

GIS BASED URBAN LAND VALUATION MODEL
A CASE STUDY OF HOMAGAMA DIVISIONAL
SECRETARY DIVISION

LASITHA HASHAN PARANAVITHANA WEERASEKARA
219550T

Master of Spatial Planning Management & Design Degree

Department of Town and Country Planning

University of Moratuwa

Sri Lanka

January 2026

GIS BASED URBAN LAND VALUATION MODEL
A CASE STUDY OF HOMAGAMA DIVISIONAL
SECRETARY DIVISION

LASITHA HASHAN PARANAVITHANA WEERASEKARA
219550T

Thesis/Dissertation submitted in partial fulfillment of the requirements for the
degree Master in Spatial Planning Management and Design

Department of Town and Country Planning

University of Moratuwa

Sri Lanka

January 2026

Declaration

I declare that this is my own work, and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis, in whole or in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as article or books).

Signature:

Date:

The above candidate has carried out research for the Masters thesis under my supervision.

Name of Supervisor:

Signature of the Supervisor:

Date:

Abstract

Accurate land valuation is essential for effective urban and regional planning, real estate development, and development control processes. In Sri Lanka, conventional land valuation practices largely rely on manual methods and professional judgment, which often result in subjectivity and inconsistency, particularly in rapidly transforming suburban areas. With increasing urban expansion and infrastructure development, there is a growing need for objective, spatially explicit land valuation approaches that can support planning and valuation decision-making.

This study aims to develop and validate a GIS-based land valuation model for a suburban area using spatial multi-criteria analysis. The Homagama Divisional Secretariat Division was selected as the study area due to its rapid suburban development and mixed urban–rural characteristics. Key factors influencing land value were identified through literature review and expert consultation and categorized into relevant spatial dimensions. The Analytical Hierarchy Process (AHP) was employed to determine the relative weights of selected factors, which were then integrated using a weighted overlay technique within a GIS environment.

A GIS workflow was developed to generate spatial land value zones classified into low, moderate, high, very high, and extremely high categories. The model outputs were validated by comparing the generated land value zones with actual land market values collected from the study area. The validation results indicate a strong spatial correspondence between high-value zones and locations with higher recorded market values, demonstrating the model's ability to represent relative land value patterns effectively.

The findings confirm that accessibility, infrastructure availability, land use, and socio-economic characteristics significantly influence land value variations in suburban contexts. The study highlights the importance of differentiating transportation infrastructure based on actual accessibility rather than treating all road networks uniformly. Overall, the research demonstrates that GIS-based land valuation models can enhance transparency, consistency, and efficiency in land valuation and planning practices. The developed framework provides a practical decision-support tool for preliminary land value assessment and offers a foundation for future comparative and advanced valuation studies.

Key words: GIS-based land valuation, Analytical Hierarchy Process (AHP), Weighted overlay analysis, Accessibility and infrastructure, Land value zoning

ACKNOWLEDGEMENT

I would like to extend my heartfelt gratitude to the University of Moratuwa and the Department of Town Country Planning for providing me with the opportunity to pursue this research and for their invaluable support, which was essential for the successful completion of my study.

I am deeply thankful to Dr. (Mrs.) Emeshi Warusavitharana for her unwavering guidance, insightful advice, and readiness to engage in discussions throughout the research process. Her mentorship has been pivotal in shaping this work.

I sincerely appreciate the constructive feedback and technical suggestions provided by the panel of examiners during the progress reviews, which greatly contributed to the improvement of my study.

My gratitude also goes to the lecturers of the Department of Town Country Planning for their guidance, encouragement, and support throughout the research period.

I would like to acknowledge the invaluable assistance and collaboration of my fellow research assistants, as well as the technical officers and non-academic staff of the Department of Town Country Planning. Their support has been greatly appreciated and instrumental in completing this research.

