AN EVALUATION OF LAND DEVELOPMENT REGULATIONS OF URBAN DEVELOPMENT AUTHORITY WITH RESPECT TO URBAN DEVELOPMENT AREAS

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ABSTRACT

Through the land use policies and practices, it is expected to achieve national, regional and local economies, productivity, health and efficiency. Other objectives of those policies, such as improving physical environment, strengthening urban economy, conserving ecological equilibrium and fostering social values. In other wards that should be achieved planned and sustainable urban development. It is, therefore, necessary to formulate rational and long-term land use planning policies.

In the process of urbanization that makes the high pressure on urban lands and demanding lands for various activities. That is basically under four categories of social, economic, physical and environmental aspects. Through the process of urbanization, regulations are challenging when meets the needs of the people

As a policy, land development regulations have been formulated by UDA for the urban development areas and those are practiced by the respective local authority. But when examine the applicability of these regulations in ground level; it is found that the most of regulations are not applicable to most of areas. Especially in the case of hilly urban areas, this situation can be observed.

Therefore, this study was attempted to check the applicability of existing land development regulations which gazette by UDA in 1986.accordingly, this will only check the degree of compliance of the development to the existing land development regulations in the urban development areas which declared by UDA. Accordingly to the results of the study, it was revealed that land subdivisions which evaluated; 73% are only compliance to the existing land development regulations and 90% are comply to the building regulations by the existing buildings in the flat land area. But this situation is totally different in hilly urban area in the case of regulation applicability. According to the analysis of the hilly land area, it is revealed that 60% is only compliance with the existing land subdivision regulations. In other wards 40% of existing land subdivision regulations is in the inapplicability situation. When examine the condition of building regulations, it was found that only 35% is only in applicable situation. It

means that the 65% of the building regulations are not comply with building developments in the hilly land areas.

In addition to above analysis, it was conducted the professional perception survey. The objective of this survey was to identify the professional experience in applicability of land development regulations. According to the survey, it was revealed the 70% professionals are not satisfied with existing regulations. According to above survey, most of land development regulations are in inapplicable condition specially areas of hilly land.

Accordingly, this study attempted to check the applicability of existing land development regulations which practiced in urban areas. In the mean time it was identified the inapplicable regulations. Therefore it is needed to reconsider this regulations and it should be re Gazettes them to achieve plan and sustainable urban development.

DECLARATION

I declare that this Research Project represents my own work,accept where due acknowledgment is made and that it has not been previously included in a thesis,dessertation,or report,submited to University of Moratuwa or other qualifications.

I wish to also declare that total number of words in the body of this report(excluding the appendices and Bibiliography) is 10971

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Group : 2008

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Date : 30Th November 2009

CERTIFICATION

I certify herewith that Ekanayake E.M.S.B Index No 07/9603 of the 2008/2009 Group has prepared this Research Project under my supervision

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Signature of the Principal Supervisor

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Head of Department of Town and Country Planning

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CHAPTER 01

1.0 INTRODUCTION

1.1 Background

This Chapter provides an introduction to the entire research, which has researched in to appropriateness of land development regulations and its influence to the land development. In addition to that, this chapter describes background and motivation for the conduct of the research and will explain the existing issues in relation to the land development regulations. Finally this chapter describes the aim, objectives and scope and limitations.

Land development regulations play very important role in the context of development in the urban areas. These regulations are being practiced since the colonial period. Especially this has commenced with the introduction of Housing & Town Improvement Ordinance in 1915. Since then many planning enactments were made such as; Town & Country Planning ordinance, Urban Development Authority act and Town and country planning amendment act. Through the land development regulations it is expected to achieve sustainable urban development through orderly planning.

But, when examining the urban context of Sri Lanka; it is observed that the unauthorized developments violated the regulations despite the existence of sound and effective land development regulations.

Land is a very important factor for any development and we all are aware, that the land is considered as scarce resource. Land unlike the other factors, is strictly limited in supply.

The consequence of urbanization makes the demand for urban land (spaces). The urbanization can be simply defined as concentration of population in an urban area where all the infrastructure facilities are available. But it has been defined in many ways by various intellectuals. "Social change on a vast scale; it means deep and irrevocable changes that alter all sectors of the society. Apparently the process is irreversible ones begun the impetus of urbanization upon society is such that society gives ways to urban institution, urban value and urban demand" (McGee T.G 1979)

In an urban area land related issues are very acute problem due to the scarcity of lands. Eventually urbanization makes the high pressure on urban lands and demanding

lands for various activities such as basically under four categories of social, economic, physical and environmental aspects. But in the case of supply for such demand is progressively a slow process. Especially land supply is respond to the demand through the land subdivisions, land pooling and high rise developments. In this process, land development regulations play its role to maximize the expected objectives.

Accordingly, when examining the Asian regions urbanization, it is found that the features of urbanization process depend on demographic economic and social factors. The demographic aspects of urbanization process mean increase in urban population in comparison with the rural areas. Social transformation which take place with the industrial growth and technological change will manifest itself in the migration of population from the village to the town and cities" Mendis M.W.J.G(1982)

Though the land use policies it is focused on to achieve objectives such as national & regional economies, productivity, health, efficiency and harmonious relationship between areas. But in reality, most of the above objectives have not been achieved to a considerable level. Accordingly, it is noted that there is a gap between theoretical and practical situation in the application of land development regulations in the urban areas. Therefore this study is focused in identifying impracticable regulations which are practiced and factors that should be considered for the formulation of the regulations.

1.2 Problem Definition

Through the land use policies and practices, it is expected to achieve national, regional and local economies, productivity, health and efficiency. It is, therefore, necessary to formulate rational and long-term land use planning policies. The objectives of objectives such as: improving physical environment, strengthening the urban economy, conserving the ecological equilibrium and fostering the social values. In addition to it; that create a harmonious relationship between areas, Providing for a planned and orderly development of an urban area, Satisfying the diverse needs of the community, Promoting a strong urban and regional economies, Helping the inhabitants of the city develop social cohesiveness, Minimizing misuse, preventing abuse, regulating and guiding reuse of land. But when taking into consideration of the real situation in the ground level, it appears different from the objectives.

The Urban Development Authority (UDA) as a prime agency for integrated urban development, it is responsible for the formulation of land development regulations for the urban development areas in Sri Lanka. It is found that about 240 local authorities have been declared under UDA Law as an urban development area. (Annexure 1).

Until the development plans are Gazetted for the declared areas, land development will be regularized by the general regulations which was Gazetted by UDA in 1986.In practice, general land development regulations are used as a tool to monitor the orderly land development in all over the declared areas under UDA law. In addition these regulations are directly included in the new development plans too. These general land development regulations have been formulated assuming that all urban areas are same with qualities of social, physical, economic and environmental conditions. But, when critically analyzed all urban areas in the country; it differs one place to another. Especially geographical features differ from flat land to hilly land areas. When applying the general planning and building regulations to all these urban areas equally irrespective of the differences of land, it creates problems. As consequence the objective of regulations were not achieved. Especially following regulations which have been become challenging to apply in the urban areas hilly land.

Plot size: the minimum plot size is 6P.for residential and commercial development. When developing the 6P, it is assumed that the entire infrastructures such water supply, solid waste and sewer disposal systems are in existence; but it arises problems infrastructure are not present.

Accessibility: this regulation can not be applied in an area where footpaths (alleyways) as well as steps are available in hilly areas. This regulation becomes ineffective. In addition to it, turning circles regulation too can not be implemented in hilly urban areas. **Building line:** since not having Gazetted all the building lines of roads in urban areas that becomes problems to apply this regulation. Street lines are only provided main roads. Especially it is very difficult to apply for the new blocking outs. Keeping the building lines for the developments in hilly areas is very difficult because of slope angle. Therefore it is observed that this regulation is violated most of the urban areas in the hilly country. **Rear space:** this regulation can be apply in flat lands and not applicable to the hilly land areas. If even applied, meaning of this regulation is not derived. **Building height:** in flat land areas, this regulation is not problem to apply .but in the case of hilly areas calculating the building height is

problematic. Because of slope lands having more foundation structures that are can not considered as foundation structures which having more than one views. **Open space:** in land subdivisions which exceeds more than one Ha. It should be allocated 10% of lands for the community and recreational uses. But most of the time developers allocate open spaces from non useable lands. In addition to that property developers are tend to sub divide lands less than one Ha. lands. The issue is that the accumulation of all small subdivisions requires the open spaces. **Drainage:** when examine the all urban areas, it is noted that floding, inundation. This has been led to health problems also. It is resulted on poor drainage systems.

In order to control this situation, provisions have not been given by the general regulations. Accordingly, it is observed that lots of problems and issues have been created because of weak regulations. Therefore It should be reexamined the applicability of above regulations, since the General regulations are aged more than 25 years. It is time to regazette them which suite to present context of urbanization.

Accordingly, in the study it is expected to identify problems which are connected General planning and building regulations and solutions to them, in order to achieve planned development with a view of sustainable urban development, while reaching to expected above objectives in urban development areas.

1.3. Research Objective

In this research, the issue of inappropriate land development regulations through rational planning has been addressed by introducing new aspects into the urban planning. The new approach has been evaluated by selecting 20 professionals with different level of experience in town planning. The aim of this research is to identify inappropriate and inapplicable land development regulations into urban development planning to achieve planned and sustainable urban development.

Objective 1

To identify the inappropriate and inapplicable land development regulations that that have been practicing in the Urban Development Areas which are declared under UDA law and will check the relationship between topographical variations and regulation violations.

Objective 2

To identify the causative factors for the inapplicable land development regulations in urban development areas.

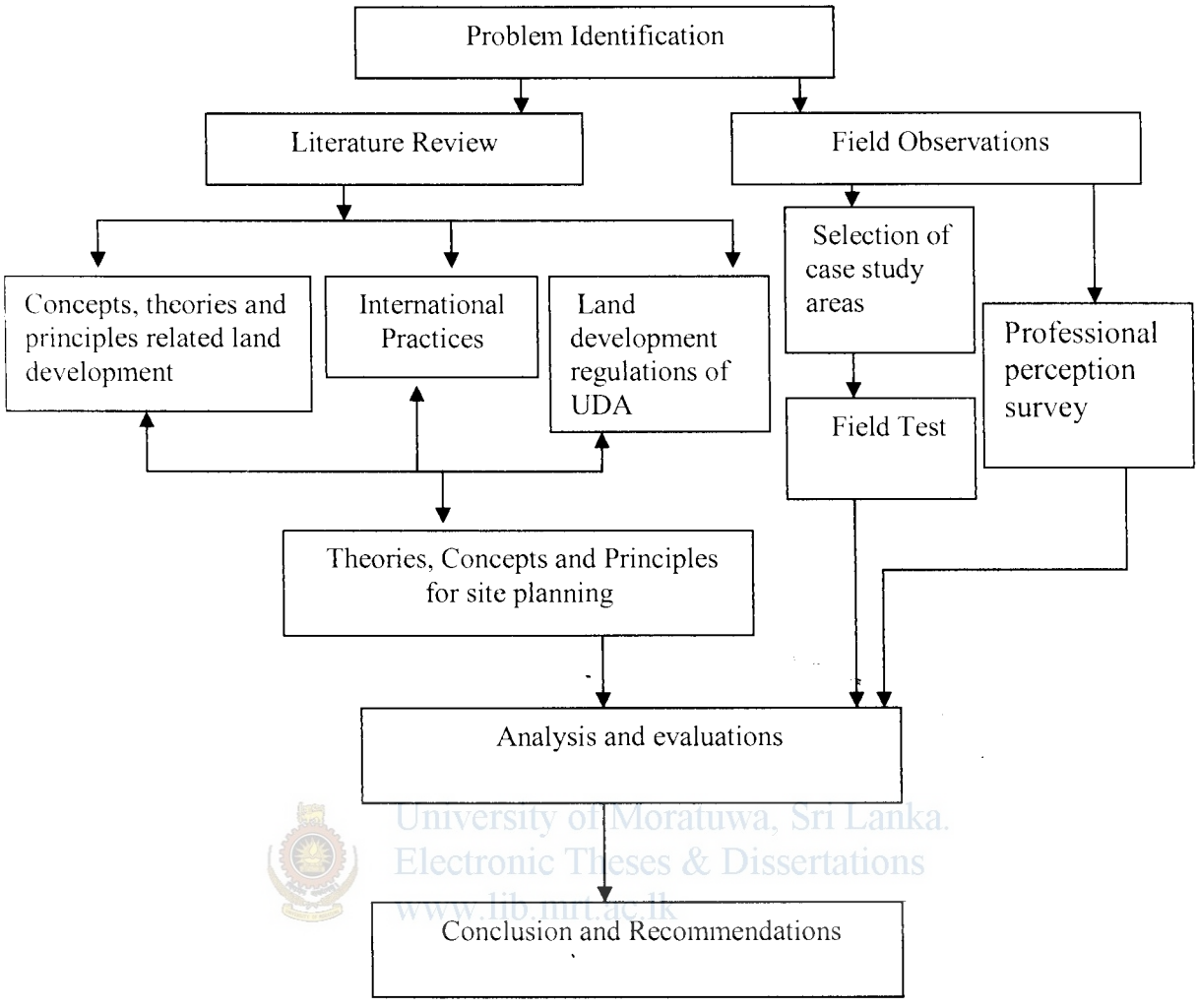
1.4 Methodology

The study was prompted by the author's observations in the field as well as by the on going discussions on the condition of urban development environment. The study adopted both empirical and concepts approaches for the purpose. Having reviewed the literature on land development regulations, urban process, site planning and standards and planning theories, established the theoretical framework. After that it was selected the land development variables for the regulations from literature review. Then it was conducted the professional perception survey form the Town planners who are currently involved in urban planning. In addition to that field observations are also expected to carry out in hilly areas and flat land areas. Then evaluate the current land development regulations in terms of applicability and with aspects of environmental, economic, physical and social aspects.

1.5 Scope and Limitations

It should be mentioned that this study is mainly focused on to evaluate land development regulations (Planning and building regulations) formulated in 1986, and to check only the appropriateness of regulations. The scope again is limited to urban development areas which are declared under UDA law. Hence this study will include problematic land development regulations in those areas. In this context two different geographical areas have been selected. The theoretical framework evolved in the study will be based only on currently available literature.

Methodology



CHAPTER 02

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter of the study attempts to short review the knowledge of the theoretical background relating to the land development and its guiding regulations, process of urbanization, property development and neighborhood planning in the urban area.

The process of urbanisation is irreversible; therefore it is important to examine in the context of Sri Lankan situation and problems and issues caused by same. One major issue is the huge demand for the land and land developments are taking place in unauthorised manner and with the violation of land development regulations.

"Urbanisation, in its most general sense, refers to the complex set of process by which the proportion of a country's population concentrated in urban areas increase over time" Bryant C.R (1982),

Therefore, through the urbanization, population is concentrated on to a limited urban area and highly demanded for urban resources.

Therefore process of urbanisation can be identified, as power full factor; which could change natural set up of the society. Bryant has defined the process of urbanisation as follows.

"Social change on a vast scale it means deep and irrevocable changes that alter all sectors of the society. Apparently the process in irrevocable once begun the impetus of urbanisation upon society is such that the society gives ways to urban institutions, urban value and urban demand"

The need for planning becomes ever more necessary in the light of the increased social, economic and environmental impacts of urbanization, growing consumption levels and renewed concerns for sustainable development since the adoption of Agenda 21 (United Nations Centre for Human Settlements, 1996, p. xxxi)

2.2 Land and land development

the land is crucial factor in the context of urban development. Therefore, it is appropriate to define the same.

According to Brown L. (1993) the land is defined as "land, ground or territory held as public or private property, landed property (in law usually) together with any buildings ect. above the ground and any minerals, mines etc

According to economics, land can be considered as one of the factor of production, land comprises all kinds of natural resources the natural fertility of the soil, mineral, wealth climate, ect. David Ricardo considered land to be fundamentally different from the other factors of production in three ways.

i) land was a " gift of nature" that is It owed nothing to man's efforts as it did capital
ii) land unlike the other factors, is strictly limited in supply
iii) production in industries primarily depend on land was peculiarly subject to the law of diminishing returns

In addition, it is important to defined the means of property, because "The word property" is frequently used indiscriminately to denote not only objects of rights that have a pecuniary content but also rights that persons have with respect to things. Thus, land and chattels are said to be property and rights, such as ownership, life estates, and easements, are likewise said to be property. Accurate legal terminology, however, usually reserves the use of the word property for the designation of rights that persons have with respect to things."

As to the Kieve J.I. (1977) " the property market deals in rights and interests in land and buildings; transaction involving heterogeneous units of high value in many sub markets-shops, offices, houses,- reflect variations in buyers, sellers, local knowledge and unique vocational factors"

Property development also part of the land subdivision that can be defined as follows.

2.3 Land and Property Development

The property development is also very important in the context of land development. that can be defined as follows.

"Property development is an industry that produces buildings for occupation by bringing together various raw materials of which land is only one. Others are building materials, public services, labour, capital and professional expertise." Cadman D. Crowe L.A. (1978) Thereby it brings the difference between the real estate and the property development further land subdivision is major a part of property development that can be defined in this way. Accordingly, this industry primarily involved in servicing land and subdividing real property into lots, for subsequent sale to builders. Servicing of land may include excavation work for the laying of roads and utility lines. The extent of work may vary from project to project. Land subdivision precedes building activity and the subsequent building is often residential, but may also be commercial tracts and industrial parks. These establishments may do all the work themselves or subcontract the work to others.

2.4 Land development and Planning

Planning can be defined in many ways. Through planning, it is expected to achieve best and highest use of the land with optimizing the prime aspects of social, economics, physical and environmental aspects.

The town planning has been defined by the Lewis Keeble, (1969) as "The art and science of ordering the use of land and the character and citing of buildings and communication routes so as to secure the maximum practicable degree of economy, convenience and beauty". Good planning at a local scale involves identifying the ways to balance economic viability, public safety, accessibility, and amenity.

Accordingly, planning can be classified in the following way

The roles of central and local government in planning	
Central government	Local government
• Legislation & Regulations • Policy Guidance • Powers in Development Plans	* Development Plans - Structure Plans - Local Plans - Unitary Development Plans
• Powers in Applications and decide on Appeals	* Development Control - Planning Applications - Permissions and Conditions - Enforcement
• Research & Monitoring	* Special controls - Conservation Areas - Listed Buildings - Hazardous Industries

Source: Philip Allmendinger et al. Introduction to Planning Practice 2006

The planning system regulates the development and use of in the public interest. The system as a whole and the preparation of development plans in particular, is the most effective way of reconciling the demand for development and the protection of the environment. Thus it has a key role to play in contributing to the Government's strategy for sustainable development by helping to provide for generations to meet their needs (Development of the Environment and the Welsh Office, 1992).

There should be objectives to achieved in a development plan. Accordingly, Philip Allmendinger (2006) identified the Following objectives are to be achieve from the development plan.

- minimize the loss of green space
- minimize the loss of and damage to historic building and archaeological sites
- favors a high degree of local recycling of water permeability of the ground
- green-up the site as mush as possible
- consider the wider environmental implications of materials used
- improve energy efficiency of new buildings and encouraging the use of renewable sources of energy
- minimize noise and pollution arising from the new development
- encourage the recycling of materials and reduce the waste stream
- minimize the use of unsuitable chemicals and ensure proper handling of hazardous materials
- Improve access and facilities for people with disabilities

In addition there are many purposes in preparing development plans. According to the Philip Allmendinger (2006) it can be summarized as follows.

1 Major purpose of development plans

- To indicate how local planning authority envisages its geographical areas developing in future, bearing in mind social, economic and environmental issues.
- To ensure that the provision of essential infrastructure (e.g. roads, sewers) is coordinated with land development
- To ensure coordination and compatibility between plans at different spatial scales, and in the adjoining districts.
- To coordinate the provision of development (e.g. h
  employment land)
- To provide a clear framework for d
  those proposing development.
- To provide some certainty to those see
  to maintain their local environment and
- To safeguard the cultural and natural h
  areas.

so

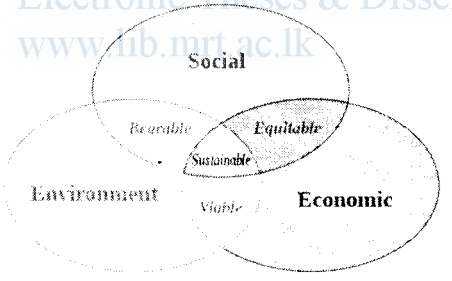
e and

- To act as promotional documents indicating locations of development opportunities.
- To steer development onto land most suited to it.
- To provide vision and a sense of place for inhabitants and existing and potential investors.
- To devise policies at an appropriate level of detail.
- To implement national and regional planning policies.

Sustainable development is interlinked basically with three aspects. namely, social, Economic and Environmental aspects.

Sustainable development is a development that meets the need of the present without compromising the ability of future generations to meet their own need (World Commission on Environment and Development. 1987,)

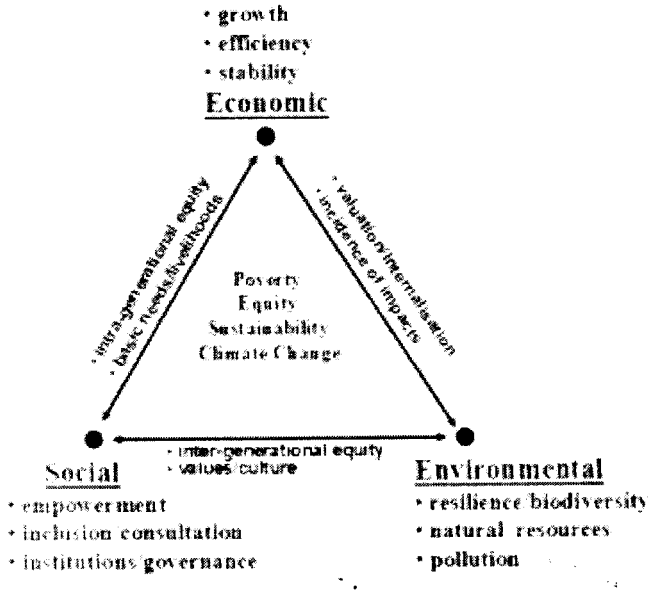
Figure : 2.1 Sustainable Development Three Components



Source: http://upload.wickimedia.org/wikipedia/commons

Through the sustainable development, it is expected to many aspects and that has been explained in a figure 2.2

Figure; 2.2 Sustainable Development Triangles



Source: Munasinghe M. 1994

2.4.1 Development plans and sustainable development

Since the publication of government's environmental strategy in 1990 (Department of the Environment, 1990), development plans have been generally seen as having a key role in assisting the delivery of sustainable patterns of development by taking environmental considerations comprehensively and consistently into account through careful long- term planning in this way:

- By environmental protection and improvement
- By facilitating the social and economic requirements of the population
- By protecting local regional and global natural systems and resources

According to the Philip Allmendinger (2006) he has identified following ways to assist the sustainable development through the planning.

- by encouraging development which makes full and affective use of land within existing urban areas;

- by guiding development to locations that are closely related to public transport networks, such as near an existing rail or bus station with spare capacity;
- by guiding new development types (such as office and retailing) that attract trips to locations (such as town centre's) which are capable of acting as nodes for public transport networks, discouraging car use, and enabling one journey to serve several purposes;
- by guiding new housing to locations where the need to use private cars for journeys to works, school and other facilities is minimized;
- by limiting town centre car parking (whether public or as part of other development);
- by identifying land for appropriate interchange opportunities between major public transport networks (such as a bus station adjacent to a rail station);
- by providing positive encouragement of facilities to increase the attraction of walking and cycling.

2.5 Land development and Site planning

Through the site planning it is expected to integrate all the disciplines which are involved. "Site planning is the art of arranging structures on the land shaping the spaces between an art linked to architecture, engineering, landscape architecture and city planning. Site plans locate objects and activities in space and time. These plans may concern small clusters of houses, a single building and its grounds, or something as extensive as a small community built in a single operation

Site planning aim is moral and esthetic: to make places which enhance every day life – which liberate their inhabitants and give them a sense of the world they live in"

Today site planning is shallow, careless and ugly. This reflects lack of skill, but also suburban structural problems of our society, which are which are political, economic and intuitional. Kevin Lynch (1986)

Site planning is a crucial aspect of environment. It has a biological, social and psychological impact that goes far beyond its more obvious influence on cost of technical function.

"Every site, natural or man made is to some degree, unique, a connected web of things and activities.

The site is analyzed for its fitness for the purpose of the plan so it will be seen differently by people who are considering different uses for it. But the designer must also look at the site in its own right. As a living community of plants and animals (including human animals) People and their habitat coexist. As humans multiply and their technology comes to dominate the earth, the conscious organization of the land becomes more important to quality of life"

Site planning then is the organization of the external physical environment to accommodate human behavior. It deals with the qualities and locations of structure, land activities and living things. It create pattern of those elements in space and time, which will be subject to continuous future management and change. The technical output – the grading plans, utility layouts, survey locations, planting plans, and specifications.

