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DAO CONG HUNG

SPATIAL, ARCHITECTURAL AND LANDSCAPE

MANAGEMENT OF BAC GIANG CITY

TOWARD A GREEN CITY

MAJOR: URBAN AND CONSTRUCTION MANAGEMENT

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ABSTRACT FOR PHD THESIS OF

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INTRODUCTION

1. Rationale

In recent years, urban areas of Vietnam have been growing rapidly. The urbanization process results in the exploitation and exhaustion of natural resources and energy, more serious environmental pollution and degradation. Moreover, our country is facing many challenges such as: increasing impacts of market economy, climate change and environmental pollution. Accordingly, the green-oriented, nature-friendly and nature-harmonious urban development is a new direction to protect and exploit natural resources properly, mitigate greenhouse gas (GHG) emissions, protect environment toward a safe and happy life of people.

Today several countries in the world successfully study and build models of green cities, ecological cities, smart cities, etc.; in which, green cities are considered the focus and goal of sustainable development of many cities to manage waste and CO₂; protect the ecosystem; and response to climate change.

In Vietnam, the model of green cities is also being studied and applied; however, only general concept of “green, clean, beautiful” city has been mentioned along with the density of green space and increasing percentage of green coverage. Issues of energy saving, ecological balance, environment protection in adaptation to climate change, etc. have not been solved comprehensively.

Bac Giang City has a high growth rate, socio-economic development with growing population and urban space, increasingly improved quality of urban areas, protected and preserved natural landscape, recently developed industry; without high construction density, traffic congestion, severe environment pollution. Space, architecture, and landscape are basically guaranteed with abundant land fund for expanding and developing green space and natural ecosystem, which is a great advantage for Bac Giang City to apply world advanced development models. However, spatial, architectural and landscape management (SALM) in Bac Giang City is facing many limitations. It is common to see construction without permit or with improper permits. Many urban areas and public utilities have not studied green buildings, green architecture and energy-saving and GHG emissions mitigation solutions. Streets do not have any highlights and architecture identity, so there is no city

aesthetics, but urban landscape degradation, environmental pollution, local flooding, and threats to natural ecosystems. From these shortcomings, the Standing Committee of Bac Giang Provincial Party Committee issued Resolution No. 138/NQ-TU dated September 1st, 2016 on “Promoting urban development in Bac Giang province to 2020 and orientation to 2030”, which emphasizes the role and importance of the city SALM and the direction of developing Bac Giang City toward a green city. The revised general planning of Bac Giang City to 2035 and vision to 2050 proposes solutions to planning Bac Giang City toward a green city. However, so far, there has been no correct and full awareness of the meaning and nature of a green city as well as no scientific foundation for the comprehensive and systematic SALM toward a green city in Bac Giang City.

Therefore, the research of the topic “*Spatial, architectural and landscape management of Bac Giang City toward a green city*” is necessary with scientific and practical significance to contribute to building a “green, clean, beautiful” Bac Giang City; improving the quality of people’s living; preserving and promoting cultural values, natural conditions, socio-economic development, and resilience to climate change.

2. Research objectives

The thesis proposes solutions to SALM in Bac Giang City in the direction of spatial, architectural and landscape construction and development toward a green city, then contributing to improving the quality of people’s living; preserving and promoting cultural values, natural conditions, socio-economic development, and climate change resilience.

3. Research subjects and scope

- *Research subjects*: Spatial and architectural management of Bac Giang City toward a green city.

- *Research scope*:

+ Space: The entire space within the expanded urban boundaries of Bac Giang City with total area of 6,677ha.

+ Timeframe: Follow the milestones of the General Planning of Bac Giang City to 2035.

4. Research content

- Research in general issues of SALM toward a green city;

- Research to summarize the scientific foundations for SALM in Bac Giang City toward a green city;
- Research and propose groups of solutions to SALM in Bac Giang City toward a green city.

5. Research methodology

The thesis uses 07 main research methodologies including: (i) Investigation and survey, collection of scientific information, materials, and data; (ii) Analysis, diagnosis, and identification of issues to be studied; (iii) Expertise; (iv) Comparison; (v) Forecast; (vi) Systematic approach; (vii) Modeling.

6. Scientific and practical significance of the topic

- *Scientific significance*: Help concretizing and adding various scientific theories and concepts of a green city; SALM toward a green city of Bac Giang City.
- *Practical significance*: (i) Contribute to improving the solutions of SALM toward a green city; (ii) Be able to make reference and to apply in practice of SALM toward a green city in similar urban areas; (iii) Be reference materials for study and training in urban planning, urban management, SALM toward a green city.

7. New contributions of the thesis

- a) Identify issues of green cities, SALM toward a green city in Bac Giang City; then systematizing theoretical foundations on SALM toward a green city.
- b) Set up criteria of evaluating the effectiveness of SALM of Bac Giang City toward a green city.
- c) Propose solutions to SALM of Bac Giang City toward a green city.

8. Concepts and glossary interpretation

Urban space; Urban architecture; Urban landscape; Natural landscape; Urban SALM; Urban planning; Sustainable development; Sustainable city; Green city; Green building.

9. Structure of the thesis

The thesis consists of: Introduction, Conclusion, Recommendations, and three chapters:

Chapter 1: Overview of SALM toward a green city.

Chapter 2: Scientific foundations for SALM of Bac Giang City toward a green city.

