



PLANNING MALAYSIA:

Journal of the Malaysian Institute of Planners

VOLUME 24 ISSUE 2 (2026), Page 458 – 475

STREET CHARACTER AND URBAN IDENTITY: DEFINING PHYSICAL DESIGN PARAMETERS OF BUILDING APPEARANCE IN THE HISTORIC URBAN FABRIC OF KUALA KANGSAR PERAK MALAYSIA

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Abstract

Streets are vital public spaces that shape the identity and character of towns, especially in historically significant areas like Kuala Kangsar, the royal town of Perak, Malaysia. Yet, modern architecture, unregulated renovations, and vehicular encroachment have altered traditional streetscapes, threatening their cultural and architectural heritage. This study aims to establish physical design parameters to define and preserve street character within Kuala Kangsar's historic urban fabric. Focusing on Istana, Laksamana, and Shahbandar Streets, it employs a mixed-methods approach: qualitative data from in-depth interviews (n=21), field observations, and archival analysis, and quantitative data from structured questionnaires (n=330). Triangulated analysis identifies two key dimensions shaping street character, appearance and function with buildings and landscape as primary influences. Basic statistical analysis of the survey responses, including descriptive frequency analysis and correlation assessment between building appearance attributes and public perception, was conducted to support the qualitative findings. This paper emphasizes building appearance, highlighting its role through attributes like attractiveness, visibility, and human scale. Findings, validated via expert focus group discussions (n=6), inform nine key design guidelines. The study contributes to urban design theory and policy by promoting heritage-sensitive street development in historic towns.

Keywords: street character, urban identity, urban fabric, physical, parameters

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INTRODUCTION

Streets, as one of Lynch's (1960) five core urban elements, are fundamental not only as movement corridors but also as key determinants of a city's experiential and cognitive image. In Malaysia's royal towns, streets within the historic urban fabric embody rich historical narratives, architectural heritage, and culturally significant spatial configurations (Sulaiman et al., 2007). Unlike generic newer developments, these streets exhibit distinctive physical qualities, including legibility, permeability, attractiveness, human scale, and comfort, that collectively forge unique urban character and reinforce local identity (Shamsuddin, 2011; Ja'afar, 2014). Consequently, streets hold critical importance in urban design theory and the preservation of place identity in heritage contexts, making their physical character essential to informing sensitive urban policies that safeguard historically significant towns (Sulaiman, 2000; Idid, 1995; Tiesdell & Adams, 2021; Roslan et al., 2023).

PROBLEM STATEMENT

Street design challenges in Malaysia's royal towns reflect growing concerns over the loss of urban identity due to rapid development. Studies by Shukri et al. (2017, 2018) and Harun et al. (2015) reveal that urbanisation has weakened the historical and cultural fabric of these towns, while Shamsudin et al. (2018) stresses the need for design guidelines to protect their heritage. In Kuala Kangsar, preserving heritage buildings, landscapes, and traditional crafts is vital to maintaining local identity (Che Leh et al., 2013; Berita Harian Online, 2016). Similar threats are seen in Seri Menanti and Klang (Harun et al., 2015; Arshad, 2015). While research often prioritises heritage buildings, Samadi and Yunus (2012) caution that neglecting the cultural and spatial qualities of streets may lead to further identity erosion. In contrast, Maharani Town in Johor demonstrates how well-planned upgrades can enhance infrastructure while preserving historic street character (Utusan Malaysia, 2012).

SCOPE OF STUDY

This study focuses on the physical dimensions of streets as key contributors to character and identity in Malaysia's royal towns. While urban design also involves social and psychological aspects (Sulaiman, 2012), physical elements such as built form, spatial structure, and active use are central to shaping place identity (Ja'afar, 2014; Shamsuddin & Sulaiman, 2002; Mulyadi, 2008; Shirvani, 1985; Moughtin & Mertens, 2003; Tuan, 1977). Pedestrian activity further enhances street vitality and meaning (Voltolini, 2006; Gehl, 2010; Jacobs, 1993). Thus, this study limits its scope to physical attributes that define street character in royal towns.

