic meters of mud which was originated from areas around Victoria Harbour. The filled mud was mostly contaminated by heavy metals and organic pollutants which had toxic effects on molluscs.

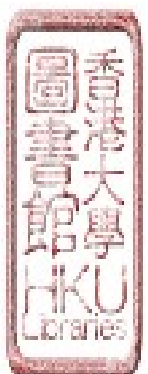
As previously mentioned in chapter 3, the core development programme of the new airport included the building of 34 km of new expressways, an express rail line





between the airport and the urban areas of the territory, one of the world's longest suspension bridges (Tsing Ma Bridge), a third cross-harbour tunnel (Western Crossing Harbour Tunnel) linking Hong Kong and Kowloon, and a major new town development at Tung Chung on Lantau Island (Liu and Hills, 1997). The reclaiming work of Chek Lap Kok airport platform itself commenced in 1993 and the scale of the reclamation were massive and unprecedented in the Hong Kong reclamation history. It was the world's fourth largest reclamation project which extended 1248 hectares and was completed in June 1995 (Liu and Hills, 1997). Esima (2006) stated that the airport's Site Preparation Contract (SPC) involved 76 million cubic meters of dredged sand and 106 million cubic metres of dredged mud at the reclamation site, which was the largest single reclamation contract. Due to impact of dredging, the Airport Authority and the Government have carried out extensive impact assessment studies in the development of Chek Lap Kok Airport to identify potential impacts on marine ecology with the project. The potential impact was mainly caused by reclamation, dredging, dumping and disturbance to fauna due to the dispersion of suspended sediment (Liu and Hills, 1997).

In connection with the impacts on marine ecology, the airport reclamation projects also seriously disrupted the habitat of Chinese White Dolphins (*Sousa Chinensis*) due to dredging works. The dredging activities at the waters of North Lantau Island caused marine pollution and had affected the fishery sources which led to a decrease in food supply for the dolphins. Liu and Hills (1997) pointed out that the Chinese White Dolphins could be found over a quite extensive area to the north and west of Lantau Island and to the west of the Western New Territories. However, the number of white dolphins had been declining or under threat in local waters attributed to a substantial loss of the shallow, sheltered, habitat favoured by the white dolphin. Morton (1995



also provided evidence that the number of dolphin strandings reported increased between 1994 and 1995, with nine and five more had been recorded up to 1 July 1995. This remarkably proved that the Chinese White Dolphins have been under threat of reclamation and other anthropogenic activities.

The green group, Green Power, conducted a research on the overall annual counts of Chinese White Dolphins. The study found that the Chinese White Dolphins near Lantau has declined seriously for about 50 percent due to the large reclamation projects of Hong Kong - Zhuhai -Macau Bridge, reclamation work for new town at Tung Chung; only 75 dolphins were found in 2010 when compared with 158 dolphins found in 2003 (Green Power, 2011).

The government has now suggested 25 reclamation sites beyond the Victoria Harbour, but many chosen places still have high ecological value. The Green Power pointed out that some potential reclamation sites chosen by government are home to mangroves. For instance, Tai Tam Inner Bay to North of Shek O Quarry has the only mangrove forest on Hong Kong Island. Another site is Ting Kok near Shuen Wan is the largest mangrove forest in Hong Kong outside Deep Bay (Green Power, 2012). Mangroves have high ecological value and provide habitat for many marine species, such as carabs and shells. Another example is the reclamation in Lung Kwu Tan. The reclamation work there will threaten the home to Horseshoe Crab there (Green Power, 2012).

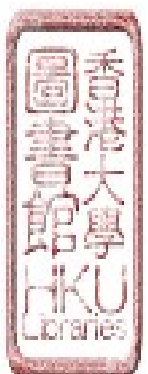


## 7.4 RECLAMATION IMPACT ON WATER QUALITY

Reclamation in Hong Kong in early days resorted to excavating into hill slopes and the complete removal of small hills. However, there has been rising environmental concern on the damaging of natural hillside landscape and the short-term aspects of dust and traffic impacts from excavating, processing, and transporting of fill materials. Dredging was a method discovered by engineers to replace excavation to source the reclamation fill (Esima, 2006).

