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Urban Intensification and the Character of Urban Landscape: A Morphological Perspective

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***Abstract*—**Urban intensification is regarded as the prevalent strategy in many cities of the world to ease the pressures of urban sprawl and deliver sustainable development through increasing the density of built form and activities. However, within the context of intensive development, planning and design control measures that help to maintain and promote the character of existing residential environments have been slow to develop. This causes the possible loss of the character of an area that makes a place unique and distinctive. The purpose of this paper is to explore the way of identifying the character of an urban area for the planning of urban landscape in the implementation of intensification. By employing the theory of urban morphology, the concept of morphological region is used for the analysis and characterisation of the spatial structure of the urban landscape in terms of ground plans, building types, and building and land utilisation. The morphological mapping of the character of urban landscape is suggested, which lays a foundation for more sensitive planning of urban landscape changes.

***Keywords*—**Character areas, urban intensification, urban morphology, urban landscape.

I. Introduction

LAND-USE-BASED zoning featuring with dispersed urban form has come under increasing criticism because of its strong negative influence on sustainability of environment [1], society [2], public health [3], and cost of provision of public services [4]. To improve urban sustainability, the concept of 'Compact City' in the UK [5], or 'Smart Growth' in the United States [6], [7] has been proposed. It is often referred to as having a compact urban form featuring: high population density, mixed land use, efficient transport, and social and economic diversity [8]. This compact urban form aims to manage urban growth, encourage mixed-use development, and emphasise the need for public transport and high quality urban design [9]. In established urban areas, one of the dominant ways of achieving the compact urban form is through the process of urban intensification - efficient use of urban land and intensifying urban development and activities [10].

With widely used in the discussion on urban form, urban intensification relates to processes that make an urban area more compact [5]. The claimed benefits include the efficient use of land resource, effective protection of natural resources, reduction of the environmental pollution from private cars, and increased opportunities for public interaction. However, the controversy about urban intensification has been noted. A stronger argument opposing the concept of compact city is that local communities in the UK, Australia and New Zealand fear the possible loss of urban 'character' in the course of urban intensification [11]–[14]. The notion of 'character' has come into the centre of the debate.

In planning, 'character' refers to urban or neighbourhood character [15] and is a combination of three elements: physical elements; cultural, social and economic elements; and perceptual and experiential elements [16]. More specifically, in urban built environment planning, 'character' is closely related to physical characteristics of urban landscape. To maintain these unique characteristics during future urban changes is of significance of urban continuity and sustainable development. However, what has been revealed is that character of urban landscape is rarely of concern in urban intensification [17]. If urban intensification is only concerned with increasing the density of housing and population, new urban development will be very likely to change the urban physical form and destroy the character of urban landscape.

To conserve the character of urban landscape during intensification, urban morphology shows the potential to provide a theoretical and practical basis. Urban morphological ideas and techniques are concerned with articulating and characterising the structure of urban form [18]. In general, a city is constituted of a set of elements of urban form. When endeavouring to articulate and characterise urban landscape, morphological elements such as urban plans, street layouts, plots and buildings, are imperative to identify features of urban landscape [19]. All these elements serve to comprise the various urban form complexes, such as morphological regions, street units and morphotopes, in addition to the urban fabric types and materials in a nested hierarchy [20]-[23]. These elements are of importance to specifically elaborate built environment for a variety of research purposes.

This paper aims to employ the theory of urban morphology more specifically morphological region generally named character area to identify the unique character of urban landscape during urban intensification. The morphological mapping of the character is suggested to provide a theoretical and practical basis for urban intensification and urban landscape conservation.

II. Urban Intensification

In recent decades, many cities have experienced urban sprawl featuring low-density, single land use, disconnected street networks and automobile-dependent model [24]. These urban issues have been well recognised in many countries since the 1990s, such as the United States, Canada, Australia,

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England and European countries [25]-[28], because of its strong negative influence on the environment, society and the economy [2], [29], [4]. To tackle these problems, one popular idea proposed is Neo-Traditional Planning, later known as 'New Urbanism', 'Smart Growth' in North America, and 'Compact City' in the UK and the European continent [30], [31]. Neo-Traditional Planning aims to integrate every part of life from, living, working, shopping and recreation to transit-oriented development and compact, walkable, and mixed-land-use communities [32], [33]. In fact, the fantasy of compact city is rooted from the form of densely developed urban core areas in many historic European cities [34].

