



A Study of Mental Image on Suburban Village of Kampung Kastam in Penang

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Abstract

This paper analyses the garden city's town image and mental mapping at Kampung Kastam, Penang, Malaysia. Kampung Kastam has a spiral layout design masterplan with a hilly contour that creates a circular layout settlement. The study evaluates five urban design elements using qualitative methods with site visits, fieldwork surveys, observation, and data collection. Lengkok Bawah becomes the main route leading to the hilltop where the surau (prayer house) is located. This study shows that this hilly site has a garden city design with greeneries. Taman Permainan at Jalan Bunga Raya is the green park's playground area that becomes the node to the area. The path has a dominant circular road forming the layout settlement. The site comprises two circular routes, one leading to the hilltop and another one leading to the downhill. Both road exits are at the main road facing RECSAM (Teacher's Educational Institute). Oasis Condominium and Custom Headquarters become the most hegemonic elements for landmarks, and their edges are prevalent. The study shows that the case study has a lack of vigorous districts and nodes.

Disciplinary: Architectural and Town Planning, History of Malaysia.

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1 Introduction

This paper analyses five design elements to evaluate the urban layout of Kampung Kastam located in Penang. Districts, edges, landmarks, nodes, and paths are the urban design elements

coherent to a study by Lynch (1962). Kampung Kastam is in the Gelugor district, and its urbanisation started in the early 1960s (Figure 1). During a peak on its historic Penang urbanisation, Gelugor was one the earliest settlement in Penang Island. Penang is located on the northwest coast of Peninsular Malaysia, divided into two parts, Penang Island and Seberang Perai. The capital city of Penang Island is George Town, and Gelugor is one of the districts situated in the southern suburb and is named after a tree species (Hassan, 2009). The residents were Sumatra fishermen who had moved to the area in the 18th Century and established their village at Kampung Kastam along the Gelugor River and Bukit Gelugor.

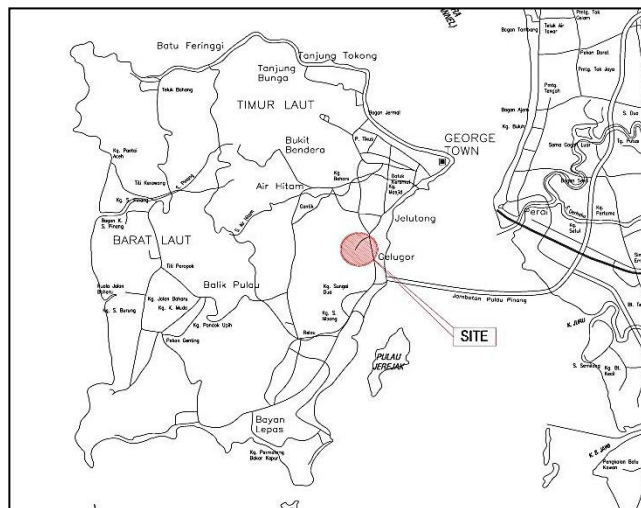


Figure 1: The map showing the key plan of Kampung Kastam, in Penang, Malaysia.

During Francis Light occupation in 1786, his Scottish partner, David Brown, owned the land of Gelugor and turned it into agricultural purposes included coconut, nutmeg, and clove plantations. David Brown brought in many labourers from India to work in the estates. Before Kampung Kastam exists, the area was once home to labourers (Seng, 2017; Teh, 2017). The 1960s was when Gelugor started to be urbanised when residential estates were established. This residential was later built for civil servants working in the British government. Kampung Kastam was one of them (Seng, 2017). This area comprised Gelugor Hill and Hilir Pemancar. This area was 7.6 km from George Town, accessible by two main roads, Jalan Yeap Chor Ee and Jalan Sultan Azlan Shah. ‘Jalan’ is a Malay word that means ‘street or road’ in English. Kampung Kastam at that time was residential with a green concept. Every house had its private garden. This area also had equipped with a commercial area and a small police barrack.

2 Literature Review

2.1 Suburban Village

Kampung Kastam was progressing from the structured settlement concept of the village. The planned village was designated to accommodate (indigenous) Bumiputera people who worked as civil servants in the British administration. The urban residential design was based on a high-density, low-rise type (Hassan, 1999; Hassan & Ku Hassan, 2001). The urban pattern of Kampung Kastam was the circular plan in a suburban layout. The village was known as the suburban, based

on its location that is nearby the metropolitan area. A group of people formed a community to build settlements from rural areas to create this suburban village. In Malaya at that time, the British had influenced its colonial city's image and its urban street layout (Hassan, 2009). The British had integrated the colonial divide and rule system to develop urban trends to assign different ethnic groups into separate settlements (Hassan, 2017).