A site is composed of many factors above, below, and on the ground but these factors are interrelated. They have achieved some approximate balance, whether static or moving toward a new equilibrium. (1986)

2.5.1 Factors to be considered in site planning

When doing the site planning, it is important to examine its factors which are more vital in site planning. It can be identified about 8 factors in site planning which enhance the living condition of the people. Those are follows. Kevin Lynch (1986)

(i) Ecology

'The diverse lining species, which capture the energy of the sun, or prey and are preyed upon, line in close relation with their immediate setting of water, earth, and air. Self

reproducing, evolving organisms interact with their changing spatial environment and create a persisting community'

(ii) Behavior

How human beings are acting is usually, the more critical aspect of any place. This can be described in terms of behavior setting, or small localities, bounded in time and space, within which there is some stable pattern of purposeful human behavior, interacting with some particular physical setting.

(iii) Soil

Beneath the surface, our first consideration is the soil. The pulverized mantle formed from rock and plant remains by the action of weather and organisms,

(iv) Engineering class of soil

The engineering classification, refers to the enact composition of a particular soil body, wherever it occurs, as it is determined by laboratory tests on field specimens. It allows accurate predictions of bearing capacity

(v) Soil as plant medium

The top soil is the critical medium for plants. In this case, its important features are its drainage, its content of humus, its relating a city (pH) and presence of available nutrients, particularly potassium, phosphorus, and nitrogen.

(vi) Water table

Perhaps the most important sub surface variable of all is the presence or absence of water. The moisture content of the soil, its internal and surface drainage and the location of the water table.

(vii) Land forms

The topographer surface, the boundary between earth and air, is the zone rich in living things. In itself, topography, sometimes determines a plan. The gradient of paths, the flow

of utilities The use of areas, the disposition of building and the visual form are all dependent on it.

Plant Cover

The plant is a useful sign of soil and weather conditions. The suitability of particular plants for any position depends on drainage, acidity, and humus, and as well as on temperature, sun light moisture, and wind.

(iv) Site character

The local association of plants, persons, and other animals all depend on another, together with the surfaces and structures the inhabit, give the site. Its essential character.

(v) Climate

The general climate of a region sets the stage and is expressed in data on temperature, humidity, precipitation, cloudiness, wind speed, wind direction and sun path. These are the constrains within which the site planner operates.

(vi) Body Comfort

Effective temperature is the sensation produced by the combination of radiation, ambient temperature, relative humidity, and air movement.

Most people tolerably comfortable at temperature ranges between 18 and 26 °c (65 and 80 °F) as long as the relative humidity lies between 20 and 50%

But these sensations of comfort are also affected by previous experience, by cultural back ground, by age, and the degree of activity.

eg: united state 22 °c(72 °F) ideal temperature

A general analysis of the prevailing local climate furnishes impotent clues in arranging the site.

(vii) Slope and climate

The slope of the ground has an added climatic effect. The orientation of the ground with respect to the sun and the way in which the topography affects air movement are the principal influences here.

Topography and air movement

Topography affects climate by its influence on air movement as well as by its orientation to the sun.

(viii) Noise

The control of outdoor noise is a subject in its own right. Sound sources are increasingly ubiquitous and powerful, as we expand our consumption of energy, since most modern noise is a form of wasted energy.

Noise levels are measured in decibels a logarithmic scale that is o at the threshold of hearing and 140 at the threshold of pain. In most locations, we like to keep noise levels down below 55 decibels in any outdoor area. 40 decibels to study or to sleep.

All factors of such as the conditions below ground, the surface form, activity and life, the structures and utilities, the ocean of light and air that envelops them and the human meanings, rights, and regulations make up the nature of a site.

In the site development, it should be focused on to user requirement. In natural user is the person who gets all benefits and losses from site. User defined as follows.

"User" means all those who interact with the place in any way: live in it, work in it, pass through it, repair it, and control it. Profit from it, suffer from it, and even dream about it Kevin Lynch (1986)

According to the Kevin Lynch (1986) there are six objectives to be achieved. Those are as follows

2.5.2 Objectives of Site planning

(i) Habitability

Our first concern is for our biological requirements or vital support of a place. Any environment may be judged by the degree to which it supports human vital functions and matches the capabilities of our bodies. In the negative, by the incidence of disease, polluted air, noise, poor climate, glare, dust, accidents, contaminated water, toxic wastes, or an unnecessary stress.

(ii) Sense

A place must not only fit the structure of our bodies it must fit the way in which our Mindy work now we perceive and image and feel places should have a clear perceptual identity be recognizable, memorable, vivid, engaging of our attention. Psychological and environmental identify are linked phenomena and so a key formations of a place may be its support of our inner feelings of coherence and continuing.

(iii) Fit

Good environment supports purposeful behaviors it makes a good fit with uses actions is there space to carry out that action? Is the site equipped and managed for it? Does the setting reinforce its mood and strachere? In other words are the behavioral settings adequate for their purpose and free from internal caflret? Of judge this the designer must understand the prevailing this of life.

(iv) Access

Any site is concerned with access, the degree to which users can reach other persons services resources information other persons services resources information or places. This is a fundamental advantage of any organized site a quality we are accustomed to when dealing with traffic circulation but two of ten neglected in regard to other kinds of access.

Many of the recurrent constitutions of site planning have to do with privacy with social interaction with the distance to shaping, jobs, or school, with preferred linkages between various activities as well as with provisions for cars transit, bicycles and pedestrians.

(v) Control

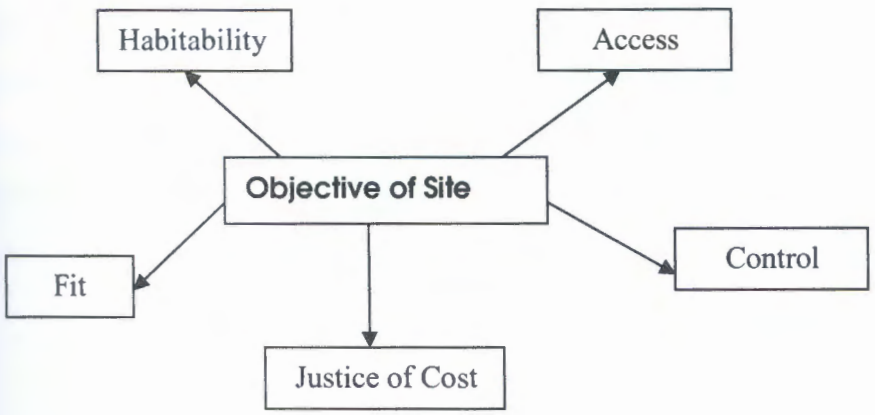
The ideal environment is one controlled in all its essential respects by those who Ute it, who there by have the greatest stake in its quality and are most familiar with its requirements.

(vi) Justice of cost

These basic criteria of vital support, sense, fit, access, and control are the enduring objectives of any site design can tenuous threads which run through all fabrics of place and people. Justifier or how these environmental good are distributed among those who will in habit the site.

Cost, which is an accounting of what quantities of other benefits, Must be given up in order to achieve these environmental benefits.

Figure: 2.3 objectives of site planning (Land Development)



2.6 Land development for the Residential purposes

Residential site selection is more crucial than any development. In this context many factors should be considered wisely.

2.6.1 Importance of Site Selection

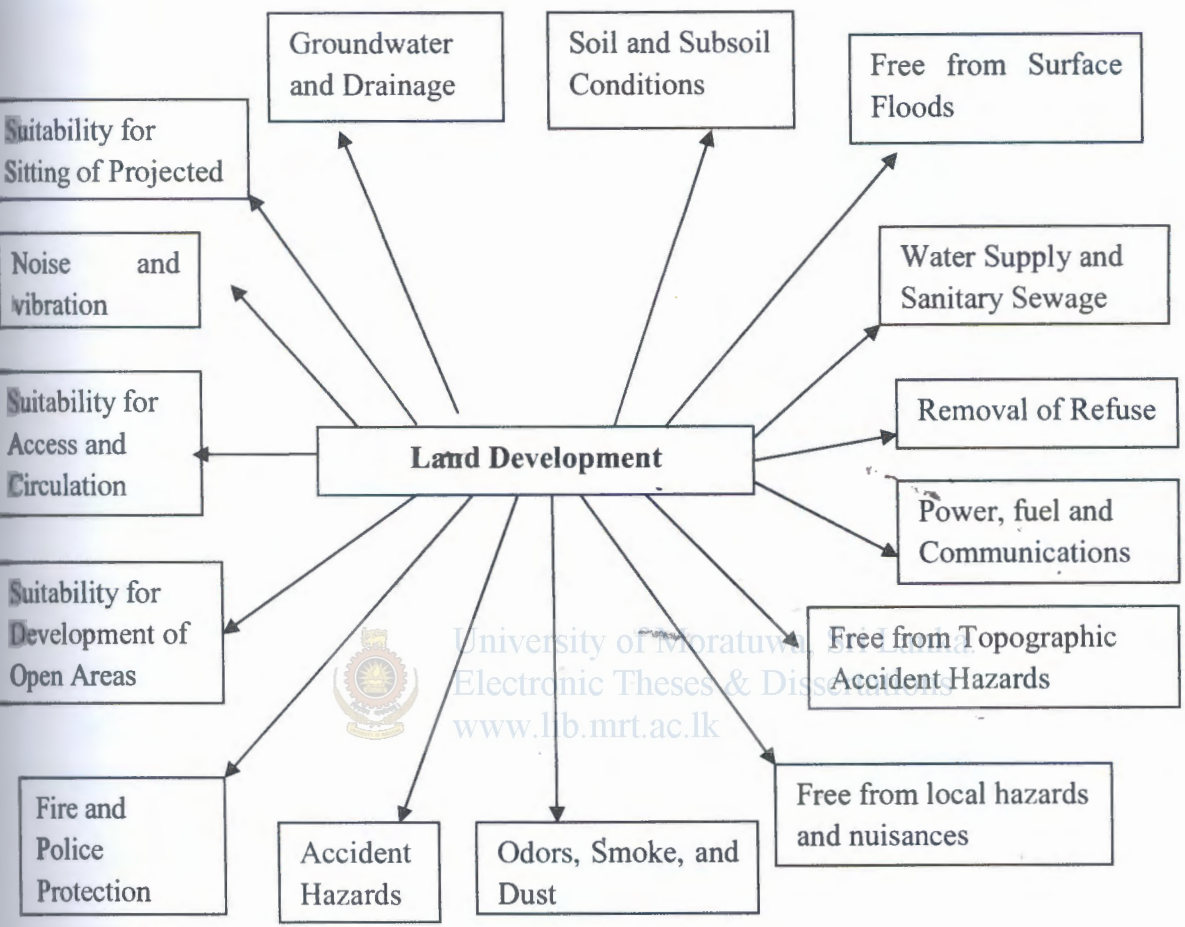
The purpose of selecting a site for residential development may be summarized as follows: to procure a site which is suitable for physical development, including the installation of utilities, and for the provision of dwellings, a circulation system, and neighborhood community facilities in a well-planned manner (all within the economic means of a definitely visualized group of families), and which is free from any unfavorable environmental factors.

The selection of a site for a neighborhood, housing project, or subdivision is an irrevocable step that often makes the difference between success and failure. It is for this reason that site selection assumes such critical importance.

2.7 Essential Physical Characteristics of the Site

The following conditions for health development and maintenance must be borne in mind in the selection of a site. Joseph De Chaiara and Lee E. Koppelman (1978). That can be summarized as follows. Soil and Subsoil Conditions, Groundwater and Drainage,Free from Surface Floods, Suitability for Sitting of Projected Buildings, Suitability for Access and Circulation, Suitability for Development of Open Areas, Free from Topographic Accident Hazards, Water Supply and Sanitary Sewage Disposal, Removal of Refuse, Power, fuel and Communications, Fire and Police Protection, Free from local hazards and nuisances, Accident Hazards, Noise and vibration, Odors, Smoke, and Dust,

Figure 2.4 **Essential Physical Characteristics of the Site**



2.7 Land Subdivision

In order to meet the demand for the Land, land supply is done in the market system. The SCPEA included the following definition: Subdivision means the division of a lot, tract, or parcel of land into two or more lots, plats, sites, or other divisions of land for the purpose, whether immediate or future, of sale or of building development. It includes re subdivision and, when appropriate to the context, relates to the process of subdividing or to the land or territory subdivided.

For the purpose of sale or of building development: Every division of a piece of land into two or more lots, parcels or parts is, of course, a subdivision. The intention is to cover all subdivision of land where the immediate or ultimate purpose is that of selling the lots or building on them. The object of inserting a definition in the text of the act is to avoid the inclusion, within the planning commission's control, of such cases as a testator's dividing his property amongst his children, partners' dividing firm property amongst themselves on dissolution, or cases of that nature.

The land subdivisions are done under the zoning strategy in the development plans for the local authority areas. The zoning can be defined as follows.

According to the Urban Development Authority act 1982, UDA must be preparing a development plan which declared under UDA law. That is mentioned in the planning procedure.

2.8 Land development related Planning Laws in Sri Lanka

When examine the evolution of the planning law in Sri Lanka, The first planning Law was introduced to Sri Lanka in 1915 by introducing Housing and Town improvement ordinance. The evolution of the planning law can be identified as follows.

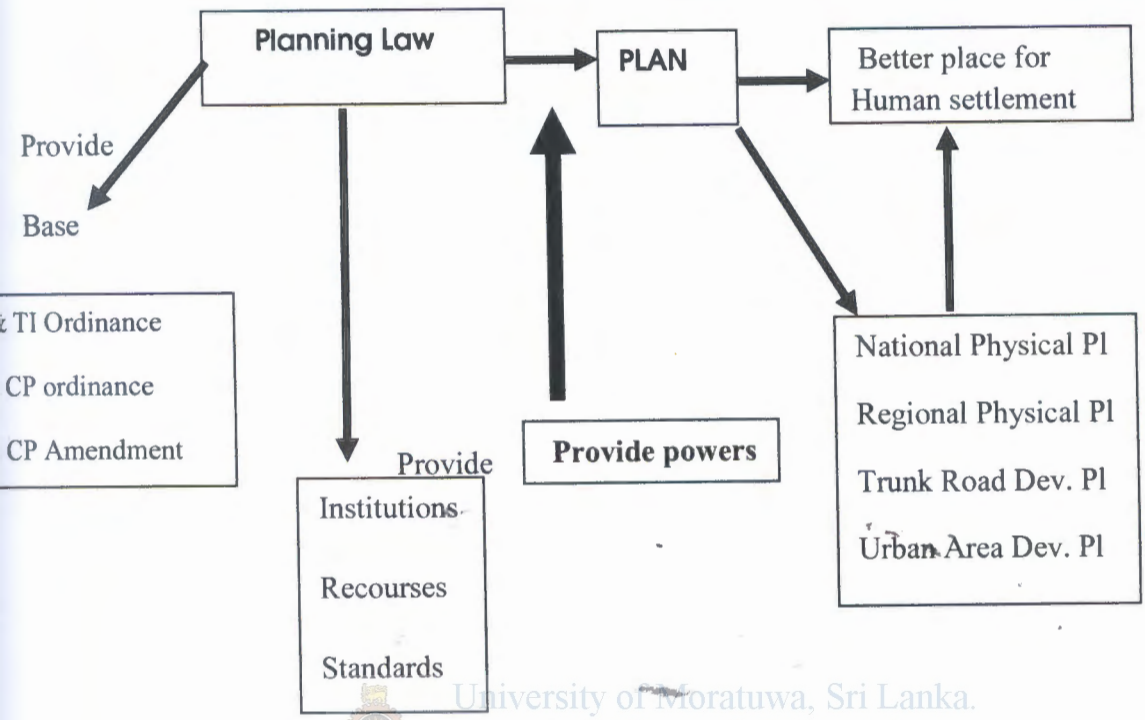
1) Housing and town improvement ordinance 19 of 1915

2) Town and country planning ordinance 13 of 1946

3) Town and country planning (amendment) act 49 of 2000

4) Urban development Authority law no 41 of 1978

Figure; 2.5 Land development related laws in Sri Lanka



Powers and functions of each planning law can be described as follows

2.8.1 Housing and town improvement ordinance 19 of 1915

The main Objective of this ordinance is the better housing. In order to achieve that building regulations were introduced in first time in Sri Lanka. In addition land zoning

(Residential, manufacturing, commercial and other) also introduced by this ordinance.

Powers was given to the PHI to carryout the requirement of the ordinance.

Organization – as implementation agencies it introduced MC, UC, TC and area which declared by the minister.

The special features of the Ordinance can be summarized as follows.

Section (31) improvement commission appoint

Section (32) powers and duties of improvement commission

Section (40) Types of improvement schemes

a) A general improvement scheme

b) A redistribution scheme

c) A rebuilding scheme

d) A re housing scheme

e) A housing accommodation scheme

f) A street scheme

g) A street intersection scheme

h) A street widening scheme

i) A back lane scheme and

j) A building scheme

Section (64) Obstructive Buildings (PHI)

Section (75) Insanitary buildings

Section (84) Land acquisition and compensation

Schedule: it has been provided the standards for buildings, rooms and streets

2.8.2 Town and country planning ordinance 13 of 19460

Preamble:" An ordinance to authorized the making of schemes with respect to the planning and development of land in Ceylon, to provide for the protection of natural amenities and preservation of buildings and objects of intersects of beauty, to facilitate the acquisition of land for the purpose of giving effect to such schemes, and to provide for matters incidental to or connected with the matters aforesaid"

Objective: controlling the development of the land comprised in the area to which the scheme applies, of securing proper sanitary conditions, amenity and convenience, of preserving existing buildings and places of architectural, historic or artistic interest and places of natural beauty.[24]

Organization: Established Department of Town and Country Planning

Following important sections can be identified in the Town and country planning ordinance.

Section 03 & 4: establishment of Central Planning commission

Application area: MC, UC, and any area minister declared

Section 09: Plans - preparation of out line scheme or detailed plan

Trunk road development plan

Regional development plan

2.8.3 Town and country planning (amendment act) 49 of 2000

Preamble: "An ordinance to authorize the formulation and implementation of national physical planning policy; the making and implementation of a national physical plan with the object of promoting and regulating integrated planning of economic, social, physical and environmental aspects of land in Sri Lanka; to provide for the protection of natural amenities, the conservation natural environment, buildings of architectural and historic interest and places of natural beauty; to facilitate the acquisition of land for the perpose of giving effect to such plan and to provide for matters to or connected with the matters aforesaid."

Section 2A; preparation of National Physical Plan and Policies

Section 3. (1) Establishment of National physical Planning Council

Section 4 ; Powers and functions of National physical Planning Council

Section 4 A Establishment of Inter Ministerial Coordinating Committee

Section 4 B Powers and functions of Inter Ministerial Coordinating Committee

Section 6 Establishment of National Physical Planning Department and Director General

Section 5A Duties and functions of Director General

Section 5 C Establishment of Technical Adversary Committee

Section 5D Functions of Adversary Committee

Section 8 Establishment of Provincial Physical Planning Committee

According to the Town and country planning (amendment act) 49 of 2000 it provides to Prepare National Physical Plan & Policies, Regional Development Area plans and Policies, Urban development area plans, Trunk road development plans.

2.8.4 Urban Development Authority Law no 41 of 1978

Preamble; A law to provide for the establishment of an urban development authority to promote integrated planning and implementation of economic, social and physical development of certain areas as may be declared by the minister to be Urban Development Areas and matters connected therewith or incidental thereto.

Following important sections can be identified in the Urban Development Authority Law no 41 of 1978.

Section 02; Establishment of UDA

Section 03; Declaration of areas as an Urban Development Area

Section 07; Establishment of Adversary committee for each development Area

Section 08; Powers and functions of the UDA

Section 05; Acquisition of Property

Section 8A of UDA Law No. 4 of 1982(Amendment) Preparation of Development Plans

Section 8B – 8B2 of UDA Law No. 4 of 1982(Amendment) Appointment of Planning Committee (Preparation/Implementation/Enforcement)

Section 8C of UDA Law no4 of 1982 (Amendment) Collection of Information required for the Development Plan

Section 8D of UDA Law of no 4 of 1982 (Amendment) Comments from Local Authority – Within 60 days

Section 8E of UDA Law of no 4 of 1982(Amendment) UDA Planning Committee Approval

Section 8F of UDA Law of no 4 of 1982 (Amendment) Approval of the Development Plan by the Hon. Minister

Section 8G of UDA Law of no 4 of 1982 (Amendment) Notice of the Development Plan

Section 8H of the UDA Law no. 4 of 1982 (Amendment) Amendments of the Development Plan

"8A (1) With a view to promoting and regulating the integrated planning and physical development of lands and buildings in a development area or part thereof, the Authority shall, having regard to the mention and services to the community, prepare a development plan for such development area or part thereof."

2.9 Land Development Regulations

When examine the land development regulations, there can be seen General planning and Building regulations, Gazetted in 1986 to apply all Urban Development areas under the UDA law. That is mainly concentrated on to the plot size, Road frontage, open space, Access, Turning circle, Splaying of Street Corners, Parking and Traffic Control, Plot usage, building Category and heights. Open space and Regulation inside the Building.

These Regulations may be cited as Urban Development Authority Planning & Building Regulation.

The Provisions of these Regulations shall be applicable to every area for the time being

declared by the Minister by notification published in the gazette to be an Urban Development Area"

Accordingly, until preparation of the Development Plans above planning and building regulations are valid. Once prepared the development plan to the particular area, it has room to prepare its own planning and building regulations. basically the development plan concentrated on to the following.

Zoning and zoning regulations, FAR , density height and number of stores, Plot sizes, open areas, set backs, building lines and the use and maintenance of building structures.

Requirements for buildings in respect of stability of the building, Area height and size of rooms, Lighting and ventilation, Fire protection, Drainage, Specification of materials,

Regulations for reservation of various facilities, Regulation in respect of unsafe buildings, controlling architectural character, Control of pollution, maintenance of environmental quality and advertisement.

Under the development plans for each urban development areas has to repair zoning plan. Under the zoning plan, subdivision regulations are included.

"Zoning is a term used in urban planning for a system of land use regulation various parts of the world, the word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another. Zoning may be use-based (regulating the uses to which land may be put), or it may regulate building height, lot coverage, and similar characteristics, or some combination of these."

Accordingly there is scope of the zoning to achieve expectations

2.9.1 Zoning

Theoretically, the primary purpose of zoning is to segregate uses that are thought to be incompatible; in practice, zoning is used as a permitting system to prevent new development from harming existing residents or businesses and to preserve the "character" of a community. Zoning is commonly controlled by local governments such

as counties or municipalities, though the nature of the zoning regime may be determined or limited by state or national planning authorities or through enabling legislation

Accordingly, Zoning may include regulation of the kinds of activities which will be acceptable on particular lots (such as open space, residential, agricultural, commercial or industrial), the densities at which those activities can be performed (from low-density housing such as single family homes to high-density such as high-rise apartment buildings), the height of buildings, the amount of space structures may occupy, the location of a building on the lot (setbacks), the proportions of the types of space on a lot, such as how much landscaped space, impervious surface, and parking must be provided.

Under the zoning mixed use has become firmly established as a key planning principle. But it was identified some of the problems and barriers uncounted in seeking mix use in several cities. Mix use promises economic vitality, social equity, and environmental quality, but it cannot readily deliver such benefits in a context where cultural and economic forces promote separation of land uses. Jill Grant (2005)

Subdivision regulations govern the development of raw land for its zoned purpose in much more detail. The regulations define standards for layout and lot sizes, street improvements and procedures for assigning private land for public purposes. Subdivisions provide the essential characteristics of land uses, street patterns and public utilities. The amount of land which is thereby dedicated for public purposes differs between countries and may represent a substantial portion of the total land area. In for example Israel, developers have to reserve 40-50 per cent of the land for open spaces and other public uses (Courtney, 1983).

While subdivision plans and regulations have proved to be a very efficient tool in European countries as a means to force developers to cover some or all the costs for provision of public infrastructure, they have been less successful in developing countries. Problems encountered include the implementation of the subdivision controls and the vast areas, mostly in the urban fringe, where land is illegally subdivided in order to provide more shelter. These irregular subdivisions with high densities frequently cause

health, fire and other hazards. The needs and conditions of development in developing countries require a more flexible set of standards than what has been introduced based on European experience. These standards should consider the rapid changes in the urban fabric, relate more to local conditions and be easier to implement. It would be beneficial to introduce, for example, a permissive system of development control whereby certain development within some clearly specified categories does not necessarily require planning and/or building permission. A permissive system would assume that the builder follows development standards but it has to be combined with a system of spot checks and strict use of penalties. A permissive system would free scarce government staff to focus on priority tasks such as controlling negative impacts from industrial development and other health hazards, and implementing innovative planning and development control measures to improve the traffic situation. It would also be possible to introduce incremental development standards which would vary depending on household affordability.