Table of Contents

Declaration	I
ACKNOWLEDGEMENT	III
CHAPTER ONE	1
Introduction	1
Background of the study	1
Research Problem.....	2
Objectives.....	3
Significance of research.	3
Planning Relevance	4
CHAPTER TWO	5
Literature Review	5
2.1 Introduction and Determinants of land value factors	5
2.2 Concept of Land Value and Land Valuation	7
2.3 Conventional Land Valuation Approaches.....	7
2.4.1 Access to Transport.....	8
2.4.2 Distance to School.....	8
2.4.3 Distance to Government & Commercial Buildings	8
2.4.4 Distance to Hospital	9
2.4.5 Slope.....	9
2.4.6 Land Use	9
2.4.7 Population	9
2.5 GIS-Based Land Valuation Studies	10
2.7 Validation of GIS-Based Land Valuation Models.....	10
Research design.....	13
3.1 Introduction	13
3.2 Methodology	14
3.3 Case study	15
3.3.1 Details of the study area	15
3.3.2. Justification for the case study area	15
3.4 Data Sampling and Validation	16
3.5 Selection Independent Factors	18
3.5.1. Access to Transport.....	18
3.5.2 Distance to School.....	18
3.5.3. Distance to Government & Commercial Buildings	19
3.5.6 Population	21
3.5.7 Land use	22

3.6 Methods of data collection	22
3.7 Method of Data Analysis	23
3.7.2. Numerical Evaluation for the criteria.....	24
3.8 Summary of Factors, Weights, and Ranking Criteria for Land Valuation	26
3.9 Data Integration in GIS and create land valuation map	27
CHAPTER FOUR.....	28
4.1 Introduction	28
4.2 Findings and Interpretation	28
4.2.1 Analysis with Land Use	29
4.2.2 Analysis with Infrastructure Facilities	31
4.2.3 Analysis with Accessibility.....	32
4.3 Map validation	34
4.3.1. Validation and Practical Application of Developed Model	35
4.3.2. Validation Using UDA Asset Valuation Report	36
4.3.3. Validation of Actual Land Prices in Homagama Area Compared to Weighted Overlay Map	39
CHAPTER FIVE.....	41
Conclusions	41
Recommendations	41
Positive outcomes for stakeholders.....	42
Limitations	43
Annexes.....	47

Table of Figures

Figure 1 flow diagram of the methodology.....	14
Figure 2 Map of Case Study Area.....	15
Figure 3 Images of Homagama Town.....	16
Figure 4 Map of Access to Transport.....	17
Figure 5 Map of Distance to Schools.....	18
Figure 6 Map of Distance to Government and Commercial Buildings	19
Figure 7 Map of Distance to Hospital.....	20
Figure 8 Map of Slope	20
Figure 9 Map of Population	21
Figure 10 Map of Land Use	22
Figure 11 Criteria Chart	26
Figure 12 Percentage area of Land Value Zone.....	29
Figure 13 Weighted Overlay Map.....	29
Figure 14 Weighted Overlay Map and Land Use of Homagama DS	30
Figure 15 Weighted Overlay Map with Schools, Hospitals, Government and Commercial Buildings	31
Figure 16 Weighted Overlay Map with Road Network of Homagama DS	32
Figure 17 Weighted Overlay Map and Slope of Homagama DS.....	33
Figure 18 Weighted Overlay Map and Population Density of Homagama DS	33
Figure 19 Weighted Overlay Map with Real Land Values of Homagama DS	34
Figure 20 Weighted Overlay Map with Title Certificate of the Subject Property – Homagama	36
Figure 21 Weighted Overlay and UDA Survey Integration – Homagama Area	38
Figure 22 Weighted Overlay map with Land selling Prices – Homagama Area	40

Tables

Table 1 - Literature of Land Methods	12
Table 3 . Weight values for the criteria.....	24
Table 4 Weight and rank for factors and their classes.	25
Table 5 Percentage of Real Land Value locations on the Land value zone.....	35
Table 6 UDA Asset Valuation Summary for Homagama Lands	37