CASE STUDY

Kuala Kangsar, Malaysia's oldest Royal Town, is selected as the case study for its rich historical, cultural, and physical heritage. The study focuses on three key streets: Istana, Laksamana, and Shahbandar, chosen for their civic, commercial, and public roles. Istana Street, the royal civic spine, features landmarks such as the royal palace and mosque, reflecting the Malay monarchy's grandeur (Harun et al., 2005; Shamsuddin et al., 2018). Laksamana and Shahbandar Streets, located near the Perak River, function as vibrant commercial and social hubs. The town's landscape, royal crafts, heritage industries, and street-based cultural practices contribute to a distinctive and lively streetscape. As highlighted by Mehta (2013), Lynch (1960), and Jacobs (1993), such activity-rich environments define street character and reinforce their role as public spaces tied to urban memory and identity.

METHODOLOGY

This study adopts a mixed-methods approach as the most suitable strategy for addressing the research questions (Creswell, 2009). By combining qualitative and quantitative analyses, it allows for a comprehensive investigation of physical street character, in line with past studies on urban form and identity (Sulaiman et al., 2007; Shamsuddin, 1997). Its relevance is further supported by recent research, including Berta et al. (2018), who emphasize the value of integrating spatial and stakeholder data for heritage evaluation, and White et al. (2023), who apply immersive methods to capture community perceptions.

Data collection involved field observations, interviews, document analysis, literature review, and structured questionnaires, with expert focus groups used for validation. Quantitative data obtained from 330 questionnaire respondents were analysed using descriptive statistics and correlation analysis to examine relationships between perceived street character and specific building appearance attributes such as façade continuity, skyline quality, and signage design. These statistical results provide additional empirical support for the qualitative interpretations derived from interviews and visual observations. The methodological framework established here forms the basis for the subsequent analysis, where both visual and perceptual dimensions of street character are evaluated in detail. The analysis section presents the synthesis of these findings. All visual documentation presented in Figures 2-11 and comparative summaries in Tables 1-3 are directly referenced in the analysis to clarify how empirical observations support the identified street character attributes.

LITERATURE REVIEW

Urban street character is largely shaped by physical components, which form a core dimension of environmental identity alongside behavioural, psychological, and social aspects (Sulaiman, 2012). This study focuses on the physical components that shape street character, recognized as a key contributor to urban identity (Sulaiman, 2012; Ja'afar, 2014). Streets, as basic elements of urban structure, derive their character from the interplay of buildings, landscapes, and networks, each assessed through appearance and function (Ja'afar, 2014; Al-Obeidy & Dabdoob, 2017). These include seven elements: building form, landscape, location, image, street pattern, visual quality, and activity (Moughtin & Mertens, 2003; Appleyard, 1980). Functional aspects are shaped by the intensity and diversity of activities, which contribute to place identity and a vibrant public realm (Gehl, 2010; Carmona et al., 2003). Although studies specific to royal towns are limited, many of these settlements are historic urban centres where physical heritage remains critical in defining unique street character (Shamsuddin & Sulaiman, 1999).

STREET CHARACTER FORMATION THROUGH BUILDING APPEARANCE AND PHYSICAL ELEMENTS

Building Appearance Components

Building appearance is shaped by a range of interrelated physical components, including building type, location, height, scale, form, age, condition, structural system, setbacks, façade elements, roof design, signage, and overall visual quality which collectively influence the distinctiveness, legibility, visibility, and attractiveness of streets (Ja'afar, 2014; Shamsuddin, 2011; Abaszadeh, 2011). Architectural features such as historic façades, cultural landmarks, and landscapes are critical in defining a street's identity. Core physical variables, like façade design (doors, windows, arcades, balconies), building scale, articulation, rhythm, human scale, rooflines, and heritage elements, work together to create a coherent and memorable streetscape. These attributes, which directly shape street character through attractiveness, visibility, and human scale, are systematically assessed in this study using established urban design measurement techniques, as outlined in the conceptual framework (Figure 1).

