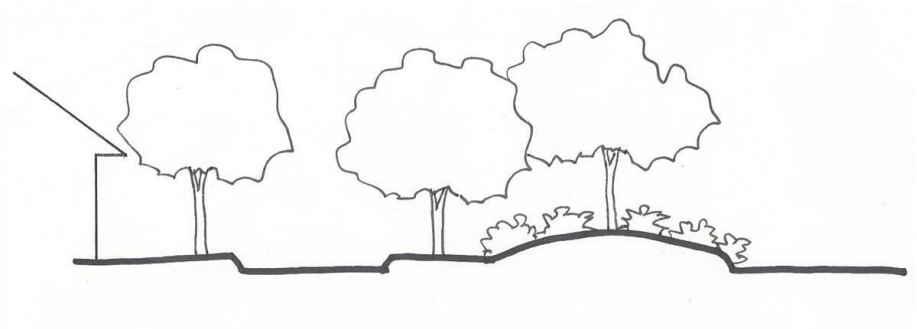
Landscape Design *for* Residential



Mohd Ramzi Mohd Hussain
Izawati Tukiman
Ismawi Hj Zen

Landscape Design *for* Residential

To the many individulas in our far-flung academic family whose research made this book possible

Landscape Design for Residential

By

Mohd Ramzi Bin Mohd Hussain

Izawati Tukiman

Ismawi Hj Zen

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Preface

The book evaluates the landscape requirements in residential areas by studying and identifying basic landscape preferences. Landscape design is an art and science of organizing and enriching outdoor space through the placement of plants and structures in agreeable and useful relationships with natural environment. The environmental, physical and biological sciences which mainly focus on outdoor space will enhance the conducive living area in residential areas that meet people's preferences. On the other side, a well-conceived landscape, adds value to property. This will create a sense of place to the area.

The book explains that the landscape design for residential areas is not only limited to plant material, but also focuses on the hardscape which complement the plants to create a successful design. With reference to the basic landscape requirements in residential areas, a high level of congruity was found between the answers given by the samples and the objective realities of the residential landscapes. The residents have very clear ideas both on how much green space is really important in residential areas to create a sustainable residential environment. There are three major spaces that need to include in house compounds which are spaces that integrate family members, spaces that respond to utilities areas and spaces that accommodate public areas. The multifunctional planning and design of green spaces in house compounds is very important since each resident prefers different types of activities.

Despite the absence of public actions in terms of providing information, encouraging participants in the survey and promoting landscape design to be applied in the residential development.

In this book, we believe that aesthetic goals of landscape design for residential areas must be balanced and merged with ecological needs, contextual issues, and user/people preferences.

Finally, we hope that his book will join others in the genre in offering designers and planners the information they need, in a format that is useful.

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BismillahirRahmanirRahiim. Assalamualaikum wmt wbt

Thanks be to Allah, the Most Benevolent and the Most Merciful, and Who made the pursuit of knowledge obligatory upon all His Believers. It was only in the pursuit of His pleasure that this work was undertaken. It is our hope that this work may contribute an iota of advancement to mankind in order to understand His knowledge.

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Introduction

Landscape design for residential areas should be favorable for the ambience of ecological environment and for the enhancement of both the local climate of a residential and the environmental quality of life. The book provides information that will enable people towards a better understanding of landscape design for residential. A good quality residential area can be highlighted as an important issue in creating a sustainable living environment.

It is stated in the Kuala Lumpur Structure Plan 2020 that the improvements in the housing environment shall include enhancing comfort levels both within and outside housing developments, upgrading the provision of infrastructure, utilities and community facilities to the level of those enjoyed in other world-class cities, and improving the visual appearance of housing developments. Innovative designs, provision of the latest conveniences and facilities, variety of choice, quality of finish and attractiveness of layout, shall become priority concerns.

Therefore, based on the issues and plans of developments highlighted, this book intends to investigate the importance of landscape design in the planning and designing of residential properties in Klang Valley as a requirement for future development that will provide a better living environment. It is proven that proper landscape planning and design with sustainable concept and approach help to create a conducive and responsive environment of the residential properties. People now look towards a better environment as a package for their better living environment. However, limited green spaces within the proximity of residential properties are not supporting the landscape space and are not conducive for living space. It is stated in the Guidelines for Housing Design and Landscaping (2006), the overall value of residential properties need to be enhanced by skilful landscape design and standard garden maintenance.

Furthermore, the initiative to create a better living environment for residential communities has been supported by Local Agenda 21. Local Agenda 21 (LA21) is a program where the public and private sectors, the District Councils, the Municipal Councils, the City Councils and the City Hall cooperate in planning and managing the environment to achieve sustainable development. Besides that, through the Local Agenda 21, local communities can be involved to identify and examine the issues of sustainable development. Sustainable development is development that balances economic development with the requirements of social and environmental. Therefore, the importance of landscape design in creating sustainable development has now become an issue that should be made aware of to all people and organizations. Moreover, the element and character of landscape design need to be enhanced in most residential developments in order to support the needs of neighborhood communities. The basic need of landscape design in residential areas can become a benchmark in creating a sustainable residential environment in the future.

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Chapter 1

Landscape Design for Residential

This chapter discusses the theoretical aspects of landscape design and their relationship to residential development. It begins by describing landscape focuses on landscape design in residential development. It also reviews the issues related to the residential landscape design and residential landscape for green neighborhoods in order to obtain a clearer and better picture of the basic needs of landscape for residential developments.

Residential Landscape Design

In theory, landscape design acts as a problem solving process through enriching the qualities of nature with human landscape preferences. Landscape design is 'an art and science of organizing and enriching outdoor space through the placement of plants and structures in agreeable and useful relationships with natural environment'. According to Williams and Tilt (2006), landscape design is the art of developing property for its greatest use and satisfaction. They add that effective landscape design is also a form of science because it involves understanding the environment around our home and selecting plants that perform well in that environment.

This view is also supported by VanDerZanden and Rodie (2008) who state that landscape design blends arts with environmental, physical and biological of sciences which mainly focus on outdoor space. They also further explain that well-defined landscape space can enhance the quality of living areas which meet people's preferences. In either case, a well-conceived landscape design, properly installed and well maintained, adds value to property and enhances the quality of life. Thus, landscape design can create a sense of place to the area.

Besides that, according to VanDerZanden and Rodie (2008), landscape design is not only limited to plant material only. It also focuses on the hardscape that complement the design in order to create a successful design. A well-defined landscape space can create a quality of environment and provide a conducive living space in residential. This landscape design might be able to become a factor influencing the price and value of the property. In relating to landscape design and housing property, Ekin (as cited in Smith, 2008) suggests that housing is an activity that is deeply connected to a sustainable environment. The connections are as follows;

- Housing is a basic human need and its quality, price and availability are crucially important to quality of life.
- The location, planning, layout and landscape design of a house make an important contribution to community spirit.

Thus, housing can be seen as the central element which can link together economic development, environment and social welfare in achieving a sustainable environment and society (*Figure 1.1*). According to Gause et al., (2007), landscape design can be used as a tool to make a community more sustainable and contribute to a balanced environment. Natural and constructed landscape design can modify the residential community to become a better living environment and also increase the value of the housing property.

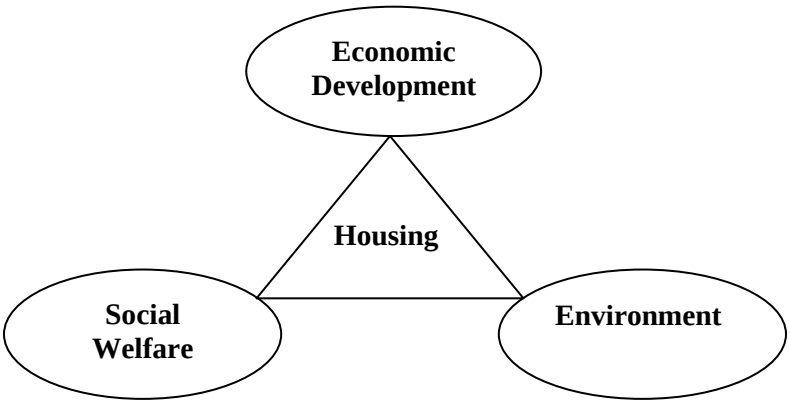


Figure 1.1: The importance of housing in a sustainable society (Smith et al., 2008)

Landscape design is the art of developing property for its greatest use and enjoyment (Williams and Tilt, 2006). They verify that effective landscape design is also a science because it involves understanding the environment around our home and selecting plants that perform well in that environment. There are four ways in which the landscape is valuable: aesthetically, economically, functionally, and environmentally (Helfand et al., (2006), Williams and Tilt (2006) :

a) Aesthetic Value

An attractive landscape is aesthetically valuable because it adds beauty or is pleasing to our senses. The visual beauty of our home and property can be enhanced through creative landscaping while undesirable features can be downplayed. The sounds that a landscape offers, like a breeze rustling the leaves in the trees or the sounds of birds or of water splashing in a fountain, enhance the aesthetic qualities of your home environment. The aroma of flowers or the smell of a freshly mowed lawn and even the taste of fruit from plants that we might have in the landscape are soothing. The sense of touch also can be an aesthetically valuable feature of the landscape. Consider lying on the lawn in the shade of a stately oak, the feel of the cool grass on your back on a hot summer day.

b) Economic Value

The well-done landscape adds economic value to our home and property. The value of our home can be increased by as much as 6 to 15 percent as a result of a good landscape. However, the landscape is not the most valuable feature of your property; the house is. The function of the landscape is to enhance the beauty and therefore the economic value of our house. Thoughtful landscaping can also reduce energy bills by buffering seasonal temperatures. In addition, trees and shrubs can be used to reduce wind speed, making our outdoor living area more comfortable.

c) Functional Value

Landscape design offers a special functional value, too. Well-placed trees, shrubs, turf, and construction features increase your use of the property. A little shade in the right place, a little sun in another, a place for the kids to play, a private patio, pool, or deck all add to the enjoyment of being outside. Landscape design helps us solve landscape problems and cut down on maintenance. For example, groundcover used on a steep hill in the yard can help us avoid lawn maintenance headaches and, on a very steep slope, groundcover may be essential to prevent erosion.

d) Environmental Value

The landscape not only has functional worth, but it can enhance the environment. Through careful landscaping, temperatures can be buffered in the summer and winter. Glare and wind can be reduced and water can be used more efficiently. In addition, plants in the landscape help clean the air of dust and some pollutants. Landscape design also provides a habitat for all kinds of wildlife (Helfand et al., (2006), Williams and Tilt (2006).

There are many attributes (for example, vegetation and associated plants, spatial configuration of landscape elements, the topography and bodies of water among others) that determine the quality of a visual landscape (Bae, 2011; Zheng et al. 2011). Additionally, the role of each attribute is dependent on the context and its interaction with the other attributes (Zheng et al., 2011). One of the important features of landscape in the context of the residential landscape is wilderness versus neatness. According to Zheng et al. (2011), most people agree that they prefer a neat environment than wilderness. Neatness is one of the factors for an attractive landscape for residential areas. However, according to Bae (2011), formulating and maintaining planting/vegetation is not easy because it requires consideration of not only the usual factors for general open space design such as ground-level ecological capacity and residents' preference but also plants' hydrophilic aspects. Different types of plants with varied heliophilicities should be cultivated in areas with various environments. Suitable plants are arranged in conformable areas based on plant characteristics (Guo et al., 2010).

The Green Building Evaluation Standards (GBET 50378-2006) require cultivating the appropriate indigenous plants for local climate and soil conditions which are of low maintenance, weatherproof and pest resistant. The plants would not harm human beings and can be cultivated in multiple types of plants to form multi-level plant communities comprising of trees, bushes and grasses based on local climate and natural distribution of plants and there should be at least three trees in every 100 m2 of green land (Guo et al., 2010). The standards specify that the plant configuration should show local characteristics, the abundance of local plants resources and plant landscapes with distinguishing features. Guo et al. (2010) add that multi-level greening through a combination of trees, bushes and grasses should be adopted to form a greening system with rich levels and favorable ecological benefits (*Figure 1.2*).

Figure 1.2: A cross-sectional view of ecological plant communities representing an ecological structural system of multi-level greening comprising of trees, bushes, and grasses. (Source: Guo et al., 2010, p.693)

Besides that, it is stated in the Jabatan Perancang Bandar dan Desa (JPBD) that the concept of neighborhood is important in order to create a harmonious community interaction and environment. Therefore, this concept can be elaborated through the arrangement of residential development that consists of the management of hierarchy neighborhood center, landscape elements and facilities for social interaction such as a community centre. *Figure 1.3* shows the importance of providing a hierarchy of neighborhood areas with landscape facilities which is essential in creating a harmonious residential area.

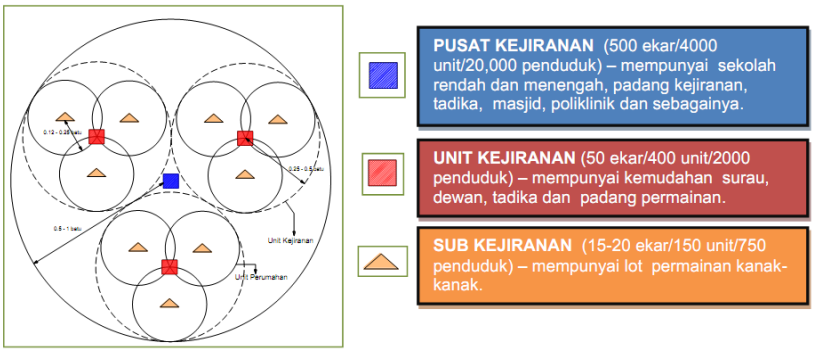


Figure 1.3: Hierarchy of the neighborhood area based on the neighborhood concept (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.12)

Issues Related to the Residential Landscape Design

Residential plays important roles in enhancing people's quality of life. This is because people's preferences when they buy/rent the residence and conduct their daily activities are closely related to the quality of life. However, there are some issues related to the residential landscape design that can hinder people from enjoying the facilities provided in residential areas. Abdul Mohit et al. (2010) stated that safeties become the major issues that influence people's decisions. This is because crimes in residential areas have become common issues that happen nowadays. These have increased the fear within the community.

Other than that, issues on the age categories also affect people preferences in residential landscape design. This is due to urbanization causing stress in the community due to many factors. Reagan and Horn (2005) state that the age factor also has become an important factor that influences people preferences. They were conducted the study based on four group which is primarily students; aged between 18-25 years old, people who settling down in terms of career and family life; aged between 26-45 years old, people who starting to look ahead; aged between 46-60 years old, and people who already retire and close to that stage; aged 60 and above. The result shows that each of categories demonstrates different preferences as well as moods to the surrounding areas.

Apart from that, Ahmad (2003) mentions that resident satisfaction is important since it can affect social integration. Among the reasons are house compounds; in terms of physical structures, lack of maintenance on public facilities, and poor social and physical environment which adversely affect the achievement of greater social integration. He also states that resident satisfaction can promote the process of socializing among people.

Residential Landscape for Green Neighborhood

The development of green neighborhoods is related to the landscape design in order to generate a favorable living environment especially in town and urban areas. Based on the objective of the National Landscape Policy 2011, the role of landscape design is important in providing a comfortable and quality housing area for each residential area. This initiative can be achieved through the idea of green neighborhood that can offer a neighborhood community with several green initiatives such as green corridor, green technology and product that can create a sustainable neighborhood environment (*Figures 1.4* and *1.5*). This initiative of a green neighborhood can be applied in macro and micro scales of residential areas

Figure 1.4: Example of housing area with a systematic green corridor
(Source: Draf Garis Panduan Perancangan Perumahan. 2011, p.20)

Figure 1.5: A conducive arrangement of house layout and the cul-de-sac give an easy accessibility for users. Cul-de-sacs can also act as a place for interaction and recreation for residential communities
(Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.17)

The overall planning of a residential area can be determined based on the pattern of the street design. There are five types of street patterns that are generally used, namely the grid, oblong grid type 1, oblong grid type 2, loops and cul-de-sac patterns. A basic type of residential layout that has been identified in most areas in the Klang Valley area is oblong grid 2 pattern. *Figure 1.6* shows an illustration of a typical pattern of residential development based on street pattern design.

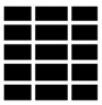
	 Square grid	 Oblong grid	 Oblong grid 2	 Loops	 Culs-de-sac
Percentage of area for streets	36.0%	35.0%	31.4%	27.4%	23.7%
Percentage of buildable area	64.0%	65.0%	68.6%	72.6%	76.3%

Figure 1.6: A comparison of area for residential areas based on type of street pattern (Source: http://www.cmhc-schl.gc.ca/publications/en/rh-pr/tech/socio75.html. Retrieved on 13th July 2012)

Figure 1.6 shows that a residential area with oblong grid 2 has more buildable area than other types of residential patterns. This is because the area that can be used for the development of building and plinth area is bigger and leads to more plinth area for landscape design purposes. Besides that, the minimum requirement is also influenced by the size of the plinth area of the house development. Plinth area can be identified as the built-up covered area measured at the floor level of the basement of the storey. It is stated in the Federal Territory Act 1982 (2006), that a management of the plinth area allows more planning of public green area and children's play to be developed in residential areas. *Figure 1.7* shows example of a plinth area for one single building that consists of a front yard, a side yard and a rear yard that can be used for landscape design purposes.

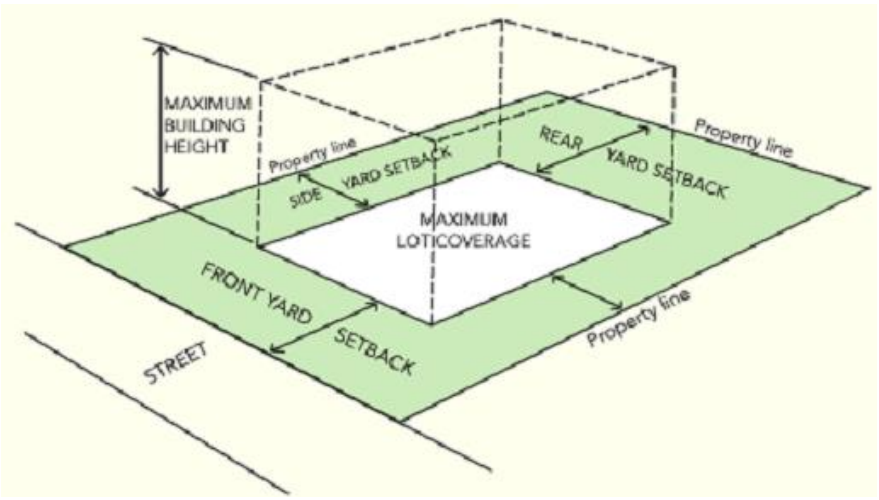


Figure 1.7: Small building plinth area over an area of the site provides harmony with availability of more space on the ground floor in a development. (Source: Garis Panduan Pengiraan Nisbah Plot Dan Kawasan Plinth, 2010, p.3)

It is also stated in the Federal Territory Act 1982 (2006), that in order to identify the size of the plinth area for a housing area, two basic information need to be identified which are size for overall site/house area and size of built-up area. The size of plinth area is measured by a formula of;

$$\textbf{Plinth area} = \frac{\text{Size of built-up area}}{\text{Size of overall site/house area}} \times 100$$

The built-up area can be understood as an area surrounded by a building area that considers the perimeter of the external wall of the building. Structures that are not considered as plinth area are recreation facilities such as pergola, gazebo/*wakaf*, post guard, porch area, balcony, roof and fountain or pond (*Figure 1.8*).

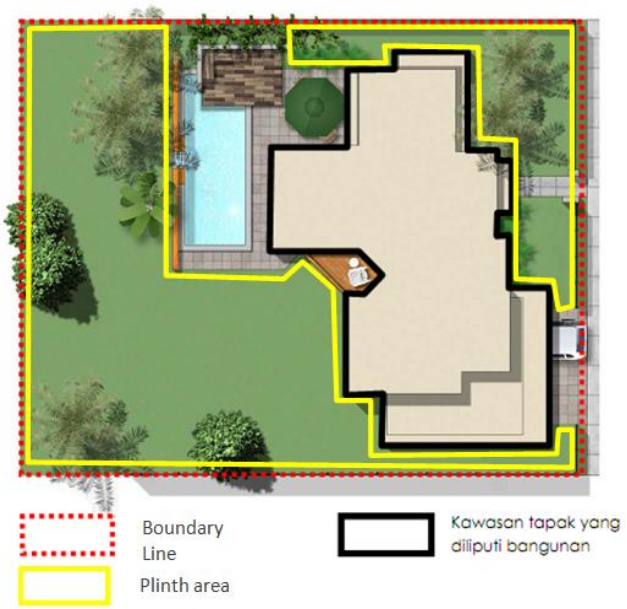


Figure 1.8: Example of plinth area for type of housing area
(Source: Federal Territory Act 1982, 2006)

The minimum requirement of the plinth area is different based on the type of house development area. As shown in *Figure 1.9*, the bungalow type of residential area has a bigger plinth area compared to other types of residential houses. It is determined through the green area provided for landscape design in the house compound area.

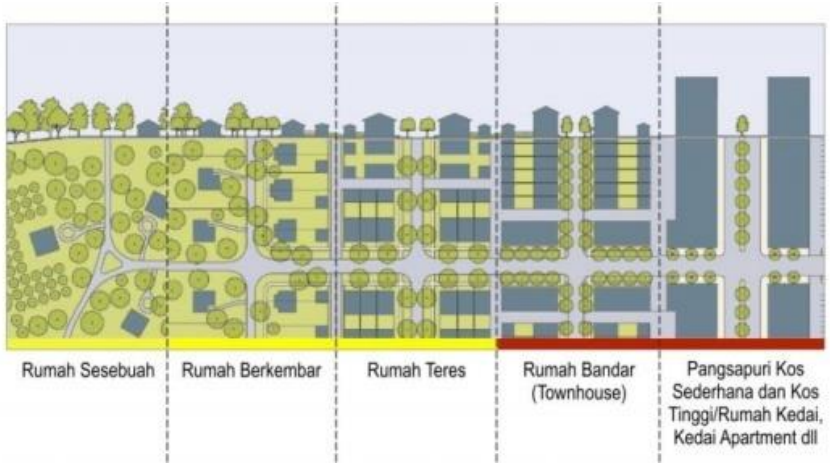


Figure 1.9: A different size of plinth area for different types of housing developments (Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.28)

Green neighborhood is also one factor that can contribute to the development of landscape design character and elements. It is stated in the Garis Panduan Perancangan Kejiranan Hijau by (JPBD), green neighborhood is important for creating a sustainable environment with the initiative of green technology in order to reduce greenhouse gases, to promote a healthy lifestyle with community kitchen garden programmed and to encourage eco-friendly environment of community. The concept of green neighborhood is influenced by four factors which are:

- Neighborhood passive design
- 3R (Reduce, Reuse and Recycle)
- Efficiency of energy
- Green technology

There are seven elements of green neighborhood listed by JPBD in order to develop a good residential development. The elements consist of ecology and environment, greenery environment, neighborhood design and transportation, structure and building, management of water, energy and solid

waste, green community and lastly innovation of green technology. These elements are important in order to create a sustainable green neighborhood. Basically, for the development of a residential area, 10 percent of the overall development should be provided for the open space and recreation areas for public use. However, for the development of green neighborhoods, other elements of greenery, such as rooftop garden, street planting, community garden, bio-retention or swale and water source, such as river or pond, can also be classified as 10 percent of open space that need to be provided for residential developments.