Chapter 3: Solutions to SALM of Bac Giang City toward a green city.

MAIN CONTENT

CHAPTER 1. OVERVIEW OF SALM TOWARD A GREEN CITY

1.1. Overview of SALM toward a green city in the world and in Vietnam

1.1.1. Trend of forming and developing green cities in the world

Several countries in the world successfully study and build models of green cities, ecological cities, smart cities, etc. The similarity of those cities is to establish sustainable relations between people and nature. Green cities are considered the focus and goal of sustainable development of many cities to manage waste and CO₂, protect the ecosystem, and response to climate change, such as Japan's green city network of 26 cities, including Kitakyushu City named as the "World Environmental Capital". All green cities have a common goal of "improving the highest quality of their people's living".

1.1.2. SALM toward a green city in the world

Now several countries in the world successfully manage space, architecture, and landscape toward a green city as follows:

- Singapore has successfully managed smart traffic and green architecture (applying low-energy buildings, increasing green area of buildings, and effectively developing public transport network), concurrently, has built and implemented E-government well.
- Japan has established the Center of "Building cities with carbon reduction" and "Building green cities". Construction uses energy-saving technologies and utilizes renewable energies.
- In Italia, Milan is good at managing the development of a green city, which is known as "a forest park in Milan". In 1995, the city government of Milan highly appreciated urban planning, taking planning as premise for urban development.
- In Netherlands, Amsterdam is the first city affected by sea level rise because of climate change; therefore, its government decided to limit personal vehicle by developing public transport network and especially, to encourage using bike.

1.1.3. Urban development toward a green city in Vietnam

In Vietnam, green cities and ecological cities are studied to apply and develop; however, in our country, the current trend of building green

cities mentions generally the slogan “green, clean, beautiful”. Tree density, increasing the rate of green coverage, and greening landscape are concerned only; while there is no solution to effectively deal with issues of energy saving, ecological balance, sustainable use of natural resources, environmental protection, mitigating GHG emissions, response to climate change. In addition, regulations on green cities under Vietnamese legal documents, construction norms and standards are unclear.

1.1.4. SALM toward a green city in Vietnam

There is no adequate by-law document from Ministries, Departments on concepts, definitions or criteria of a green city; thus, SALM toward a green city faces many difficulties and is mainly based on planning and regulations on urban architecture planning management. Meanwhile, planning has not applied world’s new approaches and not associated with criteria of a green city, especially, no specific solution to urban development toward a green city. Accordingly, shortcomings arise in the implementation process, such as: disorder and inconsistency in space, architecture, and landscape; no urban identity; environmental pollution. Therefore, uniformity is missing in the overall architecture.

1.2. Existing space, architecture and landscape in Bac Giang City

1.2.1. Overview of Bac Giang City

Bac Giang City is a political, economic and cultural hub of Bac Giang Province. Bac Giang City was upgraded from a town to a city in 2005; urban space was extended from 32.21km² to 66.77km² with 16 administrative units, including 10 wards and 6 communes.

1.2.2. Existing space, architecture, and landscape in Bac Giang City

The planning management is not performed well, leading to frequent revision of planning; construction planning also conflicts with land use planning. Space, architecture, and landscape have limitations. Urban highlights have not been created yet. Space, architecture, and landscapes of many streets and roads are unharmonious and inconsistent. Aesthetic urban presence have not been created yet.

1.2.3. Existing SALM in Bac Giang City

Many areas in city are lack of zoning planning and detailed planning. Low coverage ratio of detailed planning and no urban design lead to difficulties in SALM, as well as construction licensing.

1.2.4. Existing State management structure in Bac Giang City

Because of limited management capacity and lack of officers with expertise in planning, architecture, urban management, there are weaknesses in management.

1.2.5. Community engagement in SALM in Bac Giang City

Community engagement in urban management has not been encouraged; public consultation in the planning phase is formalistic; the roles of residents have not been promoted in building houses in accordance with urban design and granted construction permit.

1.3. Related topics and research papers

The thesis summarizes and evaluates related doctoral thesis and scientific papers to get lessons learned and research orientations.

1.4. Summary evaluation and issues

The thesis provides general evaluation of overall research findings with key issues to be solved: (i) Clarifying the concept of a green city, issues of awareness, benefits in developing green cities, then building scientific foundations for SALM toward a green city in Bac Giang City; (ii) Proposing viewpoints, goals, principles and criteria of SALM toward a green city in Bac Giang City; (iii) For the purposes of overcoming weaknesses and limitations, and gradually turning Bac Giang City into a green city, the thesis shall provide practical, effective and specific solutions in best compliance with viewpoints, goals, principles and requirements of SALM.