There was no detailed analysis of the suburban village environments in Malaya at that time. However, it seemed to be very convenient for living and encourage the growth of a sustainable environment. "Suburban village appears to be small, with well-defined borders and well-defined centres, these centres are typically some green town, square or plaza, often with a pure water body or anything that is symbolically valuable to the village's history as a perfect focal point" (Samsurijan et al., 2017). The focal point of Kampung Kastam is Surau Bukit Gelugor, located at the centre of the village with a circular grid layout. The settlement appears to be compact enough to be visible to the public. Large enough was for all the fundamental economic functions and life needs.

The colonialists and administrators had played a significant part in deciding the location of those original settlements by re-settling or instructing the residents to move from their original place (Katiman, 2001; Hassan, 2005). Thus, Kampung Kastam Gelugor formed part of the study area through the centralised village concept. Kampung Kastam was well planned with the proper zoning of the building's topologies. The residential houses were around the inner layer, while the public amenities were at the outer layer. The centralisation of the Kampung Kastam layout meant that most of the value-added operations focused around the settlement's central area. The concept evolved from old linear fashion to the development of ideal solutions. The layout arrangement applied to encourage neighbourhood relations and secure social stability among different races.

2.2 Characteristic of Suburban Village

The idea of "suburban village" is created by combining the essential characteristics of physical, social, and economic environments to form the sophisticated village and suburban area. The "suburban village" concept is derived from an ecological analysis due to the rapid urbanisation and economic development of the region (Yan & Yves, 2011; Yuting et al., 2010; Li & Li., 2011; Pu et al., 2011; Larice & Macdonald, 2013). Some principles are considered to form the suburban village by integrating the simple village concept and the suburban area characteristics.

The village is formed by the essential characteristics of the original village and suburban environments. The outcome will define and recognise the identity of the suburban town to the place of study. It is a planned village that aims to provide socio-economic livelihood and benefit to urban residents, fitted with fundamental infrastructures and services as decent examples (Bentley et al., 1985). The development of the "suburban village" area is physical, social, and financial.

2.2.1 Physical Environment

The physical setting of a suburban village may be perceived in terms of its geographical area, land use, settlement, and development (Samsurijan et al., 2017). Like Kampung Kastam's research,

Gelugor lies in the hilly sites surrounded by green elements. However, suburban growth has developed rapidly as development zones for manufacturing, commercial, and housing zones. Due to this extension, land-use at Kampung Kastam in the suburban area shifts to a new phase. Previously, when Mr Brown owned the property, the area was for agriculture, but then he sold the land to the Malay people when he decided to return to his own country, England (Jawatankuasa, 2007). Recently the area will be developed by the government to build a high-rise building for the residents there.

2.2.2 Social

The suburban village is according to its social relations, culture, local traditions, and organisational structure. We can see the villagers encourage neighbourhoods to ties among different races and ensure social stability. The social relationship is stimulated by the circular layout of the village that promotes residents to unite and form a healthy community.

2.2.3 Economic

The residents in Kampung Kastam work as government servants. Later, many marketplaces, shops and business centres are opened in the area since then, due to demand from the residents. The economic outlook of the suburban village plays a vital role in reinforcing the conceptual meaning of an ideal town for a living. Kampung Kastam as a suburban village is due to the rapid development of urbanisation and economic growth. Physical, environmental, social, and financial factors have influenced the community.

2.3 Background of the Case Study

The site study is formerly a Government Quarters neighbourhood situated in Gelugor, Penang. It was developed in the early 1960s to serve as the house for the Customs Department's settlements. Until today, there are fourth generations who inherit the village. The original structure of the quarters is still there but in an abandoned state. Most of them are now empty. This year, 2020, the Federal Government has taken the site into a high-rise residential building under Perbadanan Pr1ma Berhad (Pr1ma) because of its strategic location. From the Penang Bridge, there is Tun Dr Lim Chong Eu highway heading to Kampung Kastam, connected to Jalan Sultan Azlan Shah, which acts as an arterial road. Jalan Lembah is the primary road in Kampung Kastam. The site features many public amenities and services, including Sungai Gelugor Jamek Mosque, Gelugor Community Hall, marketplaces, banks, and a post office. There are also public institutions such as Giat Mara vocational centre, primary and secondary schools.