The idea of limiting urban expansion and promoting urban intensification was boosted in the 1990s by Newman and Kenworthy [35] with the notion that higher density cities are more transport fuel efficient than lower density cities. It is believed that the higher density makes public transport economically viable and will potentially reduce private car dependency and environmental pollution, leading to sustainable urban forms [36]-[38]. Urban intensification has then been defined as the approach to transfer urban areas into a compact, higher density, and public transportation-adapted urban form, and as the way of reducing automobile dependence, increasing public transport efficiency while promoting a safer and more equitable city [39]. Similarly, in the research conducted by Oxford Brooks University, intensification is classified into built form intensification and activity intensification [34]. More common understandings of these two types of intensification are the increase of population density and the extent of economic and social activities in urban areas through densifying new buildings and urban redevelopment, developing vacant lot, and increasing activities that take place in cities [40].

Resulting from the extensive promotion of the compact city, many cities in the world have adopted urban intensification to promote sustainable urban development. Since the 1970s, Portland, Perth, Melbourne have seen decreases in urban sprawl by focusing on concentrated development within urban growth boundaries [42]. In the United States, some states have put smart growth policies into action; well-known examples include the states of Oregon and Maryland, and Montgomery County in Virginia [41]. In Portland, for instance, a metropolitan plan was proposed based on the understanding of intensification "as being more sustainable and more socially responsible than low-density sprawl" [27]. In recent decades, Auckland Regional Council has adopted a strategic policy of urban intensification at the local level [43] for the development of medium density housing, referred to as "terrace housing, low-rise apartment buildings and cluster housing" [44]. The key focus of intensification in Auckland is on the existing metropolitan areas to infill land vacancies on an existing built environment; the renewal of urban development by demolishing and rebuilding old houses; and the exploration of new development with new compact forms of neighbourhood in the greenfield areas [44]. Although different names are used, it is likely that Smart Growth or Compact City, adapting cities to a compact city form, is an appropriate approach for sustainable development.

Although the benefits of applying intense urban form in cities can be seen, the fiercely debated issues regarding to urban intensification are also noted. In Melbourne, urban intensification was vehemently opposed due to residents' consideration of a possible loss of character, especially in the middle-ring and inner-city suburbs [12]. In Auckland, the proposed urban intensification has created an intense debate about the possible threat to historic heritage and character [13], [14]. From the perspective of the residents, despite opposing the implementation of urban intensification, when questioned, they found it difficult to articulate specific features or categories of the neighbourhood's character. The most commonly mentioned 'characteristic' refers to their years of dwelling in the buildings in which they live or the facility buildings such as libraries and churches in their communities. Lack of the understanding of what a valuable characteristic is, makes it difficult to have a consensus among local people and authorities. Conflicts between residents and developers make the goals of intensification harder to achieve.

TABLE I
SUMMARY OF THE RESEARCH ON CHARACTER

Character in different contexts	Interpretation	Source
Character (in general)	'Character' refers to unique patterns of development, landscape and use, and is the mixture of all aspects of a place that make it distinctive.	[45]
Character (in urban planning)	A distinctive consistent pattern of elements that makes urban areas different from one another and creates identity.	[46]
	Includes physical or built elements that from the place, cultural, social and economic factors to create identity, and the people associated with perceptual and experimental aspects.	[16]
Character (in urban design)	'Emphasizes the natural, visual and cultural characteristics.'	[47]
Urban or neighbourhood character (in urban design)	Investigates the urban character based on people's daily experience in terms of their visual perception and personal feelings.	[15]
Community character (in sociology)	'Focuses on social characteristics… on people, their institutions and their interrelationships.'	[47]
Historic heritage and character (in urban planning)	Focuses on physical elements of historic heritage and character, including landscape context (topography and vegetation, urban structure, streetscape, and building styles.	[48]
The character of towns	'Character is viewed as only the outward aspect (physical characteristics of a town) of basic underlying processes, activities and intention.	[49]

III. URBAN LANDSCAPE CHARACTER

In general, the character of a place refers to the features that distinguish one place from another [39]. In an urban context, 'character' refers to the unique patterns of development, landscape and use, and is the mixture of all aspects of a place that makes it distinctive [45]. Table I shows that character has

been addressed and studied regarding to the conservation of the unique character of a place. A combination of the features of character includes: physical elements, perceptual elements, and social, cultural and economic elements [16]. It is certain that physical elements are persistently preserved as the container for perceptual features, and social cultural and economic features.

According to research on character in Auckland New Zealand [48], [50], the significance of the historical perspective in studies of character is addressed, and character areas mainly refer to historic heritage and character areas [50] through the historical physical features, such as buildings and streetscape (street swales, footpath types and vegetation). The main purpose of describing and assessing these features was to provide the guideline in managing possible changes to the valuable neighbourhood character and heritage. Similarly, [48] investigated historic buildings and areas in eight historic town centres located in the traditional inner suburbs of Auckland, including: Mt Eden Village, Eden Valley/Dominion Road, St Heliers Bay, Upper Symonds Street, Grey Lynn (Surrey Crescent), West Lynn, Ellerslie and Kingsland. The primary purpose of the study [48] was to identify the unique character, heritage qualities and values to develop a new zone for the district plan.

