HILL LAND DEVELOPMENT CHALLENGES IN PENANG ISLAND

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For my beloved family & friends.....

To my beloved family that never stopped giving of themselves in countless ways, both direct and indirect. I was going to start listing them all, but realized they are just too many to do that justice – so please accept the fact that you are all mentioned in my daily prayer of thanks to a loving God who will convey that thanks in His own way back to you all.

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ABSTRACT

Land has become one of the circumscribed source in Penang Island due to its hilly topography and limited flat lands, which is about to exhaust. Although some land reclamation has been completed, it is not enough to meet high demand of flat areas within the island. Therefore, developers move to hilly areas for new projects. Hilly areas are considered high potential for development due to the attractive setting they provide. However, such developments are open to risks and challenge to people and the environment. Examples of environmental risk and hazards includes downstream flood, soil erosion, downstream river siltation, landslide, slopes failures which raises many issues such as danger to life, damage to property, environment and economy. Therefore structured mitigation action should have drawn towards sustainable hill land development without compromising public and environmental safety. The objective of this study is to identify the challenges in current practice of hill land development and to find the risk mitigation factors for "safe" hill land developments. The methodology of this research includes conducting a comprehensive literature review, interview, questionnaire survey and sampling by case study for data gathered from project practitioners like local authority, civil and geotechnical consultants, planners, architects and developers. According to the respondent's knowledge, the biggest challenge of hill land developments in Penang Island during pre-construction stage are lengthy approval for project proposal and land use suitability classification based on slope gradient. Survey results also indicate that, down stream flooding and slope failures are other life threatening test during project construction stage. Safe and sustainable hill land developments would be achieved if all parties involve work hand-in-hand in dealing with hill land developments issues and challenges.

ABSTRAK

Tanah menjadi suatu sumber yang semakin susut di Pulau Pinang disebabkan oleh bentuk mukabumi yang diselubungi kawasan gunung and kekurangan kawasan tanah rata. Walaupun sebahagian kawasasan laut ditimbul tanah untuk kemajuan, tetapi ianya tidak begitu berkesan untuk menanggung tuntutan kawasan tanah rata. Oleh itu, pemaju berganjak ke kawasan tanah tinggi untuk projek kemajuan yang baru. Kawasan tanah tinggi mempunyai potensi kemajuan kerana persekitaran alam semulajadi. Tetapi kemajuan projek sebegini terbuka kepada risiko dan cabaran kepada manusia and alam sekitar. Kegagalan cerun bukit yang menimbulkan bahaya kepada nyawa, harta milik, alam sekitar dan ekonomi. Rangka-rangka bagi mengutamakan keselamatan orang awam dan alam sekitar harus digubal. Objektif laporan ini adalah untuk mengenalpasti faktor-faktor yang menjadi cabaran kepada kemajuan projek di kawasan tanah tinggi pada masa kini dan juga bagi mengenalpasti langkah-langkah mengatasinya. Metodologi kajian ini merangkumi menjalankan ulasan karya komprehesif, temuduga, kajian soal selidik dan pensampelan oleh kajian kes untuk pengumpulan data yang diperolehi daripada pihak-pihak yang terlibat seperti, pihak berkuasa tempatan, penasihat jurutera awam dan geoteknikal, perancang bandar, akitek dan juga pemaju perumahan. Daripada kajian soal selidik didapati bahawa, cabaran utama untuk kemajuam kawasan tanah tinggi pada awal perancangan adalah masa kelulusan projek cadangan daripada pihak berkuasa tempatan yang panjang dan klasifikasi tanah untuk kemajuan mengikut kecerunan bukit. Daripada kajian, didapati bahawa, banjir dikawasan hilir, kegagalan cerun bukit adalah antara faktor yang paling mencabar pada masa projek pembinaan. Projek dikawasan tanah tinggi yang stabil and selamat dapat dibina jika pihak yang terlibat saling berganding bahu antara satu sama lain untuk menjelesaikan masalah yang timbul.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Hill land development poses unique problems for the construction and maintenance of human settlements. They are prone to natural hazards, and they topographically constrain the design of developments. Despite the constraints, they are attractive places to live. Hillsides are lands that require special land-use planning considerations because of their inclined slopes. Local governments regulate hillside development for a variety of reasons, explicit and implicit. Sometimes the regulations directly address physical issues related to sloping ground, and sometimes they also address associated aesthetic and environmental issues.

