LEVEL OF AWARENESS FOR WIND FLOW ASSESSMENT IN URBAN DEVELOPMENT (MALAYSIA)

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ABSTRACT

A sustainable housing development requires through planning which consider aspect of naturally ventilation buildings, the wind flow around the structure strongly affects the air change rates within the building. Thus, if wind environment that generate sufficient wind speed is design at a neighborhood scale, the energy consumption of air-condition in the area can be significantly reduced. Unfortunately, nowadays development housing not concerns the aspect of wind flow in houses. Besides that, they not realize the wind affects our life in various ways and makes our life comfortable by transporting heat. Unfortunately, public awareness on wind flow is less. This study focused on review of Malaysia's urban planning guidelines, cross-references with Hong Kong guidelines and level of awareness for wind flow assessment in urban development (Malaysia). The information related with review of Malaysia's urban planning guidelines contained in the Department Of Town and Country Planning Peninsular Malaysia in Town and Country Planning 1976 (Act 172) and Uniform Building By-Law 1984. The objectives of this research were to review the potential of insufficient environmental guidelines and policies required for urban development in Malaysia, to understanding the current policies and guidelines approved in Malaysia urban development and to analyses level of awareness for wind flow assessment in urban development in Malaysia. The data was collected by sending questionnaire and interviews to obtain their response on this issue. Results from the analysis show the level of awareness for wind flow assessment in urban development (Malaysia) is very important to improve the quality of our life. As conclusion, planning guidelines of residential areas must consider all aspect of wind flow because of global warming in order to provide more comfortable life for citizen.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The need for energy saving in cities is increasingly recognized in Malaysia. The world trade crude oil price has been continuing increase recently. Since more than 60 per cent of the electricity is generated by gas, which price is related to the crude oil price, it is believed that the electricity tariff may be raised soon in Malaysia (the New Strait Times, 2004). Therefore, in order to maintain a stable economic growth, the government must consider the ways to reduce the dependence on fossil fuels and promote every saving initiation.

In addition, the Kyoto Protocol on global climate change, which urges signatories to cut their greenhouse gas emissions, is expected to come into force from early 2005 since Russia, one of the major contributors to green house gas, has approved rectification. Although currently the protocol refers only for the developed nations, which have huge amount of greenhouse gas emissions, it can be predicted that the developing countries including Malaysia will be required to consent to the protocol in the near future. Thus, it is very important and effective to examine the energy saving means to reduce the green house gas in the course of its economic development.

The last three decades has seen tremendous growth of urban population in Malaysia. Its percentage has increased from 27% in 1970 to 62% in 2000. This

indicates that the current energy consumption in the urban areas has become considerable percentage and expected to further rise in the near future. The present final energy demand is almost 5 times larger than that of 1980's (Malaysia, 2002). Therefore, it is essential for efforts to attain the energy saving objectives in the urban areas in every way.

Table 1.1 Level of Urbanization, Malaysia 1995-2030
(Source: Department of Statistics, Malaysia)

YEAR	URBAN POPULATION (%)
1995	55.6
2000	61.8
2010	68.2
2020	73.5
2030	77.6

A sustainable housing development requires through planning. The integration of environmental considerations into feasibility studies in the planning stage will assist in formulating realistic development parameters, avoid late focus and provide future development agents a clearer indication of the development potentials and environmental requirements of the sites. Moreover, an environmental impact assessment study is required for preventing pollution problems, minimizing environmental damage and avoiding expensive remedial measures in major private and public housing development projects.

Greenhouse gases caused by the use of air-conditioners in residential areas contribute substantially to emissions. Maximizing the use of natural ventilation can significantly reduce the reliance on air-conditioners and therefore emissions. Recent

recognition of the need to save energy has been the catalyst for a reassessment of the important of natural ventilation.

For naturally ventilation buildings, the wind flow around the structure strongly affects the air change rates within the building. Thus, if wind environment that generate sufficient wind speed is design at a neighborhood scale, the energy consumption of air-condition in the area can be significantly reduced. In addition to the benefit stated above, wind flow plays an important role in diffusing air pollution and heat at an urban scale as well as a neighborhood scale.

1.2 Problem Statement

According to statistics of the Ministry of Housing and Local Government, approved construction of housing units to private developers for the January to December 2009 was 97,716 units. This shows the housing industry in this country is an industry that is being grown as house demand is high in the area that having population density that high.

At present, development housing not concerns the aspects of the wind flow in houses. This will cause the occupants to feel uncomfortable due to heat at home. The simplest and the most effective solution for active cooling are by introducing air conditioning.