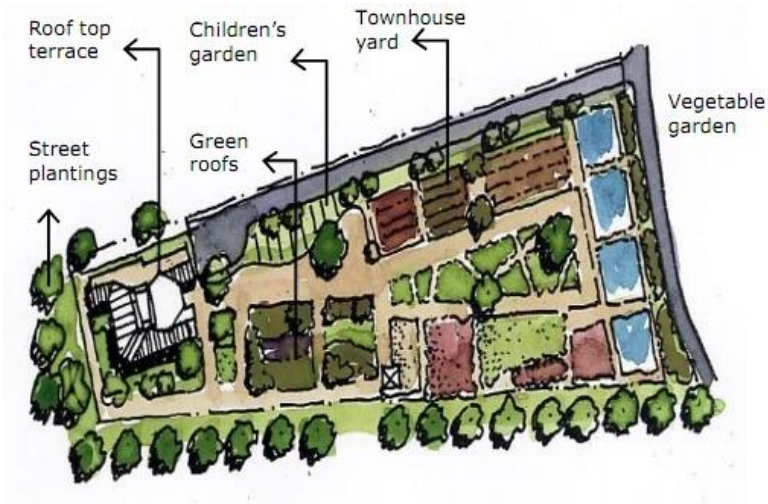


Figure 1.10: Element of greenery included in green neighborhood
(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.17)

Figure 1.11: Example of green technology method of rain water harvesting that can be applied in a residential development
(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.58)

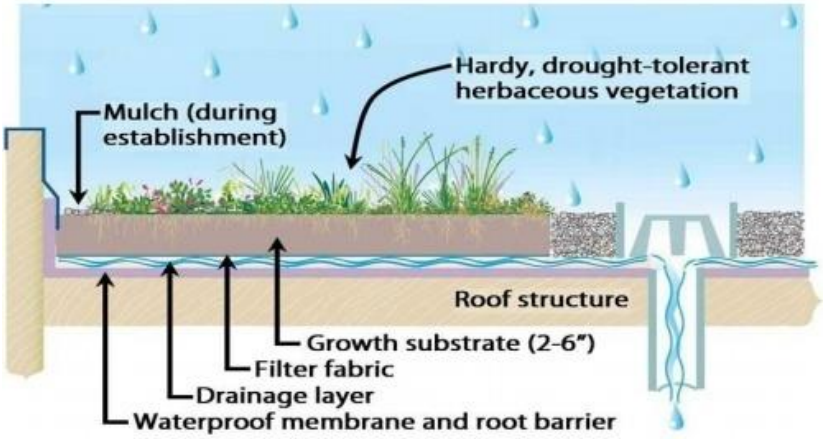


Figure 1.12: Example of green technology method of rooftop garden that can be applied in residential development
(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.53)

Figure 1.13: Example of green technology method of solar panel that can be applied in a residential development. (Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.63)

Conclusion

The understanding of landscape design for residential is important in creating a sustainable development for the residential area. The review on the issues and the concept of green neighborhood is essential to identify the basic needs and demands of landscape design in residential areas. Furthermore, the basic need of residential properties such as plants, open spaces or recreation areas, can become benchmarks for residential areas in applying more other landscape design methods in residential areas. Therefore, the roles of landscape architects are very important to be introduced and promoted with regards the importance of landscape design in residential societies.

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Chapter 2

Importance of Landscape Design in Residential Area

Landscape, which includes topography, vegetation and associated plants and soil, water bodies, and their spatial configuration, is one of the most visual needs of people (Zheng et al., 2011). They add that human–nature interactions lead human beings to have contrasting preferences on the surrounding landscape and environment because a pleasing landscape can bring mental and physical benefits to people. The understanding and preference by people on their surrounding landscape provide a challenge for policy-making and implementation. Alterations in the landscape can bring about significant demographic and economic changes in rural regions. That is, individuals largely acknowledge the intrinsic value of nature and its subsequent right to exist irrespective of its functions for mankind (Howley, 2011).

This knowledge would enable designers, such as landscape architects, to propose a more environmentally friendly environment and, at the same time, conserve the ecological values of the site. Ecological environmental design is concerned mainly with the amount of greening, the green ecological quality and the biological symbiosis of construction (Guo et al., 2010). Despite increasing demands for environmental amenities, it is becoming more difficult to reserve or supply land for parks or open spaces in metropolitan areas with high population densities (Bae, 2011).

According to Zheng et al. (2011) the neatness landscape can become one of the important features in the context of the residential landscape. They agreed that the previous studies support a general conclusion that people in general prefer a neat environment. The neatness is one of the most important factors for an attractive landscape although trimmed bushes are not usually good for biological diversity. An over-emphasis of the “garden” aspect of the garden city has resulted in the excessive planting of trees (Tuan, 1990;

quoted in Zheng et al., 2011). Perfect green lawns may not be ecologically healthy (Helfand et al., 2006; Steinberg, 2006).

Additionally, it is argued that people have different perceptions about wilderness: “One man’s wilderness may be another roadside picnic ground” (Nash, 2001, quoted in Zheng et al., 2011). Clearly, the bias in preference of our surrounding world might be ascribed to many factors. While the ability to know the world is limited by our knowledge and experience, public preferences are deeply embedded in class position and the relative economic, cultural and social capitals (Zheng et al., 2011). With this in mind, the focus of this study is to gain greater insights into the landscape characteristics that are suitable for the residential settings particularly in Klang Valley.

Landscape Influences Good Residential Areas

Landscape design has become a significant environmental effect for humans as well as all living things in order to provide a conducive living environment. The aggregate effects of private landscapes can influence habitat and water qualities, among other environmental attributes. As a result, innovative landscapes that incorporate ecologically beneficially land cover patterns have been designed in multiple scales for private lands.

The study shows that the environmental factors of a residential area are important to be analyzed so as to be beneficial for landscape design in residential areas. Therefore, landscape design, based on the suitability of the site, is very important in giving positive influence for a better living environment.

Landscape Perceived the Value of Residential

The effectiveness of landscape design will perceive the value of the living environment, especially in residential areas. Alex (2009) states that plant size is the factor that adds most to a home’s value (40.2 percent) and design sophistication is a close second (36.5 percent). Data from a study conducted from 1996-97 in Greenville, South Carolina, show that home price premiums increased 6 percent to 7 percent for home landscapes that were upgraded from good to excellence and 4 percent to 5 percent for an upgrade from average to good (Alex, 2009). Moreover, the value of a home can be increased by as much as 6 to 15 percent as a result of good landscape (Williams and Tilt, 2006). Therefore, it can be concluded that the value of a residential area has increased with a conducive landscape design.

Policies Related to the Importance of Landscape Design in Residential Development

A comprehensive national landscape policy supported by relevant regulations will be formulated to spearhead the programme. In this regard, the Jabatan Landskap Negara (JLN- National Landscape Department) will ensure that the planning of new public parks will be based on standards for open space and recreational facilities in line with the respective landscape master plans at the state levels. Public parks and landscaped areas will be designed to ensure easy maintenance, and to make them sustainable, attractive and accessible to the public, including the aged and the disabled.

In addition, research and development (R&D) on landscaping and planning of parks will be intensified to enhance landscape development. Local authorities will continue to undertake measures to forge smart partnerships with private sector and non-governmental organizations (NGOs) to upgrade and maintain public parks. This will include the provision of equipment for playgrounds, construction of fitness circuits and gazebos as well as maintaining sidewalks. It is stated in the Ninth Malaysia Plan 2006-2010, p. 442, that:

> 21.17 *Landscaping and Recreational Programmed*. In line with the national aspiration to implement a garden city concept in urban centers, various landscaping and recreational projects were implemented by local authorities with the support and assistance from the National Landscape Department. In this regard, the Department provided assistance to local authorities and state governments in planning for green lungs, designing recreational and public parks as well as greening and landscaping of rivers, roads and amenities. A total of 30 landscape master plans were developed, which provided guidelines for the proper development of landscape focusing on a clean, beautiful and safe environment while ensuring balance between physical development and the conservation of natural resources. To meet the increasing demand for better recreational areas and open spaces, 17 new public parks were built and 256 existing parks have been upgraded. In addition, the national tree planting campaign continued to be implemented during the Plan period aimed at promoting awareness among the public on the importance of trees in our living environment.
>
> 21.47 *Landscaping and Recreational Programmed*. In line with the national aspiration of making Malaysia a developed, clean and attractive garden nation, efforts will continue to be undertaken towards the development of a quality landscape.

(Ninth Malaysia Plan 2006-2010, p. 450-451)

In introducing the motion on the Tenth Malaysia Plan, the Prime Minister, Datuk Seri Mohd. Najib Tun Abdul Razak in his speech highlighted in the Fifth Strategic Thrust (ST5.8) entitled that:

> 103. The Government will also promote environmentally friendly housing by introducing guidelines and a green rating system. Putrajaya and Cyberjaya will serve as flagship green townships. The Government will take the lead in adopting green building standards. New Government buildings will be designed to meet green standards. Energy efficiency of existing buildings will be enhanced and as a showcase example, the Prime Minister's Office complex will be upgraded to meet the Gold Standard Green rating.

Conclusion

In general, the importance of landscape design covers the overall aspect of environmental, social and values of the residential. The use of elements of landscape design such as plants and landscape space create a sense of place and belonging to the residential areas. Other than that, the specific policies regarding landscape design are important since it becomes a significant guideline to the designer in order to promote landscape design in residential areas. A landscape design is needed to develop a sustainable environment of the residential areas in the future.

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Chapter 3

Basic Needs of Residential Landscape Design

The needs of residential landscape design can be classified into two which are macro scale and micro scale of landscape design. The needs are different, based on the types of house and the needs based on the condition of the neighborhood area. The explanation below shows that the needs of landscape design are based on the types and sizes of the residential areas, especially in the Klang Valley area.

Macro Scale Landscape Design

Landscape is "*an area, as perceived by people, whose character is the result of the action and interaction of human and/or natural factors*" (as stated in the Landscape Institute Position). This approach recognizes the dynamic nature of landscape, and emphasizes the management of change, the creation of new landscapes and the management of the landscape that has been inherited. Landscape actually underpins the environmental, social and economic pillars of sustainability.

Provision of housing cannot be separated from current environmental and social challenges including climate change, biodiversity, energy supply, food security, and social cohesion. Housing developments have a major impact on the fabric of landscapes. Equally, an approach to housing development which works within the constraints and opportunities provided by the landscape will not only minimize adverse effects but will also offer environmental, social and economic benefits. The housing built today will not only help to shape the environment in the immediate future, but it will also be a legacy in determining the environmental quality of many areas.

Landscape design character is very important to residential development since it can create *genius loci* to that residential area. It is very important to consider the site context before embarking on the residential development. This will determine the level of comfort for the residents and the residential areas. Good design should contribute positively to making places better for people. This means ensuring that places function well and add to the overall character and quality of the area.

In the context of bigger planning of neighborhood in landscape design, every neighborhood should have a neighborhood center community focus. It should consist of a mixture of compatible land use that supplies goods and services for the needs of residential areas (*Figure 3.1*).

Figure 3.1: Example of accessible neighborhood green linkage connected with open space and recreation facilities
(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.21)

This can be supported with major transit stops, community facilities and leisure areas (Garis Panduan Perancangan Kejiranan Hijau, 2012). Besides that, a programme such as 'safe city' has been introduced to prevent crime and promote safety in residential areas. It is stated in the JPBD that a safe city can be defined as a city that is free from all physical, social and mental threats. The environment is always in a preserved state of safety to avoid disrupting a residential harmony. Residents are always in a safe, harmonious, healthy and happy state. There are four visions that support this programme:

- City that is free from violence, vandalism and life threats such as extortion, robbery, and theft.
- City that is free from destruction as a result of natural disasters such as floods and landslides.
- City that is free of social and moral decay such as drug addiction, theft, white collar crime, bribery, abuse of power, and loss of integrity.
- City that is free from accidents in and out of buildings, such as traffic accidents, falls from buildings, fire and such.

In developing safe cities and residential areas, three steps or strategies need to be applied which are environmental design initiatives, target hardening and managements, community involvements and public awareness. All the strategies are important in order to make cities safe and to ensure that crime prevention initiatives under the Government Transformation Programme (GTP) National Key Results Area (NKRA) are on track and sustainable. In relating to landscape design, an environmental design initiative is one of the initiatives suitable for encouraging the development of landscape design in residential areas. The first initiative that has been introduced is segregation of pedestrian walkways and roads for motor vehicles that consist of provisions of dedicated walkways, bollards, railings, landscaping and dedicated motorcycle lanes. The second initiative is to implement crime prevention through environmental designs (CPTED) and lastly establishment of Geographical Information System (GIS) mapping for crimes and safe city programmes. All the initiatives support the protection of environmental surroundings and the need for crime prevention in residential areas. The efforts of crime reductions in the NKRA are commendable and will continue to be implemented in sustainable residential developments.

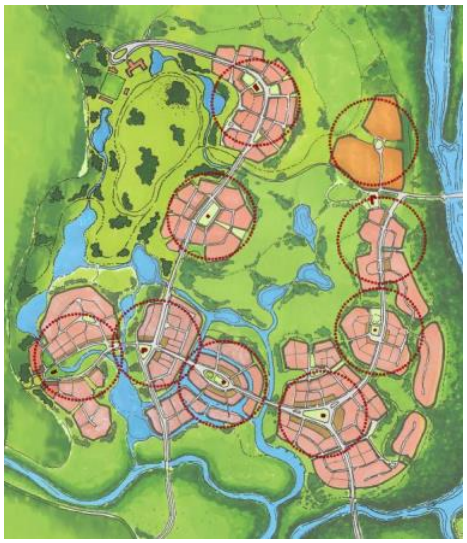


Figure 3.2: Hierarchy development of recreation area in big planning of residential area
(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.15)

Basically, landscape design elements are based on the activities that occur therein. For the macro scale context, every residential area has a recreational area in order to support residents' needs. Recreational areas usually reflect the recreational behavior needs. For example, playground equipment is needed in order to develop children's' motor skills and also their social skills, while an open space can be considered as a multi-purpose space. In addition, the size of the recreational area also determines the elements used in it. For example, tot lot playground needs less than one acre compared to the neighborhood park which needs one to six acres. Thus, many activities can be held at the neighborhood park compared to a tot-lot playground (*Table 3.1*)

Table 3.1: Park hierarchy

Park Hierarchy	Size (Hectare)	Population served	Remarks
Community Park	8.0	12,000 – 50, 000	Generally used for sport activities, social, and culture activities which cover several residential units
Neighborhood Park	2.0	3,0000 – 12,000	Often contains playfields and small sport complexes in residential units
Play field / stadium	0.6	1,000 - 3,000	Recreation area for adults and children which accommodate three sub-residential units
Tot Lot Playground	0.2	300 – 1,000	Generally active recreation for children below 12 years old

(Source: Garis Panduan Perancangan Kejiranan Hijau, 2012, p.14)

It is stated in the Garis Panduan Perancangan Tanah Lapang dan Rekreasi (2010) that there are several characters and elements that need to be considered in designing recreation areas in residential developments. The criteria have been divided into two types, namely the general and the specific criteria of guidelines for recreation areas. There are two types of distribution of open space in residential areas, namely a distribution of 50 percent of open space from the overall planning of the area that has a centralized type of development and based on the population density of the neighborhood development. *Figure 3.3* shows an example of the distribution of open space in a centralized type of residential area or gated community.

The location of the recreation area needs to be strategic and accessible for all types of users. Referring to the outline in the Garis Panduan Perancangan Tanah Lapang dan Rekreasi 2010, the existing slope and natural resources, such as river or pond, need to be designed with a specification in order to avoid any destruction or flash flood at the area at least 60 percent of the base area should be covered by components or soft landscaped areas.

Figure 3.3: Distribution of open space for centralized type of neighborhood and gated community area. (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.10)

In addition, JPBD has identified a specific guideline for recreational development in residential areas. The guideline is divided into several important criteria. The first specific criterion to be considered is accessibility and connectivity of the recreation area. The recreation area should be designed for residents to have easy access to it through walking distance or by transport. Landscaped paths must be provided at the entrance and in the garden recreation in order to foster a sense of welcoming and create a beautiful greenery environment.

The next criterion is designing a recreation area based on the type of age group. A provision of playground equipment at recreational areas should be diversified according to age category. The following *Figures 3.4* and *3.5* shows the types of playgrounds and recreation areas suitable for types of age groups. The last specific criterion is the design and layout of the recreation area. The layout of the play equipment should consist of suitable space and is sufficient enough to facilitate the movements of users. At least two types of color lights should be used to enhance the attractiveness and safety of the recreation area (*Figure 3.6*).

Figure 3.4: Recreation area for children aged 2 – 8 (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.19)

Figure 3.5: Recreation area for children aged 9 and above (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.19)

Figure 3.6: Examples of types of toys with colors and slope of sliding boards suitable for children (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.21)

Apart from that, it is also important to have a well-defined arrangement and selections of street plantings since it creates a good residential area. This is because a row of plants can create a vertical plane to the visual character. Therefore, it gives an enclosure view for people. Apart from that, most plant selections for street planting have aesthetic values in terms of shapes, colors, and character itself. Basically, plants for street planting should have a tap root system in order to grab the soil and avoid damage for pedestrian walkways and drainages. The use of suitable plants is also needed in order to create a safe environment for pedestrians.

Besides the overall layout of residential areas, other macro factors of residential developments such as type of housing, allocation of green compound or space, needs for buffer zone, pedestrian walkway, back lane, entrance and security services and proposal of type of planting, also need to be considered in the planning and designing of the whole planning of residential areas. All the factors are discussed below:

a) Housing type

There are three types of houses in residential properties namely terrace houses, semi-detached houses and bungalow houses. Each type has different needs in term of the planning and design of the overall layout of the residential area:

I. Terrace house

For a typical terrace house, the basic needs for the overall layout that have are existing planting, street planting and open space. Some areas apply the cul-de-sac design in order to create a safe environment by controlling vehicle movements in the residential area.

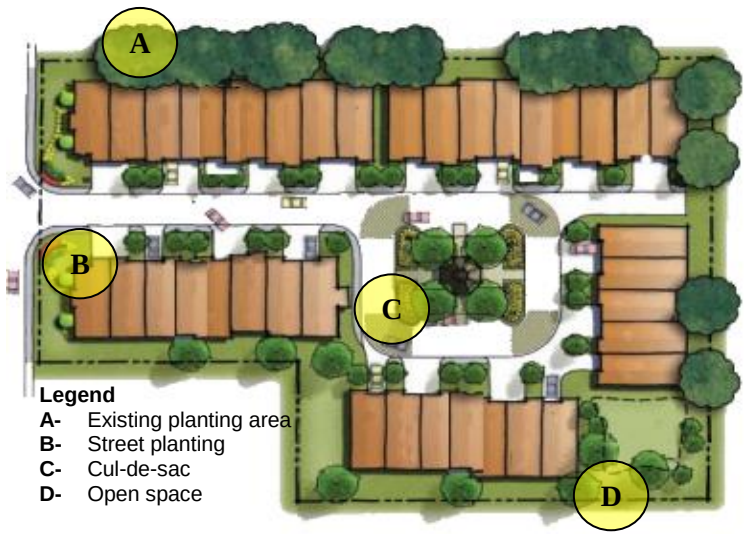
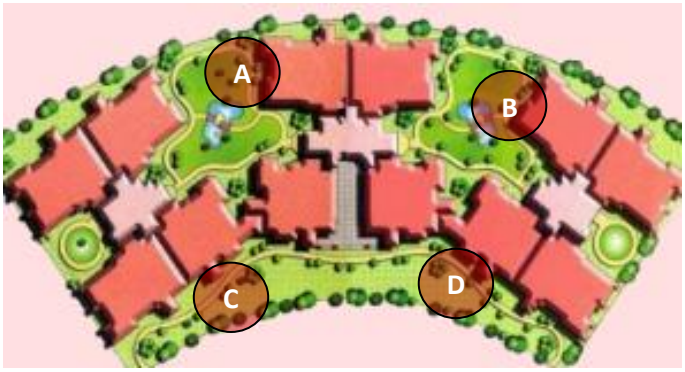


Figure 3.7: Layout of typical terrace residential area (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p.2)

II. Semi-Detached House

For the semi-D type of house, the overall layout of planning can be developed with open space, community recreation area, pedestrian and street planting that can serve as cooling elements for residential areas. Besides that, the recreation areas such as playground and open space, act as community gathering areas for the neighborhood.



Legend
A- Open space
B- Playground area
C- Pedestrian walkway
D- Street planting

Figure 2.8: Layout of typical semi-D residential area (Source: Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p.5)

III. Bungalow House

For bungalows, the private compound area can serve as a place for landscape design. People can have their own recreation area and the space is bigger than other types of housing.

Legend
A- Open space
B- Private compound area
C- Water elements
D- Existing planting

Figure 3.9: Layout of typical bungalow residential area. (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p. 7)

b) Allocation of Green Compound or Space

According to JPBD, 10% of the overall space must be reserved for green space which includes the playground area, park and others. Apart from that, a minimum of 3m at the frontage of the house must be reserved for landscape (street planting).

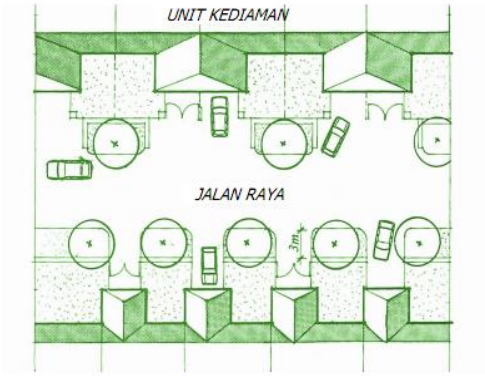


Figure 3.10: Providing a minimum of 3m of green compound along the roadside for planting area and pedestrians (Source: Garis Panduan Landskap Negara, 2008, p.42)

Figure 3.11: Providing minimum 6m of green corridor for linkages between residential and recreation area (Source: Garis Panduan Landskap Negara, 2008, p.42)

Figure 3.12: A suitable type of planting that can create green linkages for overall residential area (Source: Garis Panduan Lanskap Negara, 2008, p.43)

c) Need for Buffer Zone

A buffer zone area is very important for residential areas since it acts as an air filter. Based on the guideline stated in the JLN, if the residential area were located at an industrial area or main road, the buffer zone must be at least 20m from the area. This is to ensure the privacy and safety of residents.

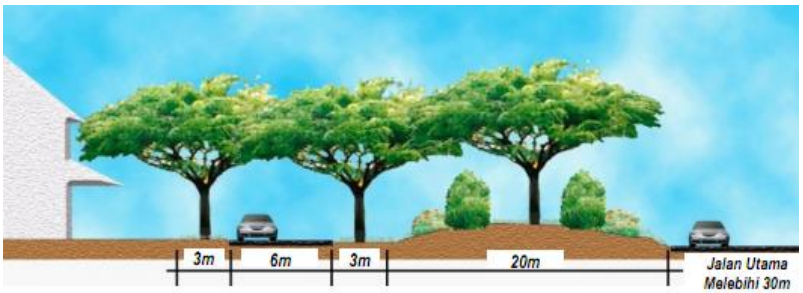


Figure 3.13: 20m area for buffer zone for noise absorbency (Source: Garis Panduan Lanskap Negara, 2008, p.42)

d) Pedestrian Walkway

There are several types of pedestrian arrangements that exist in residential areas. Pedestrian walkways can become an important element that can create connectivity and accessibility in residential areas. The plantings usually used along pedestrian walkways act as shaded elements for the pedestrians. Spreading trees and big canopy types of trees are examples of the type of species suitable to be used in pedestrian walkways and also for street planting areas.

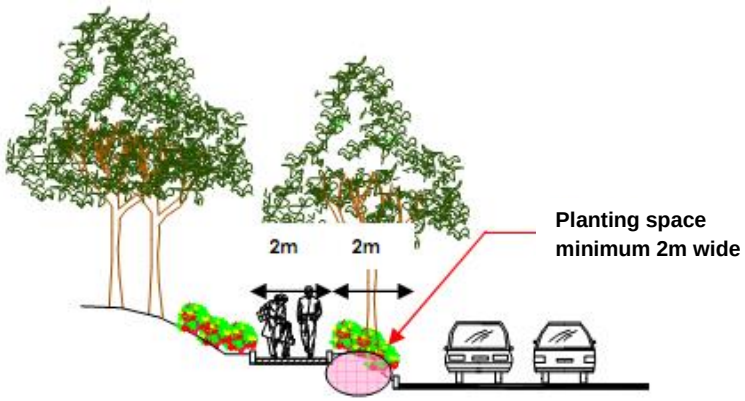


Figure 3.14: Section on pedestrian walkway divided from main road by using planting area. (Source: Draf Rancangan Tempatan Majlis Perbandaran Ampang Jaya 2020, 2009, p.7)

e) Back Lane

There are several back lanes which are serving as a path for utilities and infrastructure maintenance, need of privacy and space for ventilation and lighting between buildings and also can serve for landscape purposes such as pedestrian walkway and landscape design.

Figure 3.15: Example of back lane with a fence for safety purposes, the extension of housing building that create a barrier for back lane and drainage system at the back lane area (Source: Garis Panduan Perancangan Lorong Belakang, 2012, p.2-4)

In the JPBD, back lane is defined as a path that can be accessed by all types of public transport and a proper size of back lane is equal to or less than 4.6m (*Figure 3.16*).

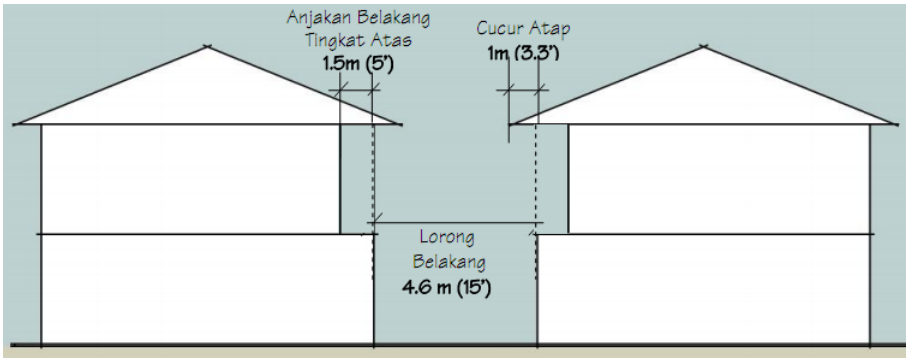


Figure 3.16: Section of back lane of house compound that can be accessed by transport and pedestrians, the proper size of back lane is 4.6m (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p. 3)

For most types of new residential houses, landscape designs and pedestrian walkways have been a major linked to the function of back lanes. Back lanes can be used as pedestrian walkways and creating landscape elements to make the back lane area friendly for users and the environment.