Increasingly, land is a scarce resource which is much sought after in Penang Island, Malaysia. This is because Penang is largely made up of steep topography and much of the lowland areas are already developed. Penang is one of the many rapidly industrializing states in Malaysia with a largely urban populace. In recent decades, efforts at industrializations and the development of other economic sectors have been intensified, leading to greater urbanization and greater pressures on land. Although land reclamation has eased the pressures somewhat, it is not enough to satisfy the high demand for land on the island. As such, developers have turned to the remaining

hill land on the island. Many hills and their environs are already being developed and many hill projects are in the pipe line. This has led to many environmental problems such as deforestation, decimation of water catchments, destruction of endangered fauna and flora, soil erosion, landslides, water pollution, sedimentation and downstream flooding (Friends 1991). Some of these problems have been exacerbated and turned into disasters due to the extremely fragile and sensitive nature of hill ecosystems. Despite such problems, the State Government has decided to lift the freeze on development of hill land since January 1998, and this has effectively opened up all hill land for development on the island (Ngai 1998).

1.2 Issues and Problem Statement

Currently land has become one of the circumscribed source in Penang due to its hilly topography and limited flat lands, which is about to exhaust. The Penang State is a rapid industrial state and the city is compact. In facing the future challenges due to rapid economic development, there are high demands for flat ground area requirements (Ahmad, 2005). Although some land reclamation has been completed, it is not enough to meet high demand of flat areas within the island. Therefore, developers move to hilly areas for new projects. Such development involves high risk since hilly areas are very sensitive with respect to environment. Hilly areas are considered high potential for development due to the attractive setting they provide. However, such developments are open to risks to people and the environment. Examples of environmental risk include flood, soil erosion, landslide, failure of slopes, etc., which raises many issues such as, injury to people; danger to life; damage to property, environment and economy.

There are lot of challenges on hill land development in Penang state, starting from planning stage till handing over to valuable clients and purchasers. Besides that, environmental management on hill land developments also plays a big part important role. A good environmental impact assessment are paramount important in order to

take into considerations of social factors and biological factors of animals and plants. Environmental problems such as deforestation, decimation of water catchments, destruction of endangered fauna and flora, soil erosion, landslides, water pollution, sedimentation and downstream flooding are occurred due to poor assessment of environmental impact studies. Some of these problems have been worse and turned into disasters. Many projects in the hilly areas failed due to several geotechnical and environmental factors. The factors that affect this environmental risk and their relevant mitigation must be identified earlier before any recurrence of hazard to the environment.

1.3 Aim and Objectives of the Study

The aims of this study are to investigate the issues and challenges in current practice of hill land developments in Penang Island. To achieve these aims, the following objectives are identified:

i. To identify problems and risk in current practice of hill land development system in Penang Island.
ii. To identify risk mitigation factors for safe hill land developments in Penang Island
iii. To identify best practices for safe hill land developments.

1.4 Scopes of the Study

The study was carried out through literature review on related journal papers, online journals, conference papers, browsing throughout the web pages or web site and textbooks to gather information and identify hill land developments challenges such as problems and risk in Penang Island and also to identify risk mitigation factors for safe hill land developments. The study will provide detail overview of hill land developments constraints and challenges in currents practices developments where the sources of data are primary from hill land development project practitioners like local authorities, consultants, planners, architects and contractors. Then the respondents were asked to evaluate the hill land developments constraints and restrictions in current practices as a comparison with perceived by their own opinion of requirements.

Basically, scopes of work for this study are as shown below:

a. Study on the hill land developments in Penang Island and identify the constraints and factors that influence to hill land development failures.
b. Focus of this research basically on the land contain any or all the following characteristics:
    i. Hilly land with existing Slope > 25
    ii. High land with ground level > 250 ft (76m) above sea level
    iii. Hill Slope cutting > 6m height
    iv. High retaining wall > 6m height
    v. Any other land or development characteristics which are of concern to JKR in connection with environment and development risks.

1.5 Brief Research Methodology

An essential stage of methodology was conducted to achieve the objective of this study as shown in Figure 1.1. The major processes include;

Stage 1: Preliminary Study

Stage 2: Data Collection

Stage 3: Data Analysis and Report Writing

1.5.1 Stage 1: Preliminary Study

This process includes identifying the problem, determining title and area of the research. This was done by doing preliminary literature review such as referring books, articles and journals. Then the aims and objectives of the study were identified before the literature review conducted.

1.5.2 Stage 2: Data Collection

The data collection process involved two types of data that is primary and secondary data. The primary data was collected by interview and survey questionnaire to identify and establish the factors that influencing to problems and risk in current practice of hill land developments and roles of project practitioners to mitigate the risk and issues arise. Finally the identification of improvement method

to mitigate the problems in hill land developments challenges in Penang Island was carried out with the Questionnaire Survey results. Secondary data was gathered from books, articles, journals conferences paper, internet and etc.