Current energy consumption in urban areas is therefore a very significant percentage of total energy consumption in the country and it is expected to rise further in the near future. The present nationwide final energy demand is almost five times larger than it was in 1980 (Malaysia, 2002a). Thus, it is essential to introduce energy-saving strategies to urban areas wherever possible.

1.3 Significant Of Study

The wind affects our life in various ways. The wind usually makes our life comfortable by transporting heat. Unfortunately, public awareness on wind flow is less. Due to this, from studies result society will start to realize how importance wind flow to ensure healthy life style and comfortable without health interference. This survey results also can be a guideline and reference to Town and Country Planning and Local Authority and hoped that this can help in enhancing wind flow quality in a houses. In the end of survey results, hoped guideline on wind flow able entity so that occupant feels comfortable and health.

1.4 Objective

The general aim of this dissertation is to investigate planning guidelines for tropical climate like Malaysia to improve the environment sustainability at project planning stage in Malaysia related to wind flow in urban development.

The specific objectives are followings:

i). To review the potential of insufficient environmental guidelines and policies required for urban development in Malaysia.

ii). To understanding the current policies and guidelines approved in Malaysia urban development.

iii). To analyses level of awareness for wind flow assessment in urban development in Malaysia.

1.5 Scope and Limitation of Study

The scope of the research carried out to ensure that the research does not become too large. In addition, it is also to ensure that the study is in within the control of authors in saving time and cost. This study focused on review of Malaysia's urban planning guidelines, cross-references with Hong Kong guidelines and level of awareness for wind flow assessment in urban development (Malaysia). The information related with review of Malaysia's urban planning guidelines contained in the Department Of Town and Country Planning Peninsular Malaysia in Town and Country Planning 1976 (Act 172) and Uniform Building By-Law 1984. The Department Of Town and Country Planning Peninsular Malaysia is under Ministry of Housing and Local Government (KPKT). Besides that, the information related with Hong Kong guidelines contained in the Planning Department of Hong Kong.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Malaysia's town planning system emanated from the English development plan system. The development plans under Malaysia's Town and Country Planning Act, 1976 consists of a Structure Plan prepared at the state level and local plans prepared at the local levels. Although the planning statute has been amended a few times to make the planning system more consultative in nature, any proposed institutional framework must still work within a top-down approach in the planning hierarchy.

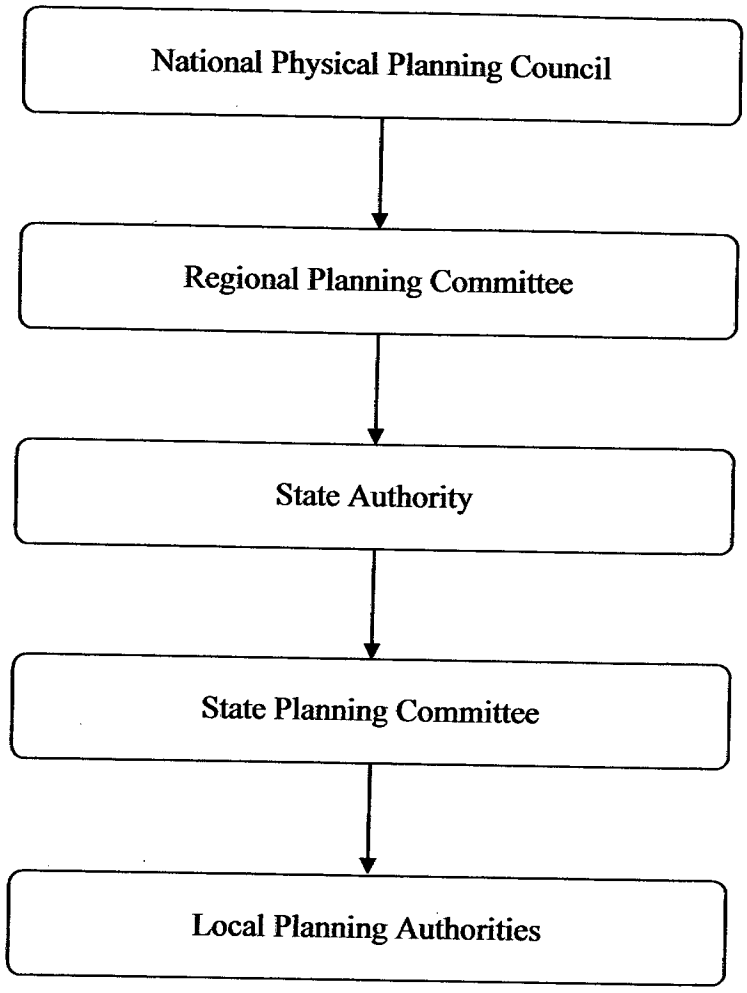

Figure 2.1: Planning hierarchy in Malaysia
(Source: Journal Institutional Framework for Metropolitan Regional Planning: Challenges In Malaysia)