Dredging also has a significant impact on the water quality in Hong Kong. The impacts are usually caused by a significant amount of suspended solids generated in dredging process and dredged mud disposal which may pollute the surrounding waters. In addition, the dredged mud is usually contaminated with heavy metals, such as silver, mercury, arsenic, copper and zinc released into the water and dropped to the seabed. The dredged mud generated in the reclamation process will be dumped at the undersea mudpits at Sha Chau, or at the South Brothers Island facility. The less toxic mud will be abandoned at south of Cheung Chau, and the ninepins Islands.

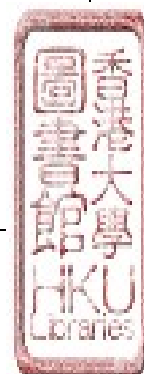
The Victoria Harbour had been subject to different kinds of pollution, such as discharge of effluents loaded with heavy metals, dyeing and finishing from factories attributed to thriving manufacturing and rapid economic growth in the 1970's and 1980's. As a result, vast amounts of contaminated sedimentary mud were deposited on the sea bed and distributed through Victoria Harbour. The reclamation of Victoria Harbour further exacerbate the water pollution problem because the dredge of shipping channels to remove mud for land reclamations can disperse the contaminated sedimentary by strong currents. The Victoria Harbour reclamation area produced contaminated mud



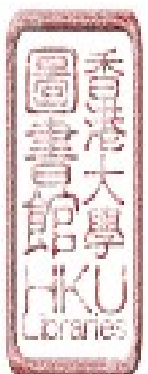
which can cause serious pollution in the harbour area. The below tables shown the metal distribution sediments which were found in the Victoria Harbour.

**Table 6: Metal distribution in Victoria Harbour sediments (Source: Environmental Protection Department, 1990)**

Metal	Concentration (mg/kg)	Location
Copper	>3, 600 >700 >100	Outer Kai Tak Rambler Channel, Kowloon Bay Majority of HK harbour sediments
Chromium	>100	Outer Kai Tak Nullah, Kowloon Bay, Yau Ma Tei, Rambler Channel
Cadmium	>7.5 >2.0 >1.0	Outer Kai Tak Nullah Yau Ma Tei Majority of HK harbour sediments
Lead <sup>5</sup>	>50	Majority of HK harbour sediments notably outer Kai Tak Nullah, Yau Ma Tei, Rambler Channel and Causeway Bay
Zinc	>100	Majority of HK harbour sediments notably outer Kai Tak Nullah, Yau Ma Tei and near West Kowloon submarine outfalls
Nickel	>20	Majority of HK harbour sediments notably outer Kai Tak Nullah, Yau Ma Tei, Rambler Channel and Belcher Bay
Mercury	>10 >6 >2	West Kowloon (south) Central/Wanchai, Rambler Channel, Majority of HK harbour sediments



**Figure 9: Locations of marine water and sediment monitoring stations in Victoria Harbour Control Zone (Source: Environmental Protection Department, 2014)**



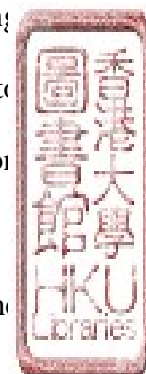
**Table 7: Metal distribution in Victoria Harbour sediments (Source: Environmental Protection Department, 2014)**

