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URBAN DESIGN ELEMENTS' ANALYSIS OF BANDAR ENSTEK, NILAI NEGERI SEMBILAN, MALAYSIA

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ABSTRACT

The study discusses modern urban design elements in a superblock planning concept for housing development in Malaysia. A case study of Kuarters KLIA & Bander Enstek, Nilai is conducted on how urban design elements influence the behaviour and flow of the tenants in the studied neighbourhood. To determine the quality of urban design elements in Kuarters KLIA & Bandar Enstek, this work conducts a qualitative and quantitative survey through the inventory of the layout plan, observations and interviews with residents. The curvilinear design approach accentuates the planning. Loops and cul-de-sacs increase security and privacy, reduce car traffic, allow more green spaces and create a social-interactive neighbourhood. Public courtyards and playgrounds in every superblock promote communal interaction. The superblock concept with public courtyards is an ideal urban design method for modern housing that promotes social interaction in a neighbourhood.

Disciplinary: Urban Planning & Design.

1. INTRODUCTION

Malaysia has experienced spectacular urban spatial transformations from the traditional water village, British colonisation, pre- and post-independence developments, and now the fast-growing modern urban design (Hassan, 2005). The implementation of the Multimedia Super Corridor (MSC) in 1996, Malaysia's first technological region stretching from KLCC to Kuala Lumpur International Airport (KLIA) jump-started the development of Putrajaya, Cyberjaya and Sepang (Siong, 2006). The Garden City concept (Howard & Osborn, 1965) employed by this Corridor pioneered a green complex urban township with modern facilities and technologies in Malaysia.

This research focuses on two townships namely Kuarters KLIA and Bandar Enstek, which will be used as case studies. The aim was to study the Malaysian interpretation of modern urban design elements of a garden city superblock township. The main objective was to investigate the image of

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the city or the visual intelligibility that is shared by residents through their mental perception. This research also aims to determine the quality of the urban spaces that create a sense of safety and belonging. Lastly, this research determines the distinction of public areas that promote neighbourhood interaction.

2. LITERATURE REVIEW

2.1 IMAGE OF THE CITY

People structure their perception of a city into recurring elements through "mental" maps with five urban elements which are paths, nodes, edges, districts and landmarks (Lynch, 1960). These five urban elements can influence and impact a locality through interactions with each other, movability in a place and usability of a place.

In Kevin Lynch's book "The Image of the City", he defines a legible city as characterised by a visual quality of clear space which allows its parts to be recognised and organised into coherent patterns. This environmental, mental image represents the strategic link. This image is formed through two factors: immediate sensation and memory of previous experiences. One becomes free from the fear of disorientation, leading to a strong sense of home that is not only familiar but also distinctive.

The elements mentioned above form the building blocks of the operation of differentiating structures on an urban level. This helps to provoke the image of the surroundings and makes its visual identification easier. These five elements can be divided into two groups which are movement facilitators and movement inhibitors. Paths, nodes and districts facilitate the movement of people, whereas edges and landmarks can be viewed but cannot be entered (Tomko & Winter, 2013).

Paths are the channels along which observers occasionally or potentially move, and they act as the predominant connectors for people to travel between two places, typified by roads, walkways, railroads and streets. Paths are represented as one-dimensional linked segments or, after integration with other paths, as networked configurations. Human travel takes place either freely in an unstructured natural environment or artificial ways (Golledge, 1999). People observe the city while moving through it and experience other environmental elements that are arranged and related along these paths.

Nodes can be defined as foci of strategic nature through which one can penetrate. It may range from small points in a city to a large square or a park. Special attention should be given to squares as they form, with paths, the main components for any urban fabric. Nodes bring social, environmental, health and economic benefits to a compact community.

Boundaries or barriers between two phases are called edges. Edges are continuous, linear breaks that are not considered paths, and they separate one region from another, exemplified by shores, railroad cuts and walls. Edges act as lateral references. Districts are medium to large sections of the city that contain zones for different land uses, building forms, and mass.

Landmarks are physical structures, buildings, or geographical features that can be used as a point of reference by the individual to navigate the built environment. It is a simple external reference to the individual. When a person is not very familiar with a city, they depend on landmarks as a guide. Some people rely only on landmarks to read the space and identify the position of adjacent spaces (Ornstein, 1992). This dependence on landmarks tends to single out an

element from other possibilities. Cognitive mapping, beginning with landmarks elements that inform landmark knowledge, precedes route knowledge, and both precede configurational knowledge in environmental development (Siegel & White, 1975). What makes a landmark memorable is its uniqueness, clarity, significance, distinctive location and its contrast to the background (Amin, 2002).