2.9.2 Land Subdivision and Land Development Regulations

Sub-division of land is an important basic element in planning of urban areas and if the subdivisions are not carried out properly, it will not be possible to carry out planned development. Main objective of subdivision of land is to make a satisfactory environment for the people. Subdivision of land has a direct influence on the activities of land market, therefore it need to regulate the subdivision of land especially in urban areas.

Under enabling legislation local governments also have the authority to establish regulations to control the subdivision of a parcel of land into building lots for specific land uses. The subdivision process actually entails dividing a parcel of land into blocks, lots, streets, open space, and community use areas. The purpose is to protect public interest by maintaining a level of quality control, justified on the basis that the development will increase the cost of public services. To that end, the subdivision and land development regulations establish requirements or specifications for streets, sidewalks, utilities, driveway connections, etc. to ensure that all of the necessary improvements are made according to a municipal plan and in accordance with municipal construction standards. For example, the streets within the subdivision must be

consistent with the municipal master street plan. The streets must be constructed to specified widths, cross-section configurations, paving materials, curbs, storm sewer standards, etc. Similar kinds of specifications for public utilities must also be met. These requirements protect the entire municipality as well as the potential property owner within the subdivision or land development.

The objectives of sub-division regulations are;

a). Provision of convenient and easy access to each plots.

b). Adequate area for desired activity and their expansions.

c). Adequate space for infrastructure and other facilities installation

d). Adequate light and ventilation.

e). Efficient utilization of the plot for necessary requirements.

f). Protection of Privacy and quietude.

Sub division regulations essentially aim at achieving conformity with the urban development plan and approved schemes; Preventing sporadic and premature development of level which may lead to urban sprawl, Minimising misuse of land, achieving an efficient network of roads, streets and parking space for the movement of people and goods and providing adequate public utilities, services and community facilities. Sub division regulations include in their scope the following the elements such as;

(a) Minimum plot area.

(b) The minimum frontage and depth of a plot.

(c) The desirable shapes sizes of plots.

(d) The minimum set backs from the centre line of the road (right of way) and the property lines.

(e) Maximum plot coverage.

(f) The minimum and desirable reservations for road, streets and parking lots, and other circulating width.

(g) Infrastructure facilities (drainage system, water supply, electricity system), (h) Space for community/public facilities (play grounds, open spaces, parks or community halls).

Conclusion

Accordingly, it is revealed that the impotency of land development regulations and its degree of influence to the land development in the context of urban development. In addition, this chapter attempted to identify the current practicing land development regulations and the important factors which should consider in land development regulations. In addition to that this chapter attempted to identify factors which should be considered land development. Further, it was revealed that the process of urbanization and its consequences for the demand of urban lands.

Accordingly, above factors are very important in land development in order to achieve planned and sustainable urban development. the identified importent factors of land development and land development regulations can be summurised as follows.

CHAPTER 03

ESSENTIAL CHARACTERISTICS OF LAND DEVELOPMENT AND ITS REGULATIONS

3.0 INTRODUCTION

According to the previous chapter, it is revealed that the land development and aspects of land development regulations. In addition to it, there were identified factors that should be considered in the land development. These factors can be considered as essential characteristics of land development. Those factors are summarized as follows.

3.1 Essential Characteristics of land development

1. Soil and sub soil conditions
2. Ground water and Drainage
3. Free from surface floods
4. Stability for sitting of projected buildings
5. Suitability for access and circulation
6. Suitability development of open areas
7. Free from topographic accident hazards
8. Water supply and sanitary sewage disposal
9. Removal of refuse
10. Power fuel and communications
11. Fire and police protection
12. Free from local hazards and nuisances
13. Noise and vibration
14. Odor, smoke and dust

3.1.1 Soil and Subsoil Conditions

Soil and subsoil conditions must be suitable for excavation and site preparation, for the location of utility connections, and for grading and planting. Subsoil conditions should afford suitable bearing capacity for the economical construction of buildings of the type

contemplated. Bearing capacity will be affected if the site contains muck, peat, poorly compacted fill, shifting sand, or quicksand.

3.1.2 Groundwater and Drainage

Essential factors in site selection include a water table low enough to protect the buildings against basement flooding and interference with sewerage, the absence of swamps or marshes, and sufficient slope to permit surface drainage of normal rainfall and a free flow of sanitary sewers. Periodic flooding due to the high groundwater table should disqualify a site unless preventive measures can be applied.

3.1.3 Free from Surface Floods

The development area should be free from danger of surface flooding by streams, lakes, or tidal waters. Significant floods are those that inundate buildings, or impede circulation within or to and from the development area.

3.1.4 Suitability for citing of Projected Buildings

Land should not be too steep for satisfactory grading in relation to dwelling construction. Building sites should not have elevations above those at which normal water pressure for domestic use and fire fighting can be obtained.

3.1.5 Suitability for Access and Circulation

Topography should permit adequate vehicular and pedestrian access to and circulation within the development area. It should permit grading so that streets and walks conform to grade standards.

3.1.6 Suitability for Development of Open Areas

Land to be reserved for private yards or gardens, playgrounds, and neighborhood parks should permit grading and development in conformance with specifications.

3.1.7 Free from Topographic Accident Hazards

The development area should be free from, or the plan should assure correction of, topographic conditions that might be a serious cause of bodily accidents. Under this would come open pits.

3.1.8 Water Supply and Sanitary Sewage Disposal

Land can be developed only on a site with a water supply that is adequate and certain as to amount, that will not be a means of conveying disease, and that is reasonably free from chemical and physical impurities. Equally important is the collection and ultimate disposal of human excreta without sanitary hazard.

3.1.9 Removal of Refuse

It is essential that a projected site have facilities for the effective removal from the neighborhood of domestic wastes (notably garbage but also inflammable and noncombustible rubbish) or that ultimate disposal on the site can be provided without sanitary hazard. Garbage should be regularly collected at time intervals.

3.1.10 Power, fuel and Communications

Electricity is essential in every home, but since electric service can usually be extended to any development of more than a few families and can even be generated on the site if necessary, it seldom offers a serious problem in site selection. Reasonable electricity rates, especially in outlying areas where, in the absence of gas, electricity may be used for cooking and water heating, may be an important factor in achieving a reasonable total housing cost.

3.1.11 Fire and Police Protection

Since water requirements for firefighting normally set the peak-load demand for a community supply; this factor in the adequacy of fire protection will automatically be checked as a part of other site selection judgments.

3.1.12 Free from local hazards and nuisances

The site should be entirely free from grave hazards to life or health and as free as possible from minor hazards and nuisances. Adequate techniques for measuring the seriousness of specific nuisances and standards for site selection in regard to them do not exist. Research on this whole problem, especially on such factors as minimum distances of dwellings from railroad lines, is badly needed. Some guides to specific standards for new development can be obtained from the procedures for the evaluation of existing neighborhoods given in a standard housing appraisal method.

3.1.13 Accident Hazards

Accident hazards are collision with moving vehicles, fire and explosions, falls, and drowning. The chief causes of collision are street traffic and rail roads, with crash landings of aircraft to be considered near an airport. Sources of fire and explosion hazards include bulk storage of petroleum, gasoline, or das; rifle ranges and other places where firearms are used under potentially dangerous conditions; dumps and rubbish piles; large expanses of brush land or cutover woodland from which the slash has not been cleared, especially in dry climates; and certain industries. Falls and drowning may occur with unprotected bodies of water, quarries, pits, junkyards, and so on.

3.1.14 Noise and vibration

Excessive noise, sometimes with appreciable vibration, is commonly produced by railroads, airports, street traffic, heavy industry, boat whistles, foghorns, and the like. The site and the surrounding area should be investigated for such potential sources of noise. Where they exist, their distance of sound barriers should be determined. In the case of an undeveloped site in open country, distant noise of moderate intensity will tend to be masked by the general noise level of the new development itself.

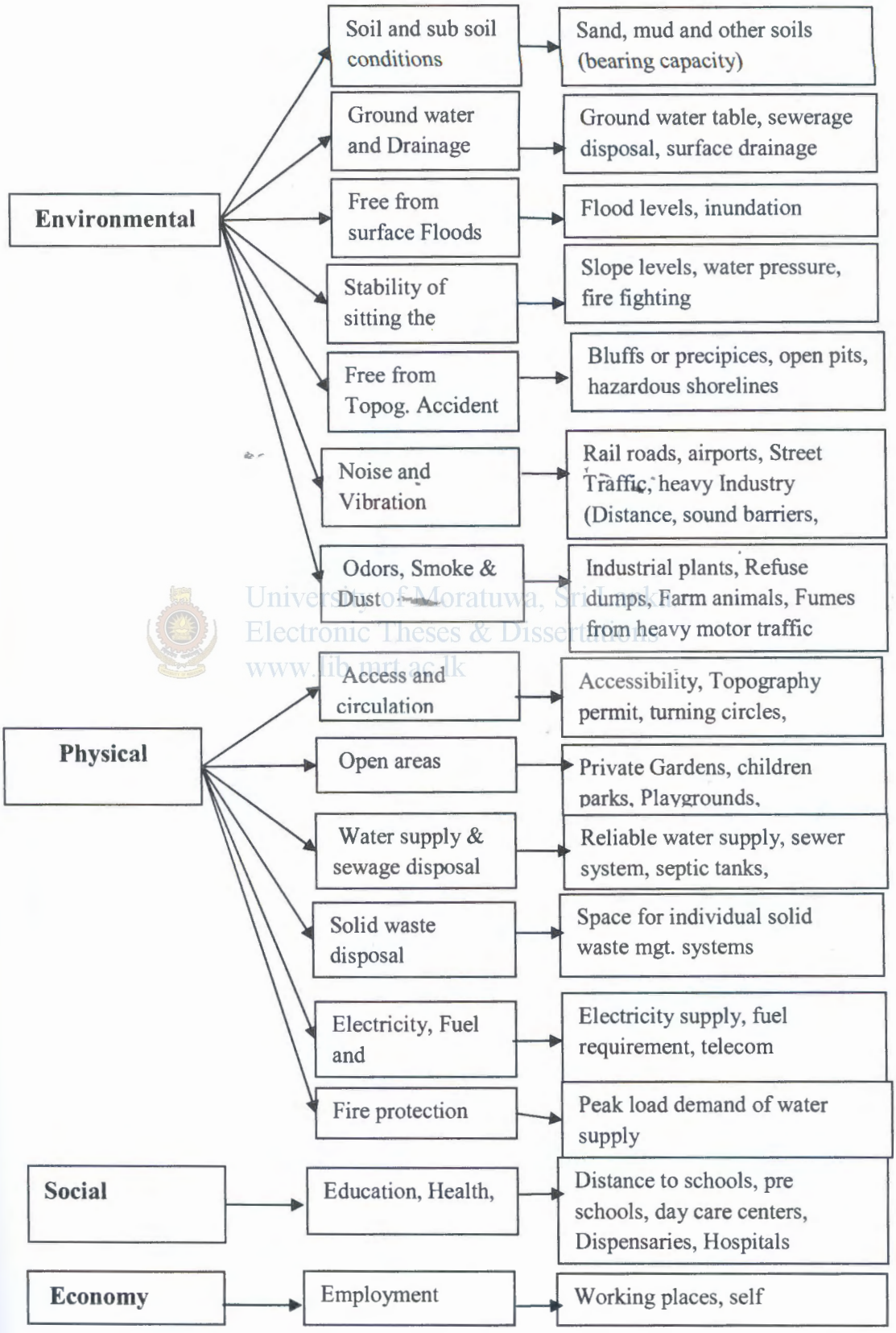
3.1.15 Odors, Smoke, and Dust

The commonest sources of objectionable odors are the following:

1. Industrial plants, especially slaughterhouses, tanneries, and other animal product factories; rubber, chemical, or fertilizer plants; textile dyeing, bleaching, and finishing plants; paper, soap, or paint factories; and gasworks
2. Refuse dumps, especially when the disposal process involves burning.
3. Streams polluted by sewage, sewer outfalls, or poorly operated sewage disposal plants
4. Farm animals, especially pigs or goats when kept under crowded or insanitary conditions; also, under some circumstances, any farm animals, manure, and fertilizer
5. Fumes from heavy motor traffic and from coal burning railroads

Accordingly, above factors are very important in land development and each factors can be categorized in to majorly four groups. Environment Physical Social and Economy

Figure no 3.1 Factors for Land Development (residential planning)



2 Land development regulations of UDA in 1986

and development regulations of UDA which was gazetted in 1986 can be summarized as llows and has been illustrated in the annexture ii.

	Regulation number	Regulation	Minimum plot size	Minimum Road frontage	Maximum Development	Development category
1	Plot Size and Road Frontage 17(1) form C schedule iii	Public buildings Other than public buildings	12 P 6 P	12 M. 6 M.	G+3 G+3	Low rise Low rise
2	27 (1)	High rise buildings	40 P Shortest side 20M.		G+4	High rise

Regulation Number	Regulation	Condition	Requirement	Nature of Development
Open space 22(1)	If Site >1.0 Ha. 10% of total land excluding roads	No	10% From suitable places for community and recreational uses.	Residential
Open space 22(1)(b)1996 Amendment	If land parcel > 40P & 2 Housing units per block	no further subdivision, no more than 2 housing units	10% open space Not required	Residential
	If further subdivision and Housing units>2		Deposit 10% market value in the relevant local authority	Residential
Open space 22(1)(b)1996 Amendment	If land parcel > 80P Road width> 9M.		10% open space Not required	Commercial and Industrial
Open space 22(1)(b)1996 Amendment	If land is further subdivision		10% of Open space or Deposit 10% Market value in the relevant local authority	Commercial and Industrial

	Regulation Number	Regulation			Nature of Development
6	16(2)(a) & Form A of Schedule iii	Accessibility Dwelling units <4 4 - 8 8-20 >20	Min.Road width . 3.0 m. 4.5m. 6.0m. 9.0m	Max. Length 50m. 100m. - -	Residential
7	16(1)	Accessibility	9.0 m.		Non residential
8	16(2)(b) Form B Schedule iii special provisions	Accessibility	street>9.0m		Non residential
9	27(2)	Accessibility High rise buildings	street>12.0m		High rise development
10	16(4)	Turning circle	Street < 9.0m Width & >30m length		
11		Parking	Every 200 sq.m		Residential & non residential

			One parking unit	
12	31(5)	Gradient for ramps	Not be steeper than 1:8	All developments
13	25 Form E of schedule iii	Plot coverage	Dwelling units,Hotels,Guest houses & public buildings 66 2/3% Offices, shops, commercial & industrial Buildings 80%	
	15(1)	Floor Area Ratio	Max.2.75	

	Regulation Number	Regulation	Nature of Development
14	8(1),8(2) & 8(3)	Building category (see annexure ii)	All category of developments
15	18(2)	Building Heights Max. height – 15m or Twice the distance between further edge of the abutting street whichever is less	low rise buildings

16	29(1)	Building Heights Max. height < Twice the horizontal distance between building and father edge of the abutting street.	High rise building
17	18(1)	Existing lot If width > 6m. and or Extent > 6 P. – Max. Two floors or 7.5 M	Residential and non residential
18	26(2)	Open space around the building - Rear space and side space Rear space – low rise buildings Rear space - 3m. (If abuts on to a 6 m. public street not required.) Storied buildings – 2.25m.	Residential and non residential - low rise buildings
19	30(2)	Rear space – high rise buildings One quarter the height of the building extending along the entire width of building	high rise buildings

20	26(5) 30(1)	Side space – low rise buildings 80 cm. Side space – high rise buildings One quarter of the height of the building or 5.5 m. whichever is less.	low rise high rise

Form B schedule III – Access to Non residential Buildings (special provision)

Maximum Extent of land Served (sq.m)	Maximum FAR on each site	Maximum width of Street (m)	Maximum length of street (m)
500 Where the street serves more than 1 lot or site but not more than four lots	1.5	6.0	50
2500 Where the street serves only one lot or site	1.5	6.0	150

Conclusion

Accordingly, it was identified the factors that should be considered in the land development in this chapter. Those factors can be considered as essential characteristics of land development. In addition to that, it was found that the existing regulations of UDA which are followed by land developments in urban areas. Those regulations which currently practiced were also considered. In the next chapter it will be evaluated the applicability land development regulations and check the consideration of essential characteristics of land development in the existing regulations which practiced in urban areas.

CHAPTER 04

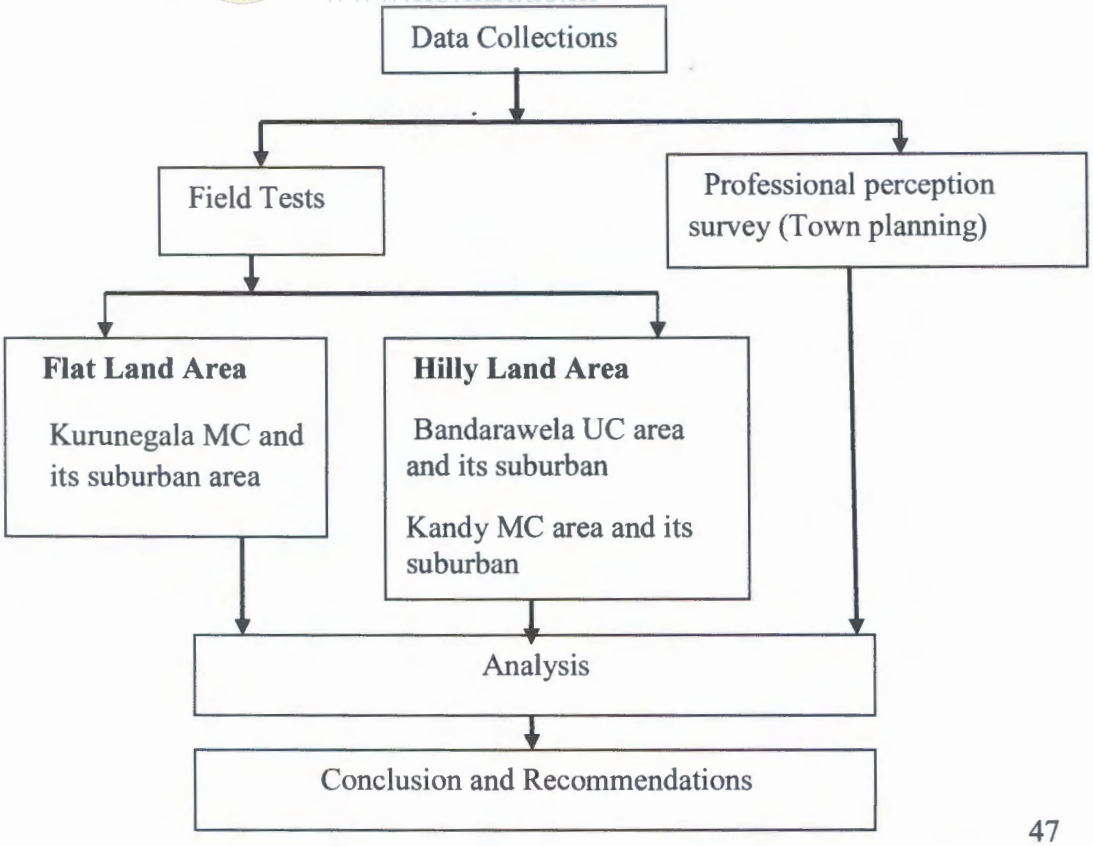
4.0 RESEARCH DESIGN

4.1 Introduction

The previous chapter described the existing land development regulations and the importent factors that should be considered for land develoment. This chapter will described the research design that is to be adopted to carry out the the study.

As already aware about the reseach problem wich was described in the problem definision in the chapter one.Accordingly, as research question why the land development regulations are violated in the case of topogrphic variations? In other wards, is there any relationship between topographic variations and violation of building regulations? Topographic variations such as flat land areas and hilly land areas have been considered as variables. Therefore this study is focused on to fill the gap between knoledge and practicle problem.In order to carry out this reserch following research design is adopted.

Figure 4.1 Research Design



4.2 Data Collection

As primary step data was collected using field tests and professional perception surveys. In the field tests, it was selected flat land area and hilly land area. For the flat area it has been selected Kurunegala MC area and it's suburban. As hilly land area; Bandarawela UC area and its suburban, Kandy MC area and its suburban areas have been selected.

For the field tests, land sub divisions which are larger than one Hectare were taken into consideration by using random selection method. In addition to that, other developments except land subdivisions (building constructions) were also selected using random sampling technique from the above mentioned areas.

In order to identify the professional practice, 20 town planners were selected who are currently involved in practicing land development regulations in various part of the country.

4.3 Data Analysis

In order to analysis the Data of this study, a comparative method was applied. Each land sub divisions and other developments were checked with the related regulations. Critical analysis methods were not adopted because of the time limitations.

Conclusion

Accordingly this chapter described the methodology which is adopted for the conduct of this research. Especially data collection and data analysis in relation to research problem were clearly presented. Next chapter will be discussed the evaluation of existing land development regulations which are currently practiced and check consideration of the important factors of land development in to land development regulations.

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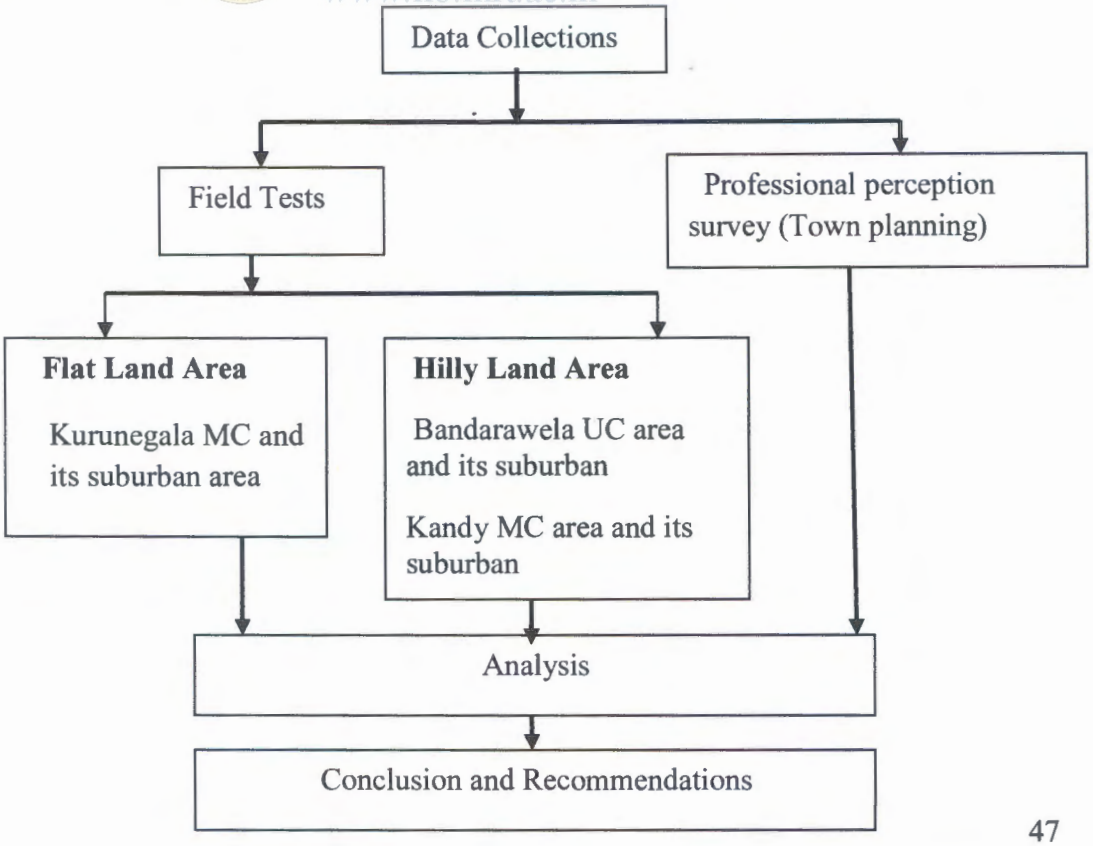

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Conclusion

Accordingly this chapter described the methodology which is adopted for the conduct of this research. Especially data collection and data analysis in relation to research problem were clearly presented. Next chapter will be discussed the evaluation of existing land development regulations which are currently practiced and check consideration of the important factors of land development in to land development regulations.

5.0 EVALUATION OF LAND DEVELOPMENT REGULATIONS

5.1 Introduction

This chapter intends to evaluate the existing land development regulations which are practiced in the urban development areas. The main objective of this chapter is to evaluate the existing land development regulations in terms of their compliance or applicability and to identify the regulations which are not acceptable to the ground situation. According to the analysis, regulations will be identified as comply, partly comply and not comply categories.

As described in the previous chapter two different topographical areas has been selected declared under UDA law to examine the applicability of Planning and building regulations. Accordingly, flat land area and hilly land area were selected to carry out the study. As a flat land area, Kureunegala Municipal council and its suburban area have been selected and as a hilly area, it has selected Bandarawela Urban Council and its suburbs along with Kandy Municipal council and its suburban area has been selected for the study.