Water Control Zone	Station	Dates	Arsenic (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Cadmium (mg/kg)	Nickel (mg/kg)	Mercury (mg/kg)	Zinc (mg/kg)
Victoria Harbour	VS10	6/1/2010	6.7	62	99	0.9	27	0.26	350
Victoria Harbour	VS10	5/7/2010	8.6	67	58	0.4	26	0.15	180
Victoria Harbour	VS10	23/2/2011	6.6	60	63	0.6	23	0.11	200
Victoria Harbour	VS10	22/7/2011	8.1	48	45	0.2	22	0.13	140
Victoria Harbour	VS10	9/2/2012	9.5	56	51	0.3	26	0.17	160
Victoria Harbour	VS10	4/7/2012	8.2	64	78	0.9	28	0.18	250
Victoria Harbour	VS3	7/1/2010	7.2	48	52	0.4	23	0.27	190
Victoria Harbour	VS3	7/7/2010	11	19	42	0.2	10	0.13	85
Victoria Harbour	VS3	9/2/2011	7.2	40	47	0.3	18	0.25	150
Victoria Harbour	VS3	6/7/2011	6.8	32	39	0.3	16	0.23	150
Victoria Harbour	VS3	4/1/2012	7.8	27	38	0.2	13	0.34	110
Victoria Harbour	VS3	5/7/2012	4.3	21	29	0.2	10	0.14	85
Victoria Harbour	VS5	7/1/2010	6.7	50	63	0.6	22	0.5	300
Victoria Harbour	VS5	7/7/2010	8.1	52	70	0.9	26	0.38	290
Victoria Harbour	VS5	9/2/2011	6.9	48	56	0.6	22	0.34	210
Victoria Harbour	VS5	6/7/2011	7.6	45	69	0.7	22	0.38	260
Victoria Harbour	VS5	4/1/2012	8.1	50	62	0.8	25	0.5	260
Victoria Harbour	VS5	5/7/2012	8.4	61	72	0.9	28	0.47	330
Victoria Harbour	VS6	6/1/2010	8.6	35	86	0.4	17	0.45	190
Victoria Harbour	VS6	5/7/2010	7.3	32	60	0.3	15	0.93	150
Victoria Harbour	VS6	23/2/2011	6	34	37	0.2	16	0.2	110
Victoria Harbour	VS6	22/7/2011	6.9	26	100	0.3	13	0.97	160
Victoria Harbour	VS6	9/2/2012	8.5	43	58	0.4	23	0.37	180
Victoria Harbour	VS6	4/7/2012	7.8	28	62	0.3	16	0.4	140
Victoria Harbour	VS9	6/1/2010	8.1	41	42	0.3	21	0.14	140
Victoria Harbour	VS9	5/7/2010	8	43	40	0.2	22	0.18	130
Victoria Harbour	VS9	23/2/2011	4.8	32	25	<0.1	19	0.07	71
Victoria Harbour	VS9	22/7/2011	8	40	41	0.2	22	0.21	130
Victoria Harbour	VS9	9/2/2012	8.4	41	40	0.2	23	0.15	130
Victoria Harbour	VS9	4/7/2012	7.6	40	39	0.2	22	0.2	130

## 7.4.1 CLASSIFICATION OF CONTAMINATED SEDIMENTS IN HONG KONG

The contaminated sediments generated in dredging activities has heavy metals, such as silver, mercury, arsenic, copper and zinc released into the water and dropped to the seabed. Based on the Review of Options for Management of Contaminated Sediments in Hong Kong Report on Assessment of Management Options from Civil Engineering and Development Department of Hong Kong 2008, the sediment is classified into Category L with low contamination level, Category M with medium contamination level, Category H with high contamination level and details are stated as follow:

Category L (Low severity): Sediment with all contaminants levels not exceeding the

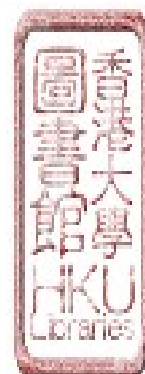


Lower Chemical Exceedance Level (LCEL). This material must be dredged and disposed of in a way which minimizes the loss of contaminants by re-suspension.

Category M (Moderate severity): Sediment with any one or more contaminant levels exceeding the Lower Chemical Exceedance Level (LCEL) and none exceeding the Upper Chemical Exceedance Level (UCEL). The material must be dredged and transported with care, and also must be isolated from environment upon final disposal

Category H (High severity): Sediment with any one or more contaminant levels exceeding the Upper Chemical Exceedance Level (LCEL). The material must be dredged and transported with great care and isolated from marine environment upon final disposal

The below Table indicated the Sediment Quality Criteria (Classification under ETWBTCW No 34/2002) (Source: the Review of Options for Management of Contaminated Sediments in Hong Kong Report on Assessment of Management Options from Civil Engineering and Development Department of Hong Kong 2008)

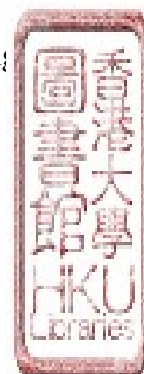


**Table 8: Sediment Quality Criteria (Classification under ETWBTCW No34/2002)**

Contaminants	LCEL (Lower Chemical Exceedance Level)	UCEL (Upper Chemical Exceedance Level)
Metals (mg kg-1 dry weight)		
Cd	1.5	4
Cr	80	160
Cu	65	110
Hg	0.5	1
Ni	40	40
Pb	75	110
Silver	1	2
Zinc (Zn)	200	270