Figure 3.17: Section of back lane of house compound that can be applied with landscape design. (Source: Garis Panduan Perancangan Lorong Belakang, 2012, p.1)

f) Entrance and Security Services

The particular design and standard of security posts also need to be considered in terms of security and safety purposes. It is important to keep a residential area safe in order to have a safe community environment. Therefore, for most housing areas, the security post has become an entrance that can create a sense of security and safety for residential areas.

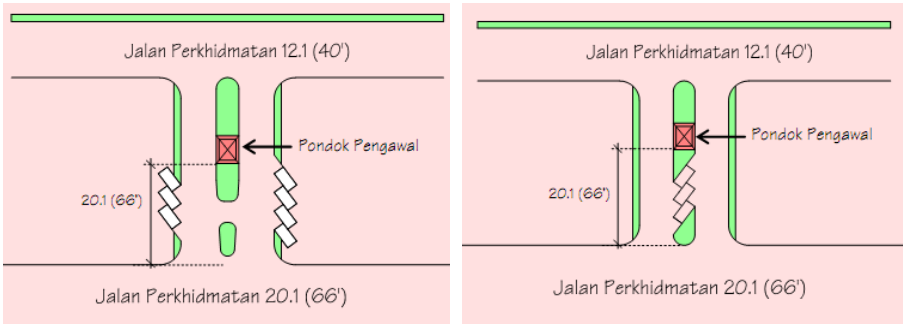


Figure 3.18: Example of layout of security post in residential areas (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p. 16)

In some residential areas such as gated community type of residential areas, the aesthetic and grand welcoming entrance has become part of the security post area. It can be seen that the security post is important as the main welcoming gesture for residential areas.

Figure 3.19: Welcoming entrance of residential area used as security posts for gated community areas (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p. 16)

Proposal of Planting Based on Type of Residential Areas

JLN has proposed some plant species according to the type of space in residential areas such as the street planting area, the buffer zone area, as well as the playground and recreation area. The choice of plants is dependent on plant suitability and functional space. In general, big trees should be given priority landscaping elements because they will give a more shading effect in improving the quality of the environment.

Besides that, the use of plants or trees for housing development has become an important aspect that needs to be considered in order to create a pleasant environment. Meanwhile, the use of palm is suitable for houses with minimum space areas. JLN outlines criteria for planting in residential areas:

- In order to create a sense of place for residential areas, it is suggested to plant only one type of planting in the entrance and street planting of the residential area in order to create a sense of belonging for the residential area.
- Use plants with colorful flowers at the entrance of the residential area as a welcoming gesture and to provide shaded trees along the street area.
- The proposed plants need to have been interesting in form and shape, have a tape root, are not easily wrecked, do not have torn and poison and are easy to maintain.
- The buffer plants are suggested as natural edges or fences for residential areas.
- Multi-sized and types of planting suggested in buffer areas of residential areas.
- Use a shaded tree for pedestrians. Use plants that have tap roots that cannot damage the structure of pedestrian walkways and drainages.
- Used edible plants for backyards as kitchen gardens.

Below is the list of recommended plants suitable to be planted in the residential areas;

I. Street Planting Area

Table 3.2: Suitable type of plants for street planting areas

Scientific Name	Common Name
Trees	
Bauhinia purpurea	Tapak kuda
Dalbergia oliveri	Tamalan
Cananga odorata	Kenanga
Erythrina glauca	Dedap merah
Gardenia carinata	Cempaka hutan
Jacaranda filicifolia	Jacaranda
Mimusops elengi	Tanjong
Lagerstroemia rosea	Bungor
Michelia champaca	Cempaka kuning
Mesua ferra	Penaga lilin
Pelthophorum pterocarpum	Batai laut
Plumeria spp	Kemboja
Tabebuia pentaphylia	Tekoma
Shrubs	
Alamanda carthartica	Alamanda
Bougainvillea spp.	Bunga kertas
Hibiscus rosa-sinensis	Bunga raya
Heliconia spp	Heliconia
Hymenocallis spp	Spider lily
Ixora cocinea	Siantan

(Source: Garis Panduan Perancangan Landskap, 2008, p. 44)

II. Buffer Zone and Recreation Areas

Table 3.3: Example of trees that can be used for buffer zones

Scientific Name	Common Name
Trees	
Mimusops elengi	Tanjung
Cinnamomum iners	Kayu manis/medang teja
Eugenia grandis	Jambu laut
Ficus roxburghii	Beringin
Hopea odorata	Merawan siput jantan
Streblus asper	Cempaka hutan

(Source: Garis Panduan Perancangan Landskap, 2008, p. 44)

Table 3.4: Example of palms and shrubs that can be used for buffer zones

Scientific Name	Common Name
Palms	
Areca catechu	Pinang
Chrysalidocarpus lutescens	Palma Kuning
Crytostachys lakka	Palma Merah
Ptychosperma macarthurii	Palma Mac Athur's
Licuala grandis	Palma fan
Raphis spp	Palma lady's
Vietchia merrilii	Palma manila
Shrubs	
Acalyphaspp	Acalypha
Baphianitida	Baphia
Calliandrasurinamensisi	Power puff

(Source: Garis Panduan Perancangan Landskap, 2008, p. 44)

Table 3.5: Example of plants that can be used for playground and recreation areas

Scientific Name	Common Name
Trees	
Cinnamomuminers	Kayu manis/medang teja
Cassia fistula	Rajah kayu
Delonix regia	Semarak api
Dalbergia olveri	Tamalan
Jacaranda filicifolia	Jacaranda
Mimusops elengi	Tanjung
Mesua ferra	Penaga lilin
Tabebuia rosea	Tekoma
Shrubs	
Hibiscus rosa-sinensis	Bunga raya
Heliconia spp	Heliconia
Hymenocallis spp	Spider lily
Ixora cocinea	Siantan
Brunfelsiapauciflora 'floribunda'	Yesterday,today,tomorrow
Cassia biflora	Bushy cassia
Canna generalis	Bunga tasbih
Duranta spp	Duranta
Eugenia orellana	Kelat paya
Gardenia jasminoides	Bunga cina
Jasminum sambac	Melur
Sansevierra trifasciata	Lidah mak mertua
Turnera ulmifolia	Turnera

(Source: Garis Panduan Perancangan Landskap, 2008, p. 44)

Micro Scale Landscape Design

The basic needs of landscape design have also been identified in reference to micro-scale which consists of the type of house compounds and elements based on the type of residential areas. There are three types of housing identified in the study, namely terrace house, semi-D house and bungalow house. The needs and requirements of landscape design for each type of house are different, based on their position and size of green space area. It is stated in the Garis Panduan Perancangan Perumahan from JPBD, some guidelines for each type of houses with regard to their size of plinth area. The guidelines for housing development can be divided into three types which are terrace house, cluster type of house and normal type of house or bungalow.

For the terrace type of house, there are two types of houses available in Klang Valley, which are low cost terrace house and medium house area. The needs of the plinth area for terrace houses are the front yard and the side yard area. For low cost terrace houses, there is a need of 6m reserve space for the side yard of a corner lot area and the front yard area for an intermediate lot area. The reserve space can be utilized with a basic landscape design and additional elements based on the needs of the users.

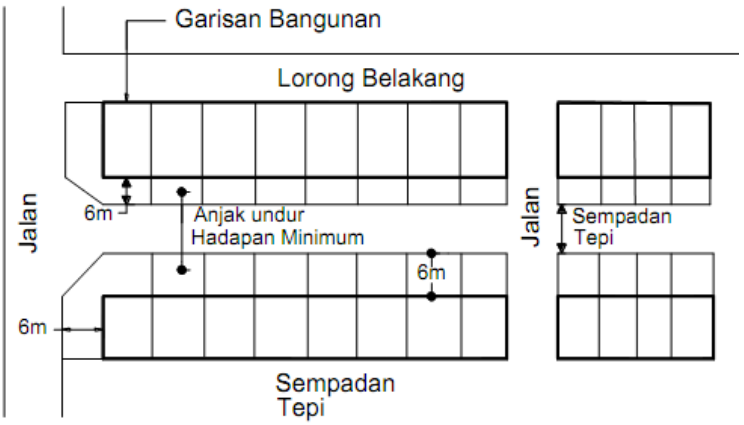


Figure 3.20: Layout size of reserve space for low cost terrace house. The need of 6m for front yard spaces and side yard spaces (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.50)

For the medium cost terrace house, there is also a 6m reserve space provided for each front yard and side yard of the residential compound.

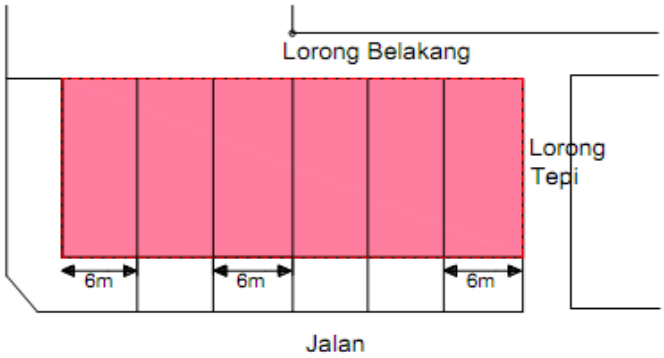


Figure 3.21: Layout size of reserve space for medium cost terrace house. The need of 6m for front yard spaces and side yard spaces (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.52)

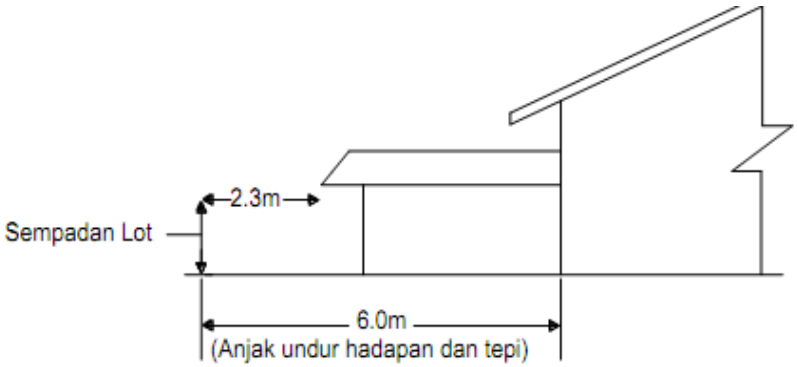


Figure 3.22: Section of front yard area that provide the minimum 6.1m reserve space for green space and 2.3m of porch areas (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.52)

Meanwhile, a semi-detached house needs 6.1m reserve space for the front yard area, and 3.1m reserve space for the side and back yard areas. The plinth area for a semi-detached house can be utilized with more landscape designs since there are more reserve spaces to be used. In terms of a normal type of house, the sizes of the plinth area are 6.1m for the front yard and 3.1m for the side and back yard areas.

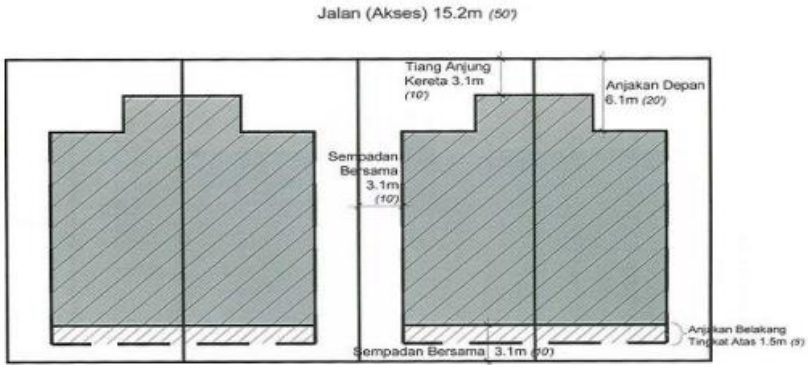


Figure 3.23: Layout of semi-detached house with 6.1m size of front yard area and 3.1m reserve space for side and back yard areas (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.55)

In addition, for a bungalow house, the size of the plinth area consists of 6.1m reserve space for the front yard area and 3m of the side and back yard reserve areas. The size of each yard is different. The limited use for landscape design can only be seen in the side and back yard areas.

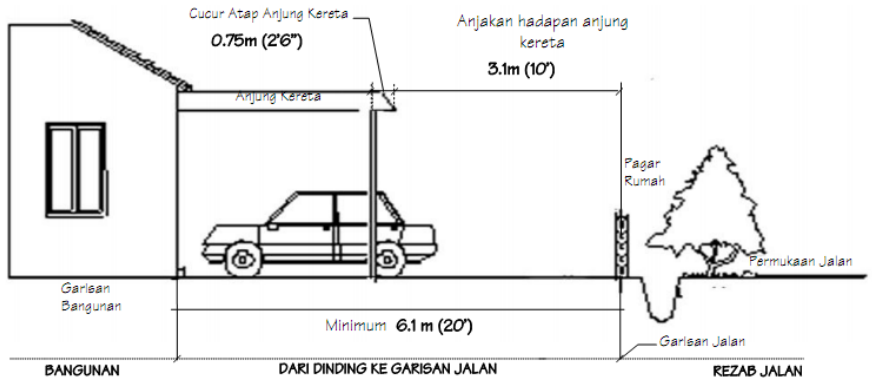


Figure 3.24: Section of front yard area that provide the minimum 6.1m reserve space for green space and 3.1m of porch areas for semi-detached type houses (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p.3)

Basically, the use of a plinth area in a bungalow house for the landscape design consists of their private garden and recreation area. This is because there are plenty of spaces that can be used for landscape design purposes.

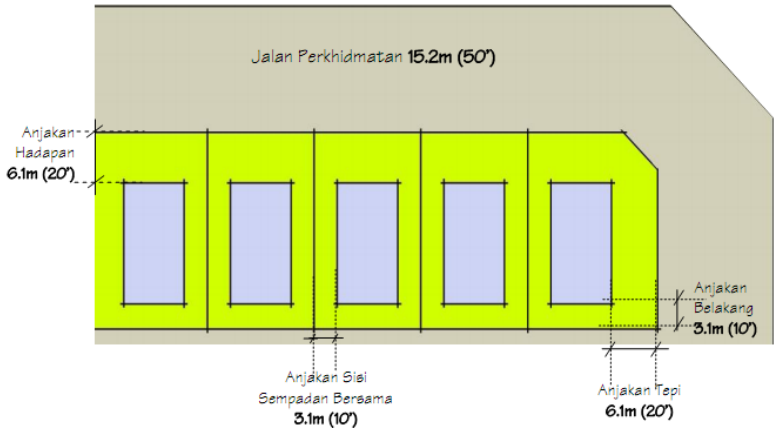


Figure 3.25: Layout of normal house or bungalow with 6.1m size of front yard area and 3.1m reserve space for side and back yard areas. (Source: Manual Garis Panduan Dan Piawaian Perancangan Negeri Selangor, 2010, p.7)

For the overall house layout, the size of the plinth area is important in order to determine the need for basic landscape design in the compound of the house. Every housing area has been provided with a reserve space consisting of the front yard, the side yard and the backyard in order to create a better private place for residents. The use of space is in demand by the users and houses with open spaces and paved areas have become a priority in Klang Valley.

Besides that, the use of plants is also important in landscape design for the front yard area. The types of plants that can be planted in the compound of houses, especially the front yard of the house are fruit trees, edible plants and herbal types of plant species. *Table 4.6 and 4.7* shows examples of plants that can be used in the frontyard area of the house.

Table 3.6: Example of plants that suitable to be planted at house compound areas

Scientific Name	Common Name
Trees	
Mangifera indica	Mangga
Punica granatum	Delima
Syzygiumspp	Jambu
Musa spp	Pisang
Nephelium mutabile	Pulasan
Annona pp	Nona
Carica papaya	Betik

(Source: Garis Panduan Perancangan Landskap, 2008, p. 45)

Table 3.7: Example of plants that suitable to be planted at house compound areas

Scientific Name	Common Name
Palms	
Crytostachys lakka	Pinang merah
Licuala grandis	Palma kipas
Vietchia merilli	Palma manila
Shrubs	
Adenumobesum	Desert rose
Bougainvillea spp	Bunga kertas
Jasminum sambac	Melur
Tabernaemontana coronaria	Susun kelapa
Buffer	
Acalypha siamensis	Daun the
Bambusa vulgaris	Buluh pagar
Climbers	
Pentas lanceolata	Pentas
Scidapsus aureus	Money plant
Tristellateia australasiae	Shower of gold

(Source: Garis Panduan Perancangan Landskap, 2008, p. 45)

Conclusion

As a conclusion, the basic needs of landscape design support the social environment of residential areas. The requirement of landscape design needs to be identified based on the requirements of the demographics and populations of the users, size of developments and spatial planning of the residential areas. Apart from that, the type of house also influenced the preferences of landscape design in residential areas. Many things need to be considered in order to have a better landscape design that supports enhancement of living environment in urban areas.

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Chapter 4

Principles of Residential Landscape Design

All effective landscape designs rely on basic principles (Williams and Tilt, 2006). An understanding of these principles can keep users from creating a landscape beast instead of the beauty that we dream about. Unity, simplicity, variety, balance, sequence, and scale are terms that are often associated with art (Ibid). These terms are used to guide an artistic expression and, in landscape design, they are just as important as in other art forms.

a) Unity describes the idea of tying the landscape together into an orderly design. Different parts of the landscape should relate to each other. We should get a sense of visual flow from one part of the landscape to the other so that features of one part remind us of another. Some repetition of a feature of the landscape is good, but it should not be carried to the point of monotony. Unity in the landscape can be achieved through a theme of colors, forms, or textures without using exactly the same plants. For example, a red color may be used as a theme, but the use of plants with reddish foliage as well as other plants with similar colored flowers or foliage. The plants would be in different areas of the landscape, but the color theme unites the overall landscape. Other themes, such as kinds of plants, curves or straight lines, and construction materials, can be used to create unity in the design. Too many design themes can be confusing, and the unity of the design is lost, so it needs to keep the design simple.

b) Simplicity is an important principle of design, but it is a hard one to achieve. Too many different colors, textures, and forms result in visual confusion, and any sense of design can be ruined. One way to achieve simplicity is by using a limited range of plant species. On

the other hand, it is needed to provide some variety in the landscape. Oversimplification is boring; some variety must be sprinkled in for interest and to focus attention on the desirable aspects of our property. The same kind of plant should not be used everywhere. A long hedge of the same kind of plant can be very monotonous, for example. Instead, plants should be broken up into groupings, maintaining some of the same plants in the groupings but adding other plants for variety.

c) A fourth principle of design is balance. In landscape design, we should think in terms of visual balance. The idea is to balance the visual weight of objects in the landscape. Balance can be symmetrical - one side of an area looks just like another. It gives a sense of stability. The overall effect is very formal. A balance can be asymmetrical. Asymmetrical balance can be achieved with a mass planting of shrubs or a tree on one side of the house visually balancing a chimney on the other side. Asymmetrical balance is dynamic. It tends to suggest movement.

d) A change in form, color, texture, or size should be gradual in the landscape. A gradual change is part of the principle of sequence. Sequence is used to direct the eye smoothly to a desired focal point like the front door or a specimen shrub. Sudden changes in appearance break the visual flow around the landscape. Proportion or scale refers to the way in which objects, like plants, people, or structures, relate to each other in size. Proportion can be used to evoke emotion. Large scale causes a humbling of the observer; a large tree or massive screen can seem to be imposing, for example. Small scale gives a sense of dominance or perhaps a desire to care for the smaller objects; dwarf plants, such as miniature roses.

User Preferences and Needs in Residential Areas

Ye (2009) states that people in a residential area mostly agree that they want a well-designed living environment that fulfills their needs of livable environments. People are more or less taking part in the activities that are part of their daily lives. As most of those activities are related to walking, the road becomes an essential element with regard to the necessary activities in space. A residential area is the basis for community development in maintaining the high, quality of life. They share common needs with each other and provide balance for everyone. Thus, the consideration for essential landscape is not only for individual needs but also the community's.

In addition, identifying the preferences and needs of a community will determine the space use in residential areas. It is important to understand what the user wants and provide the appropriate activity settings for them. Activities planned should be compatible with the site's characteristics. According to Ye (2009), a community involves the sense of belonging that reflects the culture and heritage, therefore the designer should take the initiative to provide timely assistance and support. Therefore, consultations and designs should reflect the range of functions and amenities required as well as the sense of place for each scheme. It is stated in the JPBD that the needs of landscape design can be applied in small and large groups of neighborhoods. *Figures 4.1* and *4.2* shows the needs of this type of neighborhood population towards a landscape design:

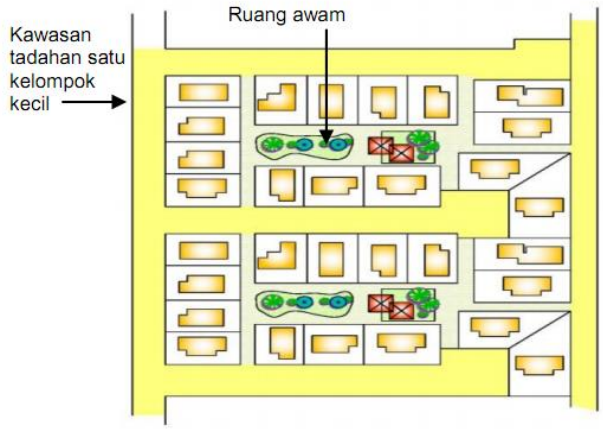

Figure 4.1: Needs of community recreation space and a cul-de-sac system path for a small group residential area (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.13)

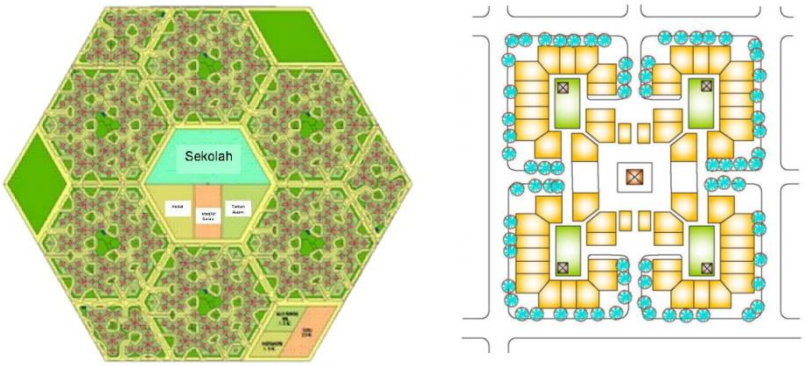

Figure 4.2: A courtyard concept for a large scale residential area arrangement (Source: Draf Garis Panduan Perancangan Perumahan, 2011, p.13 &17)

Principle of Development for Safe City

Nowadays, development is meant to help and ease people in their daily lives. Development is important because it can improve human life quality. However, when dealing with nature, much consideration must take place since it can lead to a lot of problems which can potentially threaten human lives. Therefore, humans must protect nature because nature is a “gift” from the Creator (Al-Baqarah, 21-22). It is stated in the JPBD, seven principles that need to be implemented in CPTED in order to create a safe city. The principles are building arrangement, pedestrian access, softscape and hardscape, parking area, lighting, safety equipment and also maintenance and management. Each principle has different objectives which have been outlined in order to achieve the goal of National Key Results Areas (NKRAs).

a) Building Arrangement

In building arrangement, there are several elements that need to be considered as it can influence the level of safety. The JPBD 2010 outlines four principles that need to be considered before embarking on any development. This will ensure the level of safety in that area whilst reducing crimes.

i. Mixed Development: Can create active activities in that area. Thus, this will avoid criminal hideouts and threats.

ii. Generating activities: Encourage activities that are allowed to draw the attention of the local community centre, such as night markets, open cafes, restaurants, sports and recreation among others. Therefore, this will help in improving the security and surveillance environment naturally through the approach of “*eyes on the street*”.

iii. Trapped and dead-space (Entrapment spot): Space left trapped and isolated. The design should avoid trapped space especially in a parking lot, sidewalk, street or alley dead (*Figure 4.3*).

Figure 4.3: Avoid trapped spaces such as dead street alleys and use spaces that can be viewed by other people (Source: Crime Prevention through Environmental Design (CPTED) Implementation Guide, 2010, p.11)

iv. Space views: Provide clear maximum space views at close range as well as remote and unobstructed views especially for areas around walkways. Large pillars, railings which are not transparent, shrubs that are not maintained and other obstacles near the walkways can create criminal hiding spaces or intruders to threaten or attack civilians. Thus, this facilitates criminal detections and can reduce fear of crimes.