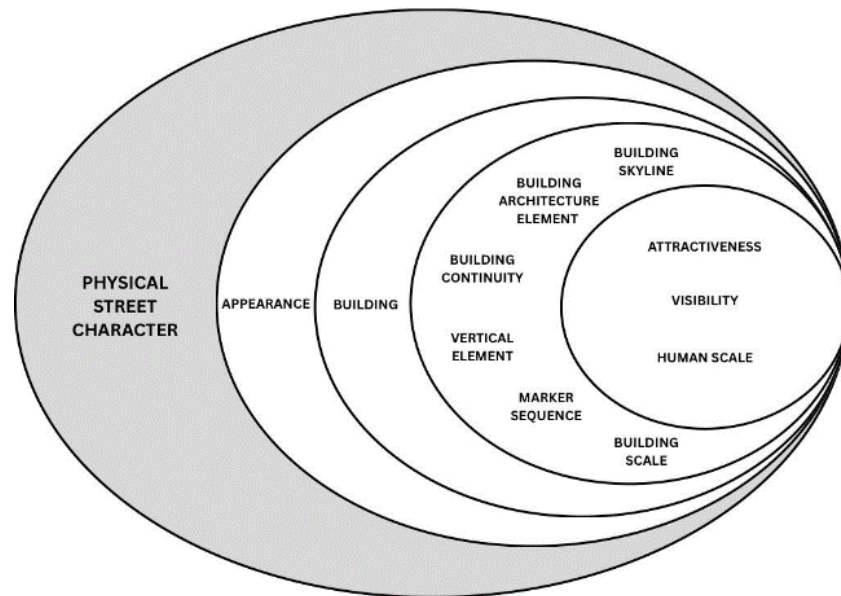


Figure 7: Conceptual Framework
 Source: Author

ANALYSIS AND DISCUSSION

Drawing on the mixed-methods data collected, the following section discusses how building appearance influences street character in terms of three key attributes: attractiveness, visibility, and human scale. Each attribute is unpacked based on qualitative insights and visual documentation from the case study areas. References to Figures and Tables are provided throughout the discussion to clearly demonstrate how visual evidence supports the analytical findings.

The study identifies that the appearance aspects of building components contribute to the physical street character in the Royal Town of Kuala Kangsar through three key attributes: (i) attractiveness (ii) visibility and (iii) human scale. Table 1 outlines the data collection techniques employed for each physical characteristic and demonstrates how different research instruments support each analytical dimension discussed in this section.

Table 1: Appearance of building components based on research techniques

Physical Character and Element	Qualitative		Quantitative	
	Visual Survey	Interview	Historical Document	Questionnaire Survey
Attractiveness				
Architectural Design of Buildings (location, function, age, architectural style, architectural detailing, visual quality)	√	√	√	√
Building Skyline Quality (location, function, age, height, roof shape and size, design, visual quality)	√	√	√	√
Continuity of Building Appearance (Façade and Signage) (location, function, building size & openings, height, design, building lines and rhythm, horizontal and vertical articulation, visual quality)	√	√	√	√
Visibility				
Vertical Elements (location, function, architectural style, size, height, building age, visual quality)	√	√	√	√
Civic Building Appearance (location, function, size, form, architectural style, visual quality)	√	√	√	√
Marker Sequences (location, function, architectural style, visual quality)	√	√	√	√
Human Scale				
Building Scale (function, size of front openings, number of units, block length, distance between intersections, building sidewalk)	√	√	-	√
Enclosure Space (function, street width, building height, viewing angle)	√	√	-	√

Source: Author

ATTRACTIVENESS

The study revealed that the attractiveness of a street is associated with three key elements: (i) architectural design of buildings, (ii) quality of the building skyline, and (iii) continuity of building appearance.

Architectural Design of Buildings

Architectural design plays a significant role in enhancing street attractiveness and shapes the physical character of the royal town's streets. It is influenced by factors such as building function, location, age, style, detailing, and visual quality of civic landmarks and traditional shophouses. This character is achieved through: (i) the Royal Palace, strategically sited on elevated or riverside locations, whose historic age, distinctive style, and heritage status create a monumental landmark, reinforcing spatial hierarchy and historical identity; (ii) the Royal Mosque, Gallery, and Museum, located on prominent sites, which contribute unique architectural features and royal imagery that enrich visual quality and enhance place recognition; and (iii) traditional mixed-use shophouses whose dual function, detailed craftsmanship, and heritage value strengthen local identity and streetscape memorability. These elements are spatially represented in the map of Kuala Kangsar (Figure 2) and further celebrated through diverse architectural

detailing as illustrated in Figure 3, which highlights ornamental façade elements and heritage motifs reflected in local commemorative stamp designs.