#### **7.4.2 REGULATIONS AND GUIDELINES TO CLASSIFY AND CONTROL CONTAMINATED MUD IN HONG KONG**

Since 1992, there have been relevant regulations and guidelines to classify the contaminated mud and control its disposal in the seabed at East of Sha Chau. The regulations and guidelines are as below according to the Review of Options of for Management of Contaminated Sediments in Hong Kong Report on Assessment of Management Options from Civil Engineering and Development Department of Hong Kong 2008:





(1) Dumping at Sea Ordinance (Cap.466)

The Cap.466 Dumping at Sea Ordinance is a statutory legislation to control the dumping of sediments at sea and safeguard the water quality and ecology of Hong Kong waters.

(2) Guidance Note No.1 /2006 “Implementation of the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972”

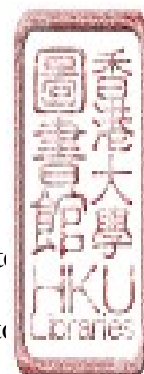
The 1996 Protocol reflects a more modern and comprehensive agreement on protecting the marine environment from dumping activities than the original 1972 Convention. It prohibits and regulates the use of a sea as a depository for wastes.

(3) PNAP 252 “Management Framework for Disposal of Dredged/Excavated sediment”

PNAP 252 provides information on the management framework for dredged and excavated sediment disposal under the Dumping at Sea Ordinance. It states all the requirements for dredging activities and provides guidance on how to obtain information on the sediment. It also outlined the procedures for assessing sediment quality and explains the marine disposal arrangements for different sediment categories.

(4) ETWB TC No.34/2002, “Management of Dredged and Excavated Sediment”

This circular sets out procedure and guideline for seeking approval to dredge/excavate sediment and management framework for marine disposal sediments. It applies to



Government and quasi Government projects which involve the dredging/excavation work must be satisfying the requirements of the EIAO. It also stated the application for approval of dredging/excavation of proposals shall be made to Secretary of Marine Fill Committee.

(5) WBTC No. 12/2000 Fill Management

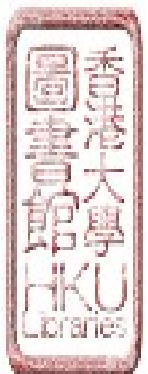
WBTC No.12/2000 Fill Management defines the responsibilities of Public Fill Committee and provides explanation on the management of fill resources and the dredged sediment disposal

## **7.5 RECLAMATION IMPACT ON AIR QUALITY**

Apart from affecting the marine ecosystem and water quality, large amounts of pollutants are also discharged from reclamation activities. Mostafa (2012) pointed out that the air quality was deteriorated as a result of the dust and particulate generated during the unloading of fill material. The effect was so significant and can affect workers on- site, workers off-site, off-site receptors, such as people using the adjacent road, land, and working in the neighboring areas within 100 meters of the site.

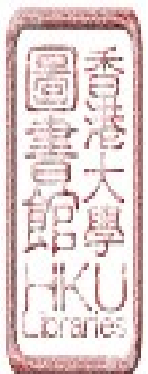
In a study review related to the assessment of reclamation effects on air quality by England Canterbury Regional Council in 2010, the council identified the following activities which produced significant effect on air quality and human health during the construction phase:

- Rock extraction and excavation emitted dust in the reclamation area



- The emission of vehicles engine during the moment in the reclamation area
- Loading and unloading
- Exposed surfaces such as stockpiles and yards
- Crushing and Screening

In Hong Kong, the project of the Hong Kong - Zhuhai - Macau Bridge (HKZB) has raised the awareness of air pollution among the residents of Lantau. Although the bridge connects Hong Kong Zhuhai City in Guangdong province and Macau which provides a convenient traffic highway, the project of the Hong Kong section had been postponed until 2011 due to the air quality problems raised from reclamation. In accordance with the EIA report study of 2009 provided by the the Hong Kong-Zhuhai Macau Bridge Hong Kong Project Management Office of Highways Department, the cumulative air impacts were in compliance with the requirement of Hong Kong Air Quality Objectives (HKAQO) and there were no significant residual impacts produced by the project. However, a Tung Chung resident, Chu Yee Wah, applied for judicial review that environmental impact assessment did not meet the requirement of the Environmental Impact Assessment Ordinance. Based on the judgement (Chu Yee Wah v Director of Environmental Protection, HCAL. 9/2010 on 18<sup>th</sup> April 2011) Chu challenged few important points in the case. Firstly, the EIA report failed to provide a quantitative ‘stand-alone’ analysis of the project even claimed these projects would have no cumulative residual air quality impact. Secondly, the EIA report failed to provide and disclose the data used in the assessment of air quality that are required by the Technical Memorandum and the Study Brief of Environmental Protection Department. Thirdly, Chu challenged the EIA report failed to assess the risk of health posed by pollutants outside the Air Quality Objectives (AQOs), such as sulphur dioxide (SO<sub>2</sub>), toxic air pollutants (TAPs), and fine suspended particulates (PM<sub>2.5</sub>)