2.2 NEIGHBOURHOOD UNIT

Clarence Perry in his book "The Neighbourhood Unit" (1929) explained Ebenezer Howard's Garden City concept with further justifications. He suggested the ideal locations of elementary school sites, small scale parks and playgrounds, commercial areas like shops that could serve day-to-day needs, and a residential environment. This self-contained residential neighbourhood revolves around several physical design principles. Firstly, the essential requirement of the elementary school in the centre of the neighbourhood and its actual size depends on the density of the population. Secondly, arterial streets should surround the unit, allowing a sufficient width to facilitate by-passing traffic. Thirdly, small parks and recreational areas should be provided according to neighbourhood needs. Fourthly, one or more commercial districts like shops should be laid out in the circumference of the unit, preferably at traffic junctions and adjacent to similar districts of adjoining neighbourhoods. Lastly, the internal street system should be distinguished from arterial streets through curvilinear patterns for safety and aesthetic purposes to enhance the safety of pedestrians.

2.3 SUPERBLOCK

Stein in his book "Toward New Towns for America" in 1951 expanded the idea of Garden City and Neighbourhood Unit by converting boring and stale urban subsection to an exciting superblock concept which introduces large courtyard and separate vehicles and pedestrian via a vast greens area. From his early work of Sunnyside Gardens to his most significant work Radburn in New Jersey, Stein introduced large residential superblock and pioneered the use of cul-de-sacs road system. Radburn design is represented by the superblocks facing common green yards and promote less car-oriented township.

3. METHODOLOGY

This research documents the urban design elements of the case studies based on Kevin Lynch's five urban design elements to structure the perception and mental mapping of these townships. Therefore, this study employs several qualitative methods to obtain data.

First, an inventory of the layout plan and field observation of both Kuarters KLIA and Bandar Enstek were conducted. The site inventory was made in person. There is a belief that the perception of a city is not just observed; it is felt with the body (Lefebvre, 1991). The on-site observation was conducted at three different times which are: Sunday evening (5-7 pm) when residents would have more social interactions at the park and playground, during peak hours (6.30-8 am) for workers and students going to work and school in the morning, and during non-peak hours (2-4.30pm). The site inventory evaluated site features, circulation, sensory input, zoning, activities and behaviours of people, and urban and architecture styles. A photographic study enhanced the observations via on-site photography.

Second, a literature review of secondary printed sources such as books, journals, and articles

was conducted to gain a background understanding of urban design elements. Others than that, qualitative data collected via non-structured interviews will be analysed and documented. Random face-to-face, non-structured interview was conducted on-site. The interviews provided a more in-depth understanding of the perception of residents towards their neighbourhood unit. They were conducted informally with the residents at random in conjunction with the site inventory.

Figure 1: The key plan of Kuarters KLIA & Bandar Enstek. (Courtesy of Google Earth).

4. KUARTERS KLIA AND BANDAR ENSTEK

The implementation of MSC and the decision to build Kuala Lumpur International Airport (KLIA) in 1998 stimulated rapid development in the surrounding areas such as Nilai, Sepang, Salak Tinggi, Banting and Cyberjaya. New developments sprang up such as housing schemes, schools, universities, and other facilities including the Sepang International Circuit. Kuarters KLIA and Bandar Enstek are two of the earlier housing schemes developed to facilitate the needs of rapid population growth in the area. It is surrounded by three cities, namely Nilai, Sepang, and Seremban (Figure 1).

