## CONTENTS

LIST OF FIGURES \hspace{2cm} ix  
LIST OF TABLES \hspace{2cm} xvi  
NOTES ON CONTRIBUTORS \hspace{2cm} xix  
FOREWORD \hspace{2cm} xxv  
PREFACE \hspace{2cm} xxvii  
ACKNOWLEDGEMENTS \hspace{2cm} xlviii  
LIST OF ABBREVIATIONS \hspace{2cm} xxx  

GENERAL INTRODUCTION  
Richard Hyde  

### PART I  ECO-DESIGN AND RENOVATION  

1.1 INTRODUCTION  
Richard Hyde  

1.2 STRATEGIES FOR DESIGNING OUR GREEN BUILT ENVIRONMENT: WHY SHOULD BUILDINGS BE DESIGNED TO INTEGRATE WITH THE NATURAL ENVIRONMENT IN THE FACE OF CHANGING CLIMATE CONDITIONS?  
Ken Yeang  

1.3 ECO-DESIGN FOR RETROFITTING: HOW CAN ECO-DESIGN WORK APPLY TO RETROFITTING BUILDINGS FOR CLIMATE CHANGE?  
Richard Hyde  

1.4 SUMMARY  
Richard Hyde  

### PART II  BIOCLIMATIC RETROFITTING  

2.1 INTRODUCTION  
Nathan Groenhout and Richard Hyde  

2.2 DESIGN SOLUTION SETS FOR BIOCLIMATIC RETROFIT  
Upendra Rajapaksha, Richard Hyde and Nathan Groenhout  

2.3 AN EVIDENCE-BASED DESIGN (EBD) APPROACH TO SELECT RETROFITTING STRATEGIES: WHAT SOURCES OF EVIDENCE CAN BE USED TO SELECT RETROFITTING STRATEGIES?  
Richard Hyde and Indrika Rajapaksha
CONTENTS

2.4 BUILDING SIMULATION METHODOLOGY TO EVALUATE PERFORMANCE IMPROVEMENTS FOR RETROFITTING Indrika Rajapaksha 107

2.5 THE ECONOMIC CASE FOR RETROFITTING USING BIOCLIMATIC PRINCIPLES: HOW CAN EXISTING BUILDINGS BE DESIGNED FOR RETROFITTING AROUND ECONOMIC CONSTRAINTS? Francis Barram 134

2.6 SUMMARY Nathan Groenhout 153

PART III TECHNOLOGICAL AND BEHAVIOUR CHANGE FOR PERFORMANCE IMPROVEMENTS 157

3.1 INTRODUCTION Richard Hyde 159

3.2 EVALUATING TYPOLOGIES OF COMMERCIAL ARCHITECTURE FOR RETROFITTING: WHAT ARE THE DESIGN AND TECHNICAL CHARACTERISTICS OF EXISTING COMMERCIAL BUILDINGS BUILT IN THE RECENT PAST AND THEIR POTENTIAL FOR ENVIRONMENTAL IMPROVEMENTS IN THE FACE OF CLIMATE CHANGE? Michelle Nurman 161

3.3 RETROFITTING COMFORT AND INDOOR ENVIRONMENTAL QUALITY: CAN IMPROVED LEVELS OF OCCUPANT COMFORT, HUMAN HEALTH, WELL-BEING AND PRODUCTIVITY BE ACHIEVED FROM EXISTING BUILDINGS? Christina Candido 178

3.4 REVIEWING BENCHMARKING SYSTEMS FOR RETROFITTING: HOW CAN BENCHMARKING BE HARNESSED FOR THE PURPOSES OF RETROFITTING? Richard Hyde 186

3.5 ENERGY PERFORMANCE RATING SYSTEMS: HOW INTERNATIONAL AND NATIONAL POLICIES AND RATING SYSTEMS LEVERAGE A METHODOLOGY FOR RETROFIT David Leifer and Alan Obrant 203

3.6 PERFORMANCE MODELLING TOOLS: WHAT ROLE CAN COMPUTER-BASED SOFTWARE TOOLS PLAY IN INFORMED DECISIONS IN PREDICTING? Lester Partridge 216

3.7 MONITORING AND TECHNOLOGICAL ENVIRONMENTS Craig Roussac

3.8 A DIAGNOSTIC APPROACH TO INFORM DECISIONS ABOUT BUILT ENVIRONMENT PARAMETERS Mark B. Luther

3.9 REDUCING EMBODIED ENVIRONMENTAL IMPACTS: EMBODIED ENVIRONMENTAL IMPACTS AND THE DESIGN AND CONSTRUCTION OF BUILDINGS John Cole and S. Craig Oshman

3.10 A CHECKLIST FOR DESIGNING SUSTAINABLE OFFICE BUILDINGS: HOW TO PLAN AND CONCEPTUALLY DESIGN A SUSTAINABLE OFFICE BUILDING Mark B. Luther

3.11 PENALTY-REWARD SYSTEMS: THE SUSTAINABILITY REWARD SYSTEM AND ITS POTENTIAL TO ACHIEVE SUSTAINABLE RETROFITTING AND BUILDING DESIGN Edward Halawani

3.12 DRIVERS FOR SUSTAINABLE BUIDLINGS AT THE LOCAL LEVEL David Leifer

3.13 A BIOCLIMATIC EVALUATION OF OFFICE BUILDINGS AS SHOWN BY THE SUSTAINABLE OFFICE BUILDING THUMB METRIC Marci Webster

3.14 SUMMARY Richard Hyde

PART IV RETROFITTING ACTIONS FOR PERFORMANCE IMPROVEMENTS

4.1 INTRODUCTION Francis Barram 219

4.2 743 ANN STREET Mark Thompson 228