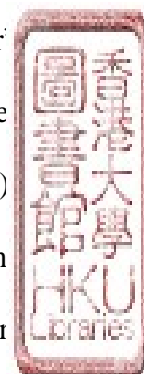


While the government lodged an appeal to the Court of Final Appeal and won the case, the judge ruled in favour of Chu that the Highway Department had to ensure that measures to be taken to minimise the pollution from a construction project. In this case, the schedule of the construction was deferred by six months and the overall cost increase for the Hong Kong-Zhuhai-Macau Bridge related projects is about HK\$6.5 billion including the cost for increase in construction prices and adjustment of construction method to compress the construction timetable (Chow, 2012).

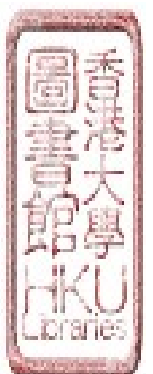
## **7.6 RECLAMATION IMPACT ON PHYSICAL ENVIRONMENT**

Reclamation is an irreversible process and poses permanent damage on the coast line of Hong Kong. The current ban on reclamation in Victoria Harbour is because the reclamation is no longer sustainable for the decreasing size of the Harbour. Ng (2006) pointed out that the distance between Hong Kong Island and Kowloon Peninsula was approximately 2,300 meters in 1841, but shrunk by 60% to 920 meters in 2006. Many people criticise the Victoria Harbour would turn into a river in the near future if more reclamation projects were carried out in there.

The shrinking of Victoria Harbour also decentralizes the shipping, and port facilities that are limited to Victoria Harbour. The scene of Victoria Harbour is more odd nowadays as the number of ships travelling between two coasts of Victoria Harbour are decreasing. The shipping activities have shifted westwards from the “inner harbour” and to in the area between Lei Yue Mun Gap and Green Island as a deep water channel is available to cater for vessels there (Planning Environment and Lands Branch, 1995). Apart from the shrinking of the Victoria, a special characteristic of concrete and man-made coast line can also be seen when we travel along two coasts of Victoria Harbour.



This proved that reclamation in the past had already made the Victoria Harbour lose its scenic value in some extent.



## CHAPTER 8

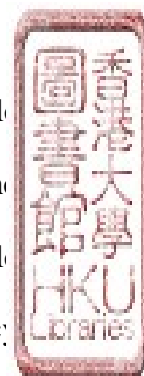
### RECOMMENDATIONS AND CONCLUSION

#### 8.1 RECOMMENDATIONS

Although reclamation will still be the easiest way to increase the land resources and adopted by government, some alternative ways can be considered to optimise the land use for reducing reclamation. According to Bertaud (1997), three elements should be considered in the measure of land supply: “(1) the total built-up area, (2) the shape of the built up area, and (3) the spatial distribution of population and jobs within the built up area”. The number of households in Hong Kong will increase from 2.4 million in 2011 to the estimated 3.1 million in 2039. Moreover, restricted land supply, high price volatility, high appreciation rate, a small group of large developers, and a huge public housing sector are also the features affecting the land uses of Hong Kong (Lai and Wang, 1999).

In view of the growing housing demand, an increase in land supply does not necessarily reduce the price of land. Moreover, the increase in the supply of reclaimed land will further discourage redevelopment efforts by the property developers in the old urban areas.

In the 2013 Policy Address entitled “Seek Change Maintain Stability Serve the People with Pragmatism”, the Chief executive stated that except reclamation outside the Victoria, the Government also regards rock caverns and underground spaces as viable sources of land supply. Studies on rock cavern master plans and formulation of policy



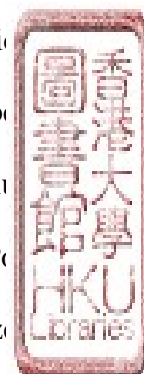
guidelines have been conducted from July 2011.