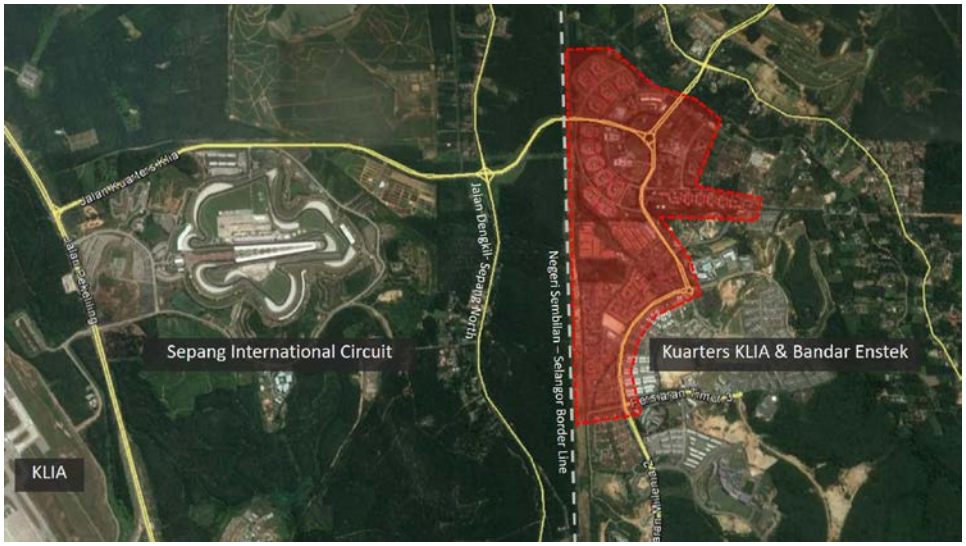

Figure 2: The location plan of Kuarters KLIA and Bandar Enstek. (Courtesy of Google Earth).

Kuarters KLIA and Bandar Enstek are located in the district of Nilai, at the border of Negeri Sembilan and Selangor, constructed over former oil palm plantations and small villages. The strategic location, approximately 10km away from KLIA and 28km from Putrajaya, makes them the prime housing location for KLIA employees or civil servants in Putrajaya. It is located between Nilai and Sepang via Jalan Dengkil-Sepang North, accessible by Jalan Felda LBJ from Seremban, Elite and PLUS highways, and sites 5km from the nearest landmark, the Sepang International Circuit via Jalan Kuarters KLIA (Figure 2).

Figure 3: Kuarters KLIA and Bandar Enstek Site Plan. (Courtesy Google Earth)

Kuarters KLIA was constructed in 1998 by the Prime Minister's Department to provide accommodations for KLIA employees and their families. A direct highway from the Sepang International Circuit is the main access route into this township, followed by a secondary road from Nilai (Figure 3). Kuarters KLIA township includes 18 superblock apartments called "Kelompok" (the Malay word for "group"), primary and secondary schools, recreational parks, sports complexes, mosques, kindergartens, clinics, and shops.

Figure 4: Bandar Enstek Master Plan (Courtesy of TH Properties Sdn Bhd).

Another township next to Kuarters KLIA is Bandar Enstek. TH Properties Sdn Bhd wholly developed it under the subsidy of *Lembaga Tabung Haji*. Spanning 5,119 acres, the township was first launched in 2000 comprising residential, commercial, institutional and industrial properties (Figure 4). For this research, the case study includes the first phase of the Bandar Enstek residential development that comprise *Persada* (the Malay word for "arena") Ikhlas, Persada Damai, Persada Jaya, Persada Kasih, Persada Aman, and later development, Cenderawasih, built in 2006.

5. ANALYSIS OF CASE STUDIES

5.1 LAND USE

The land use of Kuarters KLIA and Bandar Enstek can be classified into four types, namely residential, public facilities, commercial, and public open areas (Figure 5). As afore-mentioned, the Kuarters KLIA and Bandar Enstek housing schemes were constructed to tackle the population growth of Nilai and Sepang. Therefore, 53% of the area was taken up by residential development, with 47% green space. The ratio of the residential area to green space is almost 1:1, reflecting the aspects of ecological planning of the Garden City concept. The vast open space aims to create a neighbourhood that combines the best of city and country living in a smokeless and slumless city (Howard & Osborn, 1965).