CHAPTER 2. SCIENTIFIC FOUNDATIONS FOR SALM OF BAC GIANG CITY TOWARD A GREEN CITY

2.1. Theoretical basis

2.1.1. Concepts of a green city

a) Viewpoints of a green city in the world

- Green cities have clean air and water, as well as gorgeous roads and parks. Green cities are resistant to natural disasters and have less risks of major infectious disease outbreaks. Green cities also encourage green behaviors, such as using public transport and mitigating impacts on the ecological environment.
- From various viewpoints of a green city, the Institute for Advanced Sustainability Studies (IASS) gives the general concept: A “*Green City*” is a city that takes responsible political and societal action to achieve high environmental quality, which by itself contributes to human well-being. Although concepts of a green city are various, countries in the

world have focused on several issues, those are: *Improving the quality of human habitat; saving and renewing energy; mitigating and reusing waste; resisting disasters*. These are also the key issues that any cities should deal with nowadays.

b) Viewpoints of a green city in Vietnam

- In 2016, the Ministry of Construction in collaboration with Korea International Cooperation Agency (KOICA) proceeded the Technical Assistance Project for establishment of Vietnam Green city. For the first time, the concept of a green city is comprehensively and fully provided in compliance with the practical context of Vietnam. This concept of a green city is as follows:

A green city is a city using resources sustainably and effectively to mitigate GHG emissions and having capacity of climate change resilience.

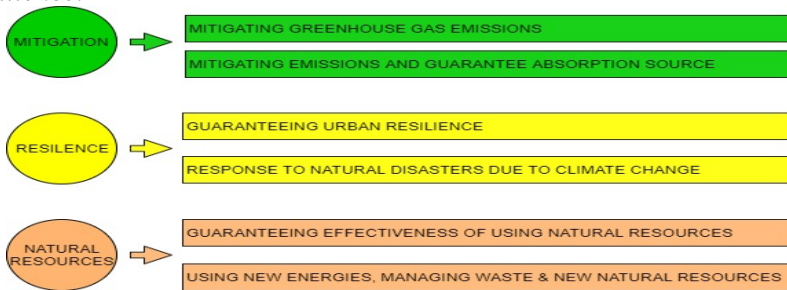


Figure 2.1. KOICA's elements of a green city.

c) Viewpoints of a green city presented in the thesis

Based on domestic and foreign scientists' viewpoints of a green city, the thesis gives its viewpoints of “a green city” and “toward a green city” as follows:

- *Green city*: a city mitigating exhaust gas causing environmental pollution, utilizing natural landscape, and improving the quality of people's living.

- *Toward a green city*: the striving process of a city to gradually achieving criteria of a green city.

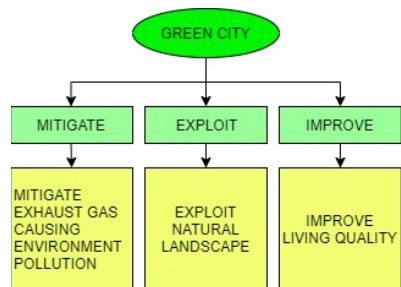


Figure 2.2. Concept diagram of a green city

2.1.2. Model and criteria of a green city

2.1.2.1. Model of a green city

- a) Land use and spatial structure: Utilities, public buildings, efficient energy use are considered thoroughly in land use and urban spatial planning.
- b) Green transport: Minimize the use of fossil fuels by walking, bicycles, electric motorcycles, green transport;
- c) Green ecology, green environment, renewable energies, waste, natural resources circulation: Use renewable energy like solar heat and new energies like fuel cell, hydrogen energy;
- d) Green buildings: Reduce CO₂ emissions to nearly zero through energy-saving solutions by using insulation materials, natural ventilation, and renewable energies, etc.
- e) Green industry: New environment-friendly technology industry, taking advantages of regional natural and cultural features.

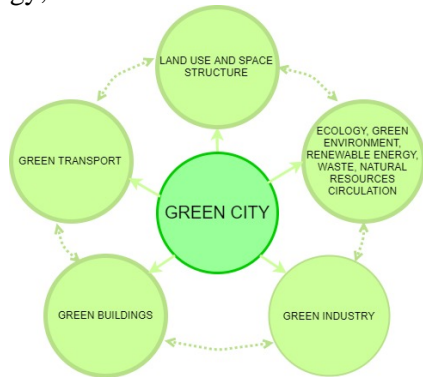


Figure 2.3. Model diagram of a green city

2.1.2.2. Criteria of a green city

Many countries in the world has set up criteria of a green city. Although these criteria are various in different continents, there are similar viewpoints of a green city. According to evaluation of Urban Ecosystem Europe (UEE) applied to European cities, there are 6 areas to evaluate a green city: (1) Local action for community health; (2) Responsible consumption and lifestyle choice; (3) Better public transport planning and design with less traffic; (4) Energy and climate change; (5) Sustainable local economy and social justice, equity and cohesion; (6) Local management in a sustainable orientation.

- The European Green City Index (EGCI) presents 8 areas: (1) CO₂ emission; (2) Use of renewable energies; (3) Residential energy consumption in buildings; (4) Residents' commuting by public transport, bicycles and walking; (5) Consumption water; (6) Recycled waste; (7) Air quality; (8) Environmental governance.

- According to Technical Assistance Project for establishment of Vietnam Green city (KOICA) published by the Ministry of Construction, there are 14 elements of a green city: (1) urban spatial structure; (2) land use; (3) green buildings; (4) green transport; (5) ecology and green environment; (6) renewable and new energies; (7) waste; (8) natural resources circulation; (9) green technology production; (10) green consumption; (11) green cooperation; (12) green administration; (13) green living; (14) green safety and 35 criteria of a green city.

- Criteria of a green city in the world and criteria of a green city provided by (KOICA) in compliance with Vietnam's context are basically similar. From the model and criteria of a green city in the line with KOICA's Technical Assistance Project for establishment of Vietnam Green city, spatial, architectural and landscape elements include: (1) Land use and urban spatial structure; (2) Green buildings; (3) Green transport; (4) Natural resources circulation; (5) Green administration. This is also the basis to identify criteria and solutions to SALM toward a green city in Bac Giang City in Chapter 3.

