

LB/Doc/104/06

(228)

**GREEN ARCHITECTURE AS AN APPARATUS SUSTAINABLE DESIGN;  
WITH SPECIAL REFERENCE TO CONTEMPORARY SRI LANKAN  
ARCHITECTURAL PRACTICE**

**LIBRARY  
UNIVERSITY OF MORATUWA, SRI LANKA  
MORATUWA**

A Dissertation

submitted to the Department of Architecture of the  
University of Moratuwa in partial fulfillment of the  
requirements for the degree of

Master of Science

In

Architecture

72<sup>v</sup>05<sup>u</sup>  
72(043)

B. A. H. Ariyaratna

March 2005

University of Moratuwa



85494

85494

85494

## DECLARATION

I declare that this dissertation represent my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

A

### *UOM Verified Signature*

Signed: .....

.....



University of Moratuwa, Sri Lanka  
Electronic Theses & Dissertations  
www.lib.uom.lk

B. A. H. Ariyaratna

Signature of supervisor .....

**Dr. Indrika Rajapaksha**

Senior lecturer

Faculty of Architecture

University of Moratuwa



## ACKNOWLEDGEMENTS

---

This study owes much to the assistance and guidance given by all the following; to whom I wish to extend my heartfelt gratitude.

Arch. Vidura Sri Nammuni – Head of the Department, Faculty of Architecture for the advices and guidance given in selecting the subject area and preparation the framework of this study.

Arch. Upendra Rajapaksha- Group Coordinator for M.Sc. Dissertations, Senior Lecturer, Faculty of Architecture for the valuable guidance and advice given in making the scope of the study as well as in 'Academic Writing' from the initial stages of this dissertation.

My Supervisor - Dr. Indrika Rajapaksha, Senior Lecturer, Faculty of Architecture who has been the 'Main Force' of making this task a success for the critical and important guidance in setting the scope of the study, managing the topics and relevant data, organizing the research and analysis and for teaching the correct way of writing focus to the topic.

Arch. Vijitha Basnayake - Senior Lecturer, Faculty of Architecture for his valuable advices on the main subject area and for the coordination in selecting case studies and conducting research.

The Staff of the Main Library, University of Moratuwa who has been helpful in collecting latest information both in printed and electronic media.

My colleagues who helped me in finding data, computer works and typing the manuscript and encouraged me in difficult situations

My Parents and my brother and sister who always encouraged me throughout my stay in campus

## CONTENTS

---

	<u>Page</u>
Declaration	i
Acknowledgements	ii
Contents	iii
List of illustrations	vii
Abstract	ix
<b>INTRODUCTION</b>	<b>01</b>
Observation	01
Criticality	01
Causes	02
Remedies	02
Intention of the study	03
Scope and Limitations	03
Methodology	04
<b>CHAPTER ONE</b>	
<b>1.0. CONCEPT OF GREEN ARCHITECTURE</b>	<b>05</b>
1.1. Architecture; Environmental response in its manner of operation	05
1.2. Sustenance of the environment- the relation ship between Architecture and environment	06
1.2.1. Human involvement of the environment through Out the history	06

1.2.2.	Contemporary practice of architecture and its impacts	
	on global environment	07
	1.2.2.1 Global warming	07
	1.2.2.2. Ozone depletion	08
1.3.	Sustainable development	08
	1.3.1. Architecture towards sustainable Development/ design	08
	1.3.2. Different approaches in sustainable architecture	10
	3.3.3. Principles of sustainable design	11
1.4.	The role of green Architectural practice -way towards	
	Sustainable design	12
	1.4.1. Green Architecture : Definition	12
	1.4.2. Principles of green architecture	13
	<b>Principle one-</b> Conservation of energy	14
	<b>Principle two-</b> working with climate	22
	<b>Principle three -</b> Minimization of new recourses	24
	<b>Principle four -</b> Respect for user	27
	<b>Principle five -</b> Respect for site	27
	<b>Principle six -</b> Waste management	29
	<b>Principle seven -</b> holism	31

## CHAPTER TWO

### 2.0. APLICABILITY OF GREEN ARCHITECTURAL PRINCIPLES

#### IN SRILANKEN CONTEXT 32

2.1.	Traditional architecture in Sri Lanka	32
	2.1.1. Traditional architecture before arrival of foreign cultures	33
	2.1.2. Traditional architecture during colonial occupation	34
	2.1.3. Early building in Sri Lanka	34

2.2.	Traditional Sri Lanken architectural practice as an Eco sensitive Architectural practice	36
2.2.1.	Energy conservation in traditional Architecture	36
2.2.2.	Climatic responsive in traditional Architecture	38
2.2.3.	Resources utilization in traditional Architecture	39
2.2.4.	Respect for Site in traditional Architecture	40
2.2.5.	Waste management in traditional Architecture	40
2.2.6.	Holistic approach	41
2.3.	Cotemporary Architecture in Sri Lanka and the practice of Green Architectural principles	41
	Case study one – Adventure Park Ella	43
	Case study two – Kandalama hotel	50
	Case study three – Media Center at Pelawatta	57