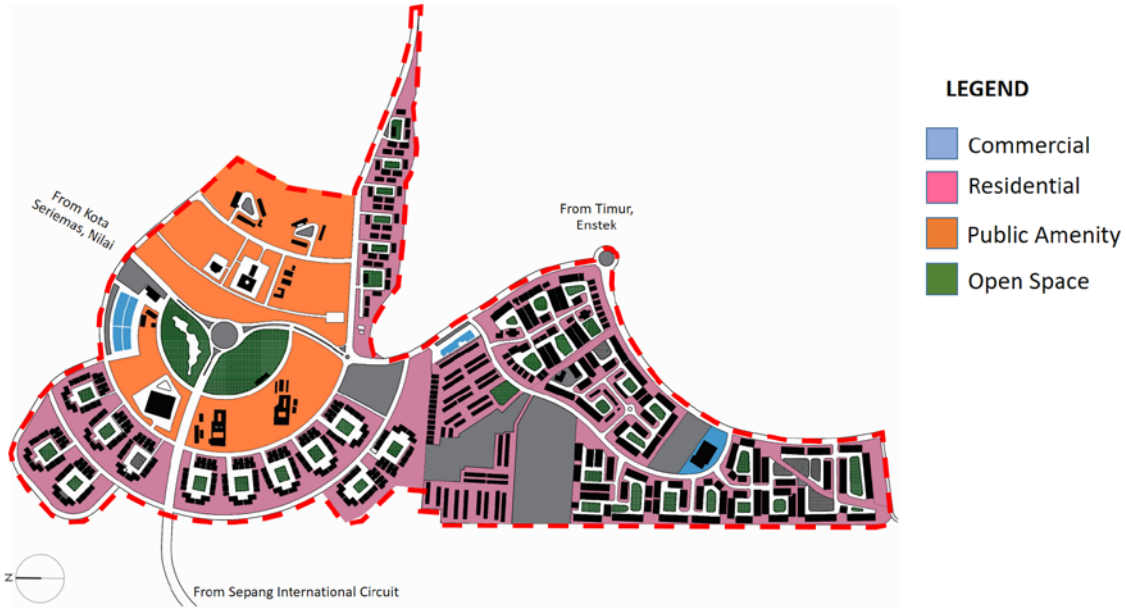

Figure 5: Districts Zoning of Kuarters KLIA and Bandar Enstek.

Schools and public recreational facilities are arranged in proximity to open spaces, while shops are located around the borders, junctions, and arranged at places with easy access. This planning follows the guideline "Hierarchy of Recreational Areas" adopted by the Department of Town and Country Planning of Peninsular Malaysia (JPBD). This guideline advises seven steps for open space town planning, neighbourhood parks, playgrounds and sports facilities, in hierarchical planning.

5.2 STREET SYSTEM PATH

The road network in Kuarters KLIA and Bandar Enstek consists of a group of main roads (100'), secondary roads (66'), local roads (40') and back lanes (20'). The road pattern for each group of roads is predominantly curvilinear and loopy. The main road, Persiaran Milenia 2,

stretching from North Kuarters KLIA to the south-east of Bandar Enstek is curvilinear. The curvilinear pattern continues throughout all secondary roads of the township (Figure 6). Ease of orientation of curvilinear pattern can alter perceptions of direction but guide movements more directly and intuitively between origins and destinations (Limited, 2010). Besides, curvilinear road creates a more prominent effect to the township in overall.

The circular road pattern in the public amenities zone was introduced to help with traffic circulation in the complex planning. Further, in the early stage of Bandar Enstek's residential area, the loop and cul-de-sac road systems created a traffic-free precinct and decrease the volume and speed of vehicles. Loops create a non-directional pattern of streets that tend to loop back on themselves. Both loops and cul-de-sacs allow children to play in the front yard, playfields, and streets without being endangered by fast-moving traffic (Limited, 2010) which creates a sense of safety and belonging to the urbanites. Access was possible only through one entrance for security purposes. However, the inner-ring and linear grid road patterns were dominant in the more recent development, as can be seen in Cenderawasih.