2.1.3. Sustainable urban development

- Under Vietnam Law on Environmental Protection 2014: *“Sustainable development refers to the formal process in which the development can help keep pace with rigorous needs that emerge at the present time without causing any harm to the likelihood of future generations’ satisfying such needs on the basis of sustaining a close and harmonious cooperation amongst the economic growth, social progress and environmental protection.”*

- Sustainable developed city: A city having capacity to maintain long-term development and having a good quality of living; harmonious development between Economy, Society, and Environment.

Thus, for sustainable development in any area, three elements or pillars “Economy, Society and Environment” shall be achieved.

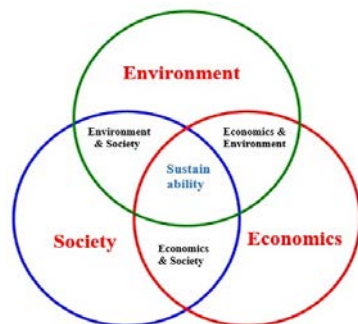


Figure 2.3. Relations between the elements of sustainable development

2.1.4. Theories of urban management and State SALM in Bac Giang City toward a green city

a) Theories of urban management

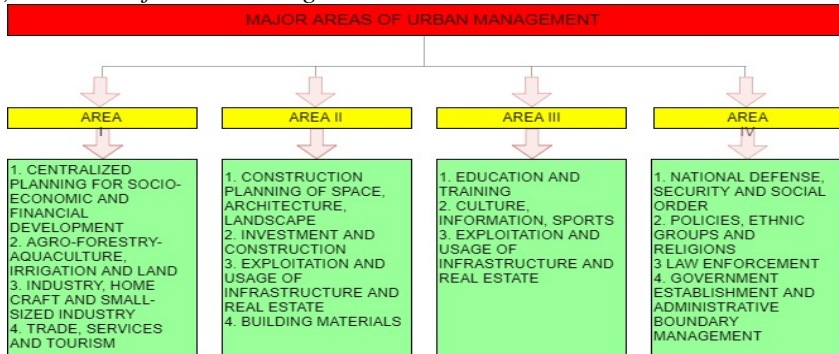


Figure 2.4. Role of space, architecture, and landscape in urban management

b) State management in spatial, architectural and landscape issues

Space, architecture, and landscape play important roles in urban development and construction planning. State SALM is specified in Article 6 of Decree 38/2010/ND-CP with 3 basic areas: (i) For urban space; (ii) For urban landscape; (iii) For urban architecture.

2.2. Legal basis

2.2.1. Legal documents

The thesis studied legal documents to see advantages and disadvantages, thereby proposing amendments and supplements to legal documents, such as: Law on Construction 2014; Law on Urban Planning 2009, Decree No. 64/2010/ND-CP on urban tree management; Circular No. 19/2010/TT-BXD dated October 22, 2010 of the Ministry of Construction guiding the preparation of Urban Architecture Planning Management Regulations, etc.

2.2.2. Technical standards and norms

The thesis studied constructions standards and norms, such as: Vietnam Building Code 01:2008/BXD on Regional and Urban Planning and Rural Residential Planning; Standards for designing houses and public utilities, Standards for trees, etc.

2.2.3. Related planning projects

Project of revising the construction planning of Hanoi Capital region to 2030 and vision to 2050; Plan of revising the General Plan of Bac Giang

City to 2035, vision to 2050 and relevant zoning planning projects and detailed planning.

2.2.4. Related Resolutions and Decisions

Resolution No. 138/NQ-TU dated September 1st, 2016 of the Standing Committee of Bac Giang Provincial Party Committee on “Promoting urban development in Bac Giang province to 2020 and orientation to 2030”; Decision No. 479/QD-UBND dated August 14th, 2017 of Bac Giang People’s Committee on approving the program of urban development in Bac Giang province to 2030.

2.2.5. Management mechanism of spatial, architectural and landscape planning in Bac Giang City

Bac Giang City issued Regulation on SALM planning in Bac Giang City.

2.3. Factors affecting SALM in Bac Giang city toward a green city

2.3.1. Development context of Bac Giang City to 2035

With 10 wards and 6 communes and total area of 6,677ha, Bac Giang City is oriented to expand to 14,398ha to 2035 as a green city.

2.3.2. Urban management institution and tools

a) Leadership and overall direction of Communist Party Executive members and governments at all levels on urban planning and development

Bac Giang Provincial and City Communist Party Committees have issued several Resolutions on developing Bac Giang City toward a green city.

b) Implementation of construction planning after the general planning project is approved

Bac Giang City People’s Committee organized the preparation of zoning planning, detailed planning, and technical infrastructure planning as the basis of organizing and managing the implementation.

2.3.3. Natural landscape of Bac Giang City

Natural landscape of Bac Giang is quite flat with various terrain and beautiful and appealing natural landscape with favorable conditions to develop a green city.

2.3.4. Science and technology

Use GIS technology in land management, planning, granting permit, etc.

2.3.5. Role of residential communities

Promoting the role of residential communities since the steps of planning, building, inspecting, and supervising with the issued construction permits.