3 Methodology

This research study applies a qualitative method based on evaluating the quality of districts, edges, landmarks, nodes, and paths. Observation refers to get information from google maps. A survey of history and background is conducted to gain further data about the site. The study also carries visiting the site and doing the fieldwork's surveys using a visual technique to determine the

quality of urban elements. The data collected are analysed referring to Lynch's mental mapping theory which is the scale of measurement of the urban design elements as follow.

During the site visit, the path is analysed by referring to its size (m^3), dimensions (m), length (m), accessibility, and function. The paths ratio is calculated using its length (m) with the total path length (m). The hierarchy of the paths is determined by the width of roads from the longest to the shortest.

Nodes are analysed by their attraction, function, and placemaking. Further data is collected by interviews with the local people of that area. The frequent usage from the public determines the hierarchy of the nodes. It also determines by the size comparison of the nodes. Finally, the number of nodes is also counted to dictate the level of satisfaction in urban design.

Edges are analysed by focusing on the physical features and function of the boundary. The data is collected from observing the surrounding environment. The hierarchy of the edges is determined by its width (m) and length (km) from most dominant to least dominant. The number of edges determines the hierarchy of the edges from the leading edge to the minor edge. The ratios are the length (m) and width (m) of the edges by comparison.

During the site visit, the study analyses the background of history, size, land use, and its characteristics. The data is collected from observation at the site. Its area determines the hierarchy of the districts from the biggest to the smallest domain. The ratio of the zone is compared from the district area (m^2) to the total area (m^2) of the site. The percentage is determined from the ratio of the primary zone to the total land area.

The landmark will be analysed by studying its popularity, architecture, function, and attraction historic. This data will be collected from the observation method with interviews from the locals. Its popularity and visibility determine the hierarchy of the landmark. The landmark also determined by the area (m^2), size (m^3), height (m) and width (m).

4 Results and Analysis

4.1 Paths

From the Penang Bridge, there is a highway heading to Kampung Kastam, which is Tun Dr Lim Chong Eu highway that is connected to Jalan Sultan Azlan Shah acts as the arterial road. It is a two-way vehicle path of 20 meters consisting of four lanes on each side and the reserve road.

The site features six significant entrances (Table 1). There are two entrances linked with Jalan Sultan Azlan Shah at the east while the other four connected with Jalan Yeap Chor Ee at the west. All the entries are the double way that supports both inlet and outlet traffic flows.

Table 1: Entrance paths and their width in suburban Kampung Kastam.

ROAD	PATHS	WIDTH (m)	PERCENTAGE
Bingham Highway	Main Entrance	25	39.7%
Jalan Selatan	Secondary Entrance 1	12	19.0%
Jalan Delima	Secondary Entrance 2	10	15.8%
Jalan Lembah	Tertiary Entrance 1	8	12.7%
Jalan Kaki Bukit	Tertiary Entrance 2	8	12.7%



Figure 2: Paths of the case study.

There is only one arterial road, Jalan Sultan Azlan Shah (Figure 2 & Table 2). It is a two-way vehicle path of 20 meters consisting of three lanes on each side, connecting Kampung Kastam from the north to Batu Uban and from the south to Jelutong. The road is shared between commercial areas, separated by the collector roads from the residential zone.

Three collector roads are located at the west and Bingham Highway, situated in the east of the area (Figure 2 & Table 2). The collector roads are double way traffic flow with one lane on each side. Kampung Kastam has four local roads connected to the village's circular layout (Figure 2 & Table 2). There is nine end road or cul-de-sac in Kampung Kastam. There is no pedestrian walkway provided in the Kampung Kastam residential area (Figure 2 & Table 2). The pedestrian paths are located only along both sides of Jalan Sultan Azlan Shah, mostly interlocking pathways. The local road is for the drainage system with no proper footpath.