5.2 Parameters of Evaluation

In order to evaluate the existing land development regulations, comparative analysis method has been selected. Accordingly, comparable variables are assessed an equitable manner to achieve a fair assessments. Therefore it is need to be carried out the evaluation within a few parameters.

5.2.1 Land development Regulations

For this evaluation, only consideration is given to the land development regulations which are gazetted by UDA in 1986 for urban development areas. In addition it is here considered the regulations which site and not consider the light and ventilations regulations. (Interior regulations of building have not considered.)

5.2.2 Compliance to the regulations

Physical development of the respective developments is checked with the relevant regulations. In this respect degree of compliance of the development is to be considered.

5.2.3 Urban Development Areas

Even though a large number of urban areas are existing in the Sri Lanka, it is has been only considered the urban development areas which have been declared under UDA law.

5.2.3 Type of land developments

Since there are many categories of land developments, it is considered only land subdivisions which are larger than one Hectare and buildings that have constructed surrounding the respective areas.

5.2.4 Regulation monitoring and feed back

The main responsible of relevant local authorities is to check the Land developments whether adhere to the regulations. It is assumed that the land developments are monitored by respective local authorities regularly and equal manner.

5.3 The evaluation Criterion

The compliance (degree of applicability) of the land development regulations which identified in the chapter three will be evaluated. In this process each selected land subdivisions are checked with the relevant regulations. These evaluations are done separately to the hilly land area as well as to the flat land area. Each selected land development which are in compliance with the regulations is rated as high and land developments which are in less compliance with the regulations is rated as low. Scores are given to comply to not comply and only three options were considered namely comply (3) partly comply (1) and comply (0).

Comply - 100% - 3 Marks

Partly Comply - 50% - 99% -1 Marks

Not comply - Less than 50% - 0 Marks and Not relavant - 0*

It should be noted that the degree of compliance of development with the regulation evaluated according to the body of knowledge and available information.

In order to evaluate planning and building regulations of UDA, 5 land subdivision plans from hill country and flat land area were selected to check the conformity with the land subdivision regulations. Land subdivisions which are larger than one Ha.was selected for this exercise. In addition to it buildings from respective urban areas were selected in randomly to check the compliance with the other regulations. Further perception survey on the planning and building regulations was also carried out by interviewing town planning professionals to test the validity and applicability of the existing planning and building regulations of UDA.

5.4) The Evaluation of Planning and building regulations, in Flat land area

Five (05) land subdivision plans were selected from Kurunegala Municipal Council area and its suburban area. Each subdivision plans and buildings which randomly selected were evaluated against the planning and building regulations of the UDA. The summary of the evaluation are as follows.

Table No. 5.1 Evaluation of compliance of the planning and building regulations in relation to flat land

Subdivision plans	Planning and Building Regulation																			Total	Percentage (%)
										Already existed buildings (Random selection From surrounding developments)											
	Plot size	Road frontage of Plot	Open Space	Access	Street lines	Turning circles	Building lines	Total	Percentage %	Random survey No.	Parking	Gradient for Ramps	Plot coverage	Floor Area Ratio	Building category	Building heights	Rear space	Side space			
KU1	3	3	1	3	1	*0	0	11	73	A	3	*0	3	3	3	3	3	3		21	100
KU2	3	3	1	3	1	3	0	14	93	B	*0	*0	3	3	3	3	3	3		18	100
KU3	3	3	1	3	3	*0	0	13	86	C	1	*0	3	3	3	3	3	3		19	90.4
KU4	3	3	1	3	1	*0	0	11	73	D	*0	*0	3	3	3	3	3	3		18	100
KU5	3	3	1	3	1	*0	0	11	73	E	1	*0	3	3	3	3	3	3		19	90.4
Total	15	15	5	15	7	3	0				5	*0	15	15	15	15	15	15			
Avg.	3.0	3.0	1.0	3.0	1.4	3.0	0				1.0	*0	3.0	3.0	3.0	3.0	3.0	3.0			

3-Comply 1- Partly Comply 0-Not Comply 0* Not relevant

According to the table 5.1, it is revealed that all of the land subdivision plans in the flat land area are not in compliance with all regulations. It was found that at least one regulation has been violated. According to the above analysis, it can be identified the regulations which can not accurately apply. When taking account of all subdivisions, 93% of regulations applicable in KU2 subdivision.in addition to that, out of the five randomly selected existing buildings three are in conformity and balance are partly conformity with the regulations.

5.4.1 Open space

As per the above evaluation table, open space regulation has also been violated and properly not applied in the land subdivision regulations. The average score is 1 and it has been found that this regulation was partly applied or misused in many ways. Those are can be summarized as follows.

- 10% of open space is not allocated in the proper places
- Allocated lands for the open spaces are not suitable lands
- Allocated lands for the open spaces are used for another purposes (not used for the community and recreational within the neighborhood)

In addition to that accumulation of land subdivisions which are below one Hectare are required the open spaces. figures 5.1 and 5.2 show the violation of open spaces.

Figure 5.1 unsuitable lands allocated for the open spaces (Ref.annex. KU 1)

Figure 5.2 Reserved open space is used for the other uses (Ref.annex. KU 2)

5.4.2 Street lines

As per the above analysis, it was found that the street line regulation is violated in four cases and has taken 1.4 as an average score. The main reason for this situation is the not allocating street line reservations in land sub divisions. It is observed that this is a common situation in new land sub divisions. Where the A and B grade roads are existed, it should be maintained 50 feet and 40 feet as road reservations respectively. But in most cases developer comes with RDA for non compensation agreement for facilitating to reduce the street line up to 33 feet. This situation is caused to parking and leads traffic problems. The following illusion shows the violation of street line regulation in the land subdivisions.

Figure 5.3 Violation of street line reservations (Ref.annex. KU 3)

5.4.3 Building lines

The building lines regulation also being violated according to the above analysis. In new subdivisions keeping the building line has become a problem. Because, most of the roads in new land sub division are considered as private roads. There is no legal back ground to keep the building lines in the case of the roads which are not gazetted by particular local authority. That may be the reason to violate this regulation in most cases.

Figure 5.4 Violation of building line regulation (Ref.annex. KU 4)

5.4.4 Parking

This regulation also violated and has not achieved expected results due to many reasons. As per the table number 5.1, in all subdivisions that regulation has been violated. Although the parking is to be provided with the site, special circular has been issued to provide the parking space within the building line. In the case of non compensation agreement with RDA parking problem has become to verse. In addition to that accumulation of 200Sq.M commercial buildings have been demanded the more parking requirements.

Figure 5.5 Parking within the building line

Figure 5.6 Parking within the building line

5.4.7 Plot Size

Plot size is very important in development activities and directly affects to the proposition of the building. The features of the building such as size, shape, building orientation, light and ventilation are important factors. All those factors of the building are depended on given plot size. When examine the existing regulations of UDA, There is no clear definition is given to determine the plot. The minimum plot size is 6P and that is common to residential and commercial developments. it is reported that the ground water has been polluted in the case of on site ground water extraction and sewer disposal. Especially where the septic tanks are located on site, it is accounted high tendency to the ground water contamination. The recent reports have been proven that the ground water has been contaminated due to close distance between wells and septic tanks. Figure 4.8 shows this situation. Therefore, this type of situations should be considered in land development regulations.

Figure 5.7 Close distance between well and septic tanks

5.5 The Evaluations of Planning and building regulations, in hilly areas

In order to evaluate the planning and building regulations in the hilly areas, it has been selected the Bandarawela Urban council and its suburban area including Kandy Municipal council and its suburban area were selected. Accordingly, 5 land subdivision plans and buildings were selected randomly and evaluated against the planning and building regulations of the UDA. The summary of the evaluation is shown in the table 5.2.

Table 5.2 Evaluation of compliance of the planning and building regulations in relation to hilly land area

Subdivision plans			Planning and Building Regulation																	
										Already existed buildings (Random selection From surrounding developments)										
	Plot size	Road frontage of Plot	Open Space	Access	Street lines	Turning circles	Building lines	Total	Percentage %	Parking	Gradient for Ramps	Plot coverage	Floor Area Ratio	Building category	Building heights	Rear space	Side space	Total	Percentage (%)
BA1	3	3	1	1	1	*0	0	9	60	1	*0	0	0	1	1	1	3	16	35
BA2	3	3	3	3	0	0	0	12	57	*0	*0	0	1	1	0	1	3	12	26
KA1	3	3	1	1	1	0	1	10	47	*0	0	3	0	1	0	0	1	15	33
KA2	3	3	1	1	*0	0	0	8	44	*0	*v0	1	1	1	1	0	1	12	26
KA3	3	3	1	0	1	*0	0	8	44	*0	0	0	0	1	0	1	3	11	24
Total	15	15	7	6	3	0	1			1	0	2	2	5	2	3	11		
Avg.	3.0	3.0	1.4	1.2	0.6	0	0.2			0.2	0	0.4	0.4	1	0.4	0.6	2.2		

3-Comply 1- Partly Comply 0-Not Comply 0* Not relevant

According to the evaluation table number 5.2, it is revealed that almost all the regulations have been completely violated or partly violated by the respective developments. Maximum conformity of the land subdivisions to the regulation is 35%.that is recorded in A1 land subdivision. In addition to that, it is noted that some regulations have not been violated, but the expected objectives of regulations are not been achieved. Due to the geographical variations in hilly lands, it has been mainly affected to this situation. The applicability of each land development regulations in respect to hilly land are discussed in detail as follows.

5.5.1 Plot size

According to the table number 5.4, it is revealed that the plot size regulation was not directly violated in the respect of hilly area. But, it is cleared that the expected objectives of that regulation has not been achieved. Due to small plot sizes, it has been affected to the proportion of the building.

Figure 5.9 Steep slope angle of the Plot (Ref.annex. BA 1)

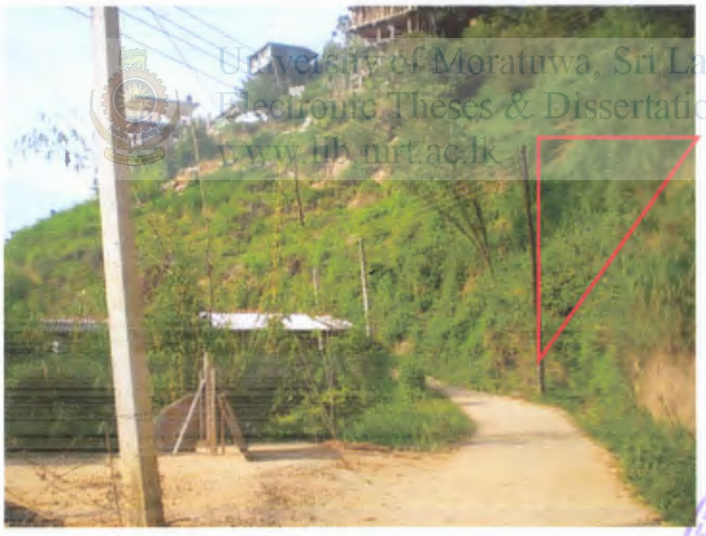


Figure 5.10 Inappropriate Plot size (Reff. Annext.KA1)

5.5.2 Road frontage of plot

Road frontage of the plot is very important in land development in the hilly area. Road frontage of the plot determined the building size and its orientation. That affects the view of the building and the light and ventilation. Figure 5.11 shows how minimum road frontage of block affects the building size and its elevation. According to above even though this regulation is not violated, expected objectives have not been achieved.

Figure 5.11 Narrow buildings due to small plot sizes in hilly area

5.5.3 Open Space

As per the above evaluation, it is revealed that the open spaces regulation has been violated due to various reasons. Developer just allocated only 10% of lands as open spaces for the requirement of regulation. But the objectives of the open spaces can not be fulfilled.

Figure 5.12 Allocation of unsuitable lands for open spaces (Ref annex. BA 1)

5.5.4 Access

According to the above evaluation, the accessibility regulation has also been violated. This regulation can not be applied properly in hilly land areas. It is found that the steeps access is commonly used in the hilly area. Contour pattern can be used for the development of accessibility in slope land instead of steep accessibility. Those types of alternative methods are not mentioned in the existing regulations and not followed by the land developers. Therefore this type of alternative methods for the accessibility for the slope lands in hilly areas should be considered in land development regulations.

Figure 5.13 Steep accesses in land subdivision (Ref.annex. KA1)

Figure 5.14 Development of steps accessibility in the hilly land area

5.5.5 Turning circles

As per the above table, it is evident that the turning circles regulation is as it is not practicable to slope lands in hilly areas. It should be considered other alternative methods such as ring system to ease the vehicle circulation in hilly area.

5.5.6 Building lines

This regulation has also been violated in the above evaluation. The degree of applicability of this regulation shows equal results for the both areas. Building lines have been only given for the roads of RDA, PRDA and local authority. But for the other roads building lines have not been considered .Especially, new roads which come under land subdivisions have not been taken account. Accordingly, in this context building line regulation can not be applied for the new land subdivisions.

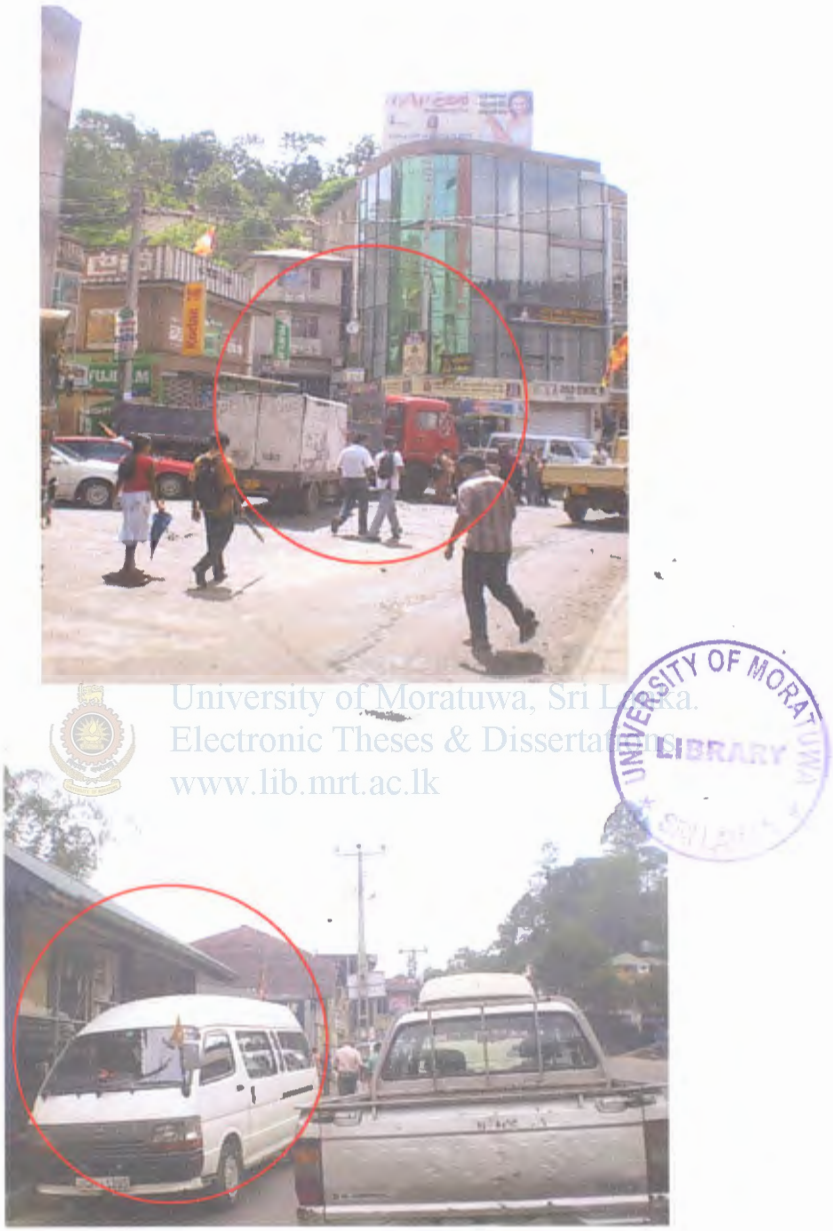
Figure 5.15 Encroachment of building lines

5.5.7 Parking

It is evident that this regulation has been violated in the most of developments in hilly land area. As per the above evaluation, average marks for this regulation was 0.2.In most cases the parking requirement of the building have been provided within the building line. According to the regulation every floor area of 200 sq.m. to be provided with one parking space. but according to above situations, parking spaces are not practiced. In addition to this the

accumulation of buildings which are below 200 sq. m. is created parking spaces. As a result of this situation, traffic congestion can be seen in the most of urban areas.

Figure 5.16 Vehicle parking within the building line



5.5.8 Gradient for Ramps

This regulation has also been violated in the most of the buildings in hilly area. Therefore, it is needed the solution for this type of developments in the hilly area. Especially it is observed that the alternative methods have been used for the ramps.

Figure 5.17. Alternative for Gradient of Ramps for the access

5.5.9 Plot Coverage

When examine the applicability of this regulation in the hilly land areas, it is found that most of the time that regulation is violated. According to the evaluation, it is revealed that this regulation has been violated by every development. According to the regulation, it should be developed only 66 2/3% and 80% of the land in the developments of residential and commercial uses respectively. Due to the scarcity of developable lands in the slope land, tendency is high to violate this regulation. Figure 5.18 shows the violation of regulation of this regulation.

Figure 5.18 Violation of plot coverage regulation

5.5.10 Floor Area Ratio

According to the table no 5.2, it is found that above regulation is also violated in the case of slope lands in hilly area. Because of the steep slopes, Foundation structures of the buildings are constructed up to the road levels. Afterwards foundations are converted to habitable spaces. Due to this situation these spaces con not be considered as foundation structures. Because those structures has been built with intention of habitable spaces. Therefore those structures cannot be considered as foundation structures of the buildings and should be considered as habitable spaces. When examine the regulation, it is not mentioned clearly about these structures in hilly land areas. Therefore this situation has made confuse to calculate the floor area and when calculate those floors that exceed the maximum floor area ratio as per the regulations.

Figure 5.19 Conversion of foundation structures to habitable spaces

5.5.11 Building Category

For the violation of this regulation, above situations are categorically affected. Accordingly, it has become to difficult situation due to confused building structures to calculate floor areas of the building in hilly areas. Since there is no clear definition is provided for the calculations of floor area, it is difficult to categories the buildings. Therefore buildings which are constructed in slope lands can not categorized according to the regulations. Figure 4.20 shows this situation clearly.

Figure 5.20 Conversion of foundation structures to building space

5.5.12 Building heights

As already discussed in above, it is understood that the real situation which caused to construct the buildings in hilly area. Accordingly the confused building structures which have been created confuse to calculate FAR and building category regulations and have become violations. According to the field observations, it was revealed that, building height regulation also has become that situation.

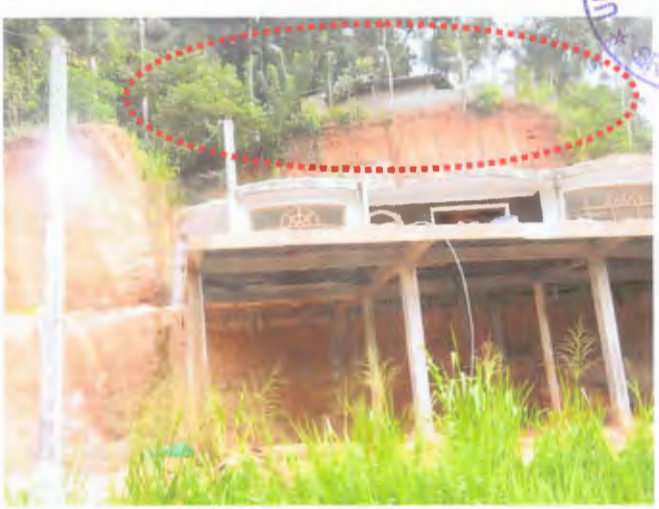
Figure 5.21 Constructions of building in slop land

5.5.13 Rear space

It is observed that rear space regulation is also violated in the hilly land area. The meaning of the rear space is not achieved in most cases. According to the field observations it is found that the difficulty to apply rear space for the Buildings which are in hilly area. When maintaining rear space in the up sides and down sides of the road in hilly area, expected objectives are not achieved. Figure 5.22 shows the situation of rear space in hilly area.

Figure 5.22 Allocation of **Steep** lands for the Rear space

Figure 5.23 Allocation of rear space at the up side of the land



5.5.14 Side space

It is evident that, in some cases in the hill country, Side space of the building is used for the accessibility purposes. As per the above evaluation this regulation is also violated.

Figure 5.24 Violation of side space in hilly area

5.6 The evaluation of important factors in land development (residential planning)

There are many important factors identified in the literature review that should be considered in the land development. These factors specially should be considered land development regulations. Therefore it is important to examine whether those factors are considered in the existing land development regulations which practiced by UDA. Accordingly, those factors are checked in the following evaluation table. (Table No. 5.3)

For the above analysis, results of the professional perception survey were utilized. Professional perception survey was carried out to aware the existing planning and building regulations, among the town planner who are currently involved in practicing regulations. According to the results of survey, it was revealed that 75% of town planners are not satisfied or partly satisfied with the existing reguations.60% of interviewed professionals have been expressed that the existing regulations are inappropriate to present situation of urban areas. Inaddition to that, it was revealed that most factors which are important to the land development regulations have not been considered. The findings of the professional perception survey have been annexed in annexure iii.

Table no 5.3 Consideration of the factors of land development with existing regulations

Facotors	considered	Partly considered (not specified)	Not considered
Soil and sub soil conditions			X
Ground water			X
Drainage system			X
Flood levels			X
Citing of projected buildings (slope)			X
Access and circulation	X		
Suitability of development of open areas		X	
Water supply	X		
Sanitary sewage disposal			X
Power and Communications			X
Noise and vibration		X	
Odor, Smoke and Dust		X	

According to the table no.5.3, it is revealed that 12 aspects of 7 have not been considered in the planning and building regulations of UDA.therfore this situation has been caused to many problems in uran areas.

hence. it is observed that the impacts due to above situation are experienced in every part of the country and those are can be shown as examples. following figures were taken from the case study areas and other part of the country.

Figure 5.25 Construction of boundary walls within the building line

Due to this situation, roads have become narrow and drainage system in the either side of road has been disappeared .in the rainy season roads are affected to flooding.

Figure 5.26 Encroachment of canal reservations and water retention areas

Figure 5.27 Encroachment of reservations of water bodies.

Figure 5.28 Residential developments in the flooding lands

Figure 5.29 Destruction of Buildings which Constructed in the steep slope land

Figure 5.29 Allocation of unsuitable lands for open spaces

CHAPTER 06

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

According to the previous chapter, it was revealed that the most of land development regulations which practiced in urban areas are inappropriate condition. It was found that number of regulations which currently practiced inapplicable situation especially where the hilly areas. Therefore, it is clear that there is a relationship between topographical variations and violation of land development regulations. this situation mostly affected to hill urban areas. In addition most of important factors that should be included to the regulations are not considered.

Therefore, weak and non applicable regulations are affected negatively to the development and led to unauthorized and regulation violated developments in urban areas. Ultimately this will led to the resource waste and creating many problems. Land as a scarce resource in the urban areas should be utilized in very wisely. As a tool, land development regulations should enhance the development while maximizing the social, physical, economic and environmental benefits.

Therefore most of existing land development regulations which practiced in urban area inappropriate situation and that has been affected negatively to efficient resource utilization in urban areas as well as negative impact to overall development of the city and country. Specially these regulations are existed inappropriate condition such as Open Space, Access ,Street lines, Turning circles, Building lines, Parking, Gradient for Ramps, Plot coverage, Floor Area Ratio, Building category, Building heights, Rear space, Side space.

Accordingly, in order to achieve planned and sustainable urban development, it is important to formulate efficient and effective land development regulations for the urban area. Therefore, following recommendations can be made for the achievement in the expected objectives through the effective land development regulations.

6.2 Recommendations

1. It should be regazzeted the planning and building regulations of UDA with clear difinitions and lacking areas of regulations.

2. Planning and Building regulations should be prepared by considering the geographical characteristics and other charateristics which are specific to the perticular urban area.(specialy enviroment,physical and social aspects)

3. Slope map should be included to the development plans and it should be indicated permissible slope and plot size and other related regulations.

4.10% of Open space should be considered even less than the 1Ha. from the land subdivision plans.

5. Building lines should be given as common regulations according to the width of road

6. It should be given the clear reservations for the Tanks, rivers and major canals through the land development regulations

7. Reservations and building lines sould be considered practicle physical mesurments

8. Drainage plan should be included in to the new subdivision plans as regulations

9.Steps should be considered for the accesibility in hilly areas.

10.Plot size should be determined according to the slope angle

11.Resrvations should be keep the surrounding of buildings or construction of retainnig walls.

12. Road width of land subdivision plans should be calculated without either side of the drainage lines and clear definition should be given.