2.2 Review of Malaysia's Urban Planning Guidelines

The wind affects our life in various ways. The wind usually makes our life comfortable by transporting heat. Unfortunately, awareness level among Malaysia people on wind flow is less. Such incidents are visible clearly in Town and Country Planning 1976 (Act 172) which is being implemented in our country nowadays. Until now, the setback of building only takes count aspect air ventilation, fire prevention and safety as recorded in Uniform Building By-Law 1984. The Town and Country Planning Act 1976 (Act 172) still no specific act about wind flow. The following are

the Town and Country Planning Act 1976 (Act 172) that implemented in our country nowadays.

2.2.1 Building Setbacks

Building setbacks are distance between the buildings of the building lots.

2.2.1.1 Purpose Setbacks

i). Provide spaces for traffic circulation, parking and pavement.
ii). Create clearance for the movement of traffic, the lighting and air circulation around a building.

2.2.1.2 Criteria Setbacks

i). Safety distance.
ii). Air space.
iii). Natural lighting.
iv). Comfort.

2.2.1.3 Three Types of Building Setbacks

i). Front setback
ii). Back setback
iii). Side setback

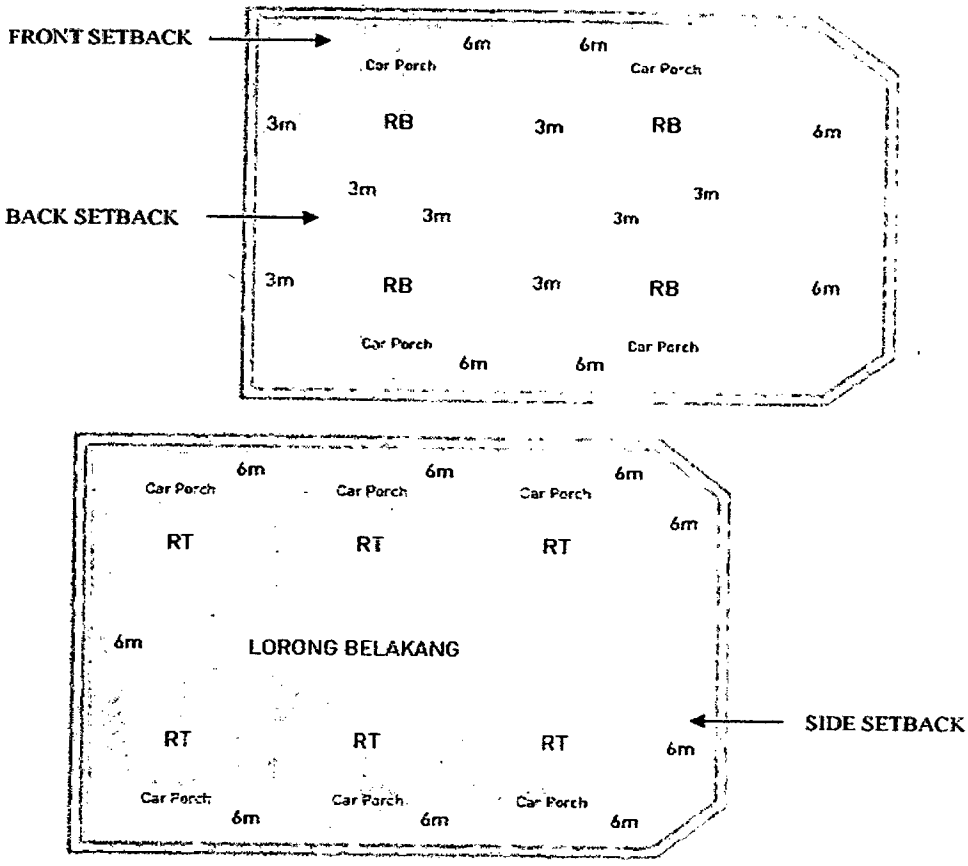

Figure 2.2: Type of Building Setback

2.2.1.4 The Type of Roads

i).	Expressway	:	60m (200')
ii).	Primary distributor road	:	30m – 40m (100' – 132')
iii).	Secondary distributor road	:	20m – 30m (66' – 100')
iv).	Local road	:	15m – 20m (50' – 66')
v).	Service road	:	12m (40')
vi).	Back lane / side lane	:	6m – 7m (20' – 26')
vii).	Cul-de-sac	:	15m x 15m (50' x 50')