2.3.6. Local living style and culture

Promoting traditional values and local customs.

2.4. Lessons learnt

With overall study and scientific foundations of SALM toward a green city in the world and in Vietnam, the thesis provides major lessons learnt as below:

2.4.1. Lesson 1: Building legal basis and management tools of space, architecture, and landscape toward a green city;

2.4.2. Lesson 2: Improving awareness of green cities for Communist Party Executive members and governments at all levels and people;

2.4.3. Lesson 3: Improving State management capacity of space, architecture, and landscape;

2.4.4. Lesson 4: Developing green transportation infrastructure;

2.4.5. Lesson 5: Promoting residential communities and people engagement in the management tools of space, architecture, and landscape toward a green city;

2.4.6. Lesson 6: Cooperating and connecting the green city network.

CHAPTER 3. SOLUTIONS TO SALM OF BAC GIANG CITY TOWARD A GREEN CITY

3.1. Viewpoints, goals and principles

3.1.1. Viewpoints

The thesis proposes 5 viewpoints as below:

(1) Building Bac Giang City as a green city requires right awareness, appropriate policies and mechanism; (2) In the transition period of turning Bac Giang City into a green city, it is necessary to focus on several key and feasible issues based on three pillars: “*Ecology, aesthetics and cleanness*”; (3) SALM of Bac Giang City shall comply with the laws; (4) The effectiveness of SALM of Bac Giang City toward a green city depends on the capacity of the urban government and the active engagement of the residents and international cooperation; (5) Building Bac Giang City toward a green city is the cause of the people, by the people and for the people, which requires promoting socialization to mobilize resources.

3.1.2. Goals

General goals and 3 specific objectives as follows:

(1) Make landscape green by managing and developing planned green space system; (2) Improve the quality of space, architecture, and

landscape associated with the conservation and promotion of valuable historical sites; develop green buildings and green architecture; strengthen construction order management and improve urban identity; (3) Protect environment, focusing on cleaning the city based on the model of “Recirculating City” and climate change resilience.

3.1.3. Principles

The thesis proposes 8 principles: (1) SALM of Bac Giang City shall comply with legal basis; (2) Improve the legal basis and management tools; (3) Synchronize the criteria of SALM for Bac Giang City; (4) Ensure the consistency in managing from the overall space to the specific space; (5) Respect local customs and culture; upholding traditional values; (6) Enhance capacity and effectiveness of State management; (7) Indicate clearly responsibilities for heads; appropriate assignment and decentralization; (8) Promote advocacy, education and training; uphold the role of residential communities.

3.2. Orientation of SALM of Bac Giang City toward a green city

Orientation of SALM of Bac Giang City to 2035 is environment-friendly; ensure “*green, cleanness, aesthetics*” and nature-harmonious criteria; preserve and promote traditional cultural values with focus on 5 major areas: (1) Land use and spatial structure; (2) Green transport; (3) Green ecology, green environment, renewable energy, waste, natural resources circulation; (4) Green buildings; (5) Green industry.

3.3. Criteria of SALM of Bac Giang City toward a green city

3.3.1. Basis of setting criteria

- Model and criteria of a green city are analyzed in the Chapter 2, including 5 factors: (1) Land use and spatial structure; (2) Green buildings; (3) Green transport; (4) Natural resources circulation; (5) Green administration.

- Resolution No. 138/NQ-TU of the Standing Committee of Bac Giang Provincial Party Committee; program of urban development in Bac Giang province to 2030; Revised General Planning Project of Bac Giang City to 2035;

- Specific conditions of Bac Giang City

3.3.2. Criteria of SALM to make Bac Giang City become a green city in 2050

- a) Criterion 1: Finalizing legal basis and management tools of space, architecture, and landscape toward a green city.

- b) Criterion 2: Zoning SALM and identifying management requirements for each zone.
- c) Criterion 3: Greening landscape.
- d) Criterion 4: Improving quality of space, architecture, and landscape.
- e) Criterion 5: Protecting urban environment in adaptation to climate change.
- f) Criterion 6: Capacity and effectiveness of State management.
- g) Criterion 7: Role of communities and residential engagement.
- h) Criterion 8: Cooperation, connection and participation of the network of green cities.

3.3.3. Criteria of SALM of Bac Giang City toward a green city to 2035

For SALM in Bac Giang City toward a green city by 2035, now only 3 groups of criteria and 16 indicators as follows: (1) Greening landscape; (2) Improving quality of space, architecture, and landscape; (3) Protecting urban environment in adaptation to climate change.

Table 3.1. Evaluation table of effectiveness of SALM in Bac Giang City toward a green city