13. Landscape plan should be included to the land development regulations

14. It should be given the clear definition to the ground flow, basements and foundation structures for the buildings in hilly land areas.

15. Contour system should be considered for the accessibility in the hilly areas for the new subdivisions and steep access should be avoided.

16. Since the turning circle is not suitable in hilly areas and it should be considered other alternatives methods for the vehicle turning.

17. Sewer disposal system should be considered in new land subdivisions.

18. Drinking water supply should be provided for the new land sub divisions by developer and quality of the ground water should be monitored by the Water Board.

19. Soil condition of the blocking out should be considered, in a permeable soil plot size should be large than hard soil.

20. Neighborhood should be capable enough for solid waste, water supply, and sewer disposal management. Regulations should be formulated for the above Factors.

21. Town planner should be certified for every land blocking outs.

22. Awarness programmes should be carried out regarding the land development regulations of UDA among the people and relavant professionals.

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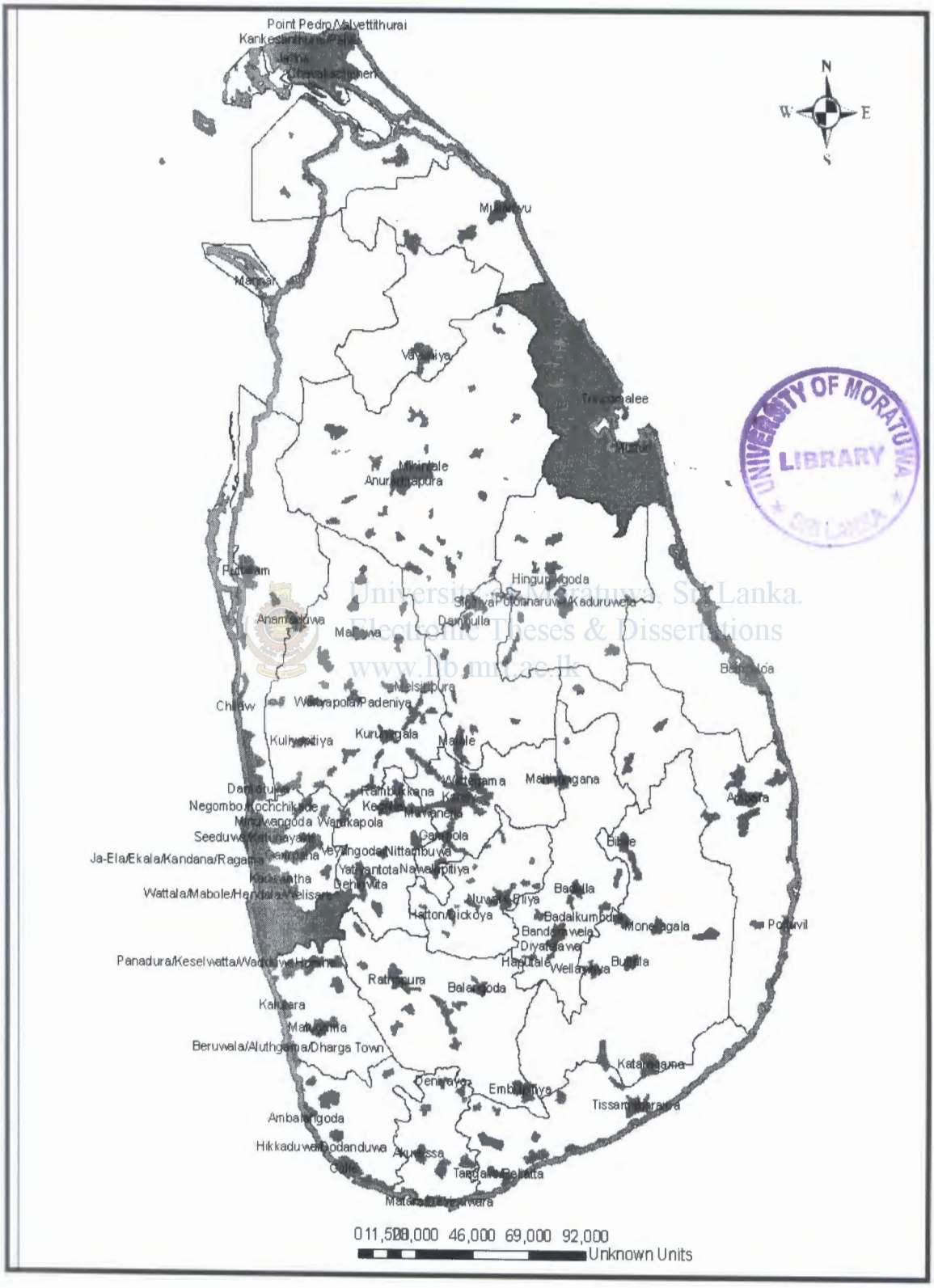
Annexture I **DECLARED ARES OF UDA**



Annexure ii

LAND DEVELOPMENT REGULATIONS OF URBAN DEVELOPMENT AUTHORITY

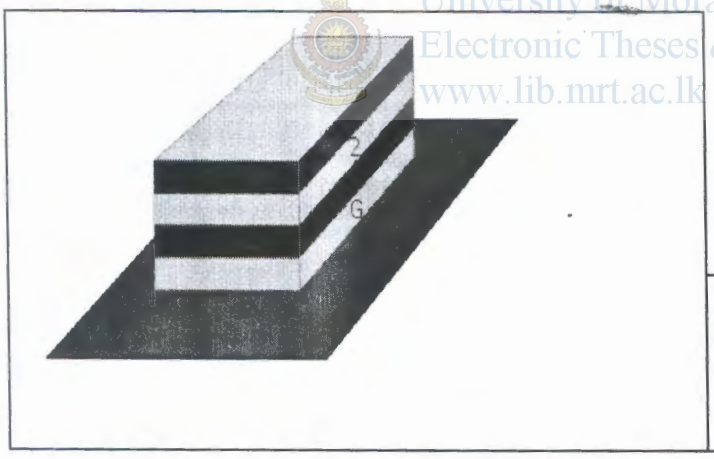
When examine the land development regulations in the UDA in 1986, there are many factors considered and that are can be summarized as follows.

1) **Plot Size and Road Frontage**

Regulation 17 (1)

The minimum extent and the minimum with of lots for different classes of building, not being high rise buildings, should be in conformity with the specification set out in Form "C" of Schedule III unless the authority has stipulated a higher or lower minimum extent and / or higher or lower width of lots in a development plan already approved for the area or proposed for the area.

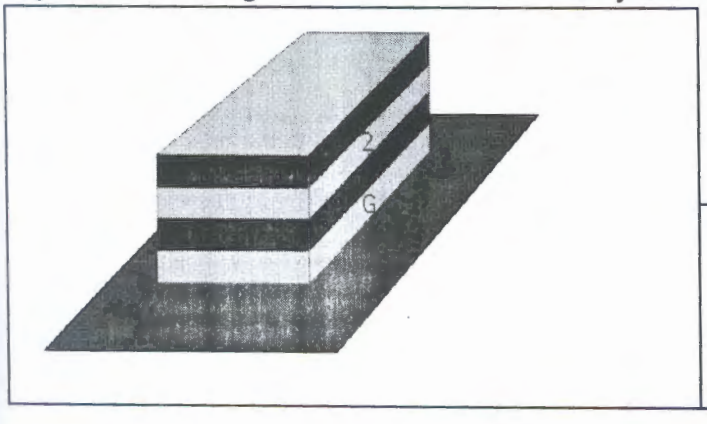
Figure: 4.1 Public Assembly and Public Buildings 17 (1) form C and schedule iii



Minimum Plot Size - 300 sq.m 12P

For G+3

Figure: 2 Buildings other than Public Assembly and Public Buildings 17 (1)



Minimum Plot Size - 150 sq.m 6P

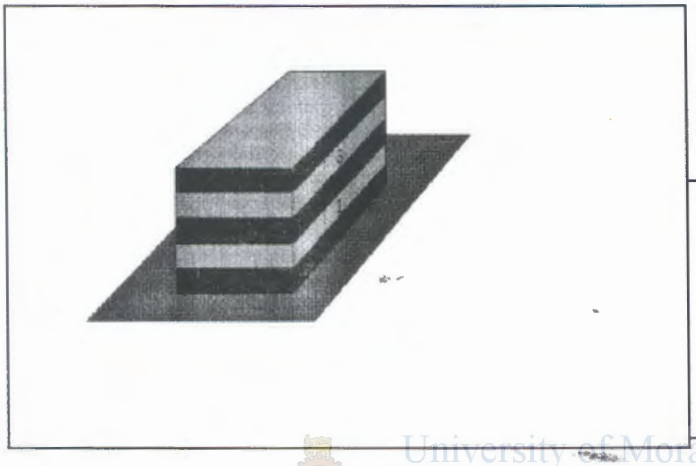
For G+3

Regulation 27(1)

No plan of the site shall be approved for the construction of a high rise building unless:

1)The site does not exceed 1000 Sq.M. In extent a has a dimension of at least 20 M. along the shortest side.

Figure: 3 High rise Buildings 27(1)

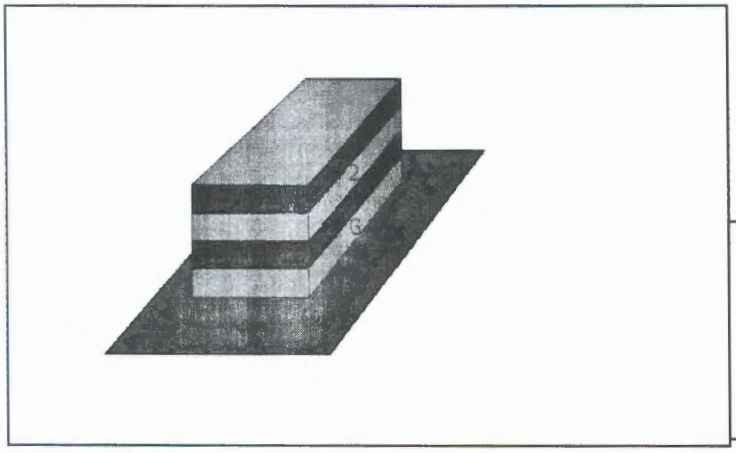


Minimum Plot size 1000sq.m.(40P)

Shortest side of the site - 20m

For G+4

Figure: 4 Buildings other than public assembly and public buildings form c of schedule iii



Minimum frontage =6m

For

G+3

Regulation 27(2)

Every lot or site which abuts on to the end of Dead End Street may have a frontage less than the width in form "C" of schedule III, but have a frontage which is not less than 3.0 M. wide
perpendicular to the line of the street.

Form C of Schedule III – Specification as to Lots

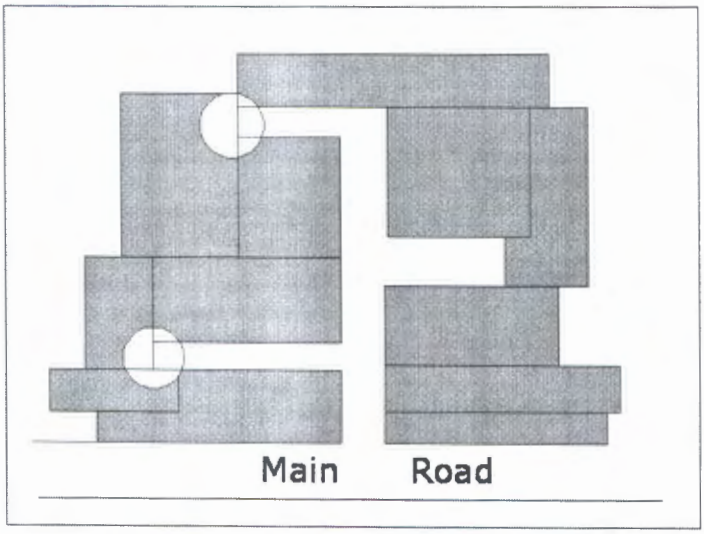
Character of Building	Minimum site Area (Sq.M)	Minimum Width of site (M)
All building except those included below	150	6
Public Assembly Buildings and Public buildings	300	12

2). Open Space

Regulation 22(1)

Where the parcel of land or site to be subdivided exceeds1.0 hectare, an area of not less than ten percent of the land or site, excluding streets shall be reserved for community and recreation uses in appropriate locations

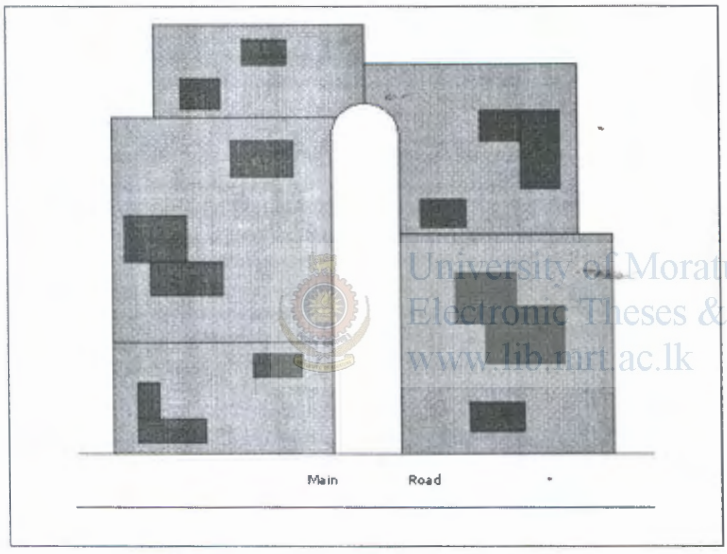
Figure 5 Residential Regulations 22(1)



Open space Residential Regulation 22(1) (b) 1996 Amendment

In the residential land subdivisions, if the minimum land parcel of the sub divisions not less than 1012Sq.M. (40Perches) and the development is limited to two housing *units per lot the land* may be sub divided without reserving 10 percent of the land for open space uses but subject to the condition that in the event of further subdivision or construction of more than two housing units per lot, the developer should deposit the *market value of 10 percent of the land so subdivided or developed at the relevant* local authority

6 Residential Regulation 22 (1) (b) (1996 Amendment

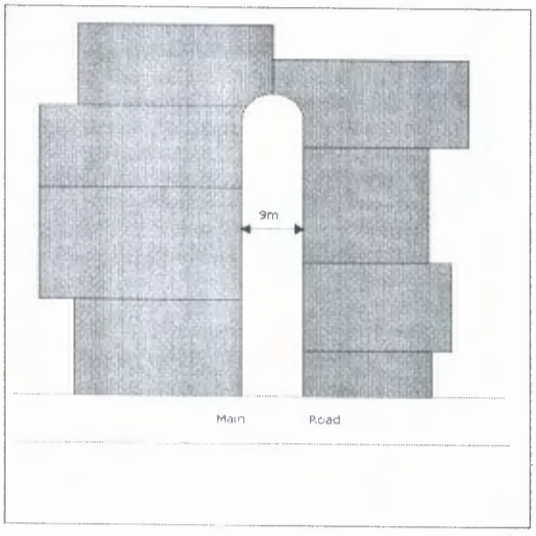


Regulation 22(1) (a) 1996 Amendment

In commercial and industrial land subdivisions, if the minimum land parcel of the sub division is not than 2024 sq.m. (80 perches) and all the road widths are not less than 9 meters the land may be the land may be sub divided without reserving 10 percent of the land for open space uses but subject to the condition that in the event of further sub division of any of of the parcels, the developer should either,

i) Reserve the 10 percent of the land so sub divided; or
ii) Deposit the market value of 10 percent of the land so sub divided at the relevant local authority.

Figure 4.7 Regulation 22 (1) (a) 1996 Amendment



4) Accessibility

4.1) Access Residential units

Regulation 16 (2) (a) and Form A of schedule III

Every street meant to serve dwelling units shall be in conformity with the specifications set out in form A of schedule III

Figure 7 Residential Units Regulation 16 (2) (a) & Form A of Schedule iii

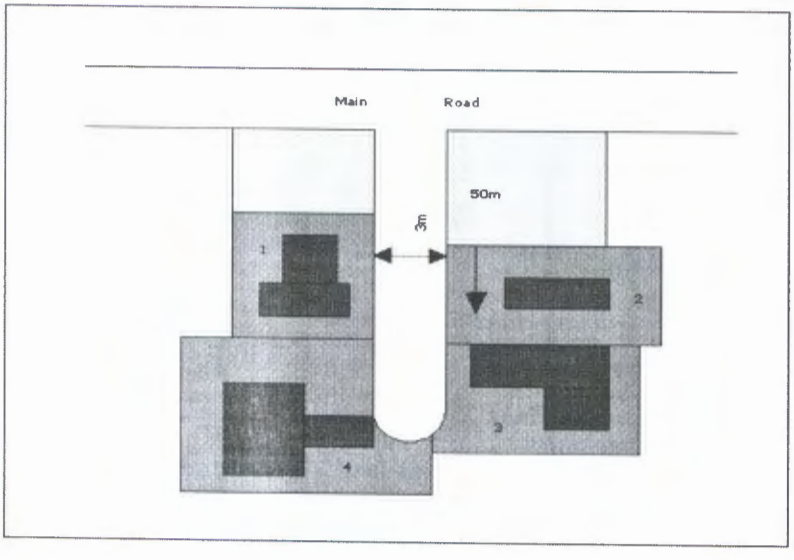


Figure 8 Residential Units Regulation 16 (2) (a) & F orm A of schedule iii

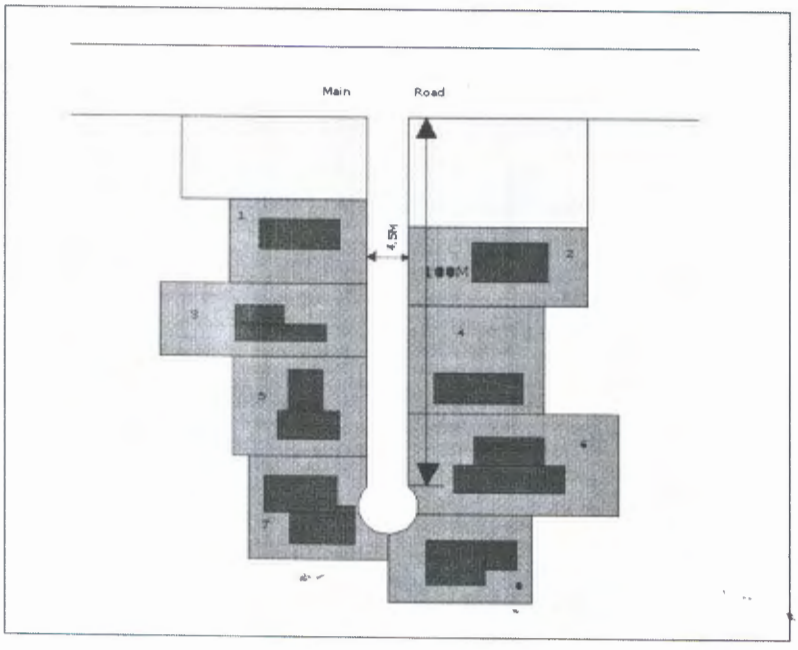
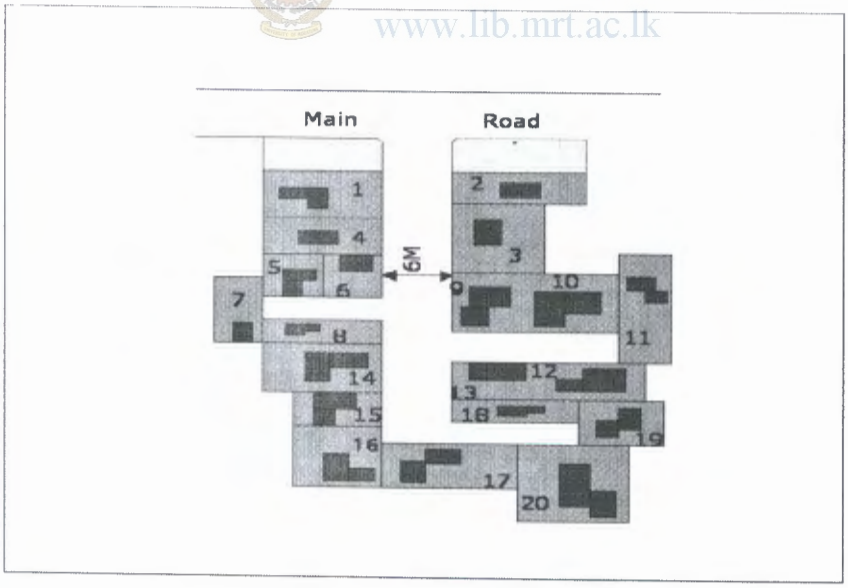


Figure 9 Residential Units Regulation 16 (2) (a) & F orm A of schedule iii



Form A of schedule III – Access to Residential units

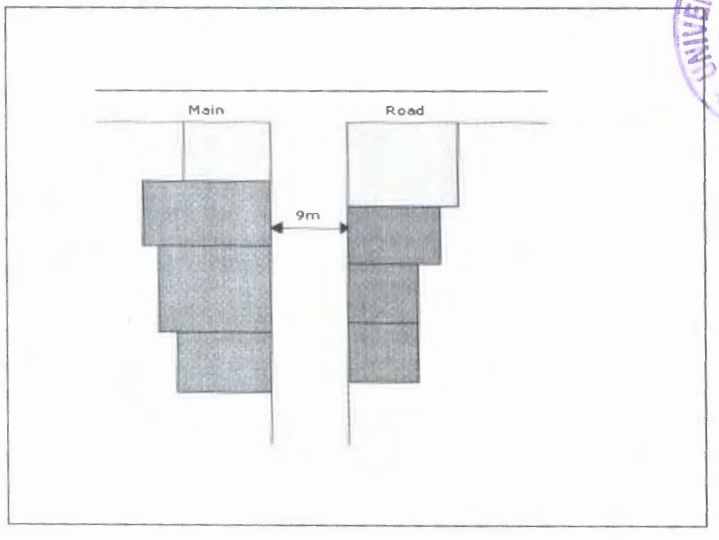
Number of dwelling units served	Minimum width (m)	Maximum length (m)
Under 4 dwelling unit	3.0	50
More than 4 but not more than 8	4.5	100
More than 8 but not more than 20	6.0	-
More than 20 dwelling units	9.0	-

4.2)Access non Residential units

Regulation 16(1)

No site or lot abutting a street less than nine meters in width shall be used for non residential use or construction of any building for such use except as provided under regulation 16(2)(b).

Figure 4.9 Non Residential Units Regulation 16



Regulation 16 (2) (b)

A Street meant to serve one or more lots for construction of any building for non residential use may be permitted with access less than 9 meters in width and shall be in conformity with the specification set out in Form B of schedule III.