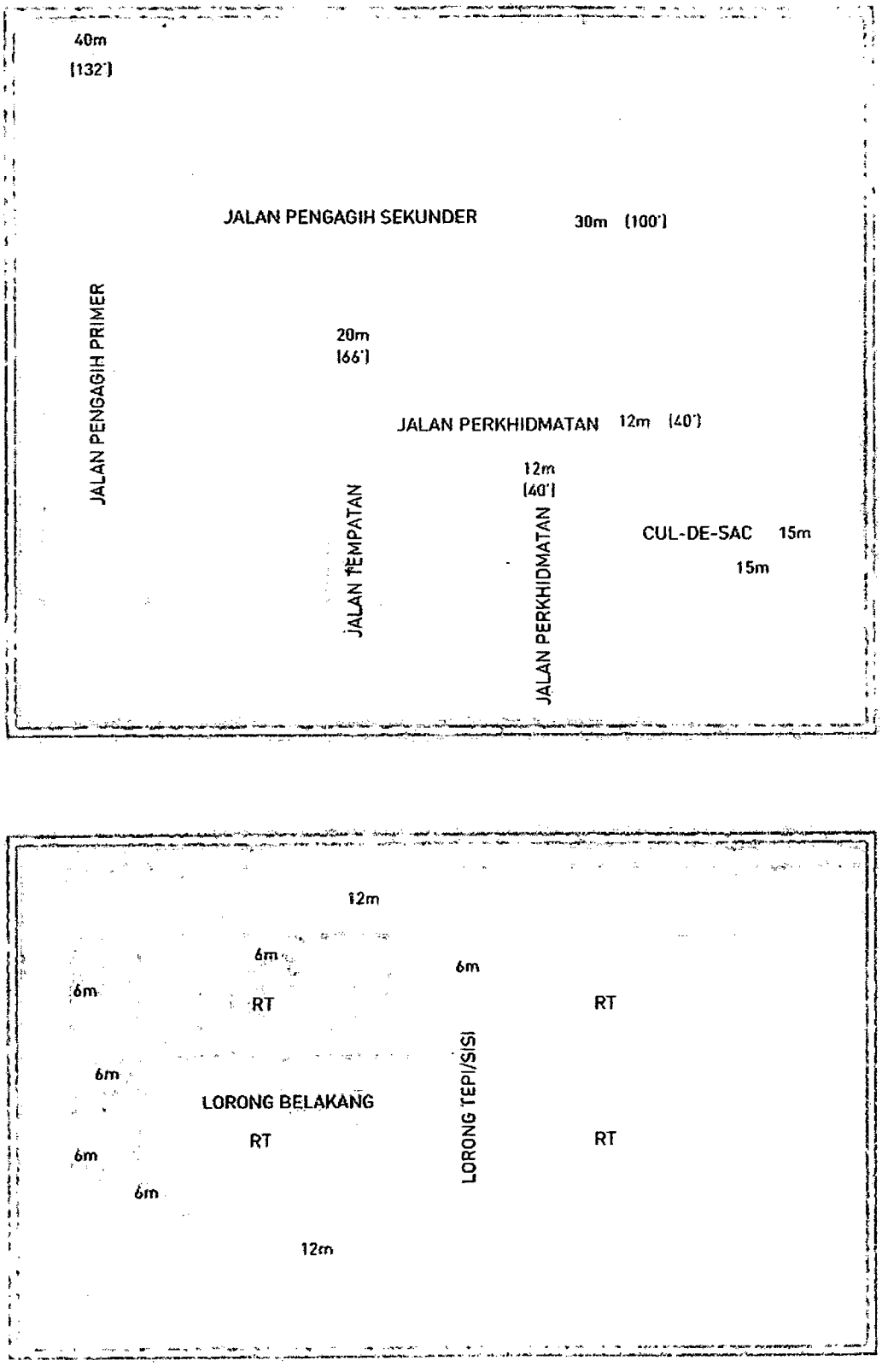

Figure 2.3: Road Hierarchy

2.2.1.5 Housing Density

Density is the intensity of use land as calculated or measured by the number of persons, dwelling units or rooms that can be occupied or any combination of those factors is the unit of land area.