No.	Criteria	Weighting score	Evaluation indicators	Evaluation benchmark	Specific weighting
1	Greening landscape	30	1. Appropriate scope of green space	Min. 18m ² / person	10
			2. Evaluate investment in developing green space system by approved planning	≥ 70%	10
			3. Exploit and use effectively green space system	Use with proper purposes and nature as planning	10
2	Improving quality of space, architecture, and landscape,	30	1. Preserve and promote values of space, architecture, and landscape; develop green architecture buildings and protect valuable architecture buildings	Preserve at least 70% of number of valuable architecture buildings	7.5
			2. Urban construction order	- Build in compliance with permits at least	7.5

	and landscape			80% of licensed buildings. - Do not let any construction with no permit.	
			3. Develop green buildings and green architecture, mainly: public utilities and new urban areas	- At least 50% of public utilities achieve green architecture. - At least 70% of new urban areas achieve green architecture.	7.5
			4. Control the process of forming and developing urban appearance, improving urban identity	Control at least 80% according to approved planning, plans, and projects	7.5
	Protecting urban environment for climate change adaptation	40	1. Build infrastructure of cleaning the city based on the model of “Recirculating City”:		
			1.1. Organize classification and collection of waste at source;	≥ 50% waste are classified at source.	4.5
			1.2. Transport and treat solid waste in the city centralized treatment areas (minimizing, reusing and recycling);	Transport and treatment of ≥ 80% waste meet 3R standards.	4.5
			1.3. Manufacturing factories shall use advanced technologies to ensure that emissions and dust do not cause environmental pollution;	Factories shall guarantee the compliance with regulations of the Law on Environment Protection.	4.5

		1.4. Relocate small and scattered cemeteries to the city centralized cemetery;	Relocate at least 70% of small cemeteries to the city centralized one.	4.5
		1.5. Streets and roads shall be frequently cleaned from dust, swept, and washed;	At least 01 time per day	4.5
		1.6. Receive and apply rainwater and wastewater circulation technology;	At least 70% of received water volume is treated in circulation.	4.5
		2. Build green infrastructure with climate change resilience:		
		2.1. Select climate change scenario(s);	Appropriate with local context	4.5
		2.2. Mitigate negative impacts of climate change;	Good	4.5
		2.3. Adapt to climate change.	Good	4.5

Total score of evaluating a green city is 100 points and divided into 03 levels as below:

- Level 1 (achieve indicators of a green city): 80-100 points – meet requirements of a green city.
- Level 2 (basically achieve indicators of a green city): 60-80 points – meet requirements toward a green city.
- Level 3 (not achieve indicators of a green city): below 60 points – not meet requirements toward a green city.

3.4. Requirements for SALM of Bac Giang City toward a green city

3.4.1. Requirements for greening landscape

- *Scope of green space:* It is required that there is 18 - 20 m² of green space per person. The total green area of the city is 3,867ha.

- *Management and development of green space*

3.4.2. Requirements for the architectural and landscape management and enhancement of the urban aesthetic quality

(1) Preserving and promoting valuable historical sites; (2) Urban construction order; (3) Development of green buildings and green architecture; (4) Improving the urban identity.

3.4.3. Requirements for development of green infrastructure and the city environmental protection

a) Requirements for developing green infrastructure to clean the city based on the model of “Recirculating City”: (1) For development of green infrastructure; (2) For cleaning up the City.

b) Requirements for developing green infrastructure to climate change resilience: (1) Selecting climate change scenarios; (2) Green infrastructure mitigates impacts of climate change; (3) Green infrastructure in adaptation to climate change.

3.5. Solutions to SALM of Bac Giang City toward a green city

3.3.1. Solution group No. 1: Finalizing legal basis and management tools of space, architecture, and landscape toward a green city

a) Issuing mechanisms and policies: Integrating green city criteria into Bac Giang City's urban development programs and objectives; formulate Bac Giang City's Development Program toward a green city; promulgating unique mechanisms to attract social resources for investment in urban development, infrastructure, cemeteries, solid waste, waste water and social welfare works.

b) Planning and plans: Reviewing and revising existing construction planning in line with models and criteria of a green city to apply to Bac Giang City; preparing plans of protecting valuable architectural structures.

c) Revising regulations on SALM of Bac Giang City toward a green city.

d) Building a database on planning and applying GIS in SALM of Bac Giang City toward a green city.

3.5.2. Solution group No. 2: Zoning SALM of Bac Giang City toward a green city

a) Zoning factors: (1) Natural factors; (2) Administrative boundaries; (3) Planning; (4) Cultural and historical factors; (5) Spatial, architectural and landscape organization; (6) Urban infrastructure development.

b) Zoning principles: (1) Uniformity in properties; (2) Natural and man-made boundaries, boundary-forming obstacles; (3) Administrative boundaries.

- c) Zoning methods: (1) Map use method; (2) Identity method; (3) Polarization method.
- d) Proposed zoning: Based on zoning factors, principles and methods, the thesis proposes 5 management zones (as in Figure 3.1).



Figure 3.1. Zoning map of SALM of Bac Giang City

3.5.3. Solution group No. 3: Performing SALM of Bac Giang City toward a green city

a) Spatial management

- For green spaces: (1) Preserve and promote natural green spaces; (2) Protect and expand artificial green spaces; (3) Increase investment in and development of green space as planning; (4) Manage green trees and put in place regulations for tree planting.
- For public spaces: (1) Street areas and squares; (2) Open space; (3) Technical space (transportation, water supply, pipelines).

b) Architecture management

- Preserve and protect valuable architectural structures; ensure construction order; control the city identity; Manage the embellishment and renovation of old street architecture; Instruct, register, inspect and certify green buildings.

c) Urban landscape management

- (1) Urban lighting management; (2) Advertising billboard management; (3) Building color management.