Figure 2: Map of Kuala Kangsar highlighting attractive buildings and their locations.
 Source: Author



Figure 3: Architectural detailing is commemorated through stamp design.
 Source: Lubis A.R. et al. (2010), Kuala Kangsar Public Library

Building Skyline Quality

The analysis highlights that the building skyline quality, essential for street attractiveness, is shaped by landmark structures embodying the royal identity, such as the Royal Palace, Mosque, Gallery, and Museum, and mixed-use buildings like traditional shophouses. This is achieved through: (i) the Royal Palace's dominant presence on elevated terrain, where its scale, distinct architectural style, and roof form create a clear, memorable landmark that anchors the skyline and reinforces local identity; (ii) the Royal Mosque, Gallery, and Museum, contributing to the skyline composition via their civic prominence, varied height, and distinctive roof forms, strategically placed on terraces or hills to enhance visual harmony; and (iii) mixed-use buildings maintaining controlled

height and consistent rooflines, preserving visual rhythm and coherence. These skyline relationships are illustrated in Figure 4 through cross-sectional views of Zones A and B, allowing comparison between civic landmarks and surrounding commercial buildings in terms of height, location, and architectural form.

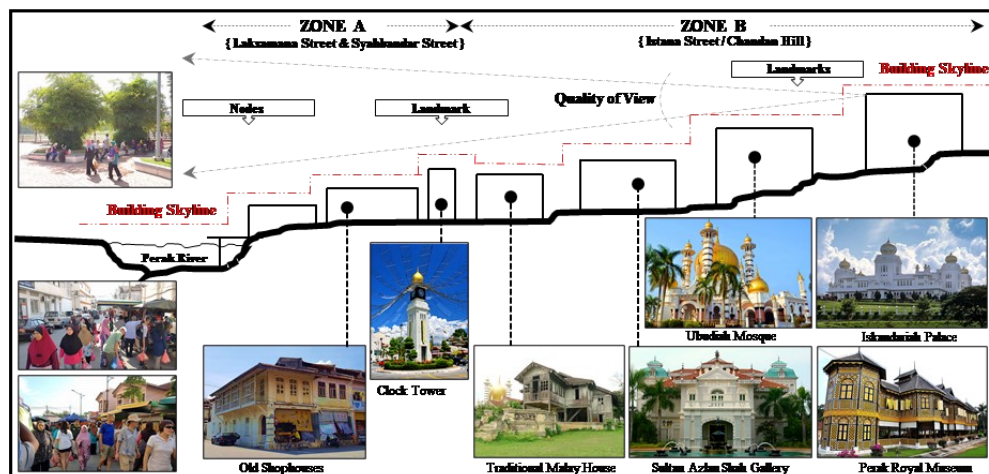


Figure 4: Cross-sectional view of Zones A and B illustrating skyline variations by function, location, height, roof form, and towers.

Source: Author

Building Façade Continuity

The analysis reveals that façade continuity, critical for street attractiveness, depends on building function, design, size and openings, height consistency, architectural rhythm, articulation, and façade control. This is achieved through: (i) uniform façade design in traditional shophouses, where consistent height, aligned architectural lines, and coherent openings create a harmonious streetscape that reinforces local identity; and (ii) incorporation of royal imagery in new commercial or mixed-use façades to maintain aesthetic continuity and emphasize the cultural uniqueness of the royal town. As demonstrated in Table 2, traditional shophouses in Zone B exhibit stronger façade alignment and rhythm compared with newer commercial units. Disruptions in façade continuity, illustrated in Figure 5, reduce the visual cohesion of the street environment and weaken its architectural identity.

Table 2: Comparison of the continuity in traditional shophouse appearances in Zone B.

Type	Element	Building Façade Appearance
(i) Old Shophouse (Original)	- Continuity of façade architectural style (colonial influence) - Uniform building height - Repetition of typical units - Consistency in building lines and rhythm - Uniformity in form and size of openings (maximum of 2 types) - Consistency in horizontal and vertical articulation	
(ii) Old Shophouses (Modified)	- Lack of continuity in façade architectural style (loss of colonial influence) - Inconsistent building height - Absence of repeating typical units - Disruption in building lines and rhythm - Irregularity in form and size of openings (more than 6 types) - Lack of consistency in horizontal and vertical articulation	