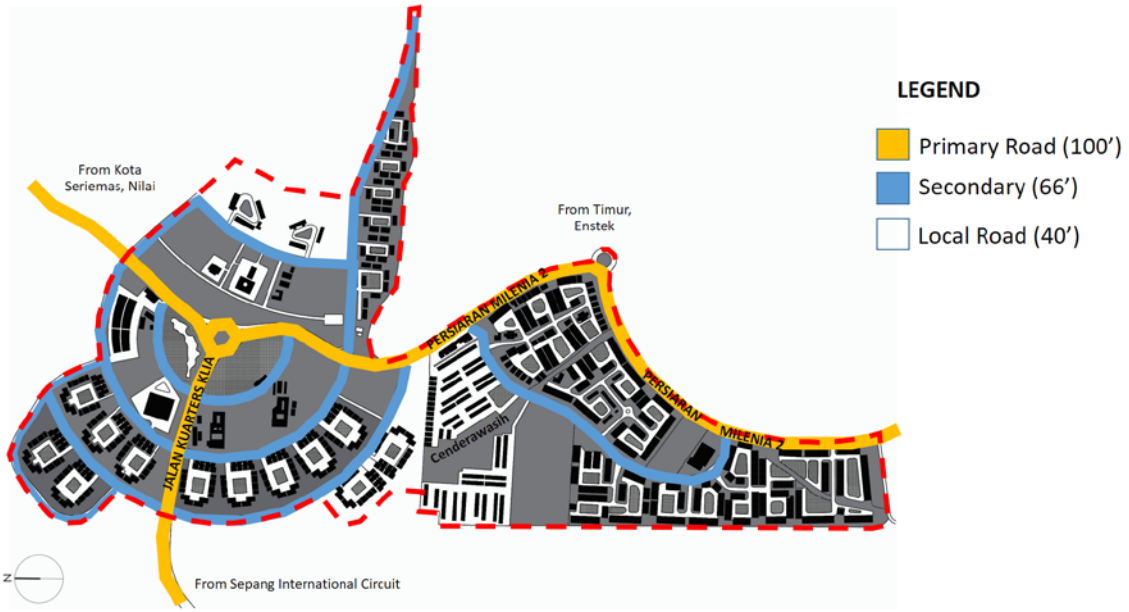

Figure 6. The hierarchy of road system

The roads' hierarchy represent one important factor that form the mental image of the township and a special feature characterises each road. Its recreational and commercial activities characterise the main road. The decorative water feature served as a welcome signboard of Bandar Enstek (Figure 7), and the massive roundabout near the KLIA Kuarters Mosque highlights its distinctiveness.

Figure 7: Various visual identity in the main roads along Recreation Park (left), Commercial Activities (middle) and Bandar Enstek Welcome Sign (right). (Courtesy of Google Streets)

On the other hand, the secondary and local roads lack this distinguished visual characteristic. Since it is a residential area, this creates a group of fenced, repeated, similar spaces which harms directional and geographical clarity when navigating within the zone (Figure 8).

Figure 8: Visual similarity of the secondary and local roads at Kelompok Kuarters KLIA (Left), Persada Ikhlas (Middle) and Cenderawasih (Right). *Source*: Google Streets

5.3 LANDMARKS

The mosque built in Kuarters KLIA area is a distinctive visual landmarks. Its strategic location on higher land acts as the first landmark for individuals coming from the Sepang International Circuit (Figure 9). Its monumental building scale with its special blue dome makes it the most remarkable landmark in this township. Besides, other landmarks such as Village@Enstek and Zemark (the commercial centres) are usually used by the residents (Figure 10).

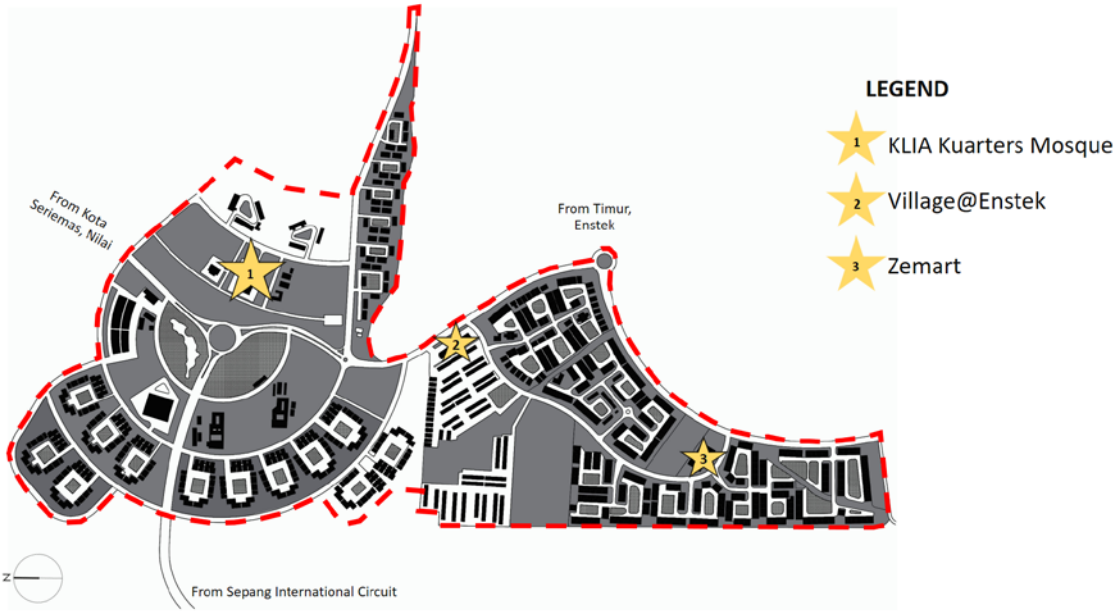

Figure 9. Landmarks

Figure 10. Special blue dome of Kuartes KLIA Mosque (left) and local hypermarket as the landmark Village@Enstek (middle) and the Zemart (right).