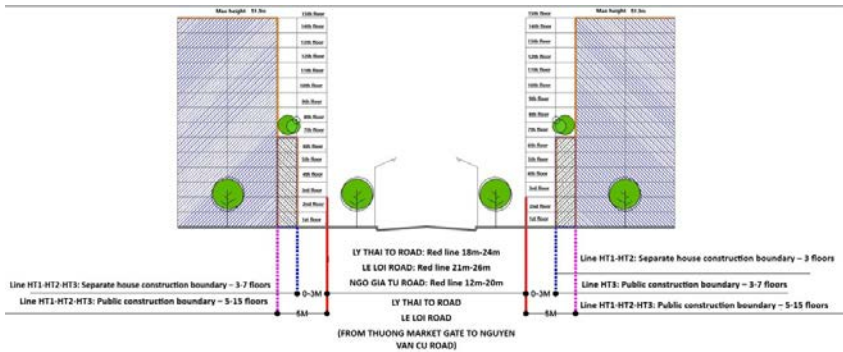


Figure 3.2. Managing construction boundaries and height of main streets

Figure 3.3. SALM of walking streets
the Southern urban area



d) Managing green infrastructure to protect the environment and respond to climate change

- Transport network: Strengthen the development of public transport network; encourage personal vehicle, such as bicycles and electric vehicle; minimize motor vehicle and emissions into the environment.
- Power line and communication cable: under pavements.
- Plan a separate drainage system for the city; regularly maintain and dredge sewage pipeline and artificial lakes.
- Invest in the city drainage system; renovate and upgrade waste water treatment plants; use waste water system in the recirculating city model; classify waste at source and adopt 3R model in recycling.
- Relocate small and scattered cemeteries to the city centralized cemetery; encourage cremation.
- Energy-saving management, GHG emissions mitigation.

3.5.4. Solution Group No 4: Improving State management in space, architecture and landscape of Bac Giang City toward a green city

a) Raise civil servants' awareness of a green city; improve the capacity of officials in charge of urban management at all levels; work closely with relevant agencies.

b) Party Committees and governments at all levels shall consider planning and planning management as key tasks; heads of relevant agencies shall be accountable to violations in planning and licensing.

3.5.5. Solution Group No 5: Upholding the community role and resident engagement in SALM of Bac Giang City toward a green city

a) Mobilize community engagement during phases of setting assignments, planning, planning appraisal and management.

b) Mobilize community engagement when it comes to construction investment, management and utilization.

c) Mobilize community engagement in inspection and supervision.

d) Communicate and raise people's awareness of SALM of Bac Giang City toward a green city.

3.6. Findings and discussions

3.6.1. Main findings of the thesis

a) The thesis provides an overview of SALM toward a green city in the world and in Vietnam, assesses the current status and raises issues to be solved and overcomes the shortcomings in SALM of Bac Giang City toward a green city.

b) Study and summarize scientific basis of SALM of Bac Giang City toward a green city; Analyze and clarify concepts and criteria of a green city in the world and in Vietnam; The thesis was able to propose concepts and criteria of a green city for Bac Giang City.

c) To overcome the shortcomings and weaknesses and gradually turn Bac Giang City into a green city, the thesis proposes 5 practical, effective and specific solutions that can best meet the viewpoints, goals, principles and requirements for SALM.

3.4.2. New contributions of the thesis

Based on its findings, the thesis puts forth 3 new contributions:

a) First new contribution: Identify issues of SALM in Bac Giang City; systematize the theoretical foundations for SALM toward a green city; clarify concepts of "green city" and "toward a green city".

b) Second new contribution: Develop criteria to evaluate the effectiveness of SALM of Bac Giang City toward a green city.

c) Third new contribution: Propose 05 groups of solutions to SALM of Bac Giang City toward a green city as a basis for effective and practical management.

3.6.3. Discussions

a) Criteria for SALM of Bac Giang City toward a green city

In Vietnam, the criteria of a green city have only been found in projects and scientific study and not defined in any legal documents. Therefore, the thesis proposes criteria to evaluate the effectiveness of SALM of Bac Giang City toward a green city by 2035, to specify planning indicators, increase green space for the City; preserve and promote valuable historical sites and architectures; increase green buildings, green architecture; improve the city identity; protect the environment and adapt to climate change; serve as a tool to manage and evaluate the effectiveness of SALM of Bac Giang City toward a green city in particular and other cities in general. These criteria can also be applied to Bac Giang City and similar cities within the province and beyond.

b) Solutions to SALM of Bac Giang City toward a green city

- Proposing solutions to SALM of Bac Giang City toward a green city is an important management task and a basis for the local authorities, organizations and individuals to proceed.
- Improving the legal basis and tools to manage Bac Giang City toward a green city is one of the indispensable solutions in each city, however, given the various sizes and conditions of each city, different mechanisms and policies shall be put in place and serve as the legal basis and instruments to attract investment, manage and implement.
- Zoning is proposed to define zones with similar properties, form groups and break into smaller management zones, and serve as a basis for better responsibility assignment to management agencies.
- Applying solutions to SALM of Bac Giang City toward a green city is in accordance with the laws and the context of Bac Giang City.

c) Pending follow-up issues that need further research

SALM toward a green city is a broad, new and complex topic, especially given the fact that there has not been a proper definition of a green city in Vietnam. The thesis only focuses on three core and feasible issues to turn Bac Giang City into green City, namely: “Ecology, aesthetics and cleanness”; to build Bac Giang City in the direction of: (1) Greening

landscape; (2) Improving the quality of SALM; preserving and promoting valuable historical sites; developing green buildings and green architecture; (3) Protecting environment with a focus on cleaning the city based on the “Recirculating City” model and with response to climate change.