Thus, in the context of neighborhood areas development, building arrangement is really important since it can influence resident movements.

b) Pedestrian Access

Pedestrian accesses include access roads and pavements consisting of tunnels, bridges and narrow lanes. Isolated pedestrian tunnels and narrow lanes are not allowed in new developments. However, pedestrian tunnels, bridges and narrow lanes with security measures, such as good lighting and installation of safety glasses need to be built. Use clear signage as directions and reminders need to be planned in an integrated manner so that users are not confused and wary of the neighborhood. Thus, by avoiding streets and sidewalks which are isolated, quiet, secluded and trapped, this will reduce crimes (*Figure 4.4*).

Figure 4.4: An open pedestrian bridge and clear direction of pedestrian movement can avoid pedestrians' user from any dangers and crimes
(Source: Crime Prevention through Environmental Design (CPTED) Implementation Guide, 2010, p.12 and 29)

c) Softscape and Hardscape

Soft landscaping, such as trees, shrubs, hedges and ground covers and hard landscaping, such as street furniture, pedestrian walkways, gazebos, fountains, garden lamps and sculptures can be used to define the boundaries of public and private spaces (Garis Panduan Lanskap Negara, 2008). Thus, this will create a user-friendly environment; making areas safe and attractive besides becoming a barrier to snatch thefts. Other than that, this also acts as a barrier border and provides directions from one place to another.

d) Parking Area

Parking areas are one of the most important areas that need to be looked into. So, the provision for parking areas should emphasize safety precautions such as parking, dealing with business premises and good lighting. Thus, this will improve the level of safety and reduce crimes. Besides that, this will also promote natural surveillance among people.

Figure 4.5: Provide lighting in parking areas and use an open view parking to reduce crime incidents. (Source: Crime Prevention through Environmental Design (CPTED) Implementation Guide, 2010, p.49 and 50)

e) Lighting

Preparation lit, especially at night, allows an individual to see or be seen clearly. Bright lighting can reduce the fear in the public, especially in parking areas, bus stops, and automatic teller machines (ATMs) among others (*Figure 5.6*). Lighting should be at a level that allows the face of a person to be identified in normal vision and help monitor the closed-circuit television (CCTV) system more effectively. By having good lighting in certain areas, this can avoid dark and murky atmosphere that allows criminals to be easily recognized and identified.

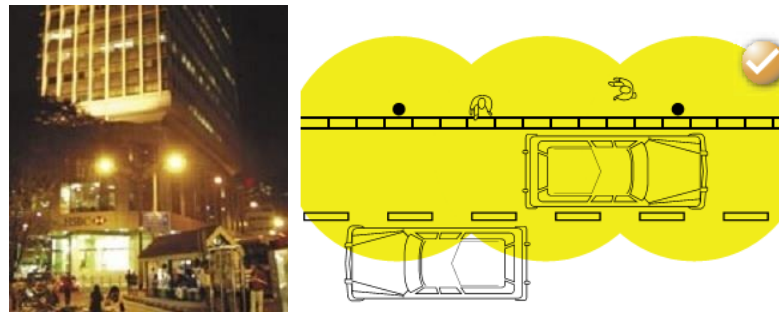

Figure 4.6: Provide good lighting in public areas such as pedestrian walkways and back lanes (Source: Crime Prevention through Environmental Design (CPTED) Implementation Guide. 2010, p.13 and 53)

f) Safety Equipment

Safety equipment includes safety mirrors, security alarm, CCTV cameras and warning signs. This will provide reminders, awareness and warning to the public to be careful about the surrounding.

Figure 4.7: Example of safety equipment: CCTV, safety mirror and alarm (Source: Crime Prevention through Environmental Design (CPTED) Implementation Guide, 2010, p.56)

g) Management and Maintenance

Every development should be maintained regularly and periodically to enhance security, such as leafy tree pruning, clearing bushes that cover lighting, and CCTV cameras as well as restoring abandoned buildings in the areas. Thus, this will prevent the existence of obsolete and abandoned buildings, and increase the level of safety.

As a whole, for safe cities, vast developments take place due to the increasing number of human population. So, development planning is important in order to avoid such a problem. This is because it has a lot of advantages especially for the well beings of humans. As a suggestion, all development must rely on the principles which have been outlined in order to avoid hazard.

Conclusion

Landscape is the combination of elements of art and science to create a functional, aesthetically pleasing outdoor environment to the users. In order to achieve a desirable landscape design in residential areas, the knowledge of basic elements and design principles need to be understood by the designer. The principle of landscape design and safety city can become a framework to create a sustainable living space for the resident. It also becomes a benchmark to a new trend of housing that particularly considers about the importance of green community in their development.

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Chapter 5

The Elements of Residential Landscape

There are two main elements in landscape designs namely hardscapes and softscapes elements. Hardscapes are man-made features including spaces, patios, benches, proportion and among others. While softscapes are soft materials known as plants, patterns of plantations, flowers and among others. Usually, hardscape is hard surface elements such as rocks, while softscape is the living elements in landscape designs which can be permanents such as trees and shrubs. It also can become temporary such as seasonal plants that appreciate its character such as fruit, flowers which gives color to the landscape designs (Hardscape versus Softscape, n.d). Usually, hardscaping is employed in an earlier stage of landscaping in order to get the shape and space for softscaping later on. Both hardscape and softscape are important to create balance in landscape designs. *Figure 5.1* shows examples of hardscape and softscape elements in landscape designs.

Figure 5.1: Examples of landscape designs that use both hardscape and softsacpe elements. (Source: http://www.jbcustomremodeling.com/, retrieved on 7th March 2013)

Other than that, water elements also important to be applied in landscape design. According to Ye (2009) water is a landscape factor which can complete outdoor environment. A distinct characteristic of water will bring a pleasant and cool mood and stimulate more emotion and inspiration. The water element that can be applied in residential includes fountain, swimming pool, artificial waterfall and others. It will keep a balance of landscape design in residential with the combination of hardscape, softscape and water elements.

Factors that Influenced Residential Landscape Design

Several factors can contribute to support the need of landscape design in residential area. According to Ye (2009), there are three factors that can support residential landscape elements which are the natural factor, the artificial factor, and the cultural factor. Other than that, various demographic factors such as age, gender, ethnic group or religion also can influence the landscape design in residential area. It is supported by Ahmad and Syed Abdul Rashid (2005) that highlights the residential areas can become a medium for establishing social contacts and strengthening positive relationships between the various ethnic and age groups in order create a harmonious neighborhood.

The Natural Factors

The natural factor of a residential area consist of basic elements of nature which include the topography, climatic condition, demand for waters, plants, mountains, forests and other natural forms. All these elements are essential for human lives. The nature and greenery factors can determine a space function in a residential area and make it livable for residents. Ye (2009) states that green space is not only the main outdoor activity for residential but also the space distributed with the highest rates of greenery system. Plants are present as the edge of site and landscape background of the residential area. This greenery environment gives a positive role in creating a relaxed and harmonious environment for the community areas.

Figure 5.2: Landscape greenery and water elements.
(Source: www.malaysiaproperty2u.com, retrieved on 20th March 2013)

The Artificial Factors

Artificial factors refer to man-made structures that consist of various types of building architecture including housing and other small-scale landscapes. They also include service facilities that function as a basic need for the residential environment. According to Ye (2009), the artificial factors can support the natural factors. It is biological environment that center on the composition of natural and artificial environment which can support human lives. Therefore, residential landscape not only provides residents with a scene of nature, but also services through the existing building and space landscape that can serve as peoples' needs in residential area.

The artificial factor can be divided into two categories which are service facilities and landscape elements. In terms of service facilities, Ye (2009) stated that people could use the services and facilities in order to spend their time with leisure and enjoyment. In context of landscape design, the facilities could be divided into several categories such as public facilities, recreational park, cultural activity facilities, playground area and others.

Figure 5.3: Recreational Park (Source: gadhogadho.blogspot.com, retrieved on 20th March 2013)

Figure 5.4: Playground area (Source: www.malaysiaproperty2u.com, retrieved on 20th March 2013)

As for landscape element, the green space and water element can help in shaping the outdoor environment of residential area. Based on the function of green space, it can promote to the distribution of green network and create a different function of the area. Besides that, the used of water element can add an aesthetic and pleasant mood that related to the people emotion. The water element includes fountain, pool, artificial waterfall and others.

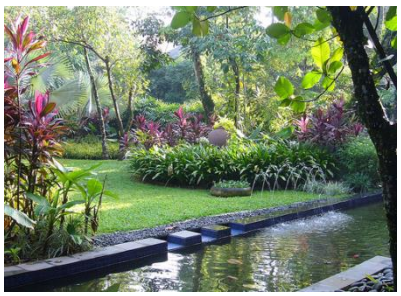

Figure 5.5: Water fountain (Source: www.flickriver.com, retrieved on 20th March 2013)

Figure 5.6: Pond and artificial waterfall (Source: www.jbip.com.my, retrieved on 20th March 2013)

The Cultural Factors

A good environmental design should not only consider natural elements and surface of appearances only, but also need to pay attention to a cultural expression of landscape features. In a residential area, the cultural factors can reflect the atmosphere of community interaction among residents. According to Ye (2009), the interpersonal relations of residents are a crucial part of the social relation. Hence, landscape space and elements can help in establishing a harmonious environment in neighborhood areas.

The landscape design that could be applied in house area is different based on the culture of the ethnic group in Malaysia. According to Ismail (2010), landscape can be influence through religion and belief, values and norms and custom and behavior of the culture. He added, the culture comprised of three major ethnicities namely Malay (Bumiputera) 65.1%, Chinese 26.0% and Indians 7.7%, has a different need in landscape design.

In Malay culture, there are three types of gardens which surround their house which are the front garden, side gardens and the backyard. A combination of native and exotic plants such as flowers and fruit trees enriches the gardens. The example of plants that usually adapt in Malay house are *Michelia champaka* (Chempaka), *Cananga odorata* (Cananga), *Jasminium sambac* (Jasmine), *Durio zebathinus* (Durian), *Nephelium lappaceum* (Rambutan), *Punica gratum* (Pomegranate) and *Musa spp*. (Banana).

In some Malay residential, the used of traditional plants and midwifery's garden is apply especially for women. The garden consists of various traditional plants such as *Vitex negundo* (Lemuning), *Curcuma domestica* (Turmeric) and *Piper sarmentosa* (Kadok). Other than that the existing kitchen garden consist of native plants such as *Manihot esculenta* (Tapioca) and *Cymbopogon citratus* (Lemongrass) give an expression of village environment in residential (Ismail, 2010).

Figure 5.7: Used of herb and fruit plants for kitchen garden and corner lot of Malay residential house

Generally, The Chinese culture landscape is based on believed to bring good fortune for the residents. The red color becomes significant and dominant for them for landscape design. Therefore, they prefer to have plant materials which chosen from species with red colors and artificial plants like 'bonsai' in their garden. For example, the *Cyrtostachys renda* (Red Palms), Bougainvillea and Ixora species are planted in various locations. Besides that, the used of hard landscape such as decorative pot, fountain, sculpture and pond act as important component in Feng Shui for good luck in their believed.

Figure 5.8: Cyrtostachys renda (Red palm) with red trunks are believed to bring good fortune in Chinese culture (Source: www.pacsoa.org.au, retrieved on 20th March 2013)

On top of that, Indian culture believed in scared thing and prefers to have gardens with sacred plant species together with ornamental flowery plants for religious ceremonies. According to Mazumdar & Mazumdar (2008) they believe that "many trees, plants, flowers, fruits and even blades of grass

are sacred". The common species which can be seen in their gardens in Malaysia include *Moringa ptergosperma* (Kacang Kelo), *Saccharum officinarum* (Sugarcane) *Murraya koeginii* (Curry Leaf), and *Ocimum santun* (Thulsi) that supply fruit or leaves for cooking and known as most sacred plants for them. A bunch of fragrant flower such as *Ervatamia coronaria* (Susun Kelapa), *Rosea spp*. (Roses) and *Gardenia jaminoides* (Jasmine) will be tied together on a single string to create floral decorate and placed around during religious rites (Ismail, 2010).

Figure 5.9: Sugarcane planted in Hindu residential communities for Ponggal celebration (Source: Ismail, 2010, p. 93)

The Demographic and Social Factors

The demographic factors need to be concerned in landscape design for residential area. Demographic factors include age of groups, genders, income level, people groups and others. Marcus and Francis (1998) have noted that demographic changes, lifestyle and attitude can contribute to public desire in outdoor environment. Therefore, a specific design based on demographic factors need to be emphasizing in landscape design for residential.

Focusing on age and group of people, there are several types of people that identified used landscape facilities which are children, teenagers, adults, elderly and disabled. According to Marcus and Francis (1998) children prefer to have an activity which they can entertain themselves and play together with other children. For that reason, the tot lot and playground often become a social place for children and at the same time have a seating place where parents can supervise their children. This shows that adults prefer to have leisure activities that can relax their mind and simply enjoy watching their children play. The benches that overlook to the play area are needed for parents more comfortable.


Figure 5.10: Examples of tot lot area for children with seating area (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.5 &12)

As for teenagers their preferences towards landscape design more focus on the activities that can create an excitement and privacy for them. Sense of privacy and eager to learn something new is factors that make teenagers have problems in using landscape design as their preference to do activities (Marcus and Francis, 1998). It is because teenagers are not supervised by adults and the best things that they really like to do is hangout with their friends and play some games. Therefore, the special landscape design such as court games, skating area, cycling path or open recreation space can create a private space for them to do their activities.

Figure 5.11: Cycling path segregate with pedestrian walkway (Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.23)

Figure 5.12: Skate Park (Source: Draf Rancangan Tempatan Majlis Perbandaran Ampang Jaya 2020, 2009, p.2)

For elderly and disabled group, they prefer to have a comfort, safety, security and easy access in their residential area. According to Marcus and Francis (1998) the opportunity for meeting others, enjoy the nature and exercise are equally important to their health and socializing. Thus, the landscape design that connected to their house usually have functional element such as parking, ramps, walkway, railings, signage, guiding tactile that support them in accessibility from one place to another.

Figure 5.13: Facilities provide for easy access for elderly and PwDs user: Parking and ramps
(Source: Garis Panduan Perancangan Tanah Lapang dan Rekreasi, 2010, p.24 &25)

Suitable Landscape Design Characters and Elements for Residential Areas

There are two criterions that people always expect from developers namely a sense of comfort and safety. These criteria can ensure the livability of the space to be utilized by people. In the context of landscape design, a sense of comfort can be obtained through natural factors such as the climate condition, greenery and others. It includes softscape selection namely to have trees with big canopy (*silara*) in order to create a cool microclimate (*Figure 5.14*). They can also be appreciated for aesthetic values either for their smell, color or fruit. Besides that, plants can also help in absorbing noise as well as breaking strong wind (*Figure 5.15*). Apart from that, in terms of artificial factors, the effect of water flow can also induce comfortable situation for people to utilize it.

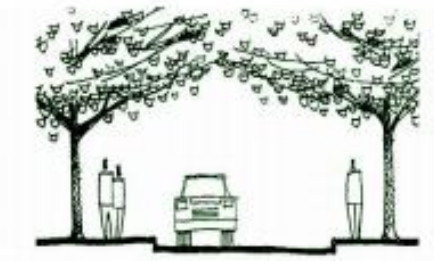

Figure 5.14: Trees with big silara can promote shaded environment

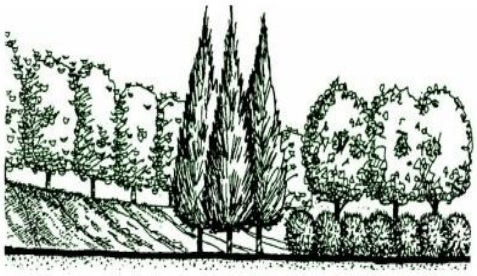

Figure 5.15: Buffer plants for noise absorbance

As for safety, plants act as the edges of space which can separate between public and private spaces. This will help owners to control people movements around their houses. In the context of house compounds, the placement of public areas should be located where the owners can see them. This also helps to in promote the concept of “eye on street” since every resident can manage to look out for strangers. Therefore, landscape design characters and elements are not only for providing a sense of nature but also for providing a sense of safety. This will serve the people in the residential areas (*Figure 5.16*).

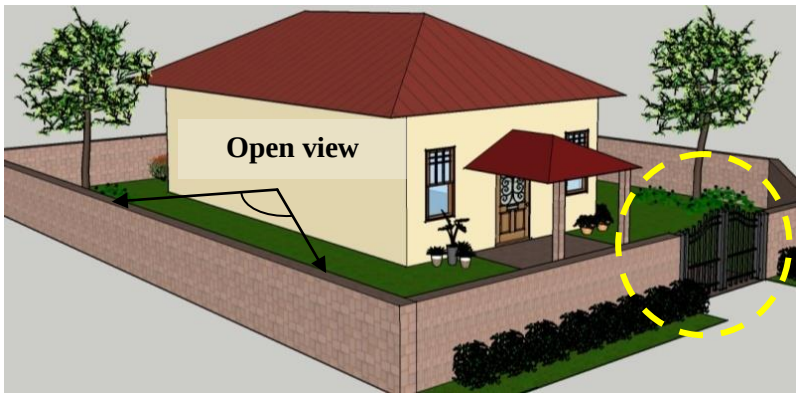

Figure 5.16: Fence and plants can be used as buffers to create a sense of safety for residential property. Besides that, the concept of “eye on street” can help residents to identify strangers and prevent crimes incident

It is also indicate the suitable landscape design characters and elements for three type of houses, terrace, semi-D and bungalow house. The character and element that suitable to be applied in residential area consist of softscape and hardscape in landscape design. Details of the requirements are discussed in the table below.

a) Softscape Characters and Elements

Softscape elements that have identified in residential are plants that consist of trees, shrubs, climbers and groundcovers. The used of plants is varies in term of form, arrangement, fruit, flower, and color. The used of plants is different based on their function to the residential. The list of character and function of plants is presented in *Table 5.1*.

Table 5.1: Character and function of plants in residential

Space/area of residential	Scientific name	Common name	Character/function of the plants
Street planting	*Tabebuia rosea* *Mimusops elengi* *Peltophorum pterocarpum* *Lagerstroemia speciosa* *Mangifera indica* *Terminalia catappa*	Tecoma Bunga Tanjung Yellow flame Rose of India/Bungor Pokok Mempelam Ketapang	-Create visual character with colorful plants -Provide shades for pedestrians by spreading form of trees
Recreational area	*Khaya senegalensis* *Samanea saman* *Araucaria bidwillii* *Tabebuia rosea* *Casuarina enguistifolia* *Pelthoporum pterocarpum*	Khaya Hujan- hujan Bunya-bunya pine Tecoma Rhu Batai laut	-Produce a shade through big silara tree -Give a sense of direction by arrangement of plants
House compound	*Musa spp.* *Syzygium spp.* *Crytostachys lakka* *Bougainvillea spp* *Jasminum sambac* *Bambusa vulgaris*	*Pisang* *Jambu* *Pinang merah* *Bunga kertas* *Melur* *Buluh Pagar*	-Fruit and edible plants -Give an aesthetic value and welcoming gesture through palm species and fragrance
Frontage area	*Mangifera indica* *Lagerstroemia speciosa*	Pokok Mempelam Rose of India/Bungor	-Fruit and edible plants -Give shade by big silara tree
Buffer area	*Mimusops elengi* *Ficus roxburghii* *Hopea odorata* *Baphia nitida* *Licuala grandis*	Bunga Tanjung Beringin Merawan siput jantan Baphia Palma fan	-Create a buffer to segregate public and private space

For terrace type of houses, the character of softscape that can be applied is minimalist in scale because of the limited space for it front and back yard area. Therefore, based on analysis, only certain type of plants such as palm, medium structure trees, shrubs, ground cover and climber can be applied in order to create a landscape environment for the space.

In terms of semi-D and bungalow type of house, the space that has been provided for landscape design is enough for the resident to apply variety type of plants in their residential space. The multi-level arrangement of plants is encourage adapting in semi-D and bungalow type of house to create a harmonious greenery environment of the house. The specific plants that suitable for terrace, semi-D and bungalow house have been identified in *Table 5.2*.

Table 5.2: Example of character and function of plants for terrace, semi-D and bungalow house

Space/area of residential	Scientific name	Common name	Character/function of the plants
Terrace house			
Front yard	*Mangifera indica* *Mimusops elengi* *Lagerstroemia speciosa* *Roystonia regia* *Plumeria spp.* *Axonopus compressus*	Pokok mempelam Bunga Tanjung Rose of India/Bungor Royal palm Kemboja Rumput laman	- Fruit and edible plants -Give an aesthetic value and welcoming gesture through palm species, fragrance and color -Groundcovers for open lawn
Back yard	*Cymbopogon citrates* *Curcuma longa* *Capsicum frutescens*	Serai Kunyit Cili padi	- Fruit and edible plants for purpose of kitchen garden
Semi-D and bungalow house			
Front yard	*Mangifera indica* *Mimusops elengi* *Lagerstroemia speciosa* *Roystonia regia* *Crytostachys lakka* *Plumeria spp.* *Axonopus compressus*	Pokok mempelam Bunga Tanjung Rose of India/Bungor Royal palm Pinang merah Kemboja Rumput laman	- Fruit and edible plants -Give an aesthetic value and welcoming gesture through palm species, fragrance and color -Groundcovers for open lawn
Side yard	*Nephelium lappaceum* *Axonopus compressus* *Adenumobesum* *Bougainvillea spp* *Jasminum sambac* *Bambusa vulgaris*	Rambutan Rumput laman Desert rose Bunga kertas Melur Buluh pagar	-Fruit and edible plants -Groundcovers for open lawn -Buffer
Back yard	*Cymbopogon citrates* *Curcuma longa* *Capsicum frutescens* *Cocos nucifera*	Serai Kunyit Cili padi Kelapa	- Fruit and edible plants for purpose of kitchen garden

b) Hardscape Characters And Elements

Hardscape characters and elements of landscape can be identified through man-made features include spaces, patios, benches, proportion, pergolas, paved and other element. Most of type of houses prefers to have benches and paved as hardscape element in house compound. It is because these two elements becomes a basic need of hardscape that have in most residential area in Klang Valley. The material of paved such as granite, tile, bricks paver, pebble wash and broom finish create a variety of background for the floor surface. The function of hard surface for house area is important is to create sense value to landscape design and give a sense of direction for the people as welcoming entrance for the house.

Figure 5.17: Example of paved finishes: Brick paver, concrete paver and tiles that applied in most residential area

Conclusion

People are now striving to have a better living environment in order to achieve higher standard of quality of life. As we all know, landscape design can create balance between environment and man-made structure. Thus, it is very important to have a balanced environment since the physical form of the area may effect on human behaviors and activities as well as biodiversity. Therefore, the development should contemplate every social, cultural, economic, and environmental aspect in order to fulfill the needs of people in the present and for future generations.

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Chapter 6

Principles of Plant Selection for Residential Landscape Design

Plants are used as materials or building blocks in order to apply the principles of design. According to Williams and Tilt (2006), plants offer qualities that help to direct foot traffic in the landscape, moderate the environment around the home, hide objects, or lead the eye and stimulate other senses like smell and touch. Plants should be used together to enhance the best features of our property. The basic elements that plants offer to the landscape in order to express the principles of design are form, texture, and color (Williams and Tilt, 2006).

a) Plants grow in a characteristic general form determined by genetics or the environment. **Form** generally refers to the silhouette or outline of the plant (*Figure 6.1*). A plant can be selected for the way its form can be used in the landscape to complement the house or achieve the principles of design. For example, a potted plant can be used under a low window. Rounded trees or shrubs can be used with oval, spreading, or weeping plants in a pleasing border. Conical plants should carefully be used as they tend to dominate a landscape because of their prominent form.

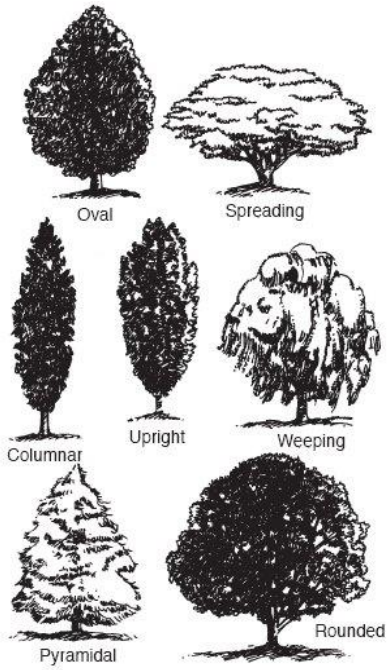

Figure 6.1: Examples of forms in landscape plants (Source: Williams and Tilt, 2006)

b) Texture can refer to a plant's feel, but generally in the landscape visual texture is the main consideration. Large leaves cast distinctive shadows in the plant canopy, offering a coarse appearance. Finer textured foliage offers a more uniform shade pattern. Texture can be used to affect the sense of scale. A fine-textured plant used near the viewer with a coarse-textured plant farther away gives a subtle sense of decreased distance. It makes your property or structure seem smaller.

c) Color has a strong effect in the landscape; color should be used with discretion. Landscape should not be planned only with by using of flowering plants in mind. 80 to 90 percent of the plants should be used for foliage effect. Some varieties in foliage color are needed, but green provides the continuity as well as the backdrop for carefully used color. Color should be used to focus attention on an area of the landscape and to complement the house. Colors should complement each other as well. Similar hues should be used together. Mass colors should be used, and should not be alternated. Alternating breaks up visual sequence and is distracting.