Table 2: path and its detailed size

Road Name	Road Type	Number	Road Length (km)	Width (m)
Jalan Sultan Azlan Shah	Arterial Roads	1	25	12,000.00
Jalan Yeap Chor Ee	Collector Roads	1	20	1,090.00
Jalan Bukit Gambir	Collector Roads	1	20	608.00
Jalan Kampung Kastam	Local Roads	1	12	370.00
Jalan Kaki Bukit	Local Roads	1	10	430.00
Lengkok Bawah	Local Roads	1	10	536.00
Bingham Highway	Main Entrance	1	8	374.00
Jalan Lembah	Local Roads	1	8	872.00
Jalan Pekeliling	Local Roads	1	8	803.00
Lengkok Atas	Local Roads	1	8	489.00
Jalan Bunga Raya	Local Roads	1	8	678.00
Jalan Bunga Cempaka	Local Roads	1	8	284.00
Jalan Utara	Local Roads	1	8	166.00
Jalan Selatan	Local Roads	1	8	308.00
Lorong Bunga Raya	Local Roads	1	8	422.00
Jalan Khemah	End Roads/Cul-de-sacs	1	8	168.00

4.2 Edges

Figure 3 illustrates the description of the edges of Kampung Kastam with its measurements in Table 3. The edges comprise major, secondary, and minor edges.

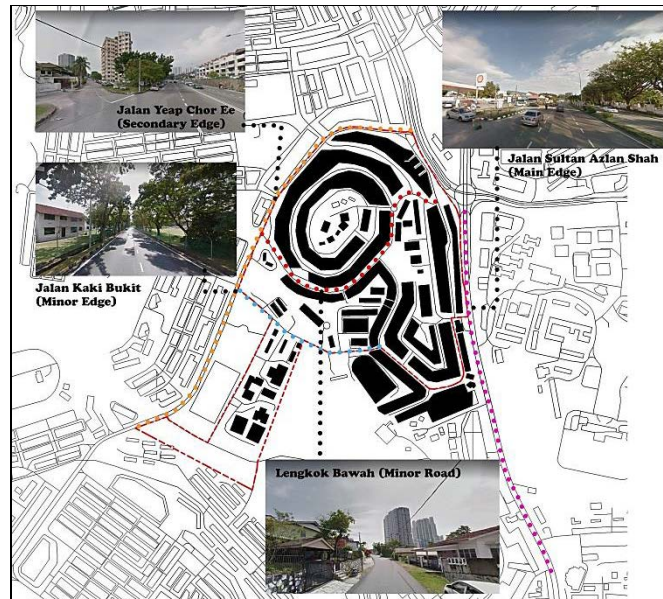


Figure 3: Edges of the Case Study.

Table 3: Edges in the site.

Road edges	Category	Number	Width (m)	Length (m)	Analysis
Jalan Sultan Azlan Shah	Main Edge	1	25	12,000	Connecting the site from the main road. The road also separates Kampung Kastam from the commercial plot,
Jalan Yap Chor Ee	Secondary Edge	1	20	1,090	Separating two villages between Kampung Kastam and Taman Island Glades. Taman Island Glades has a gridiron layout for the whole development.
Jalan Kaki Bukit	Minor 1 Edge	1	10	430	Six blocks of high-rise residential across Kampung Kastam from the collector road, (Jalan Bukit Gambir).
Jalan Kampung Kastam	Minor 2 Edge	1	10	536	

4.3 Districts

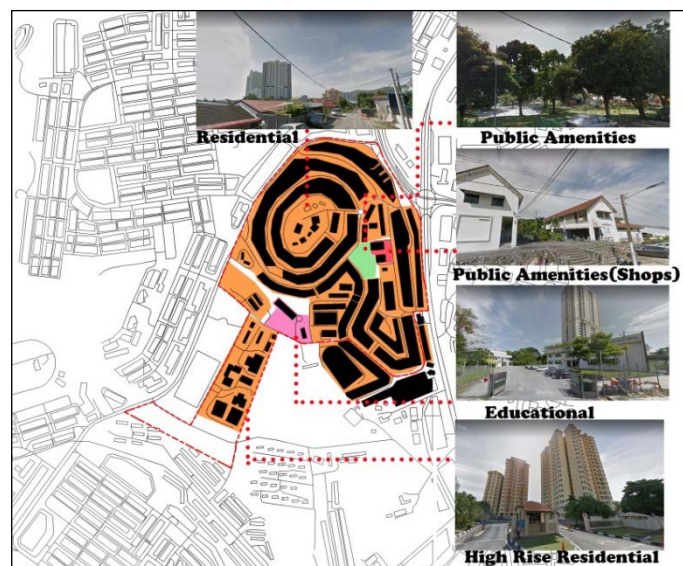


Figure 4: Districts of the Case Study.