5.4 NODES

There were two types of nodes in Kuarters KLIA and Bandar Enstek (Figure 11). Firstly, the

public park near the main roundabout of Kuarters KLIA is distinguished by its scale and geographical characteristics. The park is a recreational space for residents. Its scale and sunken geographical character with a lake make it a remarkable park in the township (Figure 12). Unfortunately, residents do not use it as for main social gatherings or human activities due to its removed location away from the residential area; it is only reachable by vehicle.

Figure 11: A large recreation park and neighbourhood garden in every superblock.

Figure 12: Public Recreation Park.

Neighbourhood gardens exist in each superblock are easily accessed by residents; thus are used as the main social gathering area and play park for the children. Evening time is the peak periods residents, use these gardens for social and human activities. Non-fenced residential neighbourhood gardens allow residents from other superblocks to access them, and this promotes interaction between superblocks. However, some gardens are not used for social gatherings or human activities but are instead used for vehicle parking (Figure 13). Some are left in bad physical conditions with no signs of regular maintenance, which creates a negative impact on the unity between inhabitants and their surrounding urban environments.

Figure 13: Neighbourhood gardens (left) as the main social place for residents (middle) but some are misused as car parks (right)

5.5 EDGES

Kuarters KLIA and Bandar Enstek have distinctive clear edges formed by its significant

topography. Palm plantations spread over most of its northern, western and eastern flanks. Electrical transmission towers form a clear boundary in the west, separating Kuarters KLIA and Bandar Enstek in Negeri Sembilan from Selangor. The southern border, Timur@Enstek, is adjacent to other residential areas (Figure 14).

Figure 14. The edge of Kuarters KLIA & Bandar Enstek

6. DISCUSSION

The town planning of Kuarters KLIA and Bandar Enstek is similar to the neighbourhood unit concept (Perry, 1998), in which schools and recreational parks are located at the center of neighbourhood unit while commercial districts are laid out at traffic junctions. Consequently, each district is visually readable, which increases the legibility of the township. The different types form a clear visual image with a hierarchical arrangement.

T significance of the path system in this township has been strongly affected by the size of the road in general. While the size of the road meets the requirements of the Department of Town and Country Planning (Jabatan Perancangan Bandar dan Desa) which dictates the path system hierarchy of a town. However, the lack of visual characteristics of the secondary roads and local roads can be improved by adding more landscape features. This creates uniqueness and less similarities between all secondary and local roads.

As mentioned earlier, the mosque in this township is a distinctive welcome landmark for all residents and visitors from the direction of the Sepang International Circuit. This memorable and unique landmark is not only an external reference, but also a pivotal point for the whole layout. This religious landmark represents the religion of the residents in this township. One can understand the beliefs of the residents via this landmark.

The concept of the neighbourhood garden playground in every superblock promotes social interaction in this neighbourhood. It plays a role in softening the environment (Wilson, 1984) and enhances the quality of life by reducing stressful life conditions. The playfield is suitable for children, adults and elderly for both its convenience and usefulness as an open public space and vistas for adjacent homes. Planting around the edges divides the playfield from the roads.

7. CONCLUSION

This research has shown several urban design elements that are important and represent good urban environments, wayfinding and image identity of a township. Urban design is successful is not only in its usage but also when it creates the probability of encountering others (Amin, 2002). A distinctive and ordered environment helps the resident orient themselves (Sternberg, 2000). Residents and visitors are able to figure out the basic layout, land uses and orientation of the neighbourhood through its landmarks, districts zoning, nodes, edges, and road paths. A sense of security is elicited when one can relate to the surrounding urban world. Besides, the visual identity of urbanscape is clearly defined when it shows the components of the culture of the society. The unique element of town planning in this township is its religious facility. This reflects the beliefs and culture of residents.

Urban design should encourage social interaction. The structure of a township should have more public life. The open space playfield in every superblock and loop housing is a good approach to promote neighbourhood interaction. The built environment was designed for all residents of the community where different kinds of people can meet. However, overlapping the functions of open space playfields in each superblock with recreational parks caused an excess of parks in one township. Public open spaces can be successfully used for different functional activities for every superblock to avoid overlapping functions such as badminton court, basketball court, futsal court, and a jogging track in each different superblock.

8. DATA AND MATERIAL AVAILABILITY

This study data can be provided upon contacting the corresponding author.

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