Form B schedule III – Access to Non residential Buildings (specialprovision)

Maximum Extent of land Served (sq.m)	Maximum FAR on each site	Maximum width of Street (m)	Maximum length of street (m)
500 Where the street serves more than 1 lot or site but not more than four lots	1.5	6.0	50
2500 Where the street serves only one lot or site	1.5	6.0	150

Figure 4.9 Non Residential Units (Special Provision) Regulation 16 (2) (b) & From B of Schedule iii

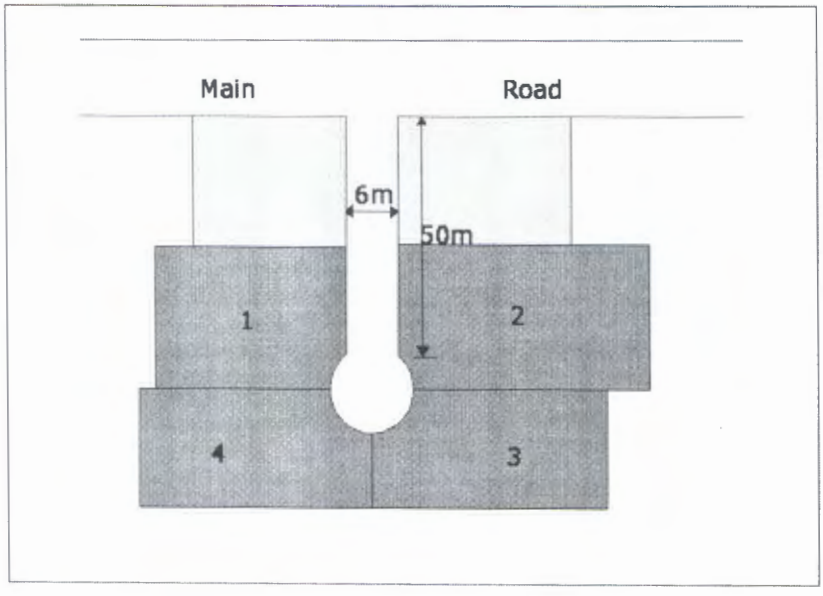
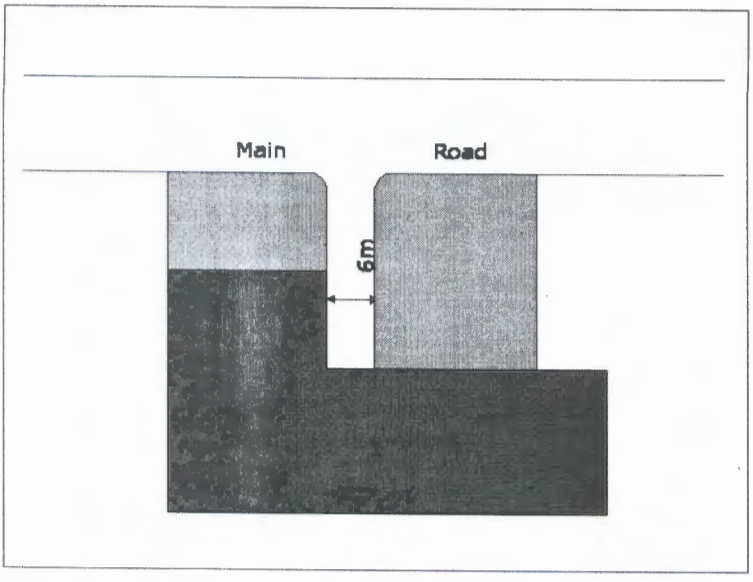


Figure 4.10: Non Residential Units (Special Provision) Regulation 16 (2) (b) & From B of Schedule iii

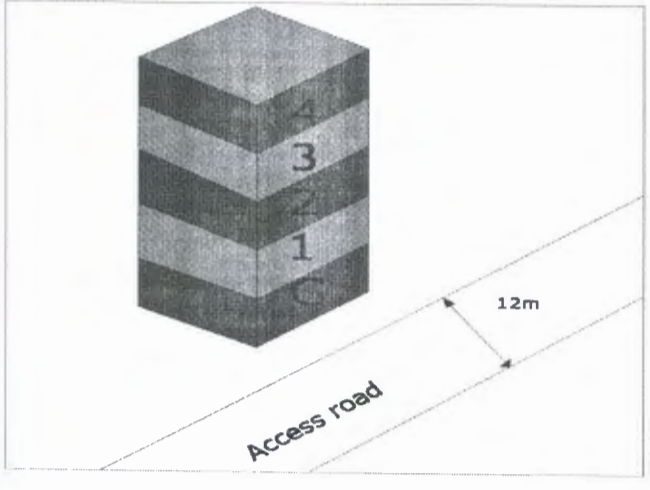


4.3 Access High rise Buildings

Regulation 27 (2)

No plan of the site shall be approved for the construction of high rise buildings unless the site abuts on a street which is not less than 12 meters in width.

Figure 4.11: High rise Buildings Regulation 27 (2)

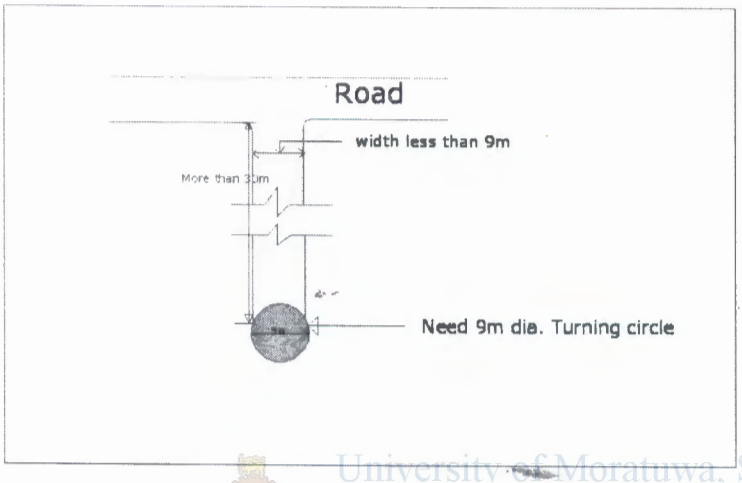


5)Turning Circle

Regulation 16(4)

Every street which is less than 9 meters in width and exceeds 30 meters in length shall be provided with a turning circle of not less than 9 meters in diameter at the dead end.

Figure 12: Turning Circle

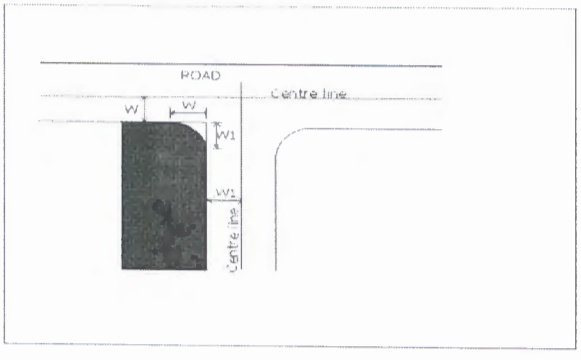


6) Splaying of Street Corners

Regulation 32

The authority may require the corner of any building including boundary walls or fences to be erected at the corner of two streets be rounded off or splayed to such extent and height as may be necessary in the interest of the safety of the users of the streets.

Figure 13: Splaying of Street Corners



Parking and traffic control Dimensions of stalls

Regulation 31(2) and section 3(b) (7) of schedule III of 1994 Amendment

Vehicle category	Dimension of stalls			
	Angle parking		Parallel parking	
	Min. length (m)	Min. Width (m)	Min. length (m)	Min. Width (m)
Motor Cycles	2.25	0.6	2.25	0.6
Lorry	8.0	3.0	8.0	3.0
Other Vehicles	4.8	2.4	5.4	2.4

Regulation 31(2)

The dimensions of car parking stalls shall be

a) Minimum stall width 2.4 meters
b) Minimum stall length 4.8 meters
c) Minimum stall length for parellelparking5.4 meters

Regulation 31(3)

The minimum width of aisles shall confirm to the requirements specified in Form F of Schedule III

Parking Angle	One way traffic		Two way Traffic (m)
	Bays on one side (m)	Bays on two sides (m)	
Parallel	3.6	3.6	6.0
30 degree	3.6	4.2	6.3
45 degree	4.2	4.8	6.3
60 degree	4.8	4.8	6.6
90 degree	6.0	6.3	7.2

7) Access to Parking – Separate Entry and exit

Regulation 31(4)

The width of access to car parking area shall not be less than 3 meters clear of footways and other obstructions if entry and exit are separately provided and 5.5 meters if entry and exit are provided together.

Section 2(9) (a) of 1994 amendment

Only one entrance and exit point for sites with a road frontage width less than 12 m is to be permitted; provided that the authority may consider permitting not more than two entrance and exit points for sites if the road frontage width exceeds 12 m.

8) Gradient for Ramps

Regulation 31 (5)

The maximum gradient of ramps shall not be steeper than 1 in 8

Regulation 31(6)

Every such ramp shall start only beyond a distance of 6.0 m from the street edge.

9) Plot Usage – Plot Coverage and Floor Area Ratio

Regulation 25 - Plot coverage

The maximum plot coverage permissible on any site for any of the purposes specified in Form E of schedule III shall be as in conformity with the requirements specified therein.

Form E of Schedule III – Maximum lot coverage

Character of Building	Maximum lot Coverage	Minimum Open Space at the Ground Level
Dwelling units, Hotels, Guest houses and public Assembly buildings	66 2/3 %	33 1/3 %
Offices, shops, Other commercial & industrial buildings	80%	20%

Plot Coverage = Ground Floor Plinth Area × 100

Land area

Regulation 15(1) - Floor Area Ratio (Relevant part only)

The provision of any development plan approved for any development area or the provisions of any development plan under consideration shall contain the maximum floor area ratio permissible on any site provided that where no such plans are available, the maximum floor area Ratio permissible shall be determined, taking into account the characteristics of the buildings intended for the area, the location of the site and the capacity of infrastructure systems, provided that the floor area ratio permissible on any site shall not exceed 2.75.

Floor Area Ratio = Gross Floor Area of all buildings

Land Area

10) Building category and Heights

Building category

Regulation 8(1), 8(2) and 8(3)

For the purpose of these regulations, buildings shall be categorized follows.

1) Category A, means any building consisting of five or more floors including the ground floor or any building the height of which exceeds 15m above the adjoining street.

2) Category B, means any building not being a high rise building which consist of ;

i) A basement, roofs, foundations, beams and other related parts of the buildings.

ii) 2 or more floors including the ground floor where a wall or column is situated on the property boundary

iii) Pile or raft foundation

iv) Roof span exceeding 10m.

v) A place of public assembly or a public building

vi) A building, which is wind sensitive such as ware house and factories

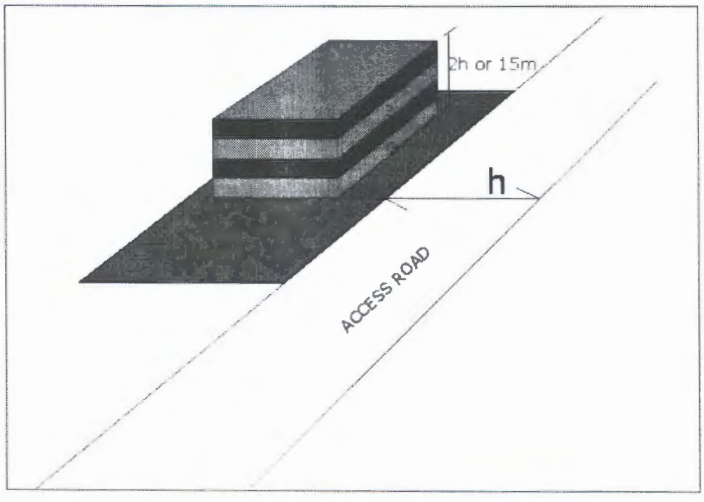
vii) Any other type of building not covered under category A and C

3) Category C, (i) includes any residential building which does not exceed 300sq.m. in extent, which is not covered under category B(ii) and (ii) includes any building other than a residential building, which does not exceed 100sq.m.in extent which is not covered under category B(ii)

Regulation 18 (2) – Low rise buildings

The maximum height of a building in other cases not being a high rise building shall not exceed 15 m. or twice the distance between any storey of a building and the further edge of the abutting street whichever is less.

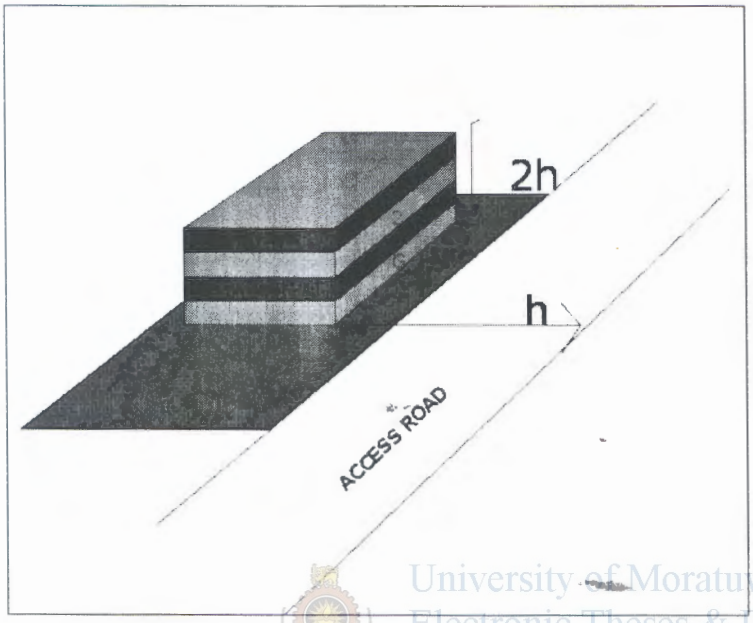
Figure 14: Building Heights Low rise Buildings Regulation 18 (2)



Regulation 29 (1) – High rise buildings

The maximum height of the building shall not exceed twice the horizontal distance between any storey of the building and the farther edge of the abutting street.

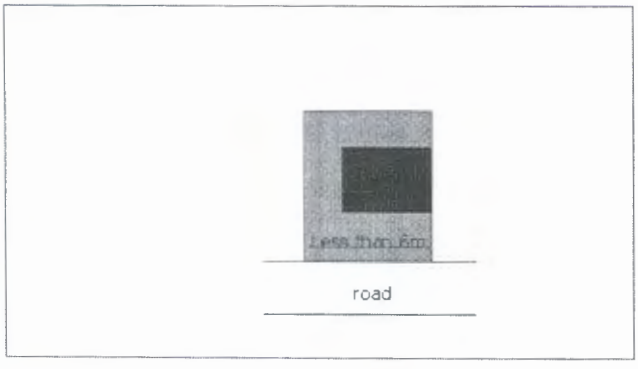
Figure 14: Low rise Buildings Regulation 29(1)



11) Regulation 18 (1) – existing lot

The maximum height of the building on an existing lot which is six (6.0) m. or less in width and or has less than one hundred and fifty (150) sq.m. in extent shall not exceed seven and a half (7.5) meters or two floors unless the authority directs otherwise.

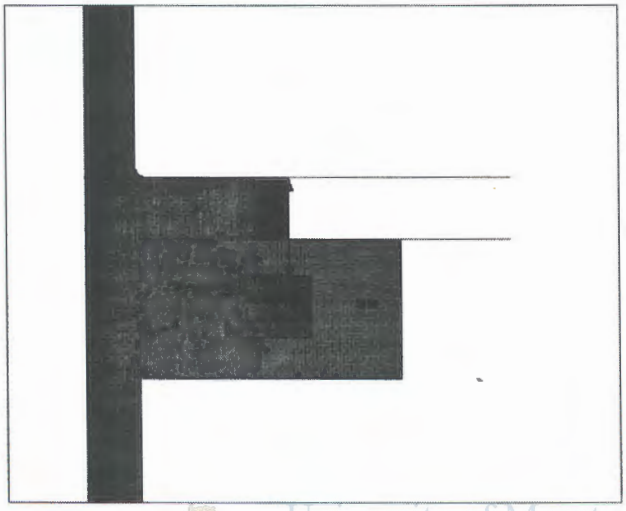
Figure 15: Existing Lot Regulation 18 (1)



Regulation 18 (3) - Building heights (site situated in a corner)

If the lot is situated in a corner, the height of the building shall be regulated by the wider of such streets so far as it abuts or will abut on the narrower street to a depth of 20 m. from the wider street.

Figure 16: Site situated in a corner Regulation 18 (3)



12) Open space around the building – Rear space and Side space

Regulation 26(2)

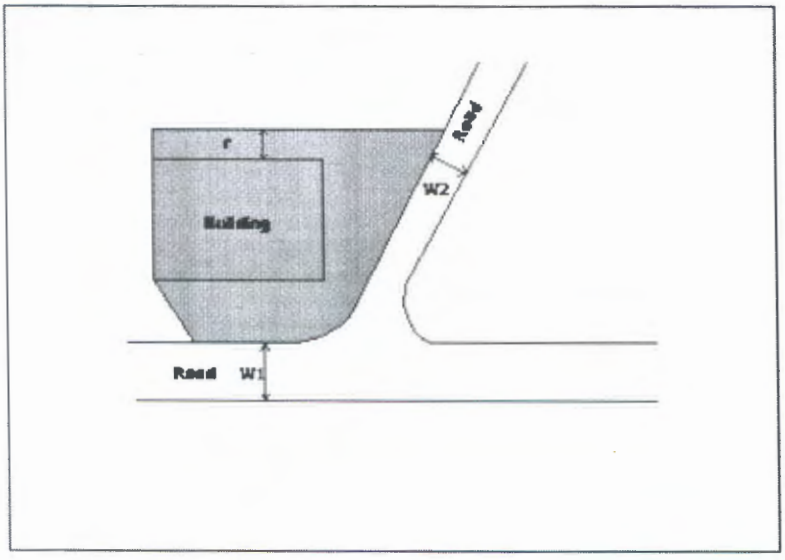
For the purpose of this regulation the rear of the building shall be deemed to be the face which is further from any street on which the building is situated.

Provided that where the building is situated on more than one street, the rear of the building, unless the authority otherwise directs shall be deemed to be the face which is farthest from the widest of such streets.

Regulation 26(4)

In sites of irregular shapes where it is impracticable to provide an open space to the entire width of the building in the rear, the authority may direct that the open space in the rear shall be left as it deems appropriate having regard to the circumstances of the case.

Figre 17: Regulation 26 (2) & 26(4)



Regulation 26(1)

There shall be in the rear of every building and belonging exclusively to it an open space of not less than three (3.0) meters extending along the entire width of the building unless the rear of the building abuts on to a public street not less than six (6.0) meters in width.

Provided that where the building consists of a ground floor and no further storeys are proposed to be added the width of such rear open space may be reduced to 2.25 meters.

Figre 18 Regulation 26 (1) Rear Space

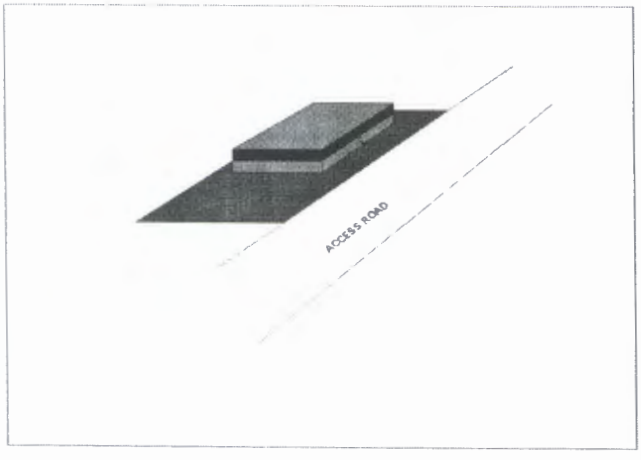
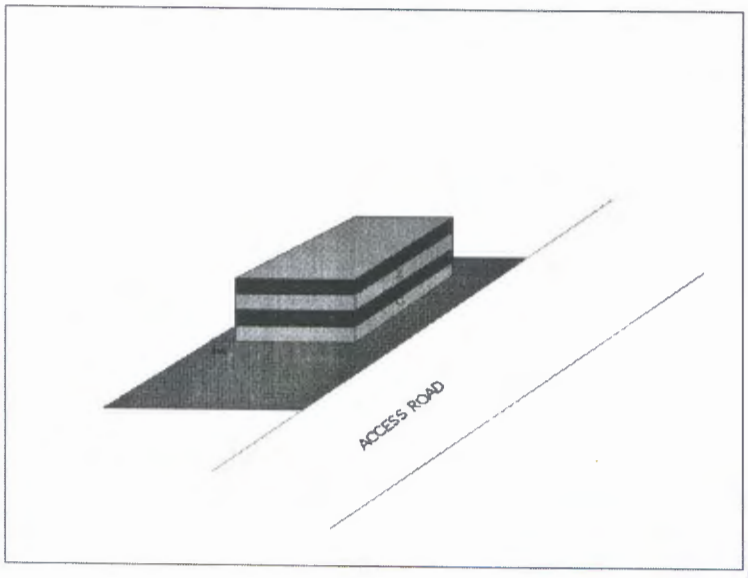


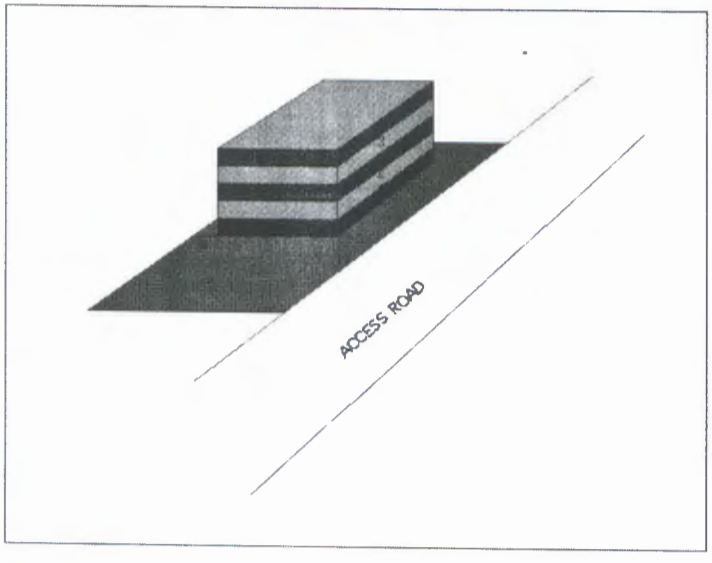
Figure 19 Regulation 26 (1)



Regulation 30 (2) – Rear space high rise Buildings.

There shall be in the rear of every building an open space of at least one quarter the height of the building extending along the entire width of building.

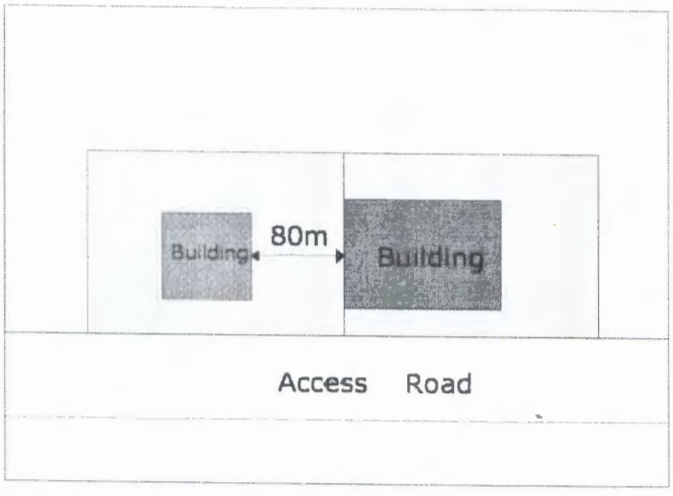
Figure 20: High rise Buildings Regulation 30 (2)



Regulation 26(5) – side space low rise Buildings

In the case of buildings where an open space is intended to be provided on the site for purpose of access, maintenance of the building in separating it from adjoining properties, such open space shall in no case be less than 80 cm. in width.

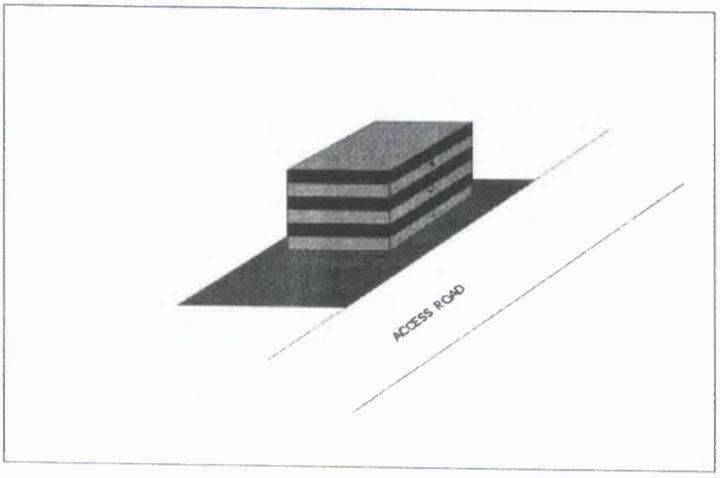
Figure 21 Low rise buildings Regulation 26 (5)



Regulation 30(1) – side space High rise Buildings

There shall be in the least on one side of the building, not being the front or rear side, between the building and the boundary of the site a minimum open space of at least one quarter of the height of the building or 5.5 meters whichever is less.

Figure 22 High rise Buildings Regulation 30(1)



Annexure III

Analysis of Professonal perception Survey

In order to get the ideas and perception of Town planners regarding the existing planning and building regulations of UDA, questionnaire survey was carried out. Accordingly, 20 Town planning professionals were interviewed during the month of May 2009. The interviewed town planners are represented in different geographical areas in the country. The questionnaire sheet is attached in the annexure. Results of the questionnaire survey can be summarized as follows.