From Table I, physical features are the main content for the formation of historic heritage and character areas. These features include the natural and cultural aspects of an area such as: its topography, streets, buildings and vegetation, constituting the physical urban form of the area. In fact, planning and design control measures for future urban change can be established on thorough understanding of an area's character through its physical form when planners are concerned about preserving and protecting the invaluable historical character of a neighbourhood area. However, the historic process of these elements has rarely been investigated theoretically. It is certain that physical elements are persistently preserved as the container for perceptual features, and social cultural and economic features. Hence, the investigation of character needs to start with identifying the process of the character formation of the physical elements of a place, which is the study of urban morphological theory.

IV. Historico-Geographical Urban Morphology

In general, morphology means 'the study of form' [45], literally referring to 'form-lore', or knowledge of form [51]. Urban morphology is the research focusing on urban form, more specifically articulating and characterising the structure of urban form [18]. Conzen's work during the 1960s, especially his landmark research on the town-plan analysis of Alnwick [52], a town in north Northumberland, England, has made a significant contribution to the conceptual and methodological development of urban morphology; this is regarded as one of the most important books, 'Alnwick Northumland: A study in Town-plan Analysis', [52] on the development of urban morphology published to date [19]. He provided a comprehensive framework for the study of urban physical form, with an intellectual understanding of urban landscape in tripartite division: town plan (or ground plan), the building fabric, land and building utilisation [52]. Conzen's work is widely considered as a fundamental advance in urban form research [53]. Based on his research, the town-plan can be interpreted as the topographical arrangement of man-made areas, consisting of three distinctive complexes of plan element: a street system showing streets and their arrangements, street blocks presenting plots and their arrangement, and block plans giving information of buildings [19]. Meanwhile, the concept of morphological region, an area of homogenous urban form consisting of the combination of ground plan, building form, land and building utilisation, is intensively developed for interpreting the historical development of an area [23], and one of the significant contributions to historico-geographical urban morphology,

It is evident that historico-geographical urban morphology [19] features the intellectual understanding of urban landscape in a tripartite division: town plan (or ground plan), the building fabric, land and building utilisation [52]. This division forms the basis of the concept of morphological region [21], [54] also known as urban landscape units [54], [18] or character areas [23]. Hence, morphological regions represent distinctive features of historical development of urban landscape can be used for identifying the main features of urban landscape. The extensive application of this concept can be seen in the research in town-plan analysis in Germany [52], and morphological regions and landscape management in New Zealand [23]. In fact, this concept offers a systematic research method to comprehensively understand the development and evaluation of the physical features of urban landscape, and this understanding lays a foundation for future urban intensification in established neighbourhood areas.

From histrico-geographic perspective, the past offers objective lessons for the future; the method of elaborating the historical development of urban landscape therefore provides a theoretical basis for future urban planning: it provides the way of rooting the future urban landscape management into its historical development [21]. Moreover, in morphological analysis, urban form including physical spaces such as streets, buildings and open space, refers to urban landscape that constantly changes with different levels of persistence in time and space [55] showing the additive and transformative features [22]. Morphological region provides an analytical approach for characterising distinctive physical features of the urban landscape and guiding historical urban landscape management during its change. Practically, the concept of morphological region can be used as an approach to map unique physical features of urban landscape. This morphological mapping is not only the identification of character of physical urban space but also lays a foundation to the development of urban intensification.

V. Conclusion

Although urban intensification is recognised as a process or strategy for achieving compact urban forms with the increase in density of built form and activities, it has rarely been concerned about how to conserve invaluable urban landscape character during the process of urban intensification. This reveals a lack

of knowledge in the implementation of urban intensification to harmoniously integrate new urban growth into an existing character context. The concept of morphological region provides the theoretical basis and the practical method for integrating the historical features of urban form into new urban landscape changes through mapping unique features of urban landscape. More significantly, investigation of ground plan, building fabric and building and land utilisation forms the morphological mapping method to characterise the urban physical form. The concept of morphological regions and the method of morphological mapping underpinned by this concept are of importance to specifically elaborate the distinctive characteristics of urban landscape for intensive development purposes. In applying this mapping method, the unique character of urban landscape could be identified, which could provide a reference for residents, urban planners and decision makers on managing the character of urban landscape during future urban change.

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