Source: Author

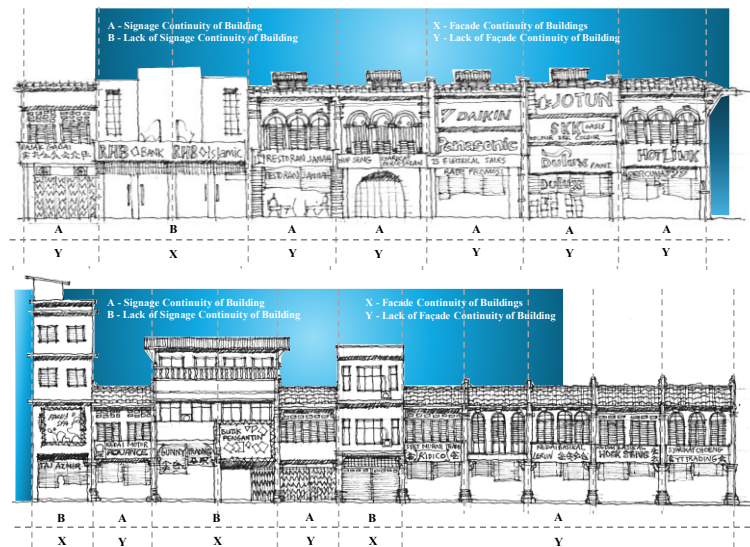


Figure 5: The lack of facade continuity with adjacent units reduces street attractiveness in Zone B.

Source: Author

Signage Design

Results indicate that signage continuity, essential for enhancing street attractiveness, is influenced by location, design, quantity, type, size, and color. This is achieved through: (i) strategic placement, ideally above façades with balanced proportions, legible typography, and cohesive color schemes that support pedestrian readability and reinforce the royal town identity at a human scale; and (ii) traditional signage forms, such as carved names on façades or shutters, which preserve architectural coherence and cultural continuity. Poorly positioned or oversized signage undermines aesthetic harmony (Figure 6), while traditional models support visual consistency and historic character (Figure 7).



Figure 6: Improperly placed, oversized, and excessive signage disrupt façade continuity, streetscape harmony, and reduce the building's architectural aesthetic.

Source: Author

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Figure 7: Traditional signage design enhances building facade aesthetics (i-iii) and preserves the continuity of historic building appearances (iv).

Source: Author and Lubis et al. (2010)

VISIBILITY

The study found that street visibility is influenced by three key elements: (i) vertical elements (ii) the visual prominence of civic buildings, and (iii) the sequential arrangement of urban markers.

Vertical Elements

The analysis reveals that vertical elements significantly enhance street visibility, spatial legibility, and wayfinding within Zones A and B of the Royal Town (Figure 8). This is achieved through: (i) the integration of towers or minarets with key royal landmarks, such as the Royal Palace and Royal Mosque, whose strategic location, scale, and architectural style amplify visual clarity and reinforce the Royal identity; and (ii) the presence of non-civic vertical features, like clock towers situated at intersections or roundabouts, which serve as urban reference points and aid pedestrian orientation. Collectively, these vertical markers strengthen visual connectivity and spatial recognition, enriching the streetscape character of the royal town.



Figure 8: Vertical elements: Iskandariah Palace tower (i), Ubudiah Mosque minaret (ii), and Kuala Kangsar Clock Tower (iii) enhance visual clarity and define the royal town's streetscape.

Source: Author

Civic Building Appearance

The analysis highlights the visual prominence of key Royal civic buildings as central to shaping street design and reinforcing the character of the royal town. Table 3 summarises the comparative attributes of these civic buildings in terms of architectural form, height dominance, and landmark visibility. This is achieved through: (i) the strategic siting of the Royal Palace on elevated terrain, making it the dominant landmark, with its substantial scale and distinctive architecture that embodies royal identity; (ii) the positioning of the Royal Mosque, Gallery, and Museum near the palace or on hills, enhancing visibility and recognition through their size, unique forms, and Royal symbolic features. Together, these buildings create highly visible urban markers that differentiate the royal town, strengthening its localized street character and sense of place (Table 3).

Table 3: Comparison of civic building appearances contributing to visibility.

Civic Building	Location Size Age	Shape/ Form	Architectural Style	Historical Document
Iskandariah Palace	Peak of Chandan Hill 17220.35 sq feet 86 years	 A symmetrical form combining a rectangle and a square.	 A combination of Indo-Islamic 'Saracenic' architecture and Middle Eastern architectural styles.	 Astana Negara (1933)
Ubudiah Mosque	Chandan Hill 4305.56 sq feet 102 years	 A symmetrical form combining an octagon and a square.	 Islamic 'Saracenic' architecture and Moorish carving artistry.	 Ubudiah Mosque (1917)
Sultan Azlan Shah Gallery	Chandan Hill 6725.35 sq feet 116 years	 An asymmetrical form combining multiple rectangular shapes.	 A combination of Moorish, Indian, and Nusantara architectural styles.	 Ulu Palace (1903)
Perak Royal Museum	Bukit Chandan 93 tahun	 An asymmetrical form symbolizing a keris blade sheathed in its scabbard.	 Hardwood construction, woven bamboo walls (tepas), and diamond-shaped wooden roofing.	 Kenangan Palace (1926)