University of Moratuwa, Sri Lanka  
Electronic Theses & Dissertations  
www.lib.mrt.ac.lk

## CHAPTER THREE

### 3.0. GREEN ARCHITECTURE AS A MAJOR ISSUE IN FUTURE SRI

#### LANKANARCHITECTURAL DESIGNS AND PRACTICES 62

3.1.	A Green Architectural design practice for Sri Lanka	64
3.1.1.	Practice of Green principles in future Architectural designs	64
3.1.1.1.	Conservation of Energy	65
3.1.1.2.	Working with climate	69
3.1.1.3.	Resources utilization	70

3.1.1.4. Respect for User	72
3.1.1.5. Respect for Site	73
3.1.1.6. Waste management	74
3.1.1.7. Holism	75
3.2. Including Green thinking into Building regulations	76
3.3. A Green building process for Sri Lankan Architectural practice	77
Conclusion	79
Bibliography	81



University of Moratuwa, Sri Lanka  
Electronic Theses & Dissertations  
[www.lib.mrt.ac.lk](http://www.lib.mrt.ac.lk)

## LIST OF ILLUSTRATIONS

---

Figure	Page
01. Sustainability, a diagrammatic illustration	08
02. Windows from one-sided causes glare	17
03. Windows from two adjacent walls reduces glare	17
04. Window positioning for good ventilation	18
05. Low energy consuming solar air-conditioning system	19
06. Bio gas also a good alternative for fuel gas	19
07. Maximum contribution from sun and wind to make Combatable inside environment	23
08. Design high rises for obtain maximum benefits from its local Climate - Monera Tower Malaysia	23
09. A house constructed with bear bottles	25
10. Lightly touch on earth	28
11. The Typical section – Traditional house	35
12. A gallery to experience nature – Ella Adventure Park	43
13. The traditional technology and simple geometry -Ella Adventure Park	45
14. Plan of the timber deck -Ella Adventure Park	45
15. Section through main deck-Ella Adventure Park	46
16. The selection of natural material and simple technique - Ella Adventure Park	47
17. The harmony with natural context -Ella Adventure Park	48
18. The built foam and nature -Ella Adventure Park	49
19. The timber bridge -Ella Adventure Park	49
20. An arial view of the Kandalama hotel	50
21. The true harmony with nature- Kandalama hotel	51
22. The sun protection pergolas blended with nature - Kandalama hotel	52
23. The pergolas - Kandalama hotel	53
24. Natural rock wall and cave -Kandalama hotel	54
25. Section through Kandalama hotel	55
26. The Media center at Pelawatta	57
27. Floor plans -Media center at Pelawatta	58



28. Solar panels treated as Building Element	
- Media center at Pelawatta	59
29. Solar panels placed as sun protector also	
- Media center at Pelawatta	59
30. View of greener garden spaces - Media center at Pelawatta	60
31. Green cover with optimum foot paths	
-Media center at Pelawatta	61
32. The embodied energy of some common materials	66
33. Mouli house by Archt. V. Basnayake is good example for	
Environmentally harvest material composing	66
34. The Mahaweli Building	69
35. The Jaffna library	71
36. The Boulder Garden - respect to its natural rockery terrene	73



University of Moratuwa, Sri Lanka.  
Electronic Theses & Dissertations  
[www.lib.mrt.ac.lk](http://www.lib.mrt.ac.lk)

## ABSTRACT

---

The world today is fast moving into highly sophisticated, technological realities where quality and conditions of living meant to be easier more than ever. In this exercise man has forgotten that is compromising resources and opportunities meant for a future. Subsequently entire plant has dragged to a greater risk of environmental devastation, which will be affected for a future in consequence.

Damage done to the environment is such that life on earth is a 100% risk in terms of environmental consideration. At a wedge of this catastrophic event conception of 'sustainable development' has been introduced as a remedial action for an issue. As far as Architecture conserved in this context a great deal of exploration is usable within a practical reality.



University of Moratuwa, Sri Lanka  
Electronic Theses & Dissertations

Further an a Architectural starting point will be responsible for a sensual manipulation of environment as most of a development strategies are associated with some sort of construction and building industry.

In this context achieving of sustainable design solutions can be done using different channels and approaches. Green Architectural practice is highlighted as one of a most environmentally sensitive and productive means of realizing the foresaid aspect. This particular study focuses to seek a validity of practical realms of such a concept with contemporary application in Architectural practice in Sri Lanka.