$$\text{Housing Density} = \frac{\text{Number of Unit}}{\text{Area of Site / Lot}}$$

Table 2.2: Average Housing Area

DENSITY	UNIT	HECTARE
Low	< 30	< 12
Median	30 – 60	12 – 24
High	> 60	> 24

Table 2.3: Estimates by Type of Housing Density

HOUSES TYPE	DENSITY						MINIMUM SIZE m^2
	LOW Unit / hec.		MEDIAN Unit / hec.		HIGH Unit / hec.		
Bungalow	3 – 5	7 – 12	6 – 8	15 – 20	–	–	502
Semi-Detached	4 – 6	10 – 15	8 – 12	20 – 30	–	–	260
Terrace	–	–	–	–	12	30	126
Apartments	12	30	24	59	36	89	110
Flats	–	–	–	–	36	89	110

2.2.2 Guideline and Planning Standards to Residential Area

Each development must receive approval from Local Authorities (additional conditions can be imposed by Local Authorities for the benefit of a development project). Diagram following is part from residential area standard which showed building setback.

2.2.2.1 Standard Setback for Bungalow Houses

Follow the Uniform Building By-Law 1984; minimum setback is 10 feet (3.048m) from fence of building to another lot. Furthermore, minimum setback is 20 feet (6.096m) for boundaries at front road. Besides that, width of proposed road is 50 feet (15.242m). (Figure 2.4)

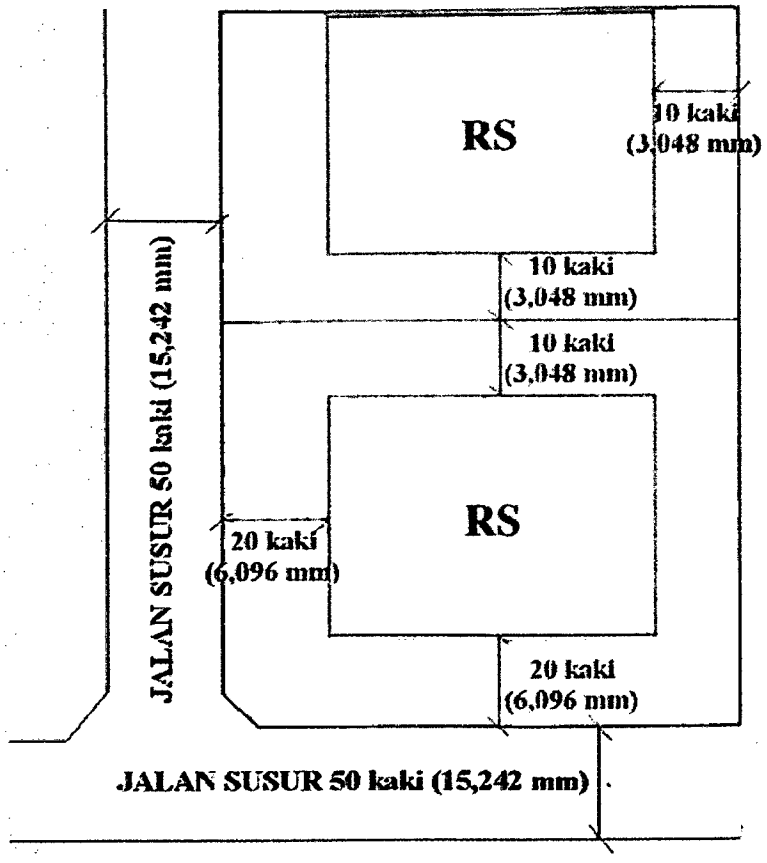

Figure 2.4: Standard Bungalow Houses

2.2.2.2 Standard Setback for Terraces Houses

According the Uniform Building By-Law 1984; minimum setback is 20 feet (6.096m) for boundaries at front road and minimum setback for back lane is 10 feet (3.048m). Besides that, minimum setback for side lane is 20 feet (6.096m) and width of proposed road is 50 feet (15.242m). (Figure 2.5)

