

**APPLICATION OF GREEN BUILDING RATING
SYSTEMS FOR HIGH-RISE LOW-INCOME
RESIDENTIAL BUILDINGS IN SRI LANKA.**

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Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa

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Thesis/Dissertation submitted in partial fulfilment of the requirements for the degree
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DECLARATION

I declare that this is my own work, and this thesis does not incorporate without acknowledgment any material previously submitted for a Degree or Diploma in any other University or institute of higher education 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 acknowledgment is made in the text.

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W.A.D. Madushani

.....

Date

The above candidate has carried out research for the Master's Dissertation under my supervision.

.....

Professor. (Mrs.) Nayanthara de Silva

...../...../.....

Date

DEDICATION

I dedicate this piece of work to all my teachers and my beloved family.

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This research is accomplished with the inspiration, concepts and enthusiastic support from all the dedicated people whom I have met. So, my sincere gratitude must acknowledge them for the outstanding support given.

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ABSTRACT

“Green Building” technology has not been fully adopted into the housing construction industry due to many limitations. Hence, housing developers rarely obtain the services provided by green building consultants in their projects. A Large amount of low-income people within the city creates a great problem for urban housing. Since they are unable to afford a house, the government of Sri Lanka has created high rise housing concept for these urban poor. However, there are many issues and problems regarding this high-rise housing from the view of sustainability perspective.

Therefore, this research is focused on investigating the application of green rating systems for developing high-rise low-income housing projects in Sri Lanka as sustainable housing solutions to increase housing affordability and enhance urban livelihoods. Subsequently, three objectives were identified to form this study. Reviewing green building concept and its application in high-rise low-income housing projects through published research works. Analyzing the level of application of green rating systems in Sri Lankan high-rise low-income housing projects. Finally, proposing the strategies to enhance the application of the green rating systems for high-rise low-income housing projects.

Semi-structured interviews were selected as the main method of data collection. GREENSL® RATING SYSTEM FOR EXISTING BUILDINGS Version 1.0 was used as the interview guide for obtaining data from the experts. The panel of expert were selected based on extensive working experience in high-rise low-income housing construction industry in Sri Lanka and green accredited professionals who were declared by GBCSL. All the interview comments were analyzed using “Manual content analysis.”

The findings revealed that the extent of application of the green building concept and GREENSL® RATING SYSTEM in high-rise low-income housing projects is limited due to the identified current limitations of the green building concept. Furthermore, 148 possible green building strategies were derived aiming for the 8 green aspects which comes in GREENSL® RATING SYSTEM to improve sustainability aspects of high-rise low-income housing buildings in urban environments. These proposed green strategies will benefit for emerging and existing high-rise low-income housing projects to ensure a lower environmental effect, decrease the use of natural resources, and improve living standards of occupants.

Key Words: Green Building, High- rise Low-income housing projects, Green Rating System.

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LIST OF ABBREVIATIONS

A-	-Architect
BAS-	-Building Automation Systems
BMS	-Building Management System
BREAM	-Building Research Establishment Environmental Assessment Method
CASBEE	-Comprehensive Assessment System for Building Environmental Efficiency
CCD	- Coast Conservation Department
CE	-Civil Engineer
CEA	- Central environmental Authority
CFC	- Chlorofluorocarbons
DGNB	- German Sustainable Building Council
EA	- Energy and Atmosphere
EE	- Electrical Engineer
EIA	- Environmental Impact Assessments
EQ	- Indoor Environmental Quality
EMP	- Environmental Management Plan
ES	- Environmental Specialist
ESCP	- Erosion and Sediment Control Plans
ETS	- Environmental Tobacco Smoke
GB	- Green building
GBCSL	-Green Building Council of Sri Lanka
GBRS	- Green Building Rating Systems
HCFC	-Hydrochlorofluorocarbons
HVAC	- Heating, Ventilation, and Air Conditioning
IAQ	- Indoor Air Quality
IPM	- integrated Pest Management
LEED	- Leadership in Energy and Environmental Design
ME	-Mechanical Engineer
MR	- Materials and Resources
NHDA	- National Housing Development Authority

NWSDB	- National Water Supply and Drainage Board
PV	- Photovoltaic
QS	- Quantity Surveyor
ROI	- Return On Investment
SEA	- Sustainable Energy Authority
SWMP	-Soil and Water Management Plan
SS	- Social Specialist
UDA	- Urban Development Authority
USDA	- Urban Settlements Development Authority
USGBC	- United States Green Building Council
VOC	- Volatile Organic Compound