

**GIS MODELLING APPLICATION FOR EFFICIENT  
DEVELOPMENT CONTROL SYSTEM IN COLOMBO  
URBAN AREA**

**(Case study in Borlasgamuwa Urban Council Area)**

**By**

**KGPK Weerakoon**

2006/01

**Department of Estate Management and Valuation  
University of Sri Jayewardenepura  
Sri Lanka**

**February 2010**

## TABLE OF CONTENTS

Abstract	
Table of contents	
Acknowledgement	

### 1. CHAPTER ONE - INTRODUCTION

1.1	Background of the Study	1
1.2	Statement of the Problem	4
1.3	Objectives of the Study	5
1.4	Rationale of the Study	5
1.5	Limitations of the Study	6

### 2. CHAPTER TWO – RESEARCH DESIGN

2.1	The General Background	7
2.2	Land Evaluation Map	7
2.3	Development of Land Evaluation Model	8
2.4	Development of GIS based system for efficient development control	13

### 3. CHAPTER THREE THEORITICAL AND CONCEPTUAL REVIEW

3.1	Concept of Land and Determinants of Urban Land Use	18
3.2	Urban Land Use Planning and Urban Land Evaluation	20
3.3	Developable land with development control	24
3.4	Land Information System	26
3.5	Geographic Information Systems	27
3.6	Multi-Criteria Evaluation (MEC)	30
3.7	The Analytic Hierarchy Process (AHP)	33
3.8	AHP and Expert Choice	35
3.9	Development Control System in Sri Lanka	36

#### **4 CHAPTER FOUR – CASE STUDY AREA**

4.1 Introduction	39
4.2 Regional Setting	39
4.3 Population Distribution	40
4.4 Economic base	41
4.5 Housing	41
4.6 Land values	41
4.7 Road net work	41
4.8 Land use pattern	42
4.9 Physical and Social infrastructure	43

#### **5 CHAPTER FIVE - DATA ANALYSIS**

5.1 Development of GIS Model	45
5.2 Definition of the Relevant Quality Parameters	45
5.3 Establishment of the Geographic Database of the Input Layers	46
5.4 Multi-Criterion Analysis of Land Evaluation	46
5.5 Preference elicitations for pair wise comparisons	47
5.6 Calculating weights by hierarchic analysis of nine-degree	48
5.7 Sensitivity Analysis	52
5.8 Development Control System	56

#### **CHAPTER SIX - CONCLUSIONS AND RECOMMENDATIONS**

6.1 Conclusions and Recommendations	62
-------------------------------------	----

## ABSTRACT

The study aims to improve land use processes in local government with the support of information systems. The study takes Boralasgamuwa Urban Council as case for develop model as a base for efficient development control. GIS and multi-criteria analysis used for development of the model. Analysis of the study was attempt to introduce data information system for planning staff for minimize processing drawbacks. Development control involves a complex process and tedious procedures. The due consideration given to an application for planning requires a tedious process as it will have to go through several committees and technical evaluations. Generally, a planning application will be assessed in terms of current development scenario, land information, planning requirements and planning design. Issues concerning development control process include delay of planning approval, lack of consistency in decision making, comprehensive and updated information apart from effective public participation. Given the benefit of IT, it is imperative that the procedures of development control be improved to cater for increasing development rate. Non availability of cadastre mapping is major obstacle for development of this system. Therefore building based collected field data use for this analysis. GIS provides planners with tools to implement their work more efficiently especially with support of the interactive and user-friendly interface developed to ease the use of the sophisticated system without the need of advanced technical skill. Therefore ARCGIS plug-in MainStreet GIS extension was use for develop this.

Study start with literature survey to describe the context of change as reflected in the continuing redefinition concepts of land use management and information systems. It focuses on urban land use planning, development control system, GIS and multi-criteria evaluation.

In the conclusion implication of the system for local government are defined, as follows. 1) Land evaluation model for platform of understanding future development areas. 2) Easy information system for building and planning application system. The system was designed to cover all the necessary work process involved in development control and approval supported by Geographical Information System (GIS) application.