Source: Author

Marker Sequence

The study finds that marker sequences, which enhance street visibility, are shaped by building location, function, and architectural style. This is realized through: (i) civic royal buildings such as the Royal Palace, Royal Mosque, and Royal Gallery acting as visual markers; (ii) their strategic placement along curved or winding roads, creating a sequential visual experience that improves street

legibility and recognizability. Figure 9 illustrates this spatial sequence, where the SAS Gallery, Ubudiah Mosque, and Iskandariah Palace appear progressively along the winding road, reinforcing visual continuity and orientation for street users.



Figure 9: The presence of SAS Gallery, Ubudiah Mosque, and Iskandariah Palace along the winding road forms a marker sequence that enhances street visibility.

Source: Author

Building Scale

The study highlights that a human-scaled street environment is influenced by building function, unit size, block length, intersection distance, and the presence of covered walkways. This environment is shaped through: (i) mixed-use buildings, such as traditional shophouses, where narrow frontages and elongated layouts increase the number of units per block, enhancing street rhythm and visual interest at the pedestrian scale; (ii) block lengths with intersection distances under 100 meters, which correspond to pedestrian movement speeds, promoting walkability and street vitality; and (iii) continuous, weather-protected walkways (*kaki lima*) of appropriate height and width, which enhance pedestrian comfort, safety, and connectivity (Figure 10).



Figure 10: Five-foot ways with human-scaled height and narrow, sheltered widths support pedestrian activity, creating a vibrant and character-rich streetscape.

Source: Author

Enclosure

The study identifies spatial enclosure as a key element of a human-scaled streetscape, influenced by building function, height, and street width. This quality is achieved through: (i) mixed-use buildings such as traditional shophouses, which, when aligned with narrow streets, create a defined spatial character; (ii) a height-to-width ratio where taller buildings along narrow streets enhance visual enclosure; (iii) viewing angles over 45° , which improve façade legibility and spatial clarity; and (iv) active pedestrian presence, reinforcing the street's vibrancy and public function. As shown in Figure 11, the strongest spatial enclosure occurs when building height meets or exceeds street width, complemented by wide viewing angles and active street-level use.



Figure 11: The best spatial enclosure occurs when building height matches or exceeds street width, with a 45° viewing angle and active street-level use.

Source: Author

CONCLUSION

This study confirms that the appearance of building components significantly shapes street character in the historic urban fabric of Kuala Kangsar, particularly through the attributes of attractiveness, visibility, and human scale. By identifying and analyzing key physical elements such as architectural style, façade continuity, skyline quality, signage, spatial sequencing, and enclosure, this research establishes a coherent set of design parameters grounded in the local

royal identity. Statistical analysis of public perception further supports the qualitative findings, demonstrating consistent relationships between building appearance attributes and perceived street character. These findings have direct policy implications for local authorities and urban designers, particularly in guiding development control, conservation zoning, and façade improvement initiatives. The nine design parameters developed can serve as a reference framework for heritage-based development plans, ensuring that visual coherence and traditional elements are integrated into future urban interventions. Municipal councils may adopt these guidelines to inform planning approvals, while heritage departments can use them to evaluate and retrofit existing streetscapes sensitively. This study not only advances urban design scholarship but also provides actionable insights for policymakers, planners, and conservationists seeking to protect and revitalize historic streetscapes without compromising their cultural integrity.

LIMITATIONS AND FUTURE RESEARCH

While this study offers a context-specific framework, its scope is geographically limited to Kuala Kangsar, which may restrict generalizability to other royal towns. Additionally, the visual assessment of architectural features and spatial qualities involves interpretative judgment, introducing an element of subjectivity. Future research could explore cross-town comparative analyses across different royal towns or expand into urban regeneration scenarios, where adaptive reuse and new development require sensitive integration with heritage contexts. Furthermore, longitudinal studies could assess how these parameters influence the success of conservation efforts over time.

DISCLOSURE STATEMENT

The authors declare that there are no conflicts of interest. No funding was received that could have influenced the outcome of this research.

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Received: 11th November 2025. Accepted: 13th January 2026