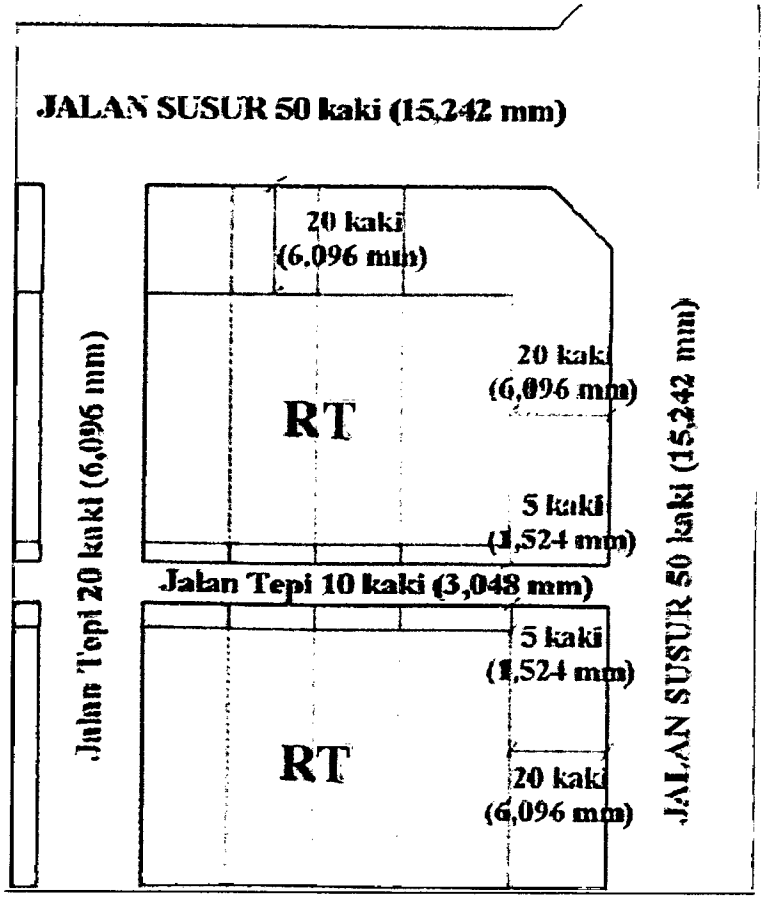

Figure 2.5: Standard Terraces Houses

2.2.2.3 Standard Setback for Semi-Detached Houses

Refer to Uniform Building By-Law 1984; minimum setback is 10 feet (3.048m) from fence of building to another lot. Furthermore, minimum setback is 20 feet (6.096m) for boundaries at front road. Besides that, width of proposed road is 50 feet (15.242m). (Figure 2.6)

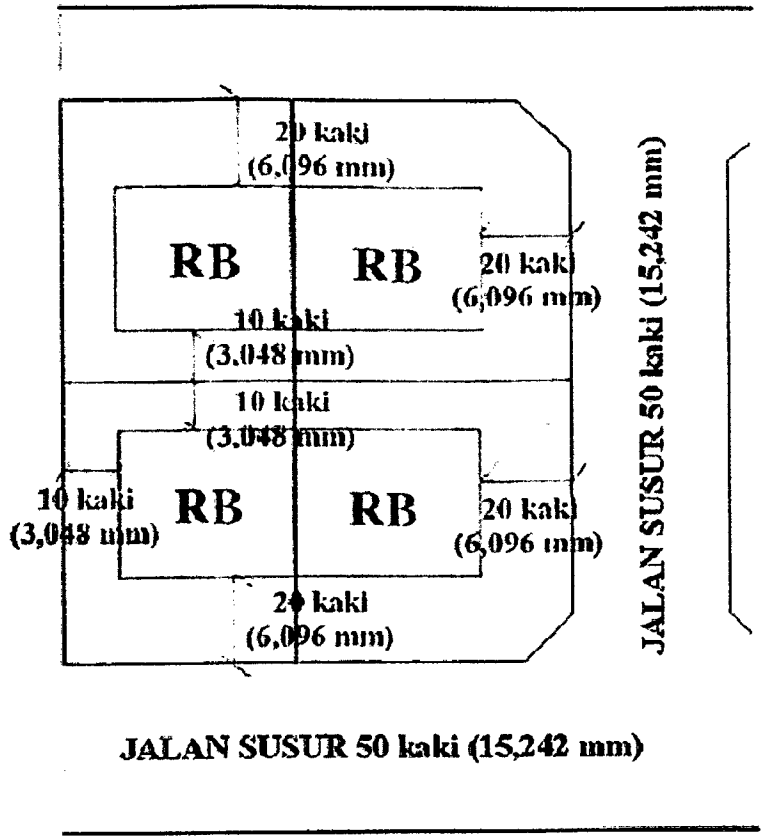

Figure 2.6: Standard Semi-Detached Houses