Environmental factors have a great influence on plant placement and choice (Williams and Tilt, 2006). An attractive, healthy plant placed in an unsuitable site may have poor growth, disease, and insect problems, or it can die. This might occur from too much shade or sun, poor water drainage, or poor fertility. There are three main principles of plant selection for residential landscape design which are:

a) Select plants suited to local conditions: plant local seeds as much as possible to improve survival rate and facilitate maintenance and future management.

b) Functional priority: high trees should be planted at an adequate distance from buildings and preferably not on the south side of buildings because of daylight and ventilation constraints.

c) Harmony and unification: various plants and corresponding configurations should be adopted to create artistic landscapes according to different characteristics of every space. Residential communities need uniform types of plants to form the greening style of a whole region. Human culture, history, and environment should all be taken into account for harmony (Williams and Tilt (2006) and Guo et al. (2010).

It is necessary to achieve harmony between the ecological environment and living conditions in landscape design land (Guo et al. 2010). A reasonable configuration of plants is required based on the heliophilicity of plants for a healthy development in accordance with different sunshine and shading conditions in various residential areas undergoing planning and construction. This approach should influence the utilization of the buildings and environment.

Residential landscapes can also provide aesthetic surroundings for human living as well as for wildlife habitat, protection against soil erosion, and microclimate control through shade and windbreaks (Martin et al., 2003). Also residential landscapes, though largely a human construct, are the main venue through which people come into contact with nature on a daily basis. The ecological functions provided by green spaces will depend on their configuration and composition (Smith et al., 2005). Also, larger rear residential gardens would expand the options available to garden owners, encouraging them to have a broader range of land covers and possibly greater extents of individual land covers, as well as different types of vegetation (for example, larger trees). Though some of these ecological benefits are difficult to quantify, landscape plantings can increase home property values by up to 20% or and are a sought-after attribute when individuals consider the purchase of a home (Martin et al., 2003).

Besides that, plants arrangement gives a beneficial impact for the residential area in terms of security and aesthetical value as well as creates space for activities for the resident. Mohd Rejab (2000) explains that plants provide a several functions for the area residential especially urban areas. Since urban areas are full of hard surface, this leads to high temperature to the surrounding areas. Therefore, shaded trees are important to protect the residential area from sun radiation and provide a comfortable environment also.

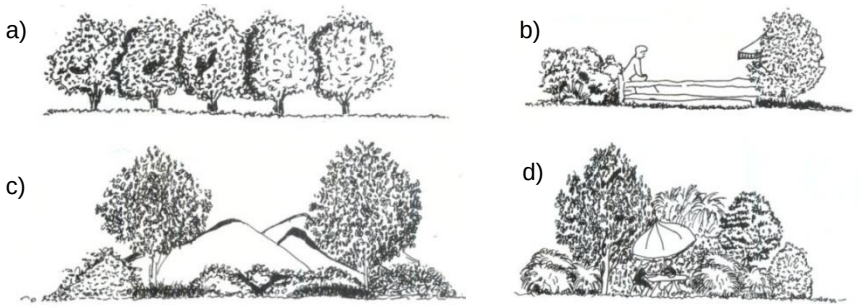

Figure 6.2: Several functions of plants: a) as a barrier b) as a frame for scenic scenery c) to provide a sense of privacy d) as a protection from sun radiation
(Source: Robinette, 1972)

Smith et al. (2005), in their study on residential areas in Sheffield, U.K. discover that most urban areas in the UK comprise four principal types of dwellings: blocks of apartments (many adjoining dwellings, on more than one level), or terraced (two or more adjoining dwellings), semi-detached (one adjoining dwelling), and detached (no adjoining dwellings) housing, usually built in rows. Housing nearly always incorporates a private garden (*Figure 7.3*), whereas apartments are much less likely to possess either a communal or a private garden.

Smith et al. (2005) also add that rear garden size plays an overwhelming role in determining the internal composition of domestic gardens in the UK and, hence, the provision of potential resources for wildlife. They add that the role of garden size is significant because it affects garden resources in multiple ways: (a) larger gardens supported more land covers; (b) specific land covers – the number of trees above 2 m, vegetable patches, and compost heaps or bins – were more likely to occur in large gardens; and (c) the extents of more than three-quarters of the land covers recorded in gardens, as well as vegetation cover, increased with garden area.

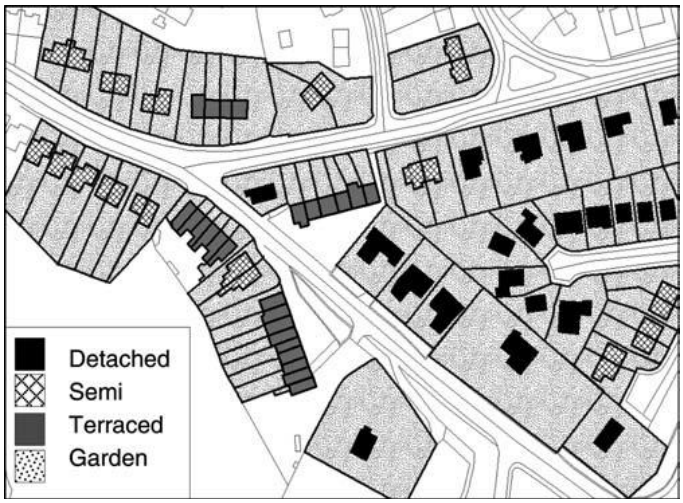

Figure 6.3: Examples of typical UK house types with associated garden space: detached, semi-detached and terraced dwellings in Sheffield. Thick grey lines show parcel boundaries. Property outlines were traced from the Ordinance Survey Landline data (Crown Copyright Ordnance Survey. All rights reserved). (Source: Smith et al., 2005, p. 238)

In general, use of plants or trees for house developments has become an important aspect that needs to be considered in order to create a pleasant environment. Meanwhile, the use of palm is suitable for house area with minimum space. It is stated in the Jabatan Landskap Negara (JLN) that there is a criteria for planting in residential areas.

- In order to create a sense of place for residential areas, it is suggested to plant only one type of plant in the entrance and street planting of the residential in order to create a sense of belonging for the residential area.
- Use a plant with colorful flower at the entrance of a residential area as a welcoming gesture and provide shaded trees along the street area.
- The proposed plants need to have an interesting form and shape, to have a tape root, to not be easily wrecked, to not have a ragged and poisonous and is easy to maintained.
- The buffer plants are suggested as natural edges or fences for residential areas.
- Multi-sizes and types of plantings are suggested in the buffer area of residential areas.
- Use a shaded tree for pedestrians. Use plants that have tape root that cannot damage the structure of pedestrian walkways and drainages.
- Used edible plants for the backyard as kitchen garden.

There is also a criterion to be considered in applying a sofscape element in landscape design for residential areas. It is stated in the JLN, that the first criterion is the size of the plants. Basically, trees are planted based on three types of plant sizes which are main trees, shrubs and ground covers;

Table 6.1: Type of plants based on size and height

Categories	Height of tree	Examples
Structure Tree		
i. Tall	> 15.0m	*Samanea saman*/Rain Tree
ii. Medium	10.0m – 15.0m	*Cinnamomum iners*/Wild cinnamomum
iii. Short	4.0m – 10.0m	*Bauhinia blakeana*/Pokok Tapak Kuda
Shrub		
i. Tall	1.5 – 4.0m	*Cassia bifiora*/Bushy cassia
ii. Medium	1.0 – 1.5m	*Hibiscus spp.*/Hibiscus
iii. Short	0.5 – 1.0m	*Ixora sunkist*/Siantan
Groundcover	< 0.5 m	*Arachis pintoi*/Yellow Pintoi plant

(Source: Garis Panduan Landskap Negara, 2008,p.15)

Besides that, the sizes of plants are also influenced by density, plant growth and canopy *(silara*) of crown. There are three types of silara identified in the JLN:

Table 6.2: Type of plants based on silara

Categories (Silara)	Height of tree	Examples
i. Big	> 15.0m	*Delonix regia* /Semarak Api
ii. Medium	10.0m – 15.0m	*Filicium decipiens*/Fern Tree
iii. Small	<10.0m	*Erythrina glauca*/Dedap

(Source: Garis Panduan Landskap Negara, 2008, p.15)

Figure 6.4: Type of silara and height (Source: Garis Panduan Landskap Negara. 2008, p.15)

Table 6.3: Type of plants based on growth rate

Type of tree	*Growth Rate*
Structure Tree	
i. Fast Growth	> 2.5m / year
ii. Medium Growth	1.5m – 2.5m / year
iii. Slow growth	< 1.5m / year
Shrub	
i. Fast Growth	Mature : < 3 years Mature : 3- 6 years
ii. Medium Growth	Mature : > 6 years
iii. Slow growth	
Groundcovers	In general, it only takes < 1 years to mature

(Source: Garis Panduan Landskap Negara, 2008, p.17)

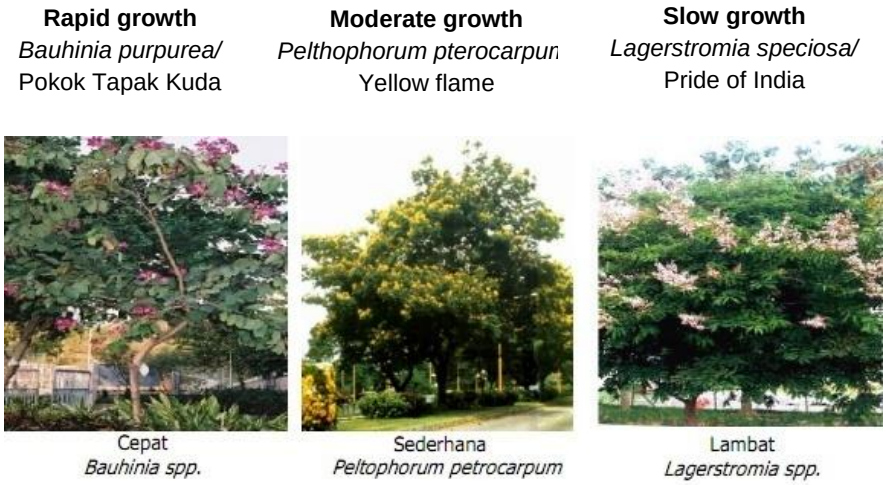

Figure 6.5: Plants growth rate (Source: Garis Panduan Landskap Negara. 2008, p.17)

There are three types of silara of plants that have been identified which are compact, modest and exposed. The type of silara can influence the landscape design of a residential development.

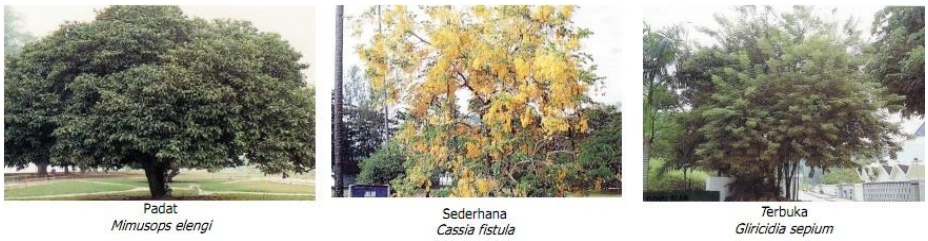

Figure 6.6: Density of plants (Source: Garis Panduan Landskap Negara, 2008, p.16)

Other than that, the selection of plants also can be influenced by the type of plants, such as trees, shrubs, palms, climbers or groundcovers. Basically, basic plants, such as potted flower/shrub and palm are planted in the limited space of a house compound because the sizes of the plants are suitable for compact small spaces. Meanwhile, edible plants, such as fruit trees planted as a source of food for residents.

In addition, shaded trees are important for residential developments because they can produce a cooling environment for residential areas. The distance for planting is different for each type of housing area. Referring to the standard as stated in JLN, a terrace house is not less than five meters and the location of planting is between two lots of houses. Meanwhile, for type of Semi-D and bungalows, the planting distance between each are a minimum of two branches of trees for each unit. Besides that, there are several types of shaded trees that can be used in residential areas, most of the proposed shaded trees are chosen because they are easy to plant, grow and maintained. Shaded trees can be divided into two basic types which are big or medium. JLN classifies the size of trees based on the planting distance of each type of shaded trees.

Figure 6.7: Type of shaded plants species with medium size canopy (Source: Panduan Penanaman Pokok Teduhan, 2008, p.27)

The size of the tree is also influenced by the size of the canopy that can provide a shady environment for pedestrians.

Table 6.4: Planting distance for big type of shaded trees and medium size of shaded trees

Tree		Scientific Name	Common Name	Planting Distance
Structure Tree	1	*Alstonia angustifolia*	Pulai	6 – 8m
	2	*Delonix regia*	Semarak api	6 – 10m
	3	*Eugenia grandis*	Jambu laut	6 – 10m
	4	*Khaya senegalensis*	Khaya	6 – 12m
	5	*Millettiaatro purpurea*	Tulang daing	6 – 10m
	6	*Samanea saman*	Hujan-hujan	6 – 18m
	7	*Swietenia macrophylla*	Mahagoni	6 – 12m
	8	*Tabebuia rosea*	Tecoma	6 – 10m
	9	*Hopeao dorata*	Merawan Siput Jantan	6 – 10m
	10	*Pelthoporum pterocarpum*	Batai laut	6 – 10m

(Source: Panduan Penanaman Pokok Teduhan, 2008, p.26)

Table 6.5: Planting distance for big type of shaded trees and medium size of shaded trees

Tree		Scientific Name	Common Name	Planting Distance
Tree	1	*Andira inermis*	Kedondong hutan	6 – 8m
	2	*Azadiracta indica*	Mambu	4 – 8m
	3	*Bucida molineti*	Spiny black olive	4 – 8m
	4	*Dalbergia oliveri*	Tamalan	4 – 8m
	5	*Lagerstromia speciosa*	Bungor	4 – 8m
	6	*Bauhinia blakaena*	Tapak kuda	4 – 8m
	7	*Ptelecarpa lamponga*	Tembusu tikus	4 – 8m
	8	*Dillenia indica*	Simpoh india	4 – 8m

(Source: Panduan Penanaman Pokok Teduhan, 2008, p.26)

Figure 6.8 shows the examples of shaded trees with many forms of canopies and shapes that are suitable for residential areas.

Figure 6.8: Type of shaded plants species with bigger size canopy (Source: Panduan Penanaman Pokok Teduhan, 2008, p.27)

In addition, according to Arnold (1993) there are five factors that contribute to the development of good street planting design, namely density, order, diversity, scale and form, and detail of plants:

Density: Can be understood as trees widely spaced when planted to develop a spreading crown form in order to create a shade for pedestrians.
Order: Determined by the arrangement of different species of plants used randomly, naturally or straight row in arrangement.

Diversity: Plant a variety of type of species based on the principle of ecology

Scale: Use an appropriate scale of trees to create a residential character and environment

Form and detail: The crown shape and color of the plants play an important role to create an image and sense of place for residential areas.

Conclusion

Plants can be used functionally to solve some of the environmental problem of the residential areas. This may include the need for privacy, protection from glare or direct sunlight into windows, or creating shade for the users. The contemporary approach to planning a residential landscape incorporates a combination used of plants. Without a doubt, plants can become a foundation to outdoor environment. The diversity of plant species and the multitude of varieties function of plants can produce a creative and interesting landscape composition.

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Chapter 7

Perceptions towards Landscape Design for Residential Areas

This chapter presents the people's perception towards landscape design in residential areas. The data obtained from field studies, deriving and synthesizing data from surveys collected at selected residential areas in Klang Valley. The framework of this chapter is divided into four main sections comprising the planning and design of the neighborhood, space utilization of house compounds, importance of landscape design in residential areas and selecting a prospective dream house. The basic need and preferences on landscape design in residential areas is hope can be viewed at the end of the chapter.

Planning and Design of Neighborhood

It is important to obtain the residents' perceptions on the macro planning and design of housing areas. Firstly, the perception of people toward planning and design of a neighborhood can be evaluated through the level of comfort. Survey indicates that people prefer to have a good location in order to feel comfortable living in residential areas. A good location of the house can be defined based on several criteria such as availability of public facilities, easy accessibility, located near to working places, commercial areas and good arrangement of residential areas. Other than that, the availability of landscape facilities and space also can support people to choose their residential areas. It is because landscape is an element that gives sense to the surrounding. Therefore, it can be assumed that the strategic location of residential houses is important to determine the level of comfort of the residential.

In order to obtain a meaningful finding, one sample t-test has been conducted to discover the significant differences on these criteria to evaluate the level of comfort in the residential areas. Based on the results shown in *Table 7.1*, there are six factors which showed significant differences:

Table 7.1: Significant differences of the level of comfort

Level of comfort		M	*t*	*df*	p
a.	Location of residential area	3.77	6.825	990	.000
b.	Perception on layout of neighborhood	3.64	2.103	991	.036
c.	Color scheme for the whole residence	3.47	-4.411	985	.000
d.	Access to amenities	3.67	2.721	983	.007
e.	Landscape area	3.56	-.929	981	.353
f.	Balance of land use	3.51	-3.110	984	.002
g.	Landscape design	3.51	-2.817	981	.005

The probability (p) value obtained is less than the predetermined α = 0.05; the level of comfort that can be determined by the criteria such as the location of neighborhood (t = 6.825, p = 0.000), color scheme for the whole residence (t = -4.411, p = 0.000), access to amenities (t = 2.721, p = 0.007), balance of land use (t = -3.110, p = 0.002), landscape design (t = -2.817, p = 0.005) and perception on layout of neighborhood (t = 2.103, p = 0.036). Therefore, it is proven that the level of comfort in residential areas can be evaluated by all these six criteria. Meanwhile, landscape area shows a less significant result (t = -0.929, p = 0.353) for evaluating the level of comfort in residential areas. Based on the analysis above, it can be assumed that the level of comfort of residential areas can be influenced by three main factors which are the location, layout and accessibility of the residential areas.

Second, the planning and design of residential areas also can be assessed by the satisfaction level of open spaces. Results show that most of the people were satisfied with the level of open space that provided in their residential areas. However, there is a need for the improvement on the quality of the open spaces in order to experience a better living environment. In a community area such as Klang Valley, the residents of the housing areas consist of a variety group of people. In this study, the satisfaction level on the open space provided seems related to the respondents by different age groups. *Figure 7.1* shows the relationship of open spaces with the age groups. Overall, the respondents considered the landscape open space of their housing areas as good.

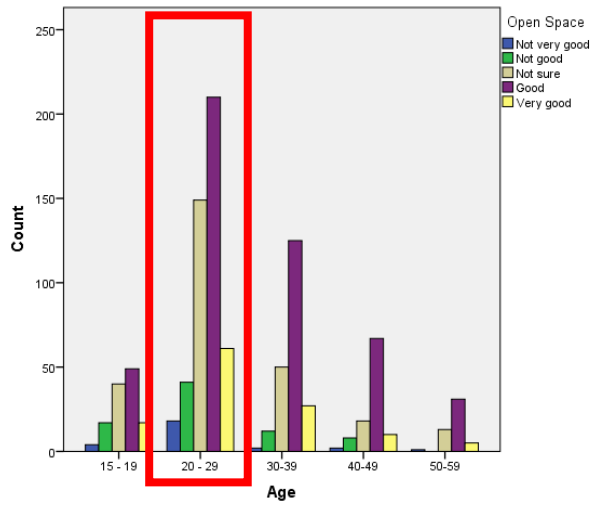

Figure 7.1: Level of satisfaction between open space design and age groups

However, according to the cross tabulation analysis, the respondents at age 20-29 years have a higher satisfaction level toward the open space design in their residential areas. These data show that adults are the users who are satisfied with the existing open space provided in their areas. This might be due to the fact that the open spaces provided have fulfilled their needs in their living environment. People in the 20-29 age groups normally work in Klang Valley and they use the open space during weekends and public holidays.

Thus, it is verified that the satisfaction level of open space and elements provided are influenced by age group. According to Fengxia and Wenbao (2011), there are different ages, occupations, incomes, and health conditions of people living in the same residential area, so that landscape design must meet the needs of different groups in order to ensure that each resident enjoy the shared area and environment fairly. For this reason, designers should understand the different needs of different groups. The requirement and criteria of landscape design must suit all age groups, especially the disabled and older people.

Third, existing plants are important for the existence of a tranquil environment of residential areas. It is also become a part of the planning and design of residential areas. Based on survey, people satisfied with the existing plants that have in their residential. Thus, it can be summarized that most of the respondents were satisfied with the placement of the existing plants in

their residential areas but improvements toward the placement and the function of the trees in the residential areas are needed in order to create a healthy environment.

Apart from that, the selection of the plants for residential areas is needed in order to create an identity and show the local characteristic of plants of the residential areas. Therefore, landscape design can increase the value of the property. According to Williams (2006), well-placed trees, shrubs, turfs, and construction features increase the uses of the property. A little shade in the right place, a little sun in another, a place for the kids to play, a private patio, pool, or deck, all add to the enjoyment of being outside for the residents.

The availability and condition of landscape design criteria is also significant in planning and designing good residential areas. In order to obtain a meaningful finding, a cross tabulation analysis was conducted to discover what type of landscape design criteria are important based on type of house in residential areas. *Table 7.2* indicates that terrace houses (M = 4.36) and semi-D houses (M = 4.41) need more comfortable landscapes to create a better living environment. However, the sense of security and safety is needed for bungalow type of house (M = 4.30) in landscape design for their house.

Table 7.2: Mean value of landscape design criteria for type of houses

Landscape design criteria		**Terrace house**	**Semi-D house**	**Bungalow house**
a.	Comfort	4.36	4.41	4.25
b.	Feeling of safety and security	4.30	4.31	4.30
c.	Privacy	3.88	3.73	3.89
d.	Sense of belonging	4.01	3.80	4.02
e.	Space to socialize	3.90	3.91	3.88
f.	Courtyard	3.95	3.82	3.94
g.	Recreation	4.07	3.85	4.03
h.	Sport	3.96	3.82	3.93
i.	Cultural	3.75	3.62	3.72
j.	Community	3.88	3.82	3.88
k.	Therapeutic garden	3.59	3.66	3.59
l.	Herbs garden	3.46	3.54	3.46
m.	Others	3.68	3.67	3.65

This result is in line with a study by Tan (2011), who states that one of the important characteristics in compound neighborhoods is the added security features. Snatch thefts, assaults and rampant break-ins in Klang Valley's urban areas make house buyers a little more concerned about their personal security. Thus, the implication of landscape design, such as fences

and buffers, can create a sense of security and safety for the residential environment. The safety and security can lead to a comfortable environment for the user.

Type of landscape space also needs to be considered in planning and design residential areas. The types of spaces that usually provided in residential areas are playgrounds, open spaces, neighborhood parks and jogging tracks or pedestrian walkways. Survey indicates that, most of residential areas have more than one landscape space within it. This shows that the respondents used the space for many types of activities. This finding is supported by Blaine et al. (2012) who state that outdoor residential environments are extremely important to homeowners, who tend to view their yards as serving multiple functions: a place to observe nature and to socialize as well as a place of beauty and recreation. Thus, the existing landscape space in a neighborhood is important for respondents to utilize and create community interaction among them. Hence, the utilization of landscape space will be discussed in the next section.

As a summary for this sub-chapter, the planning and design of a good neighborhood area can be influenced by several factors which are level of comfort, satisfaction level of open space provided and existing plants in neighborhood areas. All the factors can contribute to a good planning and design of a neighborhood area. In terms of the level of comfort, this can be determined through suitable location, overall layout, accessibility to facilities and type of land use of the residential areas.

For the satisfaction level of open space provided, this can be influenced by suitable location of open space area as well as the condition of facilities and amenities provided in order to attract more neighborhood members to use the open spaces. A satisfactory and good open space condition can encourage community interaction among residents. According to Wilkerson (2005), a community's park system can provide passive and active recreational opportunities close to home for a diversity of residents and visitors. Neighborhood and community parks serve immediate urban area needs. The neighborhood park is the mainstay of a community's park system. These parks provide recreation and open space benefits within walking distance of the residences they serve. Community parks serve a larger area of the community or groupings of neighborhoods.