In Kampung Kastam, people recognise the district (Figure 4 & 5) by observation of the area, the land size, and the function. The most dominant is the landed residential district because it is the largest area in Kampung Kastam. The second is high-rise Custom Quarters blocks, with the

second-largest land area. Next is the high-rise condominium, The Oasis and The Pulse, situated along Jalan Kaki Bukit. The least dominant is the academic district.

The central district is the residential area, which situated at the hilly site. Residential are landed property consist of a terrace, semi-detached house, and bungalow. The landed properties are mainly from the 1960's architecture style, which reflects houses on the hill. Most homes are single storey and apply the Garden City concept, where every home has its own garden space. There are also high rise condominiums, apartments, and government quarters.

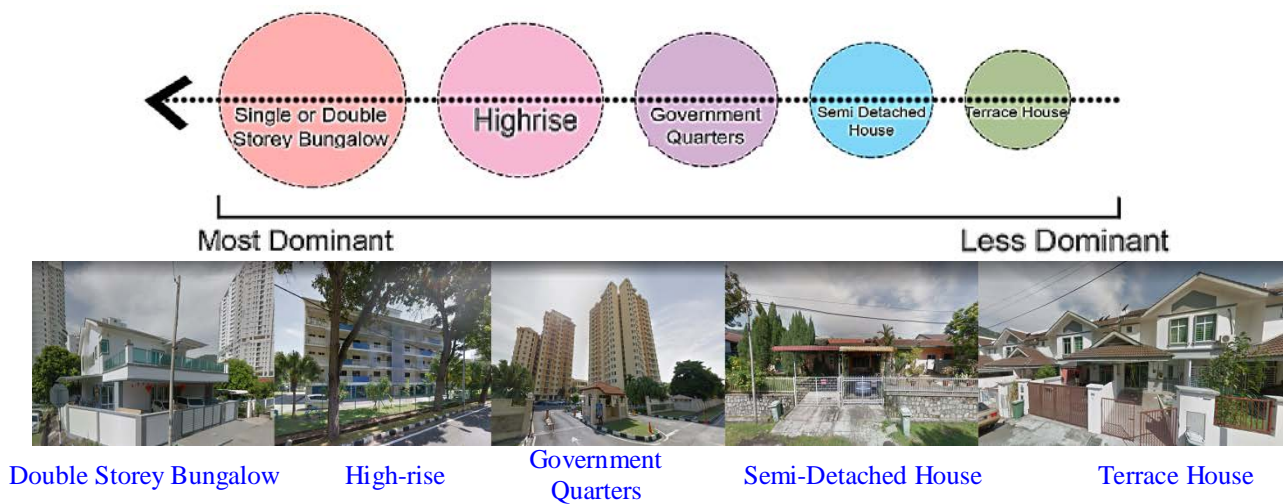


Figure 5: Hierarchical order of districts' dominance

Public amenities consist of shophouses and a green area for the residential located along Bingham Highway. There is also a kindergarten opposite the shophouses. In addition, at the residential hilltop, there is a Surau Bukit Gelugor that acts as a worship place for the Muslim religion among the residents. There is a building that serves as the training centre, but it is not a school. This building is known as the Penang Math Platform (PMP), serving as educational preparation for mathematic teachers.

4.3.1 Hierarchical Order

In this Kampung Kastam district, the most dominant area (Figure 5 and Table 4) is the landed residential located at the hillside, consisting of a bungalow, semi-detached house, and terraces. The secondary area is a high rise residential from low to medium-cost apartments, government quarters, and high-end condominiums. The smallest building in height is the two storeys police marine quarters, with the highest the 38 storeys Oasis Condo.

Table 4: Districts and their percentage to the land size.

Districts	District 1 Landed Residential	District 2 Custom Quarters	District 3 High-rise Condominium	District 4 Public Amenities	Total
Area (m ²)	236,441	35,570	18,278	7,520	325,862
Percentage (%) to the total land area	72.5	11	5.6	2.3	91.4% total district area 8.6% balance from paths area

4.4 Nodes

In this area, people recognised the node based on its function as a gathering place. The node functions as an open plaza and place of gathering for the public. In this area, it is found that there is only one node (Figure 6 & Table 5). There is no hierarchical order from most dominant to least dominant Nodes like plaza or square because there is only one node in this area. The node is the open park located within the residential along Jalan Bunga Raya. This park serves as a playground and gathering for the residential at Bukit Gelugor as the land size is enormous.