From the result of the first phrase of public consultation, a six-pronged approach is supported by the majority, including rezoning, redevelopment, resumption, reclamation outside Victoria Harbour, rock cavern development and reuse of ex-quarry site.

#### (1) Rock Cavern Development

Hong Kong is suitable for rock cavern development due to the hilly areas in the urban fringes, strong rocks and convenient access. Some above-ground facilities can be relocated to caverns systematically and new facilities can be placed in caverns to release surface land for other uses. Rock Cavern is the best location for the Not-in-my-backyard (NIMBY) facilities in urban areas and facilities with recreational or leisure uses.

Although rock carven development is a common land use strategy in some countries, high development, operation and maintenance cost are involved in developing rock caverns, so the projects may face opposition from tax payers. The overseas experience shows that the rock carven is mainly used for public utilities (e.g. power stations) and community facilities (e.g. recreational centres), so the new technology may not be able to bring economic benefits to the society. As it is a new strategy to increase land supply, the government need to conduct feasibility assessment, long-term investigative study and strategic planning to reduce potential risks and technological problems. A holistic approach should be adopted by engaging public participation so that consensus can be reached in the community. The Planning and Engineering Study for Hung Shui Kiu New Development Area (NDA), Housing Sites in Yuen Long South, Kong Nga Po and Kwun Tung South are examples of comprehensive planning efforts to optimize



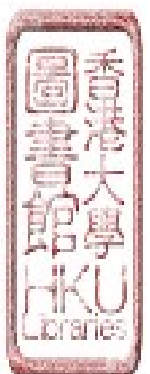
the use of brownfield sites.

## (2) Land Use Planning

In Singapore which is also facing population explosion and diverse land uses, the Urban Redevelopment Authority (URA) also suggests to develop some of the reserve land and recycle land with lower intensity uses to achieve higher land productivity (e.g. old industrial areas and golf courses) instead of solely depending on reclamation. The Master Plan, which governs land use and allocation in Singapore, is refined on a continuous basis to support the Population White Paper.

With reference to the case in Singapore, the population policy in Hong Kong (which is under Steering Committee on Population Policy of the Chief Secretary for Administration's Office established in 2007) should also be in line with the Town Planning Department or other bureaus so that the relevant stakeholders can keep well informed of the population changes and the unexpected demands for the land can be controlled (Singapore Government, 2013).

In Hong Kong, the government plays a dual role of landlord and administrator which needs to balance economic efficiency, social welfare and environmental sustainability. Therefore, the proposed land use in Hong Kong should be more diversified. For example, housing land use only composes of about 17% in the planned land supply in Singapore in 2030. The other land uses are categorized into parks and nature reserve (9%), community, institution and recreation facilities (7%) and industry and commerce (17%) in order to maintain the sustainability and balance of the future development. The Multiple Intensive Land Use (MILU) model in Hong Kong has been widely adopted by the other countries.





### (3) Use of Brownfield sites

Brownfield sites are the land previously used for industrial purposes or some commercial uses. Better utilization of the inhabited brownfield sites can also be an alternative to increasing land supply. Their land uses can be converted for more suitable uses through revitalization, rezoning and use of ex-quarry sites.

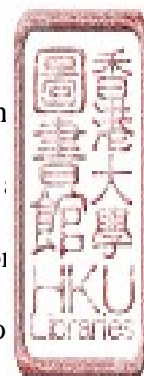
The advantages of this solution are as follows:

- (a) Although urban renewal can improve the living conditions of the residents by demolishing the old buildings, disturbance to the local culture and livelihood is inevitable. As the target brownfield sites are not for the inhabitation originally, there is less concern on the relocation of the whole community and the incompatibility of the new buildings to the surrounding environment.
- (b) Comparing with resumption of country parks, the impact to the environment can be reduced and the natural assets can be sustained.

### (4) Easing the traffic congestion

The purpose of reclamation of the Victoria Harbour is to provide more roads to alleviate the overloaded traffic on the Hong Kong Island. This is owing to the centralization of activity centres for government and commercial functions in the early development of Hong Kong.