Furthermore, in terms of existing plants provided in residential areas, suitable types of plants can provide benefits in terms of giving shades, creating an aesthetic value and giving a sense of direction, especially for the street type of planting. This shows that existing plants are important in order to keep the environment of the place cool and give a sense of place for the

residential areas. According to Arnold (1993), trees can be used as living building materials that can create spatial boundaries for the place. Besides that, the arrangement of trees can make the wall and ceiling of outdoor rooms and the structure and texture of trees give a sense of scale for the residential environment.

Space Utilization of House Compounds

This section provides information on the space utilization of house compounds in the residential areas. It is important to discover the type of space needed by users in their houses and their opinions regarding their existing house compounds. Based on the survey (*Table 7.3*), 49.7% of respondents agreed that they have enough landscape space in their house compounds and 55.1% agreed that their landscape design has fulfilled their current needs for their housing areas. Therefore, it can be seen that respondents' satisfaction level toward landscape space in their house compounds is moderate and the enhancement of landscape space in their house compounds is needed in order to achieve a better outdoor living environment.

Table 7.3: Opinion on landscape space in house compounds

Description			Frequency	Percentage %
a.	Enough landscape space in house compound.	Missing	14	1.4
		Yes	497	49.7
		No	489	48.9
		Total	1000	100.0
b.	Landscape spaces within house compound fulfill current needs.	Missing	16	1.6
		Yes	551	55.1
		No	433	43.3
		Total	1000	100.0

In terms of the utilization of house compound, *Table 7.4* shows most people that occupied terrace and bungalow house used their compound more for relaxing and drying clothes. Meanwhile, semi-detached houses prefer to have relaxing and playing for activity in external compounds.

Table 7.4: Mean value for the uses of external house compound

Type of houses		Gardening	Relaxing	Picnic	Playing	Drying Clothes	Others
Terrace house	M	3.28	3.65	2.87	3.62	3.75	3.60
	N	779	779	777	778	780	309
	SD	1.247	1.057	1.258	1.079	1.036	1.033
Semi detached house	M	3.35	3.88	3.16	3.95	3.78	3.94
	N	74	74	74	74	73	35
	SD	.985	.682	1.194	.738	.932	.802
Bungalow house	M	3.81	3.93	3.31	3.89	3.98	3.70
	N	105	105	104	104	103	56
	SD	1.057	.993	1.166	.869	.816	.971
Total	M	3.35	3.70	2.94	3.68	3.78	3.64
	N	958	958	955	956	956	400
	SD	1.219	1.031	1.251	1.041	1.009	1.009

This means that most of the house compound areas were not fully utilized with landscape design and elements. Besides that, the factors of different sizes of space for external compounds create a limitation for the activities for the users. For that reason, a well-conceived, properly installed and well maintained landscape designs are needed for residents to use their house compounds in a better way. It can also add value to their properties and also their quality of environment.

The utilization of house compounds can be influenced by the age of the respondents. This is because different types of age tend to have different interests and activities in their external compound houses. Therefore, a cross tabulation analysis was conducted in order to discover respondents' preference for the utilization of house compounds based on respondents' age.

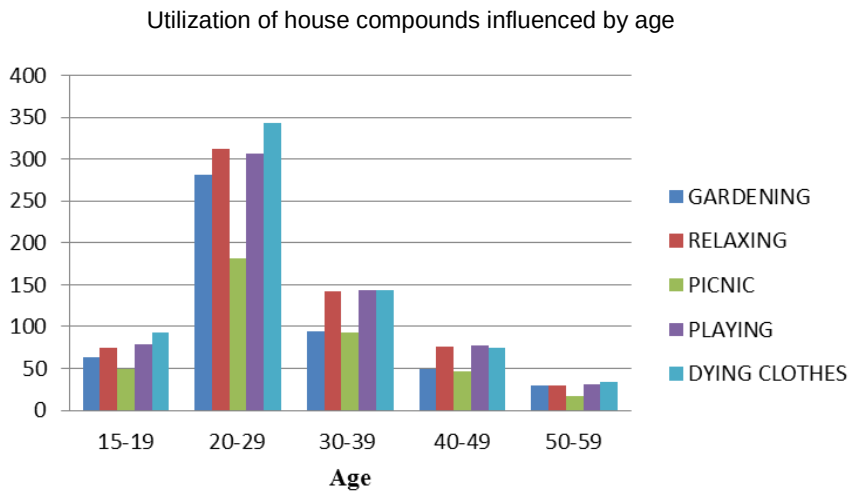

Figure 7.2: Space utilization based on respondents' age

Figure 7.2 shows that respondents aged 20-29 have been more active in conducting their house compounds more than other age groups. However, they prefer to dry their clothing in their house compounds. This shows they have utilized their house compounds with service activities rather than recreational activities such as relaxing, picnicking, gardening and playing. They might prefer to have recreation areas in public recreation areas or playgrounds because there are bigger spaces provided for them in carrying out the activities. It is also because the limited house compound spaces can be utilized for other activities, such as service activities.

Blaine (2012), states that observers were able to infer homeowners' commitments to their locale by observing the exteriors of their homes. Thus, lawns can be seen as a public expression of a person's character and values. People may use their lawns to demonstrate expertise, care, and social status as well as simply their desire to be good citizens and neighbors by upholding community norms. Therefore, landscape design is the best preference for the neighborhood to express their utilization of space in their house compounds.

The preferences type of space is also important in order to identify what type of activities can be utilized in residential areas. Results indicate that people prefer to utilize front yard areas of the house rather than other green spaces, such as the backyard, side yard, field or garden. It shows that the front yard has become the most important space desired by a majority of the respondents due to its function as the welcoming entrance for house compounds in residential areas

This finding also supports a study by Williams (2006) who states that the front yard usually becomes a visible and public area for the house compounds. The use of simple and uncluttered landscape designs needed to make the house the central focus of the landscape area. Therefore, significant landscape design, such as planting and walks that can direct people to the public entrance of the house, must be applied in order to make this area more functional and provide aesthetic value to the residence. The result also can be assumed that different types of house have a different size of compound areas (plinth areas). Thus, the different sizes of plinth area influence the preference of green spaces that have in house areas. Terrace type of house has a smaller plinth area rather than semi-D and bungalow type of house. It forms a limitation of space which can apply with landscape design.

Landscape Design Elements

There are many types of landscape design elements that are in residential houses. The landscape elements consist of hard and soft landscape elements such as fountains, gazebos, plants, benches, pergolas, trellis, planter boxes, rock gardens, lawn areas and others. Survey indicates that people prefer to have soft elements such as plants or trees to be applied in their house. It is because the importance of trees in the residential areas can lead to a cooling environment in the surrounding areas. According to Guo et al. (2010), a multi-level greening through a combination of trees, bushes and grasses should be adopted to form a greening system with rich levels and favorable ecological benefits to the environment. In addition, Williams (2006) adds that plants offer qualities that help to direct foot traffic in the landscape, moderate the environment around the home, hide objects, or lead the eye and stimulate other senses, such as smell and touch. Plants should be used together to enhance the best features of the property.

Other than that, it can be seen that the needs for plants have become the highest priority for respondents for their house compounds. Plants can give more beneficial impacts for the residential users. The function of plants for residential areas can be identified for street plantings, buffers, shading elements for pedestrians, creating aesthetic values that can create an identity for the residential areas and forming a cooling environment for the surrounding neighborhood. According to Mohd. Rejab (2000), plants provide several functions for the residential areas especially the urban areas. With the condition of urban areas that are full of hard surfaces, this leads to high temperature to the surrounding areas. Therefore, shaded trees are important for protecting residential areas from sun radiation and provide a comfortable environment for the residential areas.

Enhancement of Landscape Design

In order to enhance the landscape design and make a better living outdoor environment, people and public opinion can become a best medium to identify what they really need in terms of landscape design in their residential areas. Based on the feedback, most of the people supported the idea to enhance the space of landscape design, facilities for activities, natural landscapes and softscape elements, hardscape elements, use of plants and contemporary landscapes in residential areas. This shows that the respondents needed to enhance their landscape surrounding areas because they influence their lifestyle and living environment.

This result supports a view by Ye (2009) who states that the actual residential area needed the three basic elements which are the natural factor, the artificial factor and the cultural factor for their neighborhood areas. The natural factor includes the topography, climate condition as well as residents' demand for plants, water, and forest. Meanwhile, in terms of the artificial factor, this refers to various building bodies, architecture including housing, sculptures, service facilities and other small-scale landscapes. Lastly, for the cultural factor, this refers to the social relations and interactions between neighborhoods that can create a better living environment.

As a summary for this section, people were satisfied with the landscape design in their house compounds. However, some enhancement and additional landscape elements need to be applied in order for them to live in more comfortable and health. House compound space can become a space that provides tranquility and calm for family members. According to Ye (2009), space compound is the main space in a residential area. It includes roads, green spaces and squares. In other words, the comfort and harmonious environment are the basic requirements of a high quality landscape design. Hence, a suitable landscape design must suit its current situation so that residents can live in a better neighborhood environment.

Importance of Landscape Design in Residential Areas

Public preferences on landscape design in residential houses indicate that it is important to have landscape in order to prevent crime, help in traffic problems, develop a conducive environment and encourage social interaction. This result then corresponds to a study by Ye (2009) who states that neighborhood communities could provide material, spiritual, emotional, intellectual exchanges and also provide leisure pastime for the residential area. Therefore, the residential landscape should pay attention to the spiritual and cultural aspects in order to establish harmony between neighborhoods. The residents should have a sense of belonging, which is conducive for social stability and unity. In relation to the result, it can be seen that most of the respondents gave positive opinions on the importance of landscape design for their residential areas.

Other than that, the importance of green technology as a new approach in applying landscape design for residential areas is also supported by public preferences. There are several types of green technologies that can be applied such as green wall, plants indicator, solar or garden lighting, natural system approach, green roof, rainwater harvesting and sustainable drainage. Survey has been to finalize that people prefer to apply green walls rather than other new green technologies. It is because the application of

green walls can be used to overcome the problem of limited space in applying landscape design. It is stated in the Green Roofs for Healthy Cities (2008) that green walls have a great potential for positive environmental change in dense urban areas and the value of a property may increase by adding a real green component to the building. Therefore, it can be assumed that landscape design and green technology complement each other in protecting residential environments.

One sample t-test was conducted to identify the significant differences on this implication. Based on the results shown in *Table 7.5*, there are six suitable green technologies that can be applied in residential areas.

Table 7.5: Significance of differences on type of green technology

Implication of green technology in residential areas		**M**	***t***	***df***	**p**
a.	Vertical landscape	3.64	-10.848	976	.000
b.	Plants indicator	4.01	.483	980	.629
c.	Solar light /garden light	3.84	-5.687	981	.000
d.	Natural system approach	4.08	3.063	981	.002
e.	Green roof	3.68	-9.770	977	.000
f.	Rainwater harvesting	3.80	-6.740	981	.000
g.	Sustainable drainage	4.06	2.319	981	.021

The probability (p) values obtained are less than the predetermined α = .05; the implication of vertical landscape (t = -10.848, p = 0.000), solar light/garden light (t = -5.687, p = 0.000), green roof (t = -9.770, p = 0.000), rainwater harvesting (t = -6.740, p = 0.000), natural system approach (t = 3.063, p = 0.002) and sustainable drainage (t = 2.319, p = 0.021) are the highest in implication to be applied in residential areas. Meanwhile, in terms of plant indicator (t = 0.483, p = 0.629), the result shows a predetermined value of more than α = .05; thus, this green technology has less implication to be used in residential areas.

In consequence, it can be proven that the overall implication of green technology is suitable to be applied in residential areas. These green technology approaches help to create a better living environment for residential areas. They have become a trend and new modern methods of landscape designs are able to be applied in urban areas especially in Klang Valley. Even though there are a few approaches that are not significantly different in this test, this does not mean that they are not important at all. Most

probably, these approaches can be considered as supporting approaches that can create a cooling atmosphere for residential areas.

Selecting a Prospective Of Dream House

There are many factors to be considered in respondents' decisions to buy or rent a house. The importance of landscape design in influencing this decision is needed to be proven. Public preferences indicate that people agree that landscape design can influence their decisions in buying or renting a house and can increase the value of a property. Thus, these results support that landscape design is an important factor when making the decisions to buy or rent a house and it also increases the value of a property. This result is supported by Alex (2009) who states that, relatively, large landscape expenditure significantly increases perceived home value and will result in higher selling price than home with minimal landscape. Designs with sophistication and plant size were the landscape factors that affected the value of a house.

In selecting a good perspective of a house, the specific consideration such as good location, price range of the house offered by developers and what are the facilities provided within the neighborhood areas need to be identified. Location has always been an important determinant of property value. Location is determined not only by proximity to schools or shops but also by other externalities, such as accessibility to parks and green areas. For instance, the value of a house can be positively or negatively affected by its location near a residential area that is attractive, which is probably related to the quality of park equipped with good recreational facilities (Kauko, 2006 quoted in Shukur et al., 2010).

Apart from that, in order to discover the importance of landscape design that can give impact to the price of property, a correlation test was conducted to discover the significance of the location of the housing area which can influence the price range in buying property. The results are shown in the table below.

Table 7.6: Descriptive statistics and correlation among study variables (n=1000)

	M	SD	1	2
1. Location	14.15	2.92	-	
2. Price	15.65	3.48	.365**	-

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.6 shows the descriptive statistics and correlation between location and price. This correlation was investigated using the Pearson Product Moment Correlation Coefficient in order to determine the strength of these two items as a consideration factor in buying property, especially residential houses. The results show that location correlated negatively with price, $r = -.365$, $p<.01$, with a medium strength of relationship (Cohen, 1988 as cited in Gravetter and Wallnau, 2005). This correlation was significant at the 0.01 alpha levels (2-tailed). Thus, the null hypothesis was rejected. This means that there is a significant relationship between the location of the residential areas and the price range in the context of property buyers.

Hence, it can be assumed that the suitable location of houses is related to the reasonable price people can afford based on their incomes. Moreover, the space compound for each house is different and a variety of landscape design can be applied according to the type of space residents have. This finding is also supported by Williams (2006) who state that a well done landscape adds economic value to home and property. The value of a home can be increased by as much as 6 to 15 percent as a result of a good landscape. Thus, the function of the landscape is essential in order to enhance the beauty and also economic value of the housing area.

Conclusion

Based on public preferences above, it can be concluded that residents have their own interest and perception toward landscape design. Therefore, the basic need of landscape design in their housing areas is various and widely applied. Most of the respondents support the importance of landscape design positively in their residential areas. However, there are still many constraints and limitations in terms of planning and guidelines in order to utilize this landscape design especially in house compounds.

On top of that, based on the analysis on public perception, public users have their own needs and demands for landscape design that can be applied in their residential area. The needs for green spaces in plinth areas are different according to the types of houses and the conditions of the surrounding environment. *Table 7.7* presents the overall needs and demand of public users in landscape design.

Table 7.7: Basic needs and demands of landscape design for public user

Basic needs of landscape design	Demands of landscape design		
	Terrace houses	**Semi-D houses**	**Bungalow houses**
Basic landscape facilities, amenities and space	- Recreation facilities - Playground - Resting area - Pedestrian walkway - Street planting - Lanes/ back lanes - Community meeting place	- Jogging track - Exercising facilities	
Basic elements of landscape design	- Benches - Open lawn - Plants - Lighting	- Buffer/fence - Potted plant - Paved area	
External house compound and green space	- Front yard - Back yard	- Front yard - Back yard - Side yard	- Front yard - Back yard - Side yard
Activities	- Drying cloth - Relaxing - Playing - Gardening - Picnicking	- Others	
Additional landscape design	-Fountains, gazebos, trellis, planter boxes, vertical landscape, green roof, rain water garden, artificial waterfall, pond, others		

According to Aiello et al. (2010), the quality of residential environments is embedded with the relationships between two different components: the objective characteristics of the neighborhood (facilities, public transports, crimes, noises and among upkeeps and others) and the living unit (housing types and housing sizes among others), and the subjective perceptions of these attributes, depending on the attributes themselves, but also on personal characteristics (gender, age, income, tenure and length of residence among others). Thus, the exposure on landscape design and the awareness on protecting the living environment are important for residents in order for them to live in healthy neighborhood areas.

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Chapter 8

An Observation of Basic Needs of Landscape Design in Residential Areas

This chapter discusses the observation data gathered in order to investigate the condition of the selected residential houses and to discover how they utilize their house compounds for landscape purposes. This is also done for the purpose of identifying the basic needs of landscape design suitable for residential properties in Klang Valley.

Through the observation, only a few houses used proper landscape designs while most of the houses did not implement good landscape designs. This might be because of less awareness of protecting their environment and neighbourhood surroundings. The observations are presented in the forms of layouts, sketches and images in order to identify the basic needs of landscape design in residential areas. The results are designated based on the ten areas of observations classified into two types of landscape design, namely the macro and micro scales of areas. This will be discussed in the next sub-topic.

Basic Needs of the Macro Scale Landscape Design

The basic needs of the macro landscape design consist of several elements which are street planting, recreational area, road hierarchy, pedestrian walkway, type of back lane and street furniture provided in the residential area. Further analyses will be discussed in the next sections.

a) Street Planting

Based on the observation, there are only five types of trees identified being used as street planting in most areas, namely *Tabebuia rosea* (Tecoma), *Mimusops elengi* (Bunga Tanjung*), Peltophorum pterocarpum* (Yellow Flame*), Lagerstroemia speciosa* (Pride of India) and *Mangifera indica* (Mango tree).

Tabebuia rosea /Tecoma | *Mimusops elengi*/ Bunga Tanjung | *Peltophorum pterocarpum*/ Yellow flame | *Lagerstroemia speciosa* /Pride of India | *Mangifera indica*/ Pokok Mempelam

Figure 9.1: Type of plants in residential areas

There are many functions of street plantings that can be beneficial for residential neighborhoods. Street planting can create aesthetic value and identity for the residential areas. The use of *Tabebuia rosea* (Tecoma) *and Lagerstroemia speciosa* (Pride of India) can create harmonious scenery. The flower *Tabebuia rosea* in certain periods such as in December to March creates beautiful scenery and aesthetic value for areas, such as in Ampang, Kelana Jaya, Wangsa Maju and Shah Alam.

The function of street planting, such as *Peltophorum pterocarpum* (Yellow flame), is important for residential areas in terms of creating a shaded environment by providing a big canopy *(silara)* of trees especially for pedestrians in the residential areas. It gives a big impact towards a healthy environment by providing oxygen and breeze for the surrounding neighborhood areas. Besides that, street planting, such as *Mimusops elengi* (Bunga Tanjung), give a sense of direction and act as a buffer zone for residential areas.

Figure 8.2: Peltophorum pterocarpum (Yellow flame) is a big silara tree that can provide shaded environment for main avenue area

Figure 8.3: Mimusops elengi (Bunga Tanjung) can direct pedestrians' movement

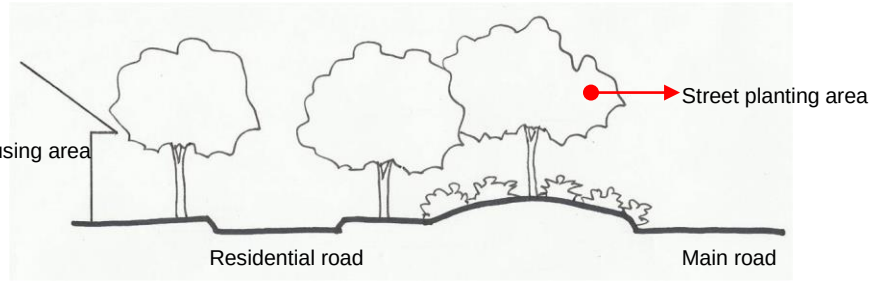


Figure 8.4: Street planting can create a buffer between residential area and main road

In addition, there are plants which are used as a frontage in the housing residential areas such as *Mangifera indica, Lagerstroemia speciosa (*Pride of India*) and Mimusops elengi (*Bunga Tanjung*)*. Usually, the *Mangifera indica* (Mango Tree) is planted at the front of houses for its fruits. It has been planted mostly in Gombak, Kepong, Shah Alam, Ampang and Setiawangsa.

Figure 8.5: Lagerstroemia speciosa (Pride of India) and Mangifera indica (Mango tree) used as frontage plants of housing area

There are two types of street planting placements in the residential areas.

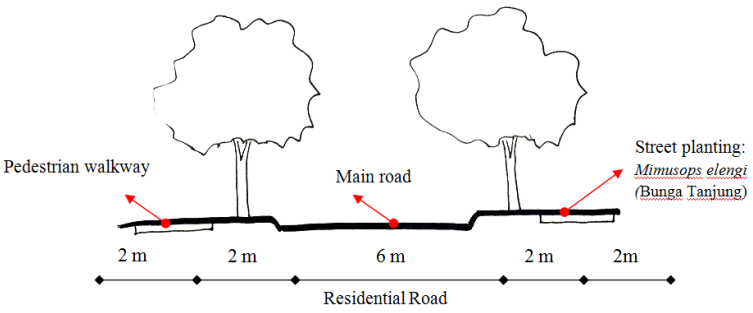


Figure 8.6: Type A, street planting in between road and pedestrian walkway

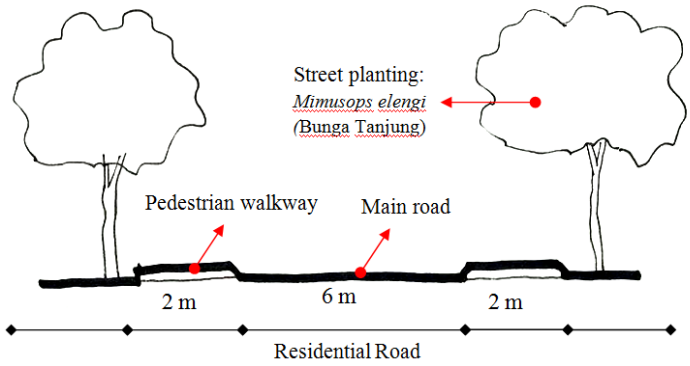


Figure 8.7: Type B, pedestrian in between road and street planting

Some street plantings were located near the public utilities, such as lightings and there are three positions identified based on the observation:

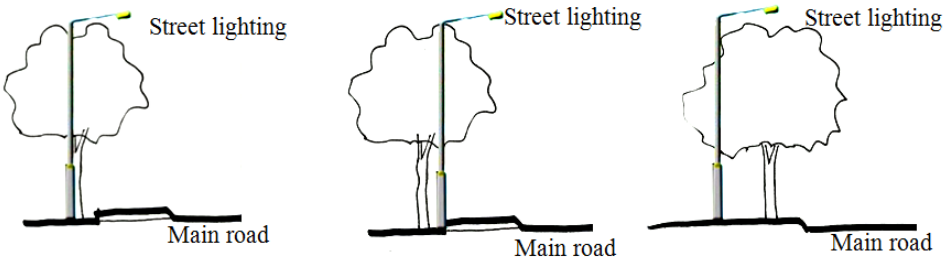


Figure 8.8: Type of pedestrian walkway with streetscape element; c) In line with street planting, d) Near to pedestrian walkways, e) Behind of street planting

As summary, *Table 8.1* shows the tree species planted based on selected areas. Most of the street trees are structural trees with many forms to show their functions and characters, such as providing shades, sense of direction, as buffers, creating aesthetic value and becoming frontages for the residential areas. Besides that, some areas used more than one type of species as street planting in the residential areas, such as Taman SS7, Kelana Jaya and Taman TTDI Jaya.

Table 8.1: Checklist of street planting provided based on area

Type of street planting	Type A	Type B	Type C	Type D	Type E
Taman SS7, Kelana Jaya	/	/			
Taman TTDI Jaya (U2/31, U2/42), Shah Alam		/		/	/
Taman Ukay Perdana, Ampang		/			
Taman Bukit Mulia, Ampang		/	/		
Jalan B, Taman Melawati	/	/			
Taman Wangsa Budi, Wangsa Melawati		/			
Taman AU3, Setiawangsa		/			
Taman AU1, Keramat		/		/	/
Seksyen 5, Wangsa Maju		/		/	/
Desa Setapak		/	/		
Desa Andaman, Wangsa Maju		/	/		
Taman Sri Gombak Fasa 4		/	/		
Taman Samudera Selatan		/	/		
Taman Kuang Bulan, Kepong		/	/		

b) Recreational Area

There are several types of recreational areas in the residential areas. Based on observation, there are several types of recreational areas which can be differentiated based on the facilities provided, such as playgrounds, game fields, multipurpose courts, resting ares and exercise equipments.

a) Playground

b) Multipurpose court

c) Playfield

d) Resting and exercise area

The location of the recreation area is important to indicate what type and size of recreation area has been provided in most residential areas. It is important to know the size of the residential area and identify whether the recreation area can be reached by pedestrian users or not. Observations show that, there are several types of location of the recreation area which are in the centre and edge of the residential area. The basic types of recreation area that provide mostly have a playground area and open space. But, there are certain areas of recreation that provide a playfield, multipurpose court, resting area and exercise equipment for the residential users. Some areas such as Taman Melawati and Taman Bukit Mulia, the playground attached with a community centre which are mosque and community hall that can become a gathering area for residential.