Figure 6: Node of the Case Study.

Table 5: The open park recognised as the important node in Kampung Kastam

Node	Size (W x L)	Area (m ²)	Percentage (%)	Activity Type	Level of Socio-Activity
Node 1 Open Park	64 x 92	5,886	1.7	Park for outdoor activities, jogging, playground, etc	Satisfactory

4.5 Landmarks

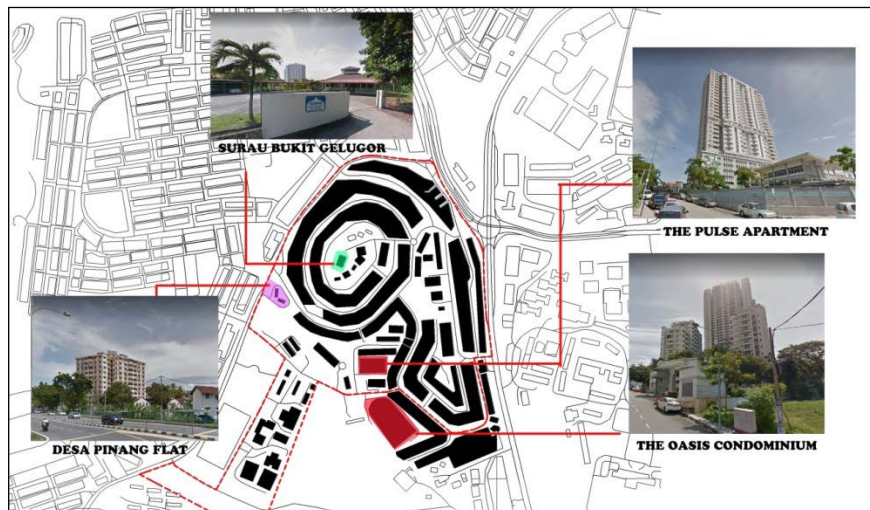


Figure 7: Landmark of the Case Study

In Kampung Kastam, people recognise the landmark based on functionality, visibility, and the scale of that building. The landmark in that area has an identical characteristic that is tall and big in size, colour dominant, and landmark function. The landmark (Figure 7 & Table 6) is listed from most prevalent to least dominant because of the size and visibility from the main road that is Jalan Yeap Chor Ee. In this area, two landmarks are visible from the main roads. Oasis

Condominium is one remarkable landmark consists of one main block of high-rise and two blocks of low-rise. White in colour makes it prominent and visible from far away. The size of the land is the biggest landmark at 13,555sqm. The building itself reflects a high-end condominium with luxury facilities mainly for high-income families. The second landmark visible from Jalan Yeap Chor Ee is The Pulse Apartment. It is high rise residential blocks where the land size is 4,728.00sqm which makes it the second biggest landmark at Kampung Kastam. This residential is a medium-cost apartment with decent facilities located next to The Oasis. The third landmark will be Desa Pinang, situated along with Jalan Yeap Chor Ee. It is a low-cost, flat consist of two blocks with ten floors each. The fourth landmark is Surau Gelugor which located on top of the hill. This surau serves as a place of worship for Muslims. To get to this surau (Muslim prayer house), one will need to turn in to Lengkok Bawah and, at the mini roundabout, turn into Jalan Khemah and go straight up.

Table 6: Comparison of each landmark all together

Landmark	Length (m)	Width (m)	Height (m)	Area (m ²)	Volume (m ³)	Level of Dominance
Landmark 1 The Oasis Condominium	152.6	70.4	114	13,555	1,224,706	Very Good
Landmark 2 The Pulse Apartment	87.9	59.3	66	4,728	344,023	Good
Landmark 3 Desa Pinang	68.6	90.3	33	3,849	204,421	Satisfactory
Landmark 4 Surau Bukit Gelugor	27.5	21.0	8	1,328	10,624	Weak
Total	336.6	241.0	221	23,460	1,783,775	