As there has been a significant increase in both cross border passenger and freight traffic between Hong Kong and China (Yeh, 1995) from the 1990s, there should be a more comprehensive transportation network covering the New Territories, Kowloon and Hong Kong Island to reduce the traffic burden in the Hong Kong Island. For



examples, more infrastructures can be provided in new towns for the expanding hub functions of Hong Kong and more integrated urban development strategies can be implemented.

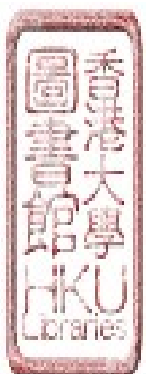
#### (5) Underground spaces

The possibility of linking up the underground spaces of existing or planned structures in the urban areas can be investigated.

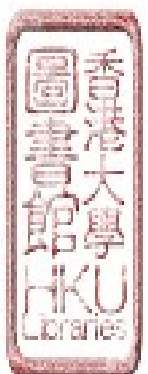
However, this solution is not used to increase land supply for residential uses. Similar to rock carven development, the government also needs to undertake a thorough research study on the feasibility and possible risk caused by the construction work.

## 8.2 CONCLUSION

As land resources have always been limited and the mountainous geographical constraints of Hong Kong, reclamation has become a fastest way to get the land resources to support the economic development and address the housing needs for the past few decades. Before the 1997, under the executive-led government in addition to the rapid economic growth, reclamation plans could be carried out easily in Hong Kong. Also the government's policy biased to property development and its significant interest in the land market regarding land sales revenue is an important source of revenue. Under the British rule, the top-down approach characterized its reclamation and planning policy. At that time, lands were easily to reclaim around the coasts of Victoria Harbour and for development of new town and large infrastructural projects. However, this policy formulation and implementing process had changed after 1997

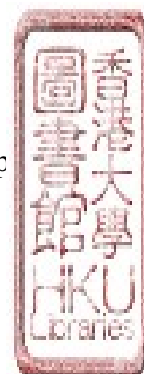


for the rising of civil society and concerns of environmental conservation by green groups. This prompted the government necessary changing bottom-up approach in order to engage the general public in participating in reclamation and some large planning projects. Public engagement has usually taken in the form of district forums, community workshops. Reclamation works around the coasts of Victoria Harbour have been nearly banned due to the law protection and legal challenge, however it still be considered as the most convenient means to increase the land reserve when comparing with rezoning land and land resumption. Reclamation has significant negative impact on Hong Kong environment, including the deterioration of air and water quality, damaging the marine ecological habitat, as well as the visual impact of the coast line. Sustainability has been the essential element to balance the needs of development and nature conserve at the same time. It is suggested that urban renewal can be considered as alternatives to reclamation because urban renewal can improve the living conditions of the residents by renewing the old buildings, but disturbance to the local culture and livelihood is inevitable. In fact, many large reclamation projects are still planned by the government, such as Kai Tak Development, the government should have a better planning and to cater the differences of public needs so that the reclaimed areas could be reduced to minimum. In fact, the government should not abandon the rezoning and redevelopment of existing under-utilized sites or buildings. Community-based planning should carry on in land use planning policy for allowing people engaging in the process so that harmonious between government, society, and the environment can be achieved.



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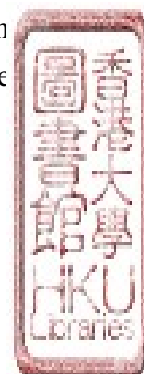
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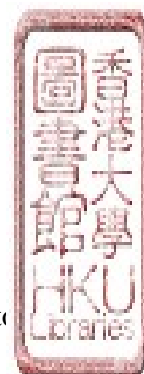
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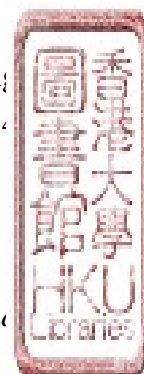
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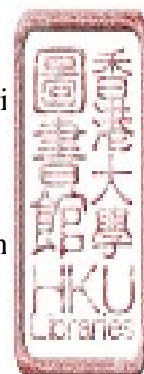
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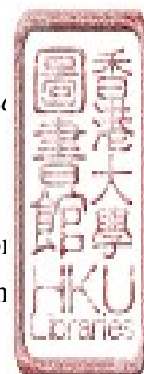
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