Figure 8.9: Example of basic recreation area located at the centre of a residential area in Shah Alam. Consists playground areas, court and open space that serve as community gathering area. This type of recreation can be accessed by pedestrian users because of the strategic location at the middle of the neighborhood area

Figure 8.10: Example of recreation area located at the edge of a neighborhood area in Ampang. Consists of playground, open space, court and water sewage area and has a mosque that serves as a community gathering area especially for Muslims

Specific planting has been identified in most visited recreational areas. Most of the plants have significant characters, namely they are shaded and give a big canopy *(silara)* that can produce a cooling environment for the residential users.

Figure 9.11: Samanea saman/ Rain tree

Figure 9.12*: Casuarina enguistifolia* /Rhu

In summary, recreation areas have become an important place for residential users. Better residential areas can provide a better recreational area, especially for children play area and community gathering place, in order to create a sustainable environment for the neighborhood area. The strategic location of a recreation area is essential to make it accessible for pedestrians and cyclists.

c) Pedestrian Walkway

Based on the overall observation, it can be identified that there are proper pedestrian walkways that connect the residential areas and the surrounding areas especially for new residential areas. Analysis shows there are several types of pedestrian arrangements in the residential areas.

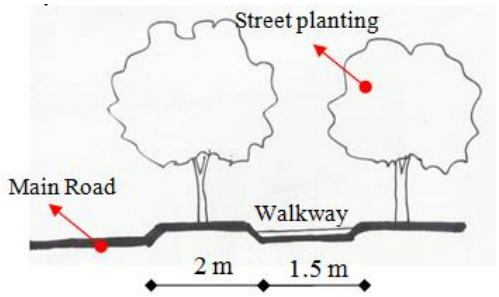


Figure 8.13: Type 1, Pedestrian walkway in between planting area

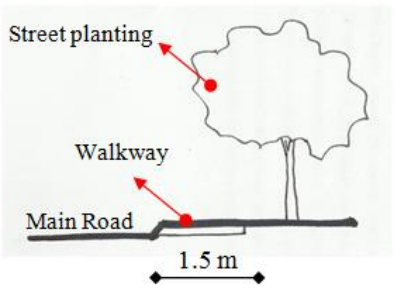


Figure 8.14: Type 2, Roadside pedestrian walkway

The two figures above show that there are two basic pedestrian walkways, namely pedestrian walkways in between planting areas and at roadside of pedestrian walkways. Most common roadside pedestrian walkways are in areas such as Shah Alam and Wangsa Maju. Thus, this shows that pedestrian walkways are an important element in landscape design that can create good connectivity and accessibility in residential areas. The location of pedestrian walkways includes roadside, playground and community gathering areas.

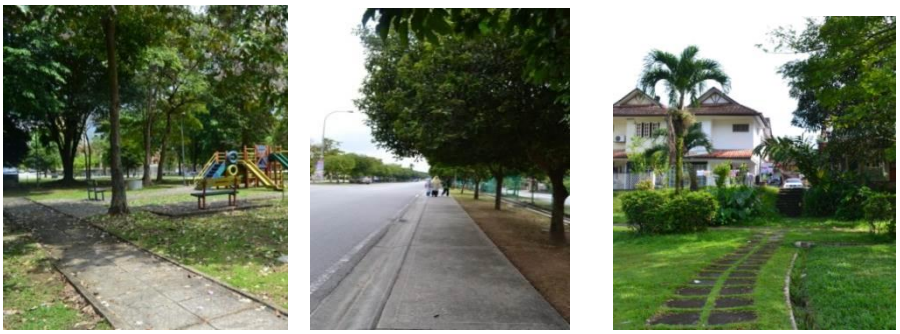


Figure 8.15: Example of pedestrian walkway that provided in residential area

Observation also shows, for some areas such as Wangsa Melawati and Kelana Jaya, the connectivity of the pedestrian walkway area is restricted to specific areas such as in the recreation area only. Pedestrians mostly used

their chosen roads and roadside areas in moving around, especially in the housing areas. Overall, it can be seen that pedestrian walkways are only used in new residential areas. Good pedestrian walkways connectivity is important to create accessibility in the residential area. *Table 8.2* shows the types of pedestrian walkways in the selected observation area.

Table 8.2: Checklist of pedestrian use based on area

Type of pedestrian walkway	Type 1	Type 2	Attached to the recreation area
Taman SS7, Kelana Jaya	/		
Taman TTDI Jaya (U2/31, U2/42), Shah Alam	/		/
Taman Ukay Perdana, Ampang	/		/
Taman Bukit Mulia, Ampang	/	/	/
Jalan B, Taman Melawati	/	/	/
Taman Wangsa Budi, Wangsa Melawati	/		
Taman AU3, Setiawangsa	/		/
Taman AU1, Keramat	/		
Seksyen 5, Wangsa Maju	/		/
Desa Setapak		/	/
Desa Andaman, Wangsa Maju		/	
Taman Sri Gombak Fasa 4		/	/
Taman Samudera Selatan		/	/
Taman Kuang Bulan, Kepong		/	/

d) Back Lane

It is stated in the Federal Department of Town and Country Planning that back lanes can be defined as paths that can be accessed by all types of public transports and a proper size of a back lane is equal to or not less than 4.27 m. Based on the observation, there are three types of back lanes provided in the residential areas. Most of the back lanes are not really used for access by transports because of the narrow size of the paths. However, in some areas in Kelana Jaya and Ampang, the back lanes can be accessed by transports that use them as service roads for garbage collection.

Figure 8.16: Back lane act as service road that can be accessed by transports

Some of the back lanes also act as placements for drainage, sewerage systems and utilities services. This type of back lane normally can be accessed by pedestrians and also private use.

Figure 8.17: Back lane used as drainage, sewerage and utilities. It is also for private use through renovation

Besides that, in Wangsa Maju there are some back lanes which have practically been used as a safety and security element, such as gates or railings that can create a sense of privacy for the residential areas. Some other back lanes are also used for natural lighting and ventilation in between the house buildings to generate a conducive and healthy environment.

Figure 8.18: Back lane used to create a safe and private environment by providing gate or railing

Table 8.3 below shows the use of back lanes in residential areas.

Table 8.3: Checklist for back lane function and use based on area

Type of back lane function and utilization	Gated/ Railing/Bollard	Service road	Placement of utility, drainage and sewerage system
Taman SS7, Kelana Jaya	/		/
Taman TTDI Jaya (U2/31, U2/42), Shah Alam	/		/
Taman Ukay Perdana, Ampang			/
Taman Bukit Mulia, Ampang		/	/
Jalan B, Taman Melawati		/	/
Taman Wangsa Budi, Wangsa Melawati			/
Taman AU3, Setiawangsa	/	/	/
Taman AU1, Keramat	/		/
Seksyen 5, Wangsa Maju	/		/
Desa Setapak, Wangsa Maju	/		/
Desa Andaman, Wangsa Maju	/		/
Taman Sri Gombak Fasa 4		/	/
Taman Samudera Selatan			/
Taman Kuang Bulan, Kepong			/

In summary, on back lane areas, most residential areas, especially in the new type of housing, have back lanes. The functions of the back lanes vary according to needs, such as to create privacy, as service roads, as drainage placements, sewerage systems and utilities for residential areas.

Basic Needs of Micro Scale Landscape Design

The basic need of micro landscape design can be divided into several elements which are the type of house compounds and elements of residential areas. There are three types of houses identified in the study, which are the terrace house, the semi-D house and the bungalow house. Analyses of the detailed layout and requirement are discussed below:

a) Terrace House

Observation shows that most areas have double storey terrace houses except for certain areas such as Kelana Jaya which also has single storey terrace houses. Overall, there are two basic layout types of terrace houses in the residential areas. This can be differentiated through the pitch roofs which determine the pattern of housing whether it is a new or an old residential area and the size of plinth areas in specific residential areas. Each type can be divided into different positions which are intermediate, end lot and corner lot.

Type 1: With pitch roof

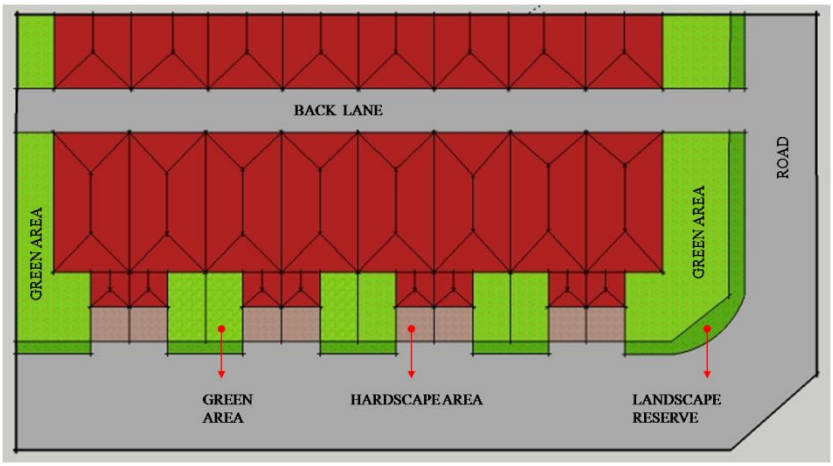


Figure 8.19: Type of terrace layout with pitch roof

Type 2: Sloping roof surface

Figure 8.20: Type of terrace layout without pitch

As seen in the above figures, the pattern of development can be identified by comparing the type of roof that has been used. This shows that new residential areas mostly use a pitch roof, while the old residential areas tend to use a sloping type of roof surface to indicate their identity.

Figure 8.21: Example of new residential area with pitch roof Setiawangsa, Keramat and Ampang

Figure 8.22: Example of terrace house with a sloping roof WangsaMaju, Taman Melawati, Gombak and Kepong

The plinth area of the landscape design in terrace houses normally exists in the front yard and the side yard of the house compounds. In terms of the plinth area in each position of the house, the use of space in an intermediate terrace house is limited compare to the corner lot and the end lot. This is shows that the green plinth area for each area is different in size and requirement. The basic needs of this type of terrace house are in open lawns and hardscape surfaces for parking and reserved landscape area. The difference space is determined by any addition and renovation of compound area by the users themselves.

- **Type of Position In Terrace House**

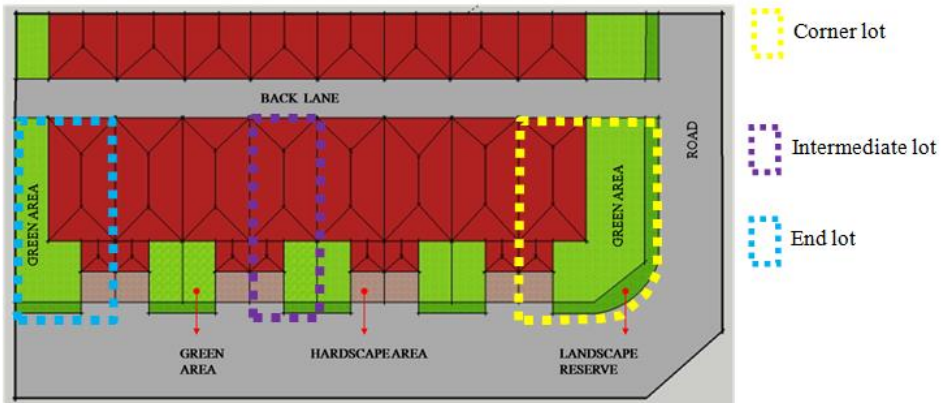


Figure 8.23: Overall position of terrace house

- **Corner Lot Terrace House**

There are two types of corner lots based on the observation in the selected study areas. Each corner lot has the same requirement of plinth areas which are the side yard and the front yard spaces. However, the difference is in terms of its shape and size of the plinth area.

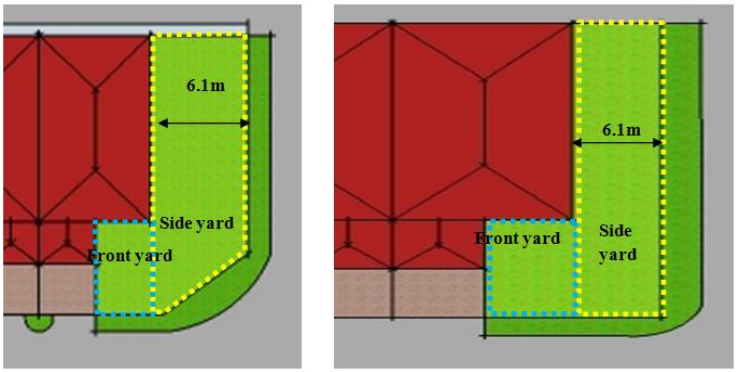


Figure 8.24: Type of corner lot

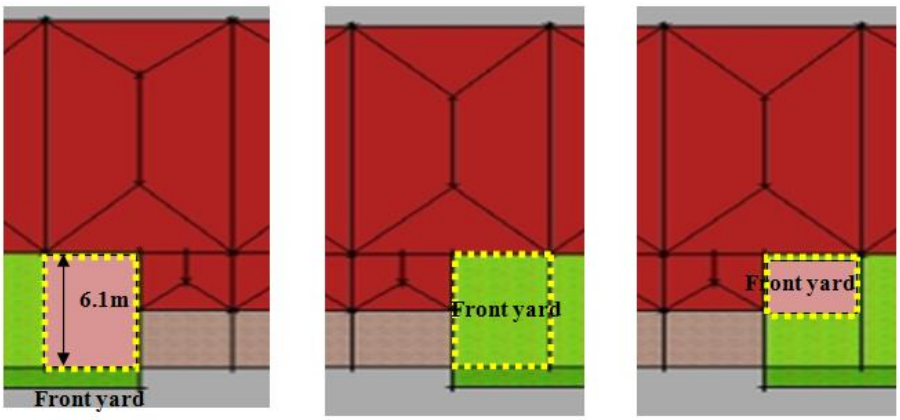
Figure 8.25: Basic needs of multilevel planting in WangsaMelawati, Setiawangsa and Shah Alam

Thus the overall basic needs in corner lot terrace houses are:

- Open spaces or lawns
- Multilevel plantings (Fruit trees and edible plants)
- Potted plant
- Hardscape surfaces
- Additional landscape elements (based on demand from users)

- **Intermediate lot terrace house**

Based on the observation there are three types of intermediate lot terrace houses which show differences based on its shape, size and surface used in the plinth areas.



Type 1: Intermediate lot with full hardscape surface

Type 2: Intermediate lot with open lawn area

Type 3: Intermediate lot with small scale softscape area

Figure 8.26: Type of intermediate lot

Figure 8.27: Example of plinth area in intermediate lot Shah Alam and Ampang

Table 8.4: Checklist for type of plinth area size for intermediate lot based on areas

Type and size of intermediate lot plinth area	Type 1	Type 2	Type 3	20x55 ft	20x60 ft
Taman SS7, Kelana Jaya		/	/	/	/
Taman TTDI Jaya (U2/31, U2/42), Shah Alam		/	/	/	
Taman Ukay Perdana, Ampang		/	/		/
Taman Bukit Mulia, Ampang		/	/		/
Jalan B, Taman Melawati		/	/	/	
Taman Wangsa Budi, WangsaMelawati		/	/	/	
Taman AU3, Setiawangsa	/		/	/	
Taman AU1, Keramat					
Seksyen 5, WangsaMaju		/	/	/	
DesaSetapak, WangsaMaju		/	/		/
Desa Andaman, WangsaMaju		/	/		/
Taman Sri Gombak 4		/	/	/	
Taman Samudera Selatan		/	/	/	
Taman KuangBulan, Kepong		/	/	/	

Observation shows that there are three plinth area sizes for intermediate lot terrace houses. *Table 8.4* shows the different plinth area sizes according to the observation areas. Basically, the front yard becomes the main space that can be utilized by landscape design in the intermediate lot space compound. Therefore, the use of landscape design is limited in the intermediate lot terrace house especially for intermediate lot type 1. This is because of the fully covered surface that makes the landscape design, especially plants, unable to be applied through the use of the plinth area. Therefore the basic alternative of landscape design that can be applied is potted plants to create a landscape portion in the house compound. Some

other creative landscape can be applied such as by using green technology of vertical plants.

Figure 8.28: Example of used of potted plants and vertical wall in Kelana Jaya

For types 2 and 3, the needs of basic landscape design identified are open spaces or lawns, some planting arrangements, hard surfaces for porch areas and some additional elements of landscape design based on the demands of the users.

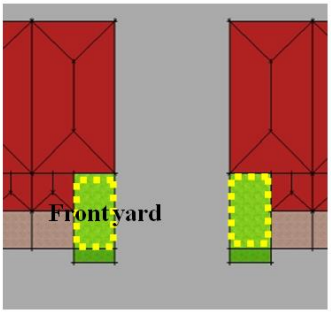
Thus, the needs of landscape design for the intermediate lot terrace house can be identified as:

- Open spaces or lawns
- Planting arrangements especially for shrubs and groundcovers
- Tree plantings if necessary (because of limited space for big trees)
- Potted plant
- Hardscape surfaces
- Additional landscape elements (based on demands from users)

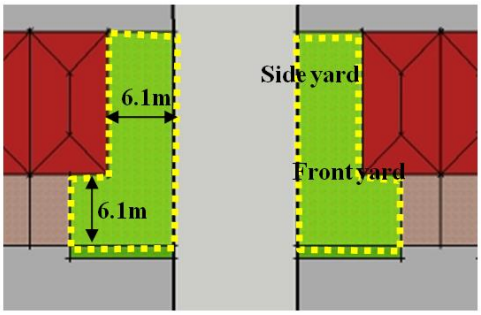
Figure 8.29: Example of basic needs of intermediate lot in Kelana Jaya; open lawn, shrubs arrangement and hard surface

- **End lot terrace house**

There are two types of end lot terrace houses based on our observation. The difference can be seen through the size and shape of the plinth areas.



Type 1: End lot terrace house without edges space



Type 2: End lot terrace house with side yard space

Figure 8.30: Example of plinth area for end lot terrace house in Gombak and Kelana Jaya

Our observation shows that the important spaces in end lot terrace houses are the front yard and the side yard of the compound areas. There are different sizes of plinth areas for end lot terrace houses.

Figure 8.31: Example of different size of plinth area for end lot terrace house in Kelana Jaya and Taman Melawati

In general, the needs of landscape design for the end lot terrace house can be identified as:

- Open spaces or lawns
- Tree plantings and plotted plants
- Hardscape surfaces or paved areas
- Additional landscape elements (based on demands by users)

b) Semi-Detached House

It is stated in the Federal Department of Town and Country Planning that there are two basic types of semi-Detached house which are the normal type and the clustered type. Based on the observation in the selected fifteen areas, only normal semi-Detached houses have been identified namely in Kelana Jaya and Taman Melawati.

Figure 8.32: Example of normal type of semi-Detached house for Taman Melawati and Kelana Jaya

Basically, the plinth areas are identified through the existing front yard, side yard and back yard areas. The vacancy for landscape design is not really limited since there are wide plinth areas to be utilized.

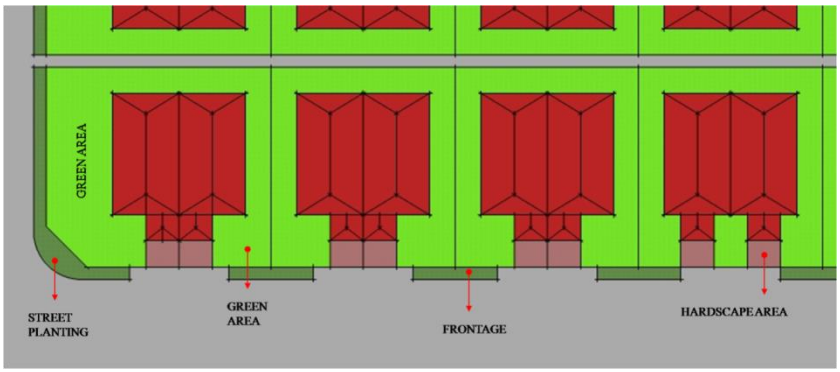


Figure 8.33: Overall layout of normal residential semi-Detached type house

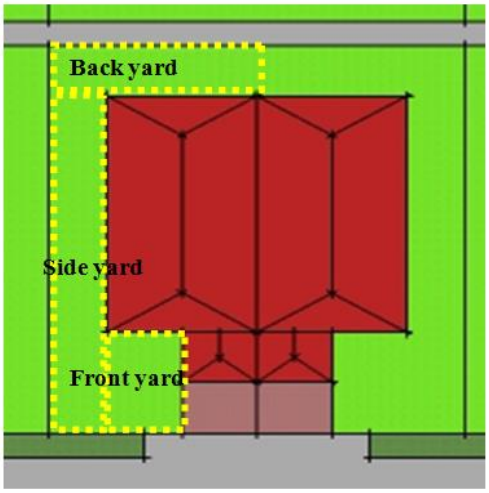


Figure 8.34: Space layout of semi-D house

Based on our overall view, most of the semi-D houses need open lawns at the front yards of the houses. This is because open lawns can become multi-functional spaces that can be used for private activities such drying clothings. The uses of landscape design are mostly applied more at the side yard. The use of potted plants, miniature trees and edible plants are the common type of planting in the semi-D house areas. This type of landscape design can minimize the use of the plinth area in the compound area.

Figure 8.35: Open lawn for front yard space and use of palm trees at the side yard of a semi-D house

Thus, it can be summarized that the basic needs of normal semi-Detached houses are:

- Open spaces or lawns
- Hardscape surfaces or paved areas
- Multilevel plantings such as trees, palms, shrubs and groundcovers
- Potted plants (edible or miniature plants)
- Additional landscape elements (based on demands by users)

c) Type of Bungalow House

From our overall observation area, there is only one type of bungalow house identified which is the normal bungalow house type in Taman SS7 Kelana Jaya and Taman AU1 Keramat.

Figure 8.36: Example of normal bungalow house type in Taman Keramat and Kelana Jaya

Overall, the plinth areas of the bungalow houses are identified through the existing front yard, side yard and back yard areas. The sizes of each yard are different. The limited use for landscape design can only be seen in the side and back yard areas.

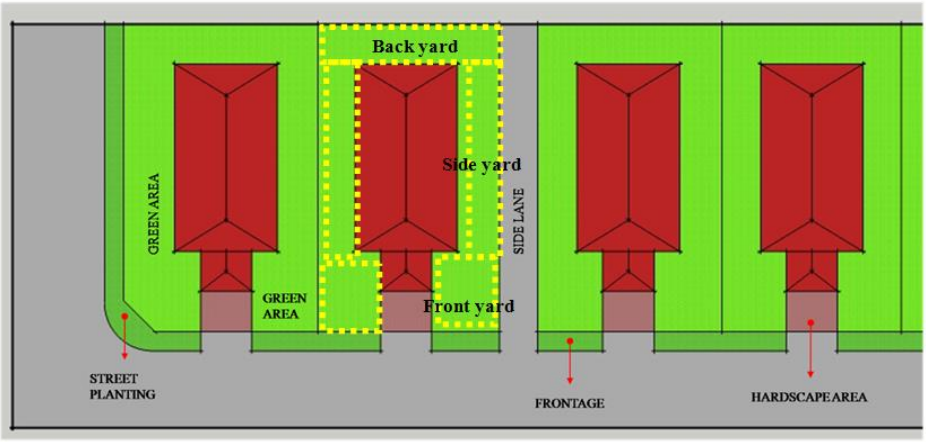


Figure 8.37: Overall layout of normal residential type of bungalow house

Figure 8.38: Basic need of hardscape surface and open space for front yard

Figure 8.39: Side yard utilized by potted plant elements and fruit trees

Figure 8.40: Back yard garden used as a kitchen garden for private use

There are no limitations of landscape design in the existing plinth areas of bungalow houses. This is because most of the plinth area sizes arrange from 6m for front yards and 3m for side and back yards. Thus, the needs of landscape design for normal bungalow house can identified as:

- Open spaces or lawns
- Multilevel plants (fruit trees, palms, shrubs and ground covers)
- Potted plants
- Hardscape surfaces or paved areas
- Additional landscape elements (based on demands by users)

d) Additional landscape element

Our observation also shows that use of additional landscape, such as fountains, gazebos, benches, pergola, trellis, planter boxes and green technology landscape design in all types of residential areas. This additional landscape element can be applied based on the needs of users to create their dream house compounds. Therefore, the basic needs of landscape design can be enhanced by adding other landscape features in order to create functional and aesthetical house areas for users' satisfactions.