1.5.3 Stage 3: Data Analysis and Report Writing

All the data collected was schedule and analyzed using appropriate statistical tools such as ranking using Likert Scale, rating using Mean Value Scale and Frequency Analysis. Then all the data analysis was summarized and a conclusion was made. Finally, recommendations for future study were given.

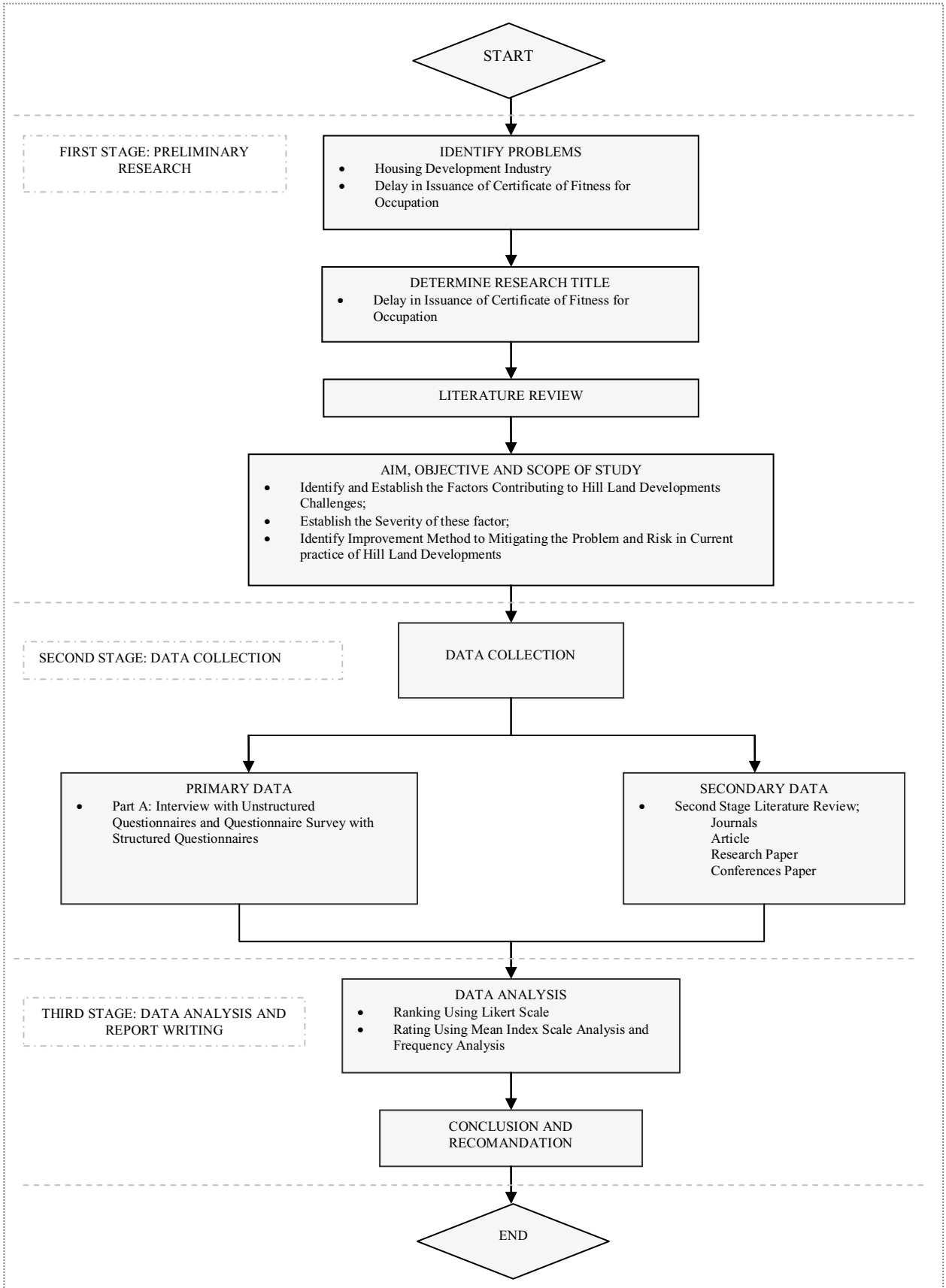

Figure 1.1: Flowchart Diagram of Study Methodology