1. Practice of the planning and building regulations by Town Planners

	Practice	Not practice	Total
Number	20	0	20
Percentage %	100%	0	

2. Satisfactory of the current practice of the Planning and Building regulations.

	Satisfied	Some extent	Not satisfied	Total
Number	6	9	5	20
Percentage %	30%	45%	25%	100

3. Appropriateness of Planning and Building regulations for their representative areas.

	Appropriate	Some extent	Not Appropriate	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

4. Applicability of Planning and Building Regulations

Regulations	Applicability					
	Can Practice		Some Extent		Can not Practice	
Plot size	12	60 %	4	20 %	4	20%
Road frontage of Plot	16	80%	1	5 %	3	5%
Open Space	19	95%	1	5%		0%
Access	12	60%	2	10%	6	30%
Street lines	10	50%	3	15%	7	35%
Turning circles	11	55%	2	10%	7	35%
Building lines	7	35%	4	20%	9	45%
Splaying of street corner	14	70%	3	15%	3	15%
Parking	8	40%	5	25%	7	35%
Gradient for Ramps	15	75%	2	10%	3	15%
Plot coverage	16	80%	3	15%	1	5%
Floor Area Ratio	10	50%	5	25%	5	25%
Building category	12	60%	3	15%	5	25%
Building heights	12	60%	3	15%	5	25%
Rear space	13	65%	2	10%	5	25%
Side space	12	60%	4	20%	4	20%

5. Satisfactory of land subdivision regulations

	Satisfied	Some extent	Not satisfied	Total
Number	7	5	8	20
Percentage %	35%	25%	40%	

6. Problems found in land subdivision approving

	Problems found	Some extent	Problems not found	Total
Number	9	6	5	20
Percentage %	45%	30%	25%	

7. Factors Consideration in land subdivision approving

Factors	Considered	Some extent	Not considered
Plot size	20(100%)		
Road frontage of Plot	18(90%)	2(10%)	
Open Space	17(85%)	3(15%)	
Access	16(80%)	4(20%)	
Recreation facilities	1(5%)	4(20%)	15(75%)
Turning circles	20(100%)		
Landscape plan		1(5%)	19(95%)
Street lines	18(90%)	2(10%)	
Building lines		3(15%)	17(85%)
Reservations (canal, tank, River)		2(10%)	18(90%)
Soil and sub soil conditions		1((5%)	19(95%)
Ground water			20(100%)
Drainage system	2(10%)	1(5%)	17(85%)
Flooding	2(10%)	3(15%)	15(75%)
Slope angle	1(5%)	3(15%)	16(80%)
Other natural Hazards			20(100%)
Water supply	18(90%)	2(10%)	
Sewage disposal	1(5%)	2(10%)	17(85%)
Solid waste	1(5%)	1(5%)	18(90%)
Telecommunication & electricity	2(10%)	1(5%)	17(85%)
Fire protection	19(95%)	1(5%)	
Noise and vibration	4(20%)	1(5%)	15(75%)
Oder, Smoke and Dust	2(10%)	4(20%)	14(70%)

8. Provision of guidelines in regulations to determine the plot sizes

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

Provision of regulations to consider the recreational facilities in land subdivisions

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

10. Practicability of turning circles of land subdivisions

	Can Practice	Some extent	Cannot Practice	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

11. Provision of any regulation to keep Building lines in approved land subdivisions (when the roads are not gazette)

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

12. Provision of any regulation to consider water supply in land subdivision

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

13. Provision of any guidelines in Planning and Building Regulation to protect the ground water

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

4. Provision of any regulation regarding reservations of River, Tank, and Canal

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

5. Provision of any regulation regarding drainage system in land subdivisions

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

16. Indication of drainage system in blocking out plans by developers

	Indicated	Some extent	Not indicated	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

17. Demarcation of drainage system within the road width

	Demarcated	Some extent	Not Demarcated	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

18. Utilization of 10% of open space in land subdivisions for the recreational development

	Can Utilized	Some extent	Can not Utilized	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

19. Provision of any regulations regarding solid waste disposal within the blocking out

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

M.Sc.in Town and Country Planning

Department of Town and Country Planning

University of Moratuwa.

No:

Questioner survey on Planning and Building Regulations of UDA 1986

Profession: Town Planner

Date:……..

A) Designation:……..
B) Working experience in Town Planning: Years……
C) Names of the Local Authorities Attending Planning committees:……
……

Are you Practice the Planning and building Regulations?

Yes		No	

Are you satisfied with the current practice of Planning and Building Regulations?

Yes		Some Extent		No	

no,
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Are all P. & Building Regulations Pragmatic to your area?

Yes		Some Extent		No	

10, what are the
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4). Applicability of Planning and Building Regulations (please tick)

Type of Regulation	Can practice	Some Extent	Cannot practice	If cannot please provide the reasons	Your suggestions
Plot size					
Road frontage of Plot					
Open Space					
Access					
Street lines					
Turning circles					
Building lines					
Splaying of street corner					
Parking					
Gradient for Ramps					
Plot coverage					
Floor Area Ratio					
Building category					
Building heights					
Rear space					
Side space					

5). Are you satisfied with the land subdivision regulations?

Yes		Some Extent		No	

If not what are reasons?.....

.....

.....

). Have you found any problems when approving Land Subdivisions in your area?

Yes		Some Extent		No	

f yes, what are
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.....

). Do you consider following factors when approving land subdivision plans.

Type of factors	yes	Some Extent	No	Is it included in Pl. & Building regulations? (Yes/No)
Plot size				
Road frontage of Plot				
Open Space				
Access				
Recreation facilities				
Turning circles				
Landscape plan				
Street lines				
Building lines				
Reservations (canal, tank, River)				
Soil and sub soil conditions				
Ground water				
Drainage system				
Flooding				
Slope angle				
Other natural Hazards				
Water supply				
Sewage disposal				
Solid waste				
Telecommunication & electricity				
Fire protection				
Noise and vibration				
Oder, Smoke and Dust				

3). have you provided any guidelines in regulations to determine the plot sizes?

Yes		Some Extent		No	

If not, how do you defined?.....

9) Have you provided any regulations to consider the recreational facilities in land subdivisions?

Yes		Some Extent		No	

.....

10) Is it practicable turning circles of land subdivisions in your area?

Yes		Some Extent		No	

.....
.....

11) Have you provided any regulation to keep Building lines in approved land subdivisions?(when the roads not gazette)

Yes		Some Extent		No	

If No, what is the legal background.....

12). Have you provided any regulation to consider water supply in land subdivision?

Yes		Some Extent		No	

If not provided water supply, what is the minimum plot size in your area?.....

13). Do you find any guidelines in Planning and Building Regulation to protect the ground water?

(Distance between well and septic tank)

Yes		Some Extent		No	

If No, How do you keep the distance between well and septic tank? .....

.....
.....

14) Have you provided any regulation regarding reservations of River, Tank, and Canal?

Yes		Some Extent		No	

If No, How do you keep above reservations?

.....

15. Have you provided any regulation regarding drainage system in land subdivisions?

Yes		Some Extent		No	

6. Do the developers indicate drainage system in blocking out plans?

Yes		Some Extent		No	

7. Is the drainage system within the road width?

.....

.....

8). Do you think that 10% of open space in land subdivisions can utilize for the recreational evelopment?

Yes		Some Extent		No	

f not why

.....

9) Have you provided any regulations regarding solid waste disposal within the blocking out?

Yes		Some Extent		No	

0). what are the factors should be included in planning and building regulations?

.....

.....

.....

1). What are the lacking factors in Planning and Building :egulations.....

.....

2). any suggestions for the land subdivision regulations?

.....

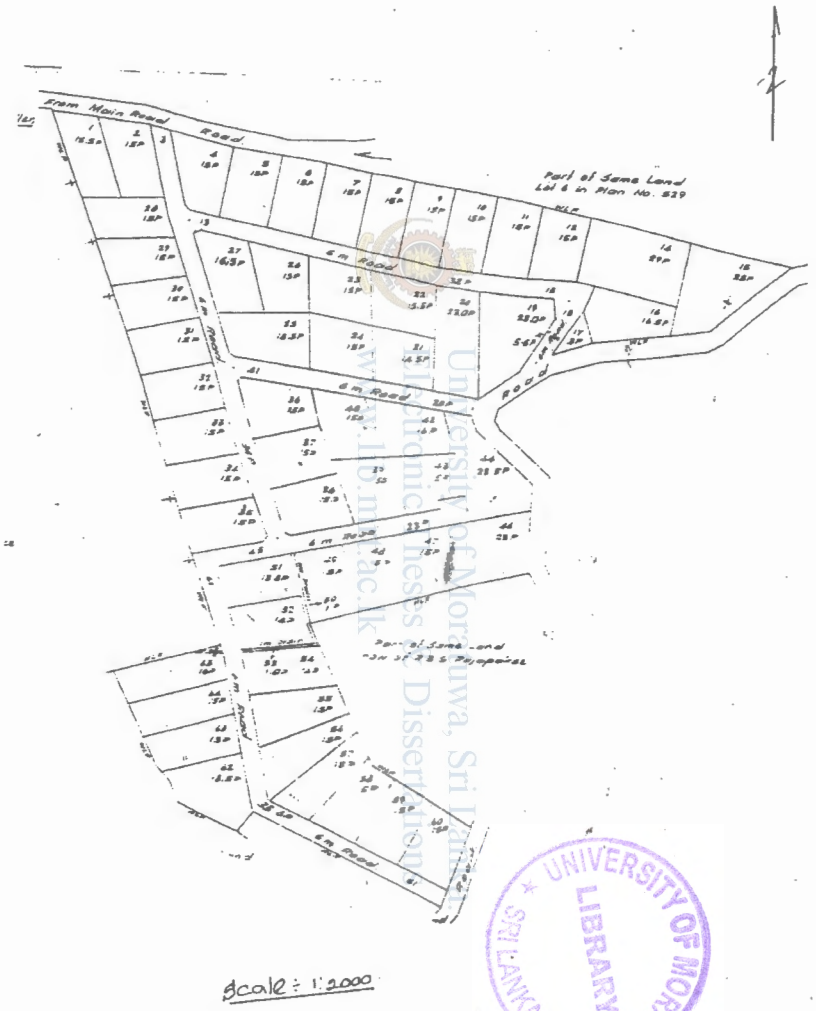
.....

.....

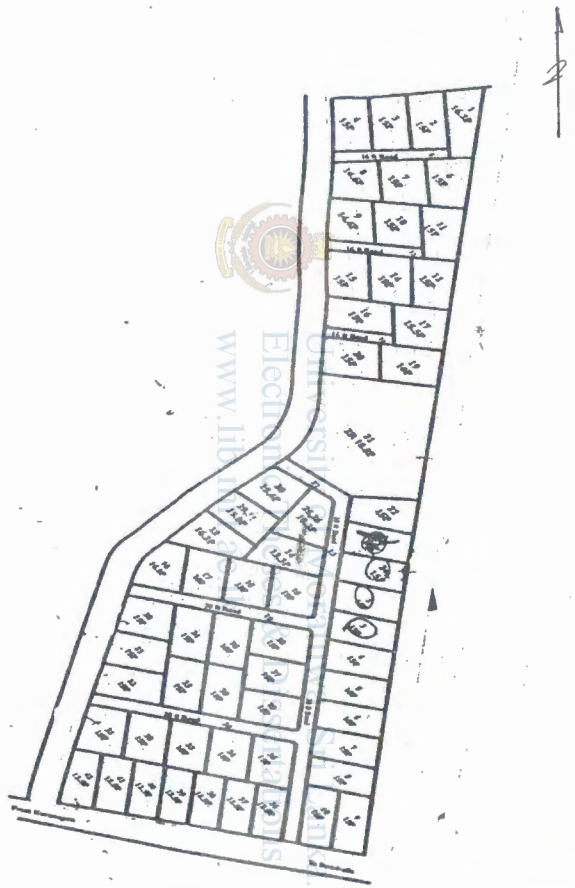
.....

THANK YOU

Reference: KU 1 Land sub division



Reference KU 2 Land sub division



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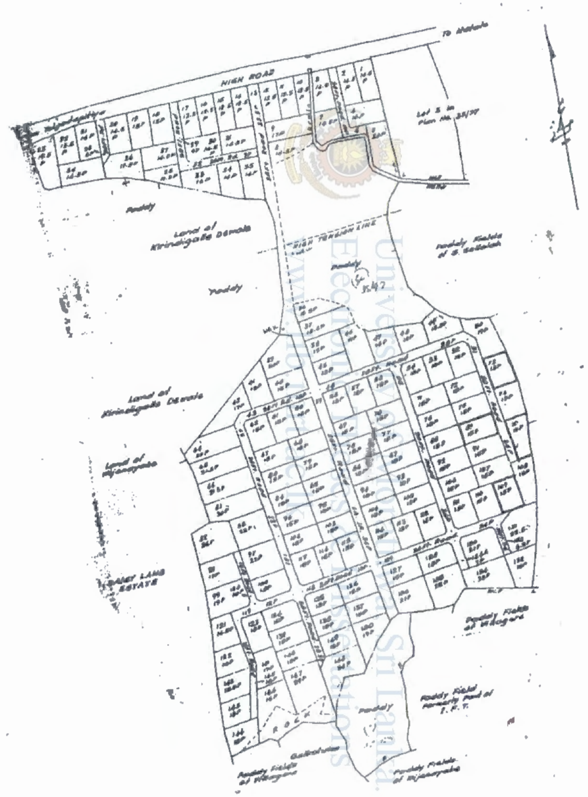
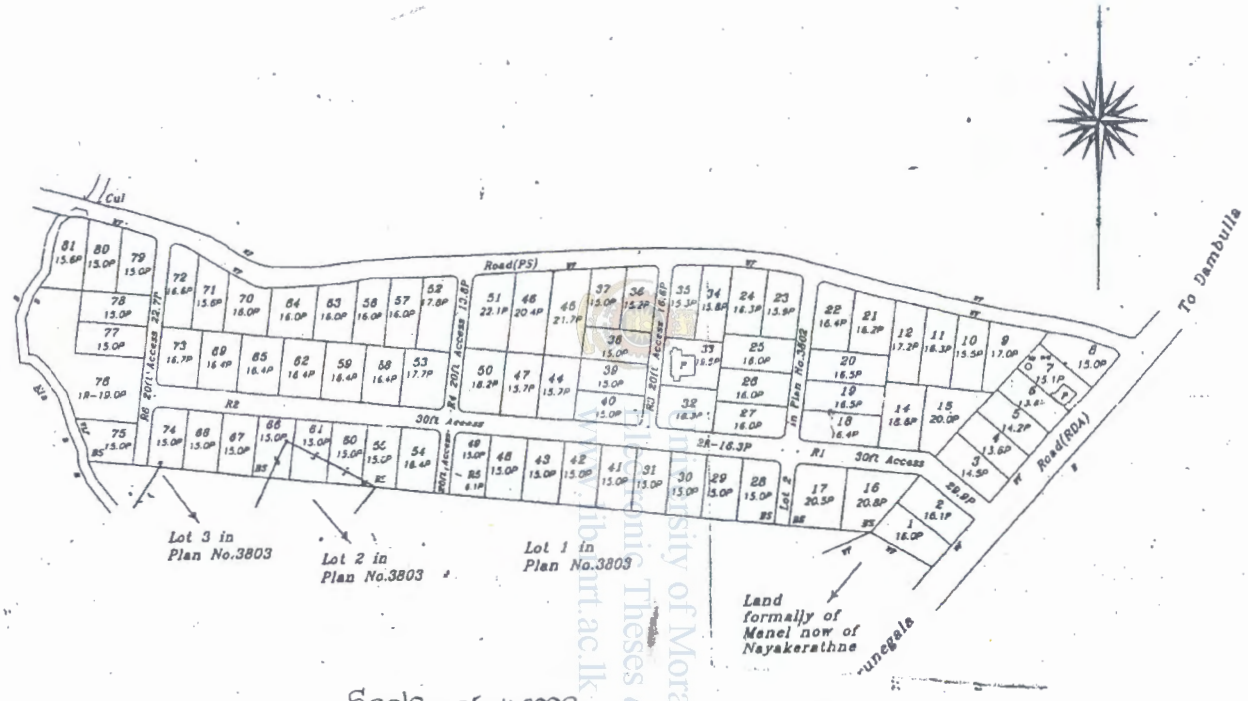
Reference KU 4 Land sub division



Scale of 2 chains to an Inch.

Reference: KU 3 Land sub division



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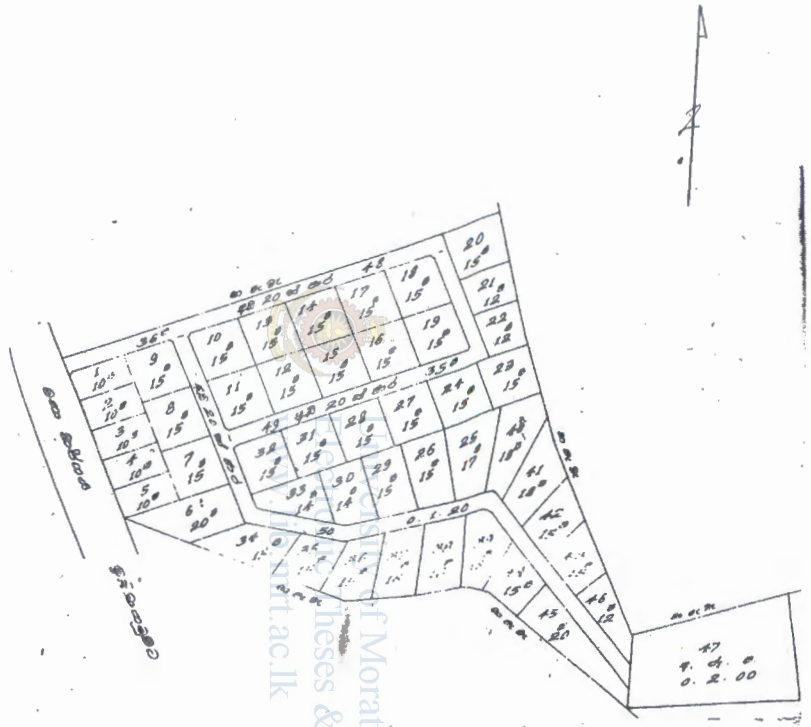

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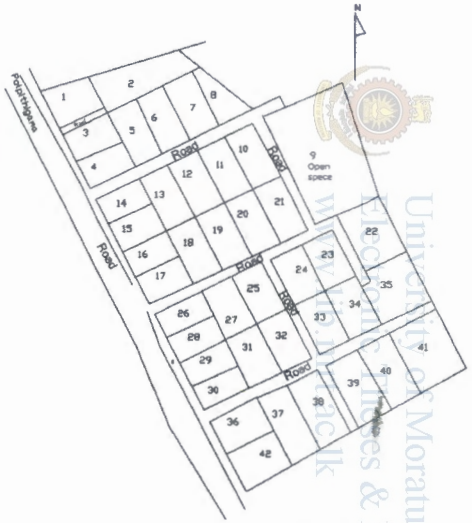

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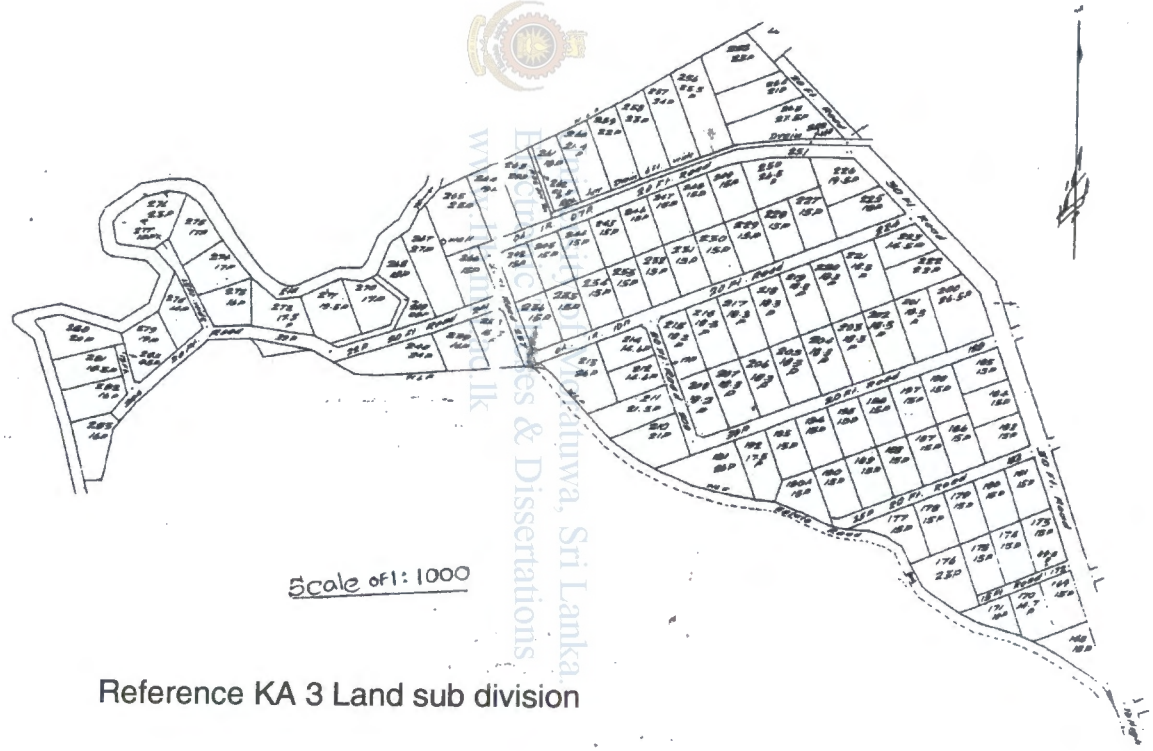

Scale of 1: 1000

Reference KA 3 Land sub division

Reference BA 1 Land sub division

SCALE-1 two chains to an inch

Reference BA 2 Land sub division

Reference

1. Joseph, D. C and Koppelman L.E. (1978) Site Planning Standars,McGraw –Hill Book Company, New York
2. Jill, G. (2005) Dialogues in Urban and Regional Planning, Mixed use in theory and practice, Rout ledge, Milton Park, Oxon.
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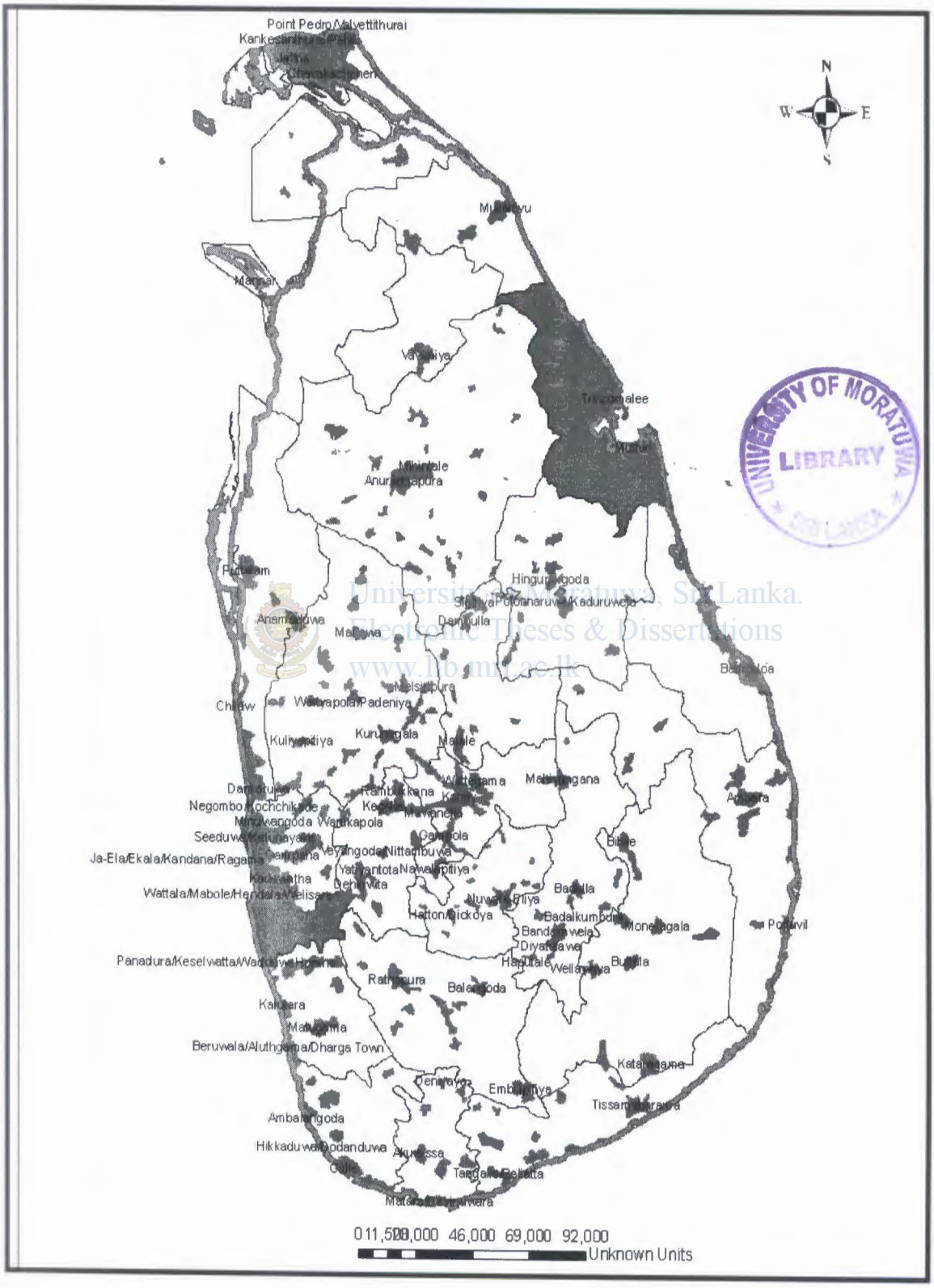
11. H&TI Ordinance (1960), the Gazette of the Democratic Socialist Republic of Sri Lanka Revision, Government Press Ceylon.