Figure 8.41: Example of water features element in front house area as welcoming entrance

Figure 8.42: Trellis for climbers plants

Figure 8.43: Pergola and vertical plant for limited space compound

Figure 8.44: Hanging potted plants for balcony house area

Conclusion

Based on our overall observation it can be summarized that the needs of residents are different according to the types of houses and the conditions of the surrounding environment. Based on the fourteen selected areas of survey, the relationship between the macro scale and micro scale of landscape are related to each other in influencing the need of the resident toward a good living environment. The basic landscape needs are required for all types of residential, but additional elements can be added through the demands of residential users themselves.

In order to answer the first research objective, a summary of the observation analysis shows that there are only four basic landscape designs types that are required in each residential which are;

- Type 1 - Fully paved areas

Figure 8.45: Example of house with fully paved landscape design

- Type 2 - Consist of paved and lawn areas

Figure 8.46: Example of house with paved and lawn areas

- Type 3 - Consist of paved areas, open lawns and potted plants

Figure 8.47: Example of house with paved area, open lawns and potted plants

- Type 4 - Consist of paved areas, open lawns, potted plants and plants arrangements

Figure 8.48: Example of house with paved areas, open lawns, potted plants and plant arrangements

All these basic needs are important as benchmarks for the use of landscape design in house compound areas. The additional landscape can become a need for residential users who want to obtain more benefits from the landscape itself. As a whole, this can affect the value of real estate development, especially in Klang Valley.

Therefore, the analysis proves that the value of house property is influenced by the condition of their houses, especially in the landscape design space. The overall result can answer the first research question that seeks to identify the basic needs of landscape design suitable for residential properties and the current needs of residential buyers in terms of their living environment.

Conclusion

Landscape design has become a trend for most residential areas in Malaysia especially in Klang Valley. Thus, the minimum requirement of landscape design can be identified based on the overall planning, detailed designs and elements of the neighborhood areas. The requirements of landscape design for the residential areas can be divided into macro and micro aspects of landscape design. In terms of macro it covers several aspects namely requirement of recreation or open space, planting design, pedestrian walkway, back lane area and safety of the residential areas. Meanwhile, for micro aspects of landscape design it covers the minimum requirement based on type of houses which are terrace house, semi-D house and bungalow house.

a) Macro Aspect of Landscape Design

i) Recreation, Open Space and Playground Areas

Figure 9.1: Type of recreation area and open space in residential area; open field, playground, multipurpose court and resting and exercise area in the residential areas

ii) Planting Design

In order to create a good landscape design in residential areas, the softscape aspect needs to be considered in order to create a harmonious and balanced sustainable environment. For the planting designs in the recreation and playground areas, most of the plants used have a significant character, namely shaded, has a nice smell, varies in color and provide a big canopy *(silara)* that can produce a cooling environment for residential users. *Table 9.1* shows the plants identified in the most visited recreation and playground areas, while *Table 9.2* shows the plant identified for street planting. All the plants have specific characteristics and functions such as providing shade for pedestrians, creating a harmonious environment through colorful flowers, giving a sense of direction, acting as buffers and providing fruits.

Table 9.1: List of plants in recreation and playground areas of residential areas

Type of planting design		Scientific Name	Common Name
Recreation area	1	*Khaya senegalensis*	Khaya
	3	*Samanea saman*	Hujan- hujan
	4	*Araucaria bidwillii*	Bunya-bunya pine
	5	*Tabebuia rosea*	Tecoma
	6	*Casuarina enguistifolia*	Rhu
	7	*Pelthoporum pterocarpum*	Batai laut

Samanea saman/Rain tree

Casuarina enguistifolia/rhu

Araucaria bidwillii/Bunya-bunya pine

Tabebuia rosea/Tecoma

Pthychosperma macarthurii/ Macarthur palm

Figure 9.2: Type of plants identified in recreation and playground areas

Table 9.2: List of plants for street planting

Type of planting design		Scientific Name	Common Name
Street planting	1	*Tabebuia rosea*	Tecoma
	3	*Mimusops elengi*	Bunga Tanjung
	4	*Peltophorum pterocarpum*	Yellow flame
	5	*Lagerstroemia speciosa*	Rose of India/Bungor
	6	*Mangifera indica*	Pokok Mempelam

Tabebuia rosea /Tecoma

Mangifera indica/ Pokok Mempelam

Lagerstroemia speciosa /Rose of India

Mimusops elengi/ Bunga Tanjung

Figure 9.3: Type of structure plants usually planted as street planting

In addition, the use of plantings as buffers to segregate the residential areas and the main roads is important to create a safe environment in the residential areas. *Figure 9.4* shows an example of a mounding area used as a buffer area in a residential area.

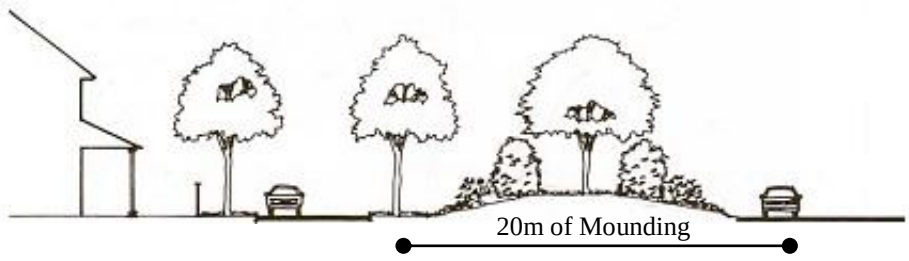


Figure 9.4: Provision of 20 meters of buffer area to segregate residential house area and main road

iii) Pedestrian Walkway

Pedestrian walkways are always integrated with the accessibility of a place. In terms of pedestrian walkways in Klang Valley, they are generally located at the roadside of the residential areas. Pedestrians' walkways normally can access public areas such as recreation areas, playgrounds and community gathering areas. *Figure 9.5* shows an example of the minimum requirement of pedestrian walkways suitable for residential areas in terms of the appropriate size of pedestrian walkways that can be accessed by pedestrians, disabled people and bicycle users.

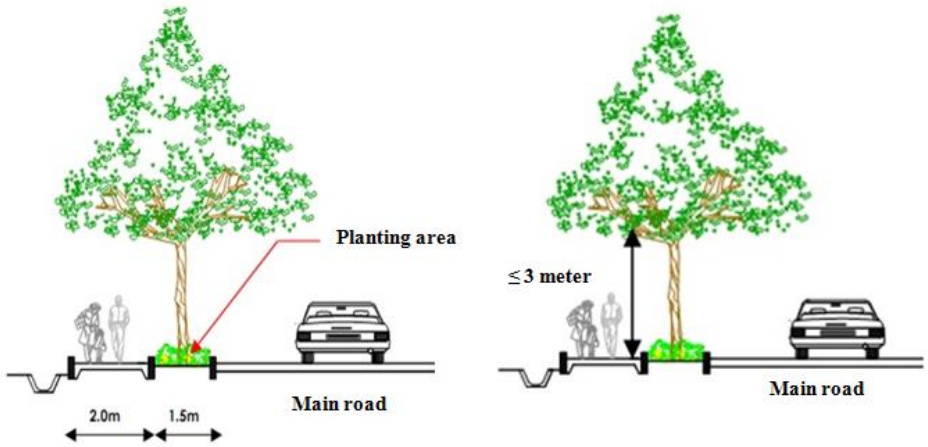


Figure 9.5: Minimum requirement of pedestrian walkway size of pedestrian and the height of trees which are not hazardous for pedestrians

Areas, such as Shah Alam, have proper pedestrian walkways that can facilitate pedestrians in accessing the residential areas through walking. Besides that, the use of street planting can give a beneficial impact to the pedestrians. This finding is supported by Streetscape Design Guidelines which states that landscape design can become an effective treatment between sidewalks and streets to create a buffer from moving vehicles and street noise, and help pedestrians feel more comfortable walking along the street.

Figure 9.6: Example of pedestrian walkway at a residential area in Shah Alam

iv) Back Lane Areas

There are two types of back lanes for the terrace house types, namely back lanes attached to buildings and those not attached to buildings. *Figure 9.7* and *9.8* show examples of the two types of back lanes. The width of the back lane is sufficient to ensure enough space for skip fire, air ventilation, lighting and access infrastructure.

Figure 9.7: Example of back lane areas in Kelana Jaya and Shah Alam attached to buildings

Figure 9.8: Example of back lane areas in Setiawangsa and Taman Melawati that are not attached to buildings

Some of the residential areas have followed the size suggested by the Federal Department of Town and Country Planning. This shows that the importance of back lanes as support access in terms of service roads, placement of facilities, amenities and ventilation have been given full attention for all parties in the residential areas. Below are the examples of requirement sizes for back lanes in residential areas.

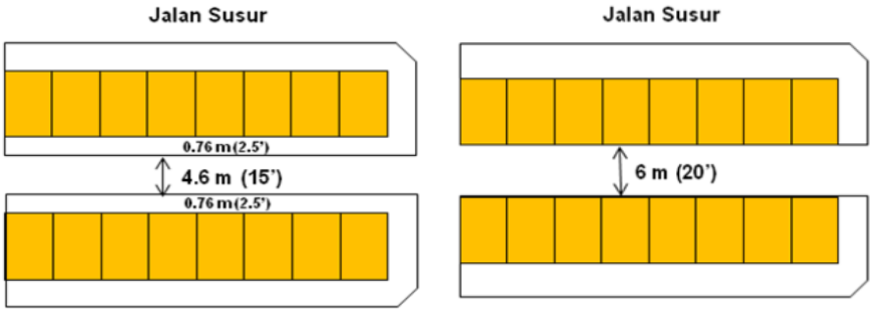


Figure 9.9: Different type of back lane requirement sizes
(Source: Garis Panduan Perancangan Lorong Belakang, 2012)

v) Safety and Security of Residential Areas

One of the important main characteristics in a compound neighborhood is the added security and safety features. Snatch thefts, assaults and rampant break-ins in Klang Valley urban areas make house buyers a little more concerned about their personal security. Thus, the implication of landscape design, such as fences and buffers can create a sense of security and safety for the residential environment.

Figure 9.10: The use of plants to segregate open space and playground area from main road and residential house in order to create a safe surrounding for users especially children

b) Micro Aspect of Landscape Design

The minimum requirement of landscape design for residential area has been identified throughout the study. There are only four basic landscape designs types that are required in each residential which are;

- Type 1 - Fully paved areas
- Type 2 - Consist of paved and lawn areas
- Type 3 - Consist of paved areas, open lawns and potted plants
- Type 4 - Consist of paved areas, open lawns, potted plants and plants arrangements

Thus, due to the limitation of space, character and type of residential, the basic needs of landscape design can be identified in *Table 9.3*

Table 9.3: Minimum requirement of landscape design criteria/element based on type of houses

Minimum requirement of landscape design	**Type 1**	**Type 2**	**Type 3**	**Type 4**
Terrace house	/	/	/	
Semi-D house	/	/	/	/
Bungalow house	/	/	/	/

Based on *Figure 9.11*, the use of landscape design is limited for terrace house especially for intermediate lot type. This is because the basic plinth area has only focused on the front and back yard of the area. Therefore the basic alternative of landscape design can be applied is potted plants to create a landscape portion in the house compound or remaining the plinth area for the purpose of lawn or paved only.

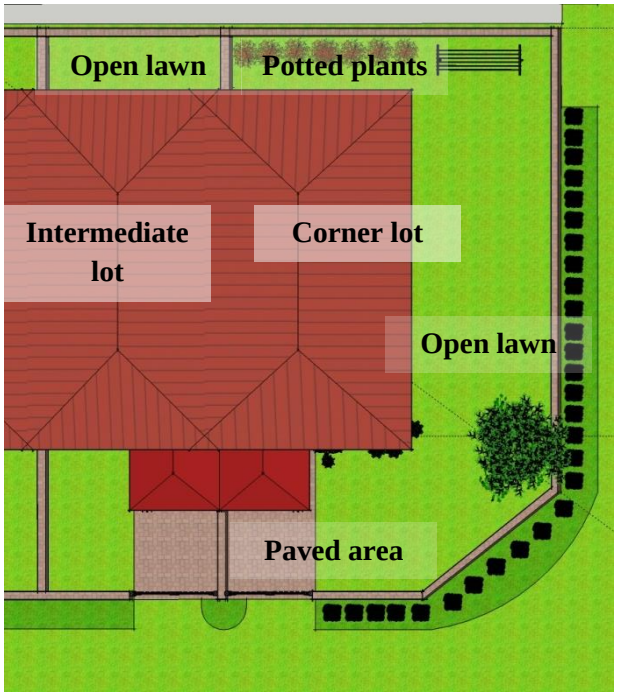


Figure 9.11: Minimum landscape requirement for terrace house

Otherwise, for a type of semi-D and bungalow house, the space of plinth area that can be applied with basic landscape design is much and there is no limitation to apply a landscape design in the house (*Figure 9.12*).

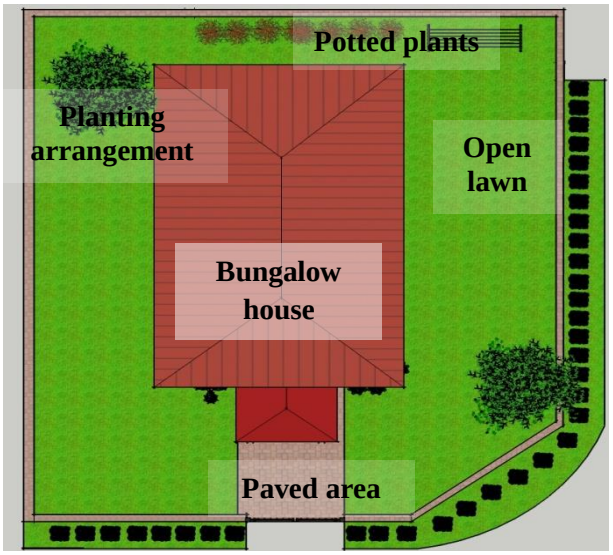


Figure 9.12: Minimum landscape requirement for bungalow and semi-D house

The requirement of landscape space needs to be identified based on the needs of the demographics and populations of the users, size of developments and spatial planning of the residential areas. Many things need to be considered in order to have a better landscape space especially recreation areas and green spaces to enhance a better living environment.

Space Requirement for Landscape Design in the Residential Areas

Space requirement is very important since it influences people's behaviour and social status. This is because people use and experience the space provided in different and distinct ways, or even in similar ways. Therefore, space design should always be informed and underpinned by an understanding of different people's needs and activities and experiences of landscapes. As for residential areas, it is very important to carefully design them since people spend most of their time in residential areas. The importance of space requirement is noted below:

- Space should integrate with all family members,
- Space should respond to utilities and service area,
- Space should have public/ entrance area

Each type of house has a different type of space. Semi-d houses have more spaces for landscape compared to terrace houses. The allocation of space for terrace houses might be only at the front and the back sides. However, the bungalow houses have more spaces than others. In relation to this aspect, based on our observation analysis, the space requirement can be divided into the overall layout of housing areas and house compound areas.

The important space requirements are only focused on the front yard and back yard spaces of the house areas. Usually, the landscape design is focused more on the front yard as the welcoming gesture of the house area. The front yard of the house can be utilized for hardscape elements, such as tiles, granites or concrete paved for car parking purposes. Besides that, the landscape design, such as pathways and open lawns, can create a sense of welcoming for the house. The basic landscape designs that can be applied in the front yards of the terrace houses are:

- Open spaces or lawns
- Fully paved covered areas
- Multilevel plants (fruit trees, palms, shrubs and groundcovers)
- Potted plants
- Hardscape surfaces or paved areas
- Additional landscape elements (based on demands by users).

For the back yard area, the landscape designs that are suitable should be simple and minimalist in design. The landscape that can be applied, such as kitchen gardens, edible gardens, herb gardens or even just open spaces, can create a function for the back yard areas. The types of plants that can be applied are edibles, fruits or herbal types of plants.

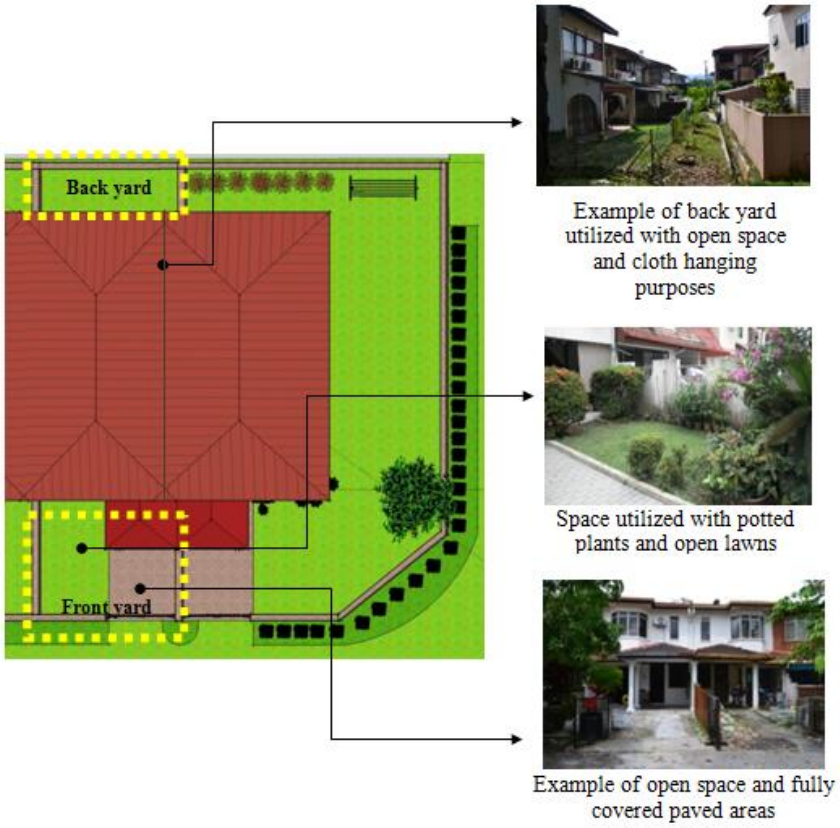


Figure 9.13: Space use of terrace house compounds

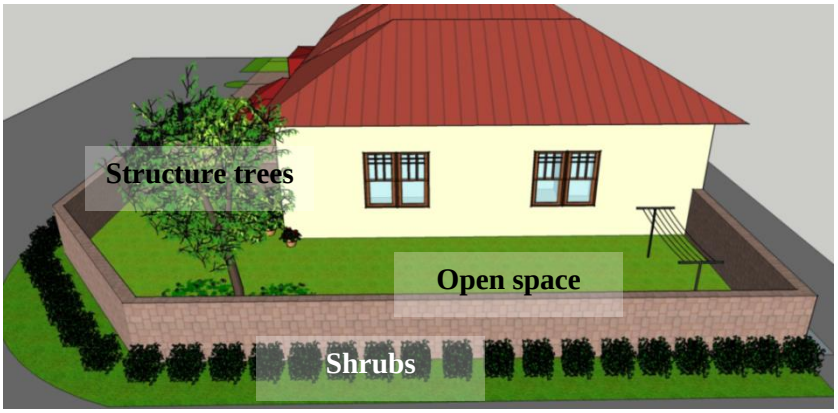


Figure 9.14: Example of terrace house without back yard area space requirement

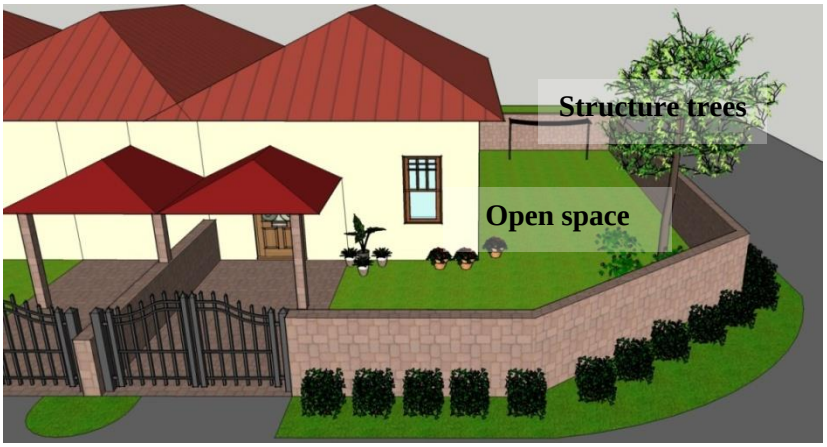


Figure 9.15: Overall view of corner lot terrace house compound space house

b) Semi-detached House

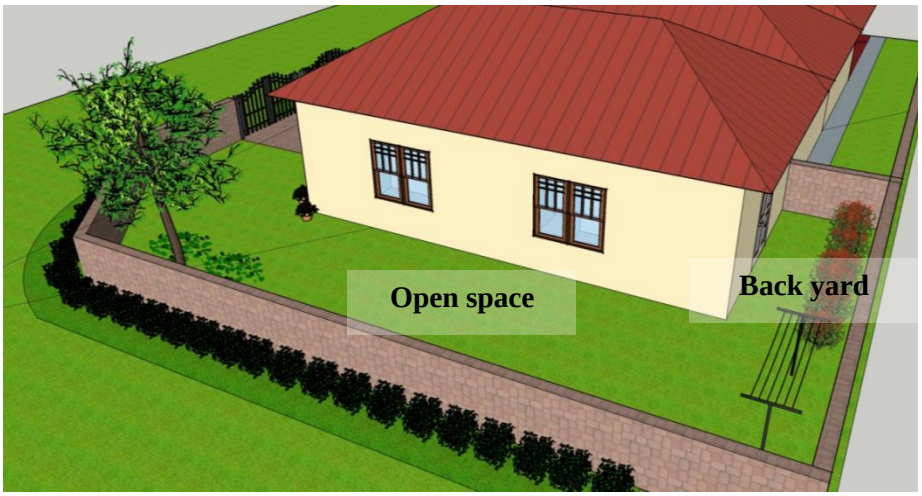


Figure 9.16: Example semi-D house space use

Figure 9.17: Example of semi-D house front yards

c) Bungalow House

Figure 9.18: Front view of basic space use for bungalow type house compound

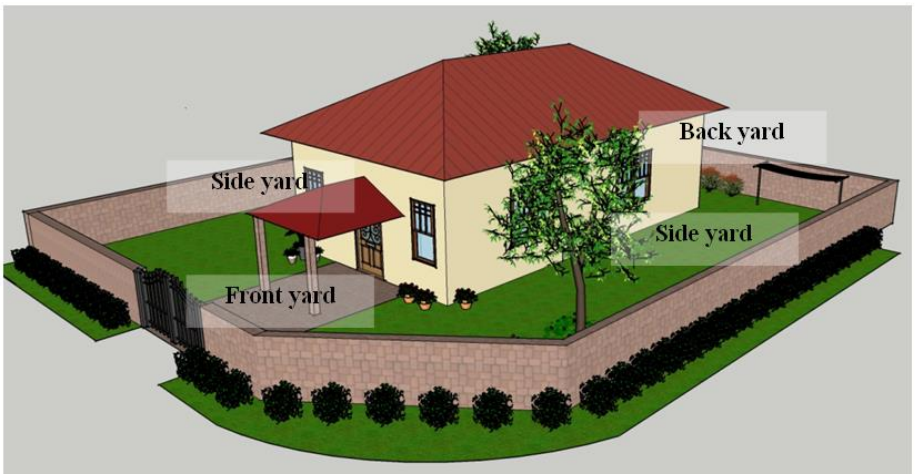


Figure 9.19: Axonometric view of basic space requirement for bungalow type house compound

The basic space requirements needed by all types of houses are front yards, side yards and back yards of space compounds in house areas. The elements and characters of each space are determined by the needs of the users for a significant landscape design. A basic landscape design normally applied in the space compounds of houses are fully paved with hardscape materials,

open lawns as well as potted plants and arrangement of multiple sizes of plants consisting of trees, shrubs or groundcovers.

For the overall space requirements in residential areas, the use of landscape design is focused on the use of space compounds that cover all vertical and horizontal spaces of house areas. The green technology approach and additional landscape design also play important roles in creating a good residential environment. Thus, the importance of space requirement of landscape design for increasing the value of real estate can be promoted.

The book had investigated the basic landscape requirements in residential areas by studying and identifying basic landscape preferences. With reference to the basic landscape requirements in residential areas, a high level of congruity was found between the answers given by the samples and the objective realities of the residential landscapes. The residents have very clear ideas both on how much green space is really important in residential areas in order to create a sustainable residential environment.

Apart from that, people's habits when they use spaces in the plinth area demonstrate what they preferred most in each house compound. So, based on the findings of the book, there are three major spaces that need to include in house compounds which are spaces that integrate family members, spaces that respond to utilities areas and spaces that accommodate public areas. Therefore, the multifunctional planning and design of green spaces in house compounds (plinth areas) is very important since each resident prefers different types of activities.

Despite the absence of public actions in terms of providing information, encouraging participation and promoting awareness about landscape design, this book can give a clear understanding how landscape design can give significant values toward residential development. The perceptions of the quality and quantity of landscape designs in residential areas can be achieved as the final result of this book.

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