5 Discussion

5.1 Paths

The paths found at Kampung Kastam is considered as satisfactory as it only served as vehicles path in linking the residential area with hilly site context. Designing a layout with a hill site is challenging as it must consider the slopes of the site and the easy way in connecting each path. As in Kampung Kastam, the paths are easily recognised by their hierarchical order from bigger paths to smaller paths. The paths in the landed residential area are only for vehicle usage. There is no pedestrian path found in that area. Along Jalan Kampung Kastam, there is a pedestrian path found along with the road connecting Jalan Lembah to Jalan Kaki Bukit. The pedestrian path of Jalan Kampung Kastam only served as a walkway for the residence of Custom Headquarters to the bus stand at Jalan Lembah. Therefore, the best path at Kampung Kastam is Jalan Kampung Kastam where it is safe for pedestrian and have a wider path for a larger amount of traffic. As for the weakest pathway, it was found that there are two paths. First is Jalan Khemah where it leads to Surau on top of the hill. The weakness is that no cul-de-sac makes it difficult for vehicles to make a u-turn. To differentiate cul-de-sac and end road\ is that end road does not provide space for the motorcar to make a u-turn while cul-de-sac offers space for the vehicle to make a u-turn. The

second path is Lengkok Atas, as it is the smallest path found at the site. It is so small where it only allowed one vehicle to pass through to make it the worst pathway at the site.

5.2 Edges

The edges are considered satisfactory because it clearly shows the differential between main road edges Jalan Sultan Azlan Shah and Jalan Yeap Chor Ee linking to edges of landed residential and high rise residential. Although it is not the best edges, people are still managed to identify the boundary. The edge of Lengkok Bawah provides the main access towards the hill residential with Jalan Yeap Chor Ee entrance, while the edge of Jalan Kaki Bukit leads to high rise residential. The best edge is Jalan Kaki Bukit, visible from Jalan Yeap Chor Ee. It leads to three different high rise consists of Custom Headquarters Residents, The Oasis Condominium, and The Pulse Apartment. This edge considered best because it linked to landmarks at the site and gave clear edges from landed residential. Lengkok Bawah is regarded as the second-best edges as its links to hilltop Surau and main road edges Jalan Sultan Azlan Shah. The weakest edge is Jalan Bunga Raya, as it does not give a clear differential of residential there.

5.3 Districts

The districts of Kampung Kastam is satisfactory and unique because it does not follow typical zoning types by the land-use system from the local planning which are the commercial district, recreational district, services district and educational district. Compared with the neighbourhood area, Kampung Kastam can be concluded as a hillside district of place for living. The districts are separated with size/height districts where the hillside is occupied with low rise houses. Jalan Kaki Bukit and Jalan Kampung Kastam consist of higher districts where the apartments and condominium are located.

5.4 Nodes

The node of Kampung Kastam is considered very weak as it only has one node at the site. The worst part is, the residents seldom use the node at the site. The node is the open park located between the amenities and landed residential. The result from observation shows that the park is inactive and only use as a walking path toward the shop lots beside it. To conclude, there is no best node at the site.

5.5 Landmarks

The landmarks of Kampung Kastam is considered satisfactory because it does have a few noticeable landmarks. The best landmarks of the site will be the high-rise condominium, The Oasis, which is the tallest. The architecture language of The Oasis is modern with high-end facilities. The second best landmark is the high rise condominium The Pulse, located next to The Oasis. The weakest landmark will be the Desa Pinang, the low-cost flat located beside Jalan Yeap Chor Ee. It has the least attraction as the design itself reflects a low-cost flat. Finally, surau (Muslim prayer house) Bukit Gelugor is one of the least known landmarks in Kampung Kastam. It is only well known among the neighbourhood of Kampung Kastam.

6 Conclusion

In the residential area in Kampung Kastam, a suburban village in Gelugor, paths forming the urban pattern is the most dominant element, followed by landmark and edge. The district and node contribute less to constructing the study area of the town image. The village is designed in a circular plan in a suburban layout. This type of urban layout design provides the housing area with a systematic structure and encourages the neighbourhood. The layout offers efficient circulation of vehicle paths, which are good for finding the way. For safety reasons, the circular layout is the best way to control traffic in the village area—the perimeter of the edge of the site by the highway and arterial road formed the distinctive boundary. The most dominant landmark identified there is a government block that is easy for finding. The district and node contribute less in building up the village image of the study area. From the research, we recommend that the node is placed nearby the hillside and separate from the main road to invite the residents to have their communal activities together. More nodes should be located to strengthen the sense of community-friendly at the site. Secondly, the site's landmark should be more visible from the main road to catch people's eyes and integrates with the uniqueness of its hilly topography naturally surrounded by the green with the background of the traditional village and the Malay culture. These are the strongest point to be a successful suburban village.

7 Availability of Data and Material

All information is included in this work.

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