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**FLOOD HAZARD AND MITIGATION
MEASURES MAP USING
GEOGRAPHICAL INFORMATION
SYSTEM (GIS): A CASE STUDY AT
IPOH CITY, PERAK**

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ABSTRACT

In recent years, Malaysia has often been shocked by the flash floods that hit major cities throughout the state. Statistics show that the amount of rainfall that fell at that time was different from normal. The Department of Irrigation and Drainage Malaysia (DID) has established several guidelines to control floods such as Urban Stormwater Management Manual (MSMA), but flood management in all major cities in Malaysia is still quite low and worried. Thus, the adoption of a strategic approach is needed to be planning and managing flood event in Malaysia. This research aims are to establish flood hazard and mitigation measures map for Ipoh City, Perak using Geographical Information System (GIS). This study contains three main objectives: i) to identify flood hazard areas, ii) to determine the mitigation measures for reducing flood hazard, and iii) to establish flood hazard and mitigation measures mapping using Geographical Information System (GIS). Ipoh City was chosen as the study area because it recorded frequent floods in recent times. Ipoh City also is the state capital and economy enhancer for the state of Perak. This research is based on interview and data obtained from relevant authorities such as Ipoh City Council (MBI) and the DID Kinta District. The data were analysed to identify flood hazard areas and proposed structural mitigation measures located for Ipoh City such as upgrade drainage system, upgrade existing riverbank, build flood reservoirs and upgrade water pumps. The research suggested that successful flood management are linked to the mitigation measures are done by the authorities that consist of Structural Mitigation and Non-Structural Mitigation. The flood hazard and mitigation measures map where the result of this study was generated with help of GIS software. It is a holistic strategic approach is needed for the local authority to manage the flood event. It is hope that the study can contribute to the improvement of flood management in Ipoh Kinta City, Perak.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Malaysian flooding is regular in Malaysia and happens almost annually in the monsoon. Flood phenomena can be described as a waterbody typically not covered by rising, swelling, and overflowing earth. However, storms, ice melting, tidal movement, and canal obstruction flood the riverside or the water drainage channel in neighbouring areas. According to the Department of Irrigation and Drainage (DID), Malaysia does not have specific flood categorizations but is mostly loosely classified as monsoonal, flash, or tidal floods. However, floods are often defined in terms of location, characteristics, cause, timing, and duration.

There are a few causes of floods. There are natural causes of the cascade where it a very short, high intensity leads to flash flood, and widespread heavy rain leads to land inundation. Secondly, human-induced floods, when the disposal of solid wastes into rivers, and sediments from land clearance and construction areas, increase impervious areas and obstruct construction in the rivers.

Floods have both positive and negative impacts. Sustaining enriching and rejuvenating other biodiversity sectors in the floodplains, replenishing the land with nutrient-rich soils suitable for agriculture and natural vegetation, removing debris, and eliminating sediments from floodplains, recharging groundwater storage are optimistic. Floods can endanger lives, disrupt social and economic activity, and ruin property, causing misery and costly recovery for individuals and governments and discouraging new investment in flood-prone areas.

Generally, floods are categorized into two (2) categories: Flash Floods and Monsoon Floods. Flash floods are due to environmental development problems and internal drainage systems that occur in less than 24 hours. Monsoon floods occur due to seasonal floods that occur over 24 hours.

Flash floods that often occurs is the impact of surrounding development that has led to an increase in surface area, causing nearby river discharges are not able to accommodate the amount of runoff in addition to the high rainfall intensity factor. Road