To turn Bac Giang City into a green city in every aspect, the thesis proposes further researching the missing areas, such as: (1) reduce spending toward green consumption; (2) Limit the use of fossil fuels in Ha Bac chemical fertilizer plant and gas production facilities in the city, etc.; (3) Use renewable energies in factories, public areas, administrative agencies in the city; (4) Develop green industry and clean agriculture; (5) Develop technical and social infrastructure toward emission and waste water mitigation, saving power and natural resources; (6) Collaborate and participate in the network of green cities in the world and in Vietnam.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

SALM toward a green city plays a very important role in urban development. However, in reality, such task has not been paid enough attention, so the topic “*SALM of Bac Giang City toward a green city*” is very relevant and points out a new path given the increasing climate change in Vietnam.

a) The findings of the thesis on SALM toward a green city result in 6 lessons and identifies 6 issues that need to be solved.

b) To solve Bac Giang City’s shortcomings and outstanding issues, the thesis focuses on providing a panoramic view and scientific foundations for SALM of Bac Giang City toward a green city, then the following recommendations are put forth: (i) Clearly define concepts of “a green city” and “toward a green city”; (ii) Provide 5 guidelines, 3 specific goals and 8 principles to manage Bac Giang City; (iii) Propose 5 orientations and 3 requirements for the management of Bac Giang City toward a green city; (iv) Propose criteria and set of indicators to evaluate the effectiveness of the management; (v) Propose 5 groups of solutions including:

(1) Finalizing legal basis and management tools of space, architecture, and landscape toward a green city; (2) Zoning SALM of Bac Giang City toward a green city; (3) Implementing activities of SALM of Bac Giang

City toward a green city; (4) Strengthening capacity of State management in space, architecture, and landscape of Bac Giang City toward a green city; (5) Promoting roles of communities and engagement of residents in SALM of Bac Giang City toward a green city.

c) Applying research findings: The thesis can be applied successfully in SALM of Bac Giang City toward a green city and other cities with similar characters and scope.

2. Recommendations

a) To the central level:

- Request the National Assembly, Government, Ministry of Construction to add the concepts of “a green city” and “toward a green city” and criteria of SALM in a green city to the Law on Planning and other relevant decrees.

- Request the Ministry of Construction to amend and supplement Vietnam Building Code 01:2008/BXD, construction standard and Circulars guiding the construction of and SALM in a green city.

b) To Bac Giang Provincial People’s Committee:

- Integrate investment objectives and criteria into the General Planning of Bac Giang City and the Provincial Investment Development Program as the basis for investment management.

- Assign, decentralize, authorize local management officials based on their capacity and expertise; Put in place mechanisms and policies to attract social resources into construction investment.

- Set up a planning appraisal council, organize planning and design contests, with a focus on green city and green architecture.

c) To Bac Giang City People’s Committee:

- Formulate an Urban Development Program in Bac Giang City that incorporates management criteria of SALM toward a green city;

- Review, amend and supplement general planning, detailed planning, regulations on architectural planning management to integrate criteria of green cities and solutions proposed by the thesis into the planning for management.

- Formulate and provide specific mechanisms to attract resources to urban development investment; improve the State management capacity at all levels;

- Put in place a mechanism of reward points and green-building certification applied to investors who meet all the criteria;
- Consider compliance with construction permits and construction order as the criteria for conferring the title of “Cultural family”.

d) For investors:

- Invest and build in accordance with the planning, construction permits and criteria of green cities;
- Speed up the construction according to investment approvals;
- Improve the construction quality, project management, labor safety, environmental sanitation as prescribed;
- Strictly abide the law on construction, investment, land use, housing and real estate business.

LIST OF THE AUTHOR'S PUBLISHED PAPERS RELATED TO THE THESIS

1. Dao Cong Hung, *Quản lý không gian kiến trúc cảnh quan Khu dân cư mới số 2, thành phố Bắc Giang theo hướng phát triển bền vững* (Spatial, architectural and landscape management of New residential area No. 2, Bac Giang City toward sustainable development). Planning Magazine, Issues 75, ISN 1859 - 3054.

2. Dao Cong Hung, *Quản lý không gian kiến trúc cảnh quan thành phố Bắc Giang theo hướng đô thị xanh - một mục tiêu cần hướng tới trong tương lai* (Spatial, architectural and landscape management of Bac Giang City toward a green city – a new goal to achieve in the future), Planning Magazine, Issue 81, ISN 1859 - 3054.

3. Dao Cong Hung, *Kinh nghiệm về quản lý không gian kiến trúc cảnh quan theo hướng đô thị xanh ở thành phố Bắc Giang* (Experience in spatial, architectural and landscape management in Bac Giang City toward a green city), Planning Magazine, Issue 88, ISN 1859 – 3054.

4. Scientific research topic at provincial level (co-author): *Nghiên cứu, khảo sát đánh giá thực trạng kiến trúc cảnh quan và đề xuất giải pháp kiểm soát để quản lý không gian các tuyến phố chính thành phố Bắc Giang đến năm 2030 tầm nhìn 2050* (Research, survey and evaluation of existing landscape architecture and solutions to spatial control and management in main streets and roads in Bac Giang City to 2030, vision to 2050).