Annexture I **DECLARED ARES OF UDA**



Annexure ii

LAND DEVELOPMENT REGULATIONS OF URBAN DEVELOPMENT AUTHORITY

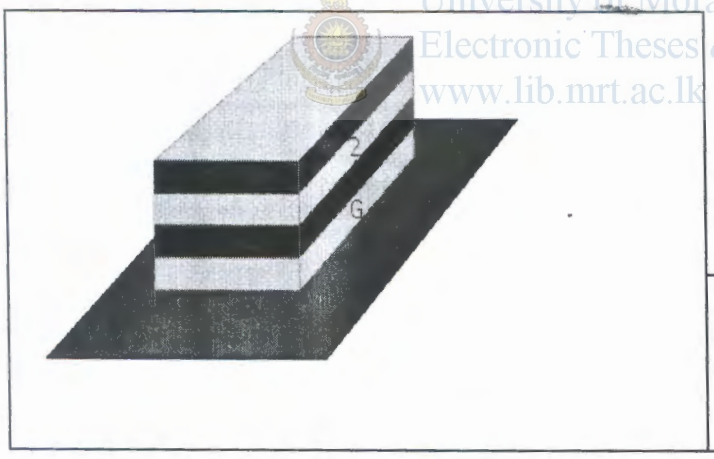
When examine the land development regulations in the UDA in 1986, there are many factors considered and that are can be summarized as follows.

1) **Plot Size and Road Frontage**

Regulation 17 (1)

The minimum extent and the minimum with of lots for different classes of building, not being high rise buildings, should be in conformity with the specification set out in Form "C" of Schedule III unless the authority has stipulated a higher or lower minimum extent and / or higher or lower width of lots in a development plan already approved for the area or proposed for the area.

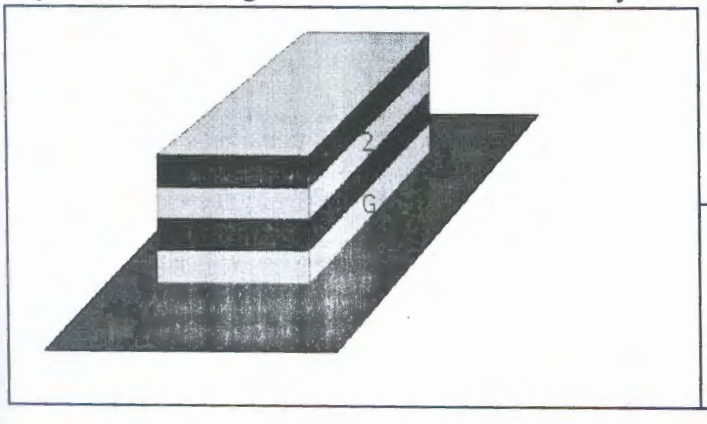
Figure: 4.1 Public Assembly and Public Buildings 17 (1) form C and schedule iii



Minimum Plot Size - 300 sq.m 12P

For G+3

Figure: 2 Buildings other than Public Assembly and Public Buildings 17 (1)



Minimum Plot Size - 150 sq.m 6P

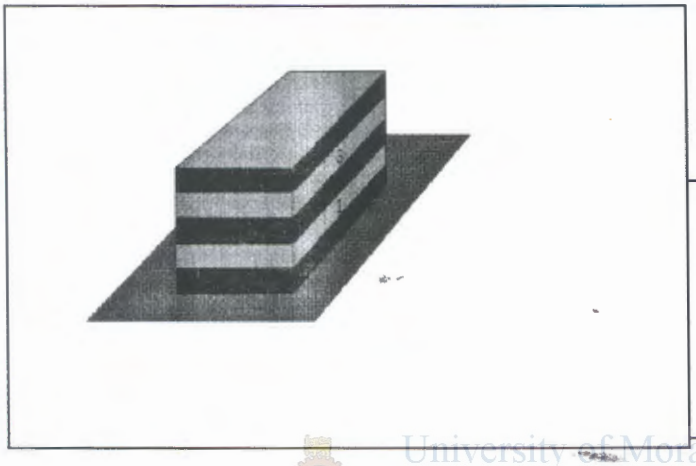
For G+3

Regulation 27(1)

No plan of the site shall be approved for the construction of a high rise building unless:

1)The site does not exceed 1000 Sq.M. In extent a has a dimension of at least 20 M. along the shortest side.

Figure: 3 High rise Buildings 27(1)

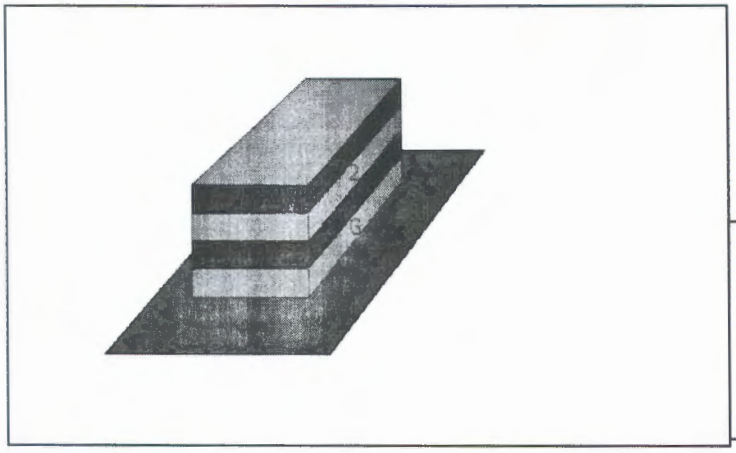


Minimum Plot size 1000sq.m.(40P)

Shortest side of the site - 20m

For G+4

Figure: 4 Buildings other than public assembly and public buildings form c of schedule iii



Minimum frontage =6m

For

G+3

Regulation 27(2)

Every lot or site which abuts on to the end of Dead End Street may have a frontage less than the width in form "C" of schedule III, but have a frontage which is not less than 3.0 M. wide
perpendicular to the line of the street.

Form C of Schedule III – Specification as to Lots

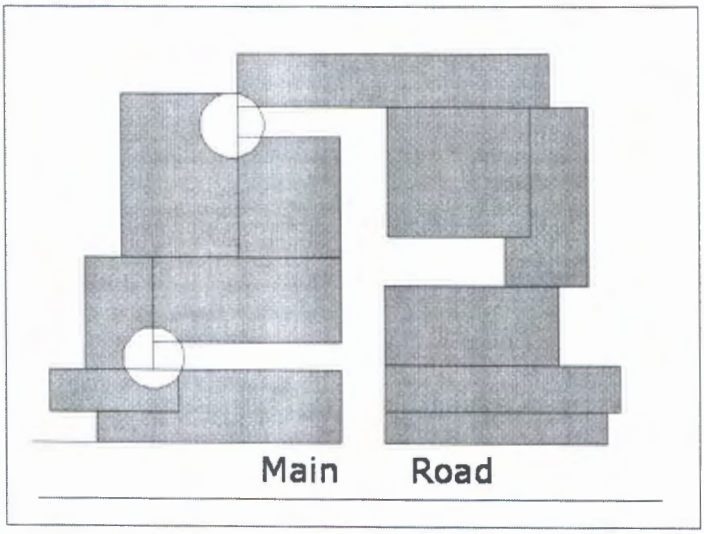
Character of Building	Minimum site Area (Sq.M)	Minimum Width of site (M)
All building except those included below	150	6
Public Assembly Buildings and Public buildings	300	12

2). Open Space

Regulation 22(1)

Where the parcel of land or site to be subdivided exceeds1.0 hectare, an area of not less than ten percent of the land or site, excluding streets shall be reserved for community and recreation uses in appropriate locations

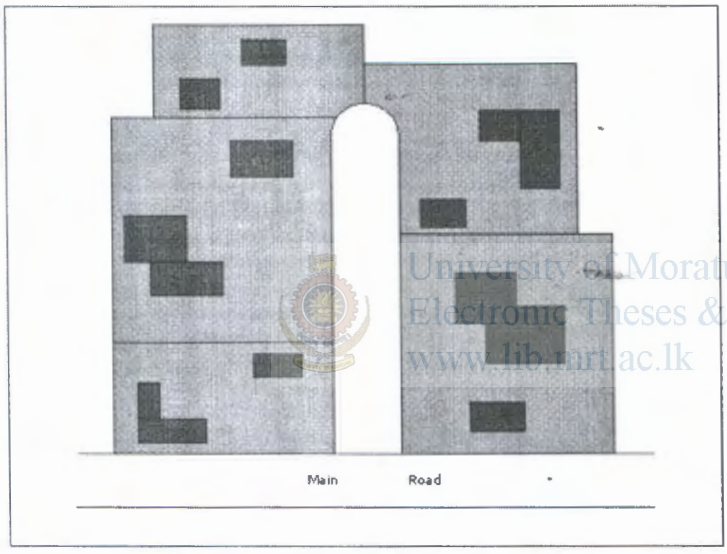
Figure 5 Residential Regulations 22(1)



Open space Residential Regulation 22(1) (b) 1996 Amendment

In the residential land subdivisions, if the minimum land parcel of the sub divisions not less than 1012Sq.M. (40Perches) and the development is limited to two housing *units per lot the land* may be sub divided without reserving 10 percent of the land for open space uses but subject to the condition that in the event of further subdivision or construction of more than two housing units per lot, the developer should deposit the *market value of 10 percent of the land so subdivided or developed at the relevant* local authority

6 Residential Regulation 22 (1) (b) (1996 Amendment

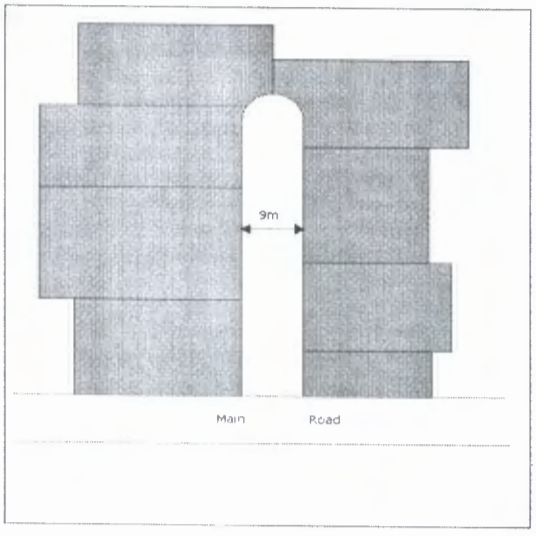


Regulation 22(1) (a) 1996 Amendment

In commercial and industrial land subdivisions, if the minimum land parcel of the sub division is not than 2024 sq.m. (80 perches) and all the road widths are not less than 9 meters the land may be the land may be sub divided without reserving 10 percent of the land for open space uses but subject to the condition that in the event of further sub division of any of of the parcels, the developer should either,

i) Reserve the 10 percent of the land so sub divided; or
ii) Deposit the market value of 10 percent of the land so sub divided at the relevant local authority.

Figure 4.7 Regulation 22 (1) (a) 1996 Amendment



4) Accessibility

4.1) Access Residential units

Regulation 16 (2) (a) and Form A of schedule III

Every street meant to serve dwelling units shall be in conformity with the specifications set out in form A of schedule III

Figure 7 Residential Units Regulation 16 (2) (a) & Form A of Schedule iii

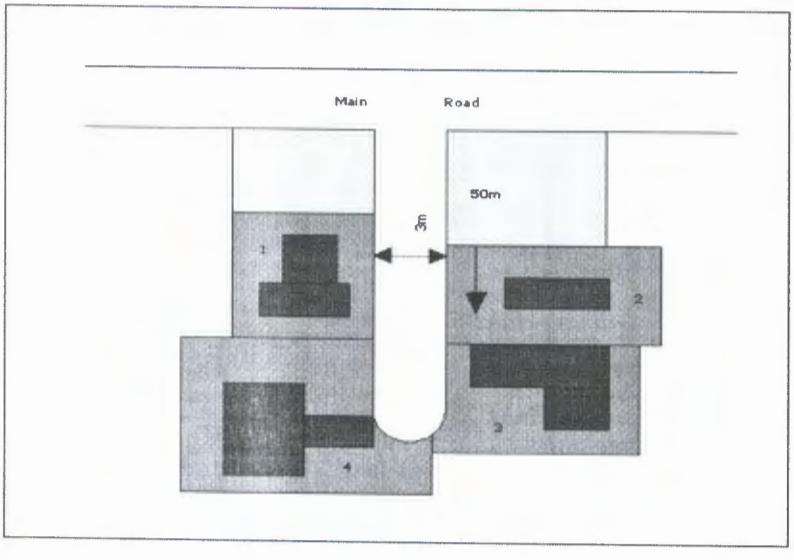


Figure 8 Residential Units Regulation 16 (2) (a) & F orm A of schedule iii

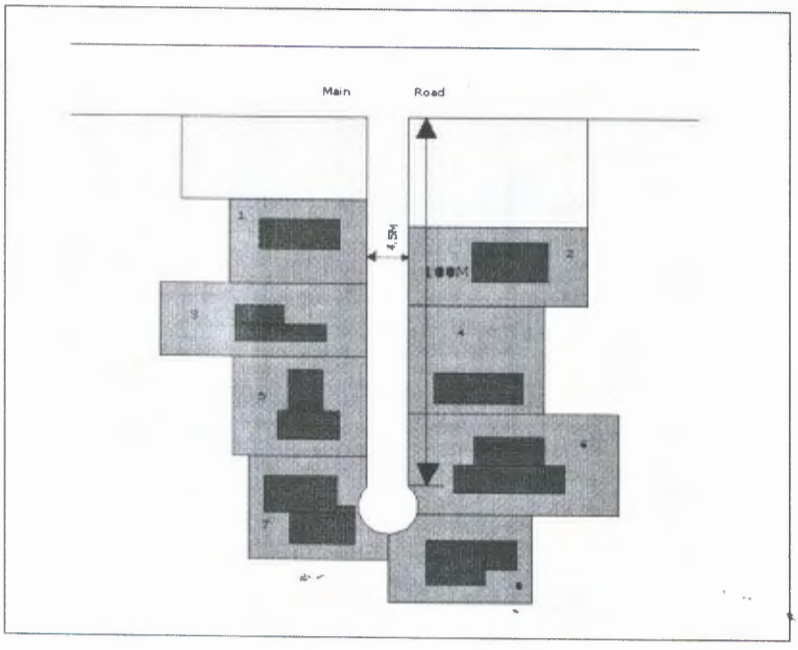
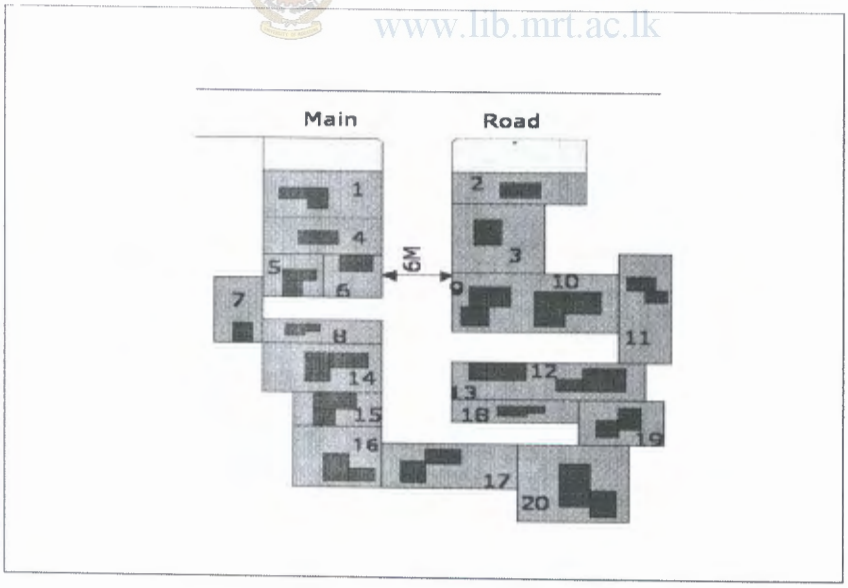


Figure 9 Residential Units Regulation 16 (2) (a) & F orm A of schedule iii



Form A of schedule III – Access to Residential units

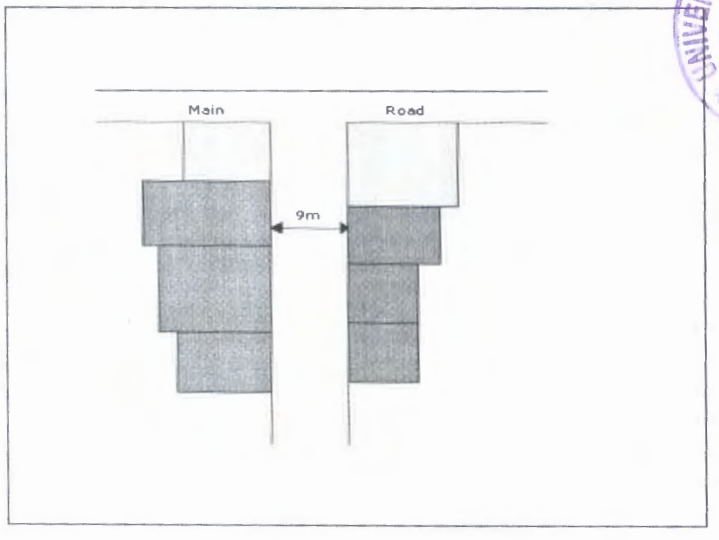
Number of dwelling units served	Minimum width (m)	Maximum length (m)
Under 4 dwelling unit	3.0	50
More than 4 but not more than 8	4.5	100
More than 8 but not more than 20	6.0	-
More than 20 dwelling units	9.0	-

4.2)Access non Residential units

Regulation 16(1)

No site or lot abutting a street less than nine meters in width shall be used for non residential use or construction of any building for such use except as provided under regulation 16(2)(b).

Figure 4.9 Non Residential Units Regulation 16



Regulation 16 (2) (b)

A Street meant to serve one or more lots for construction of any building for non residential use may be permitted with access less than 9 meters in width and shall be in conformity with the specification set out in Form B of schedule III.

Form B schedule III – Access to Non residential Buildings (specialprovision)

Maximum Extent of land Served (sq.m)	Maximum FAR on each site	Maximum width of Street (m)	Maximum length of street (m)
500 Where the street serves more than 1 lot or site but not more than four lots	1.5	6.0	50
2500 Where the street serves only one lot or site	1.5	6.0	150

Figure 4.9 Non Residential Units (Special Provision) Regulation 16 (2) (b) & From B of Schedule iii

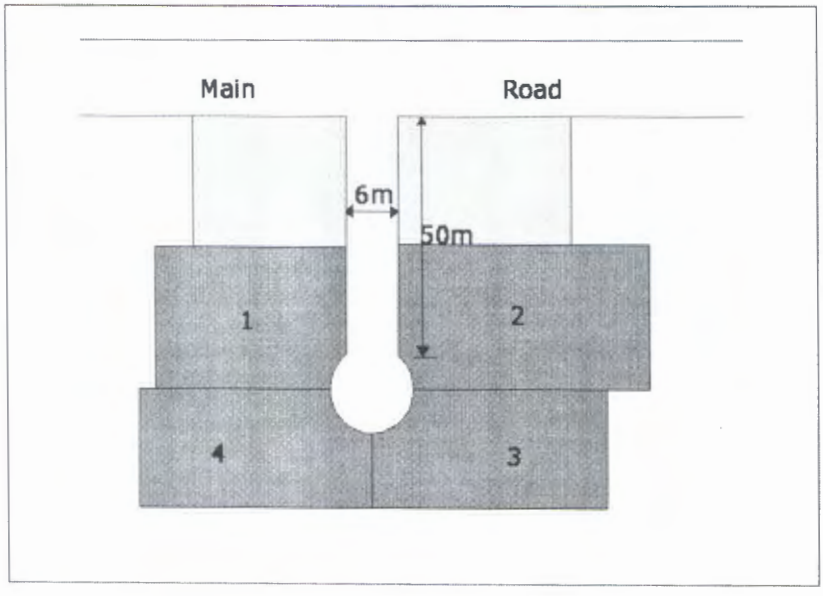
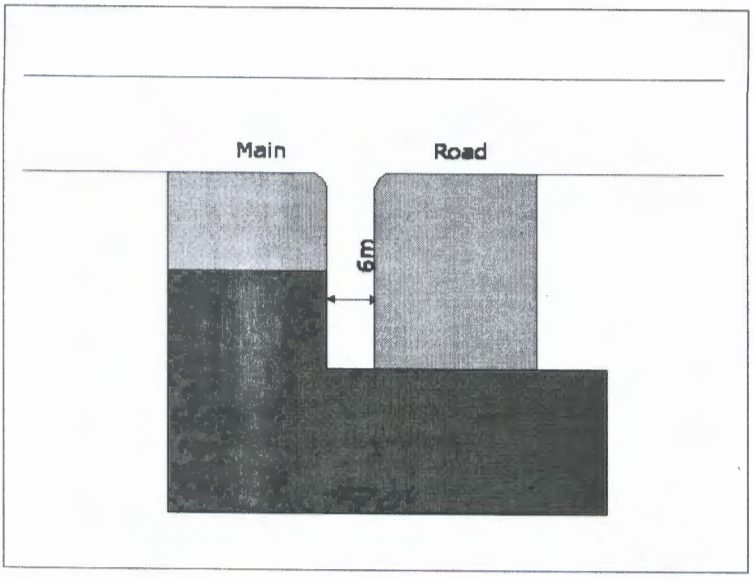


Figure 4.10: Non Residential Units (Special Provision) Regulation 16 (2) (b) & From B of Schedule iii

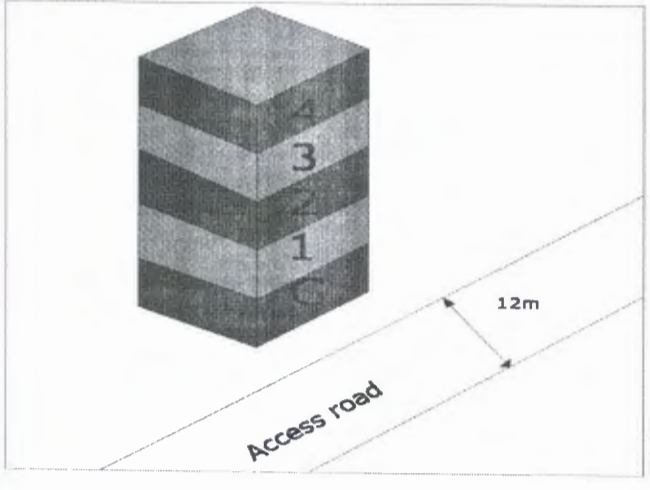


4.3 Access High rise Buildings

Regulation 27 (2)

No plan of the site shall be approved for the construction of high rise buildings unless the site abuts on a street which is not less than 12 meters in width.

Figure 4.11: High rise Buildings Regulation 27 (2)

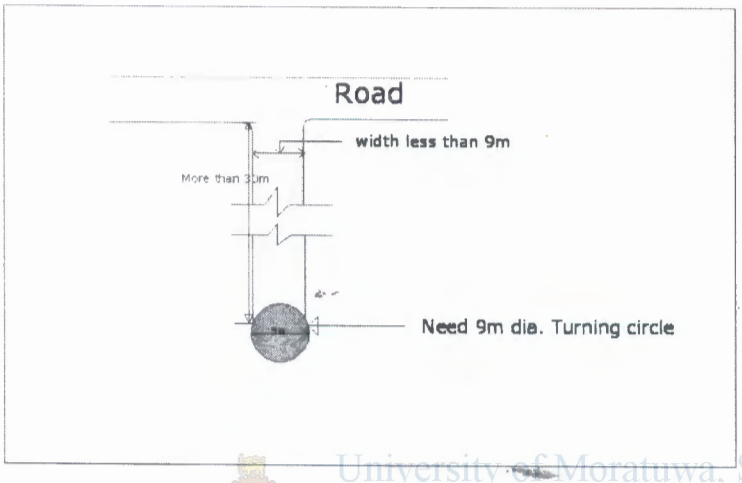


5)Turning Circle

Regulation 16(4)

Every street which is less than 9 meters in width and exceeds 30 meters in length shall be provided with a turning circle of not less than 9 meters in diameter at the dead end.

Figure 12: Turning Circle

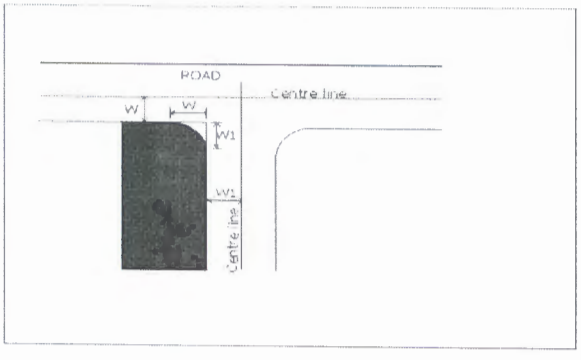


6) Splaying of Street Corners

Regulation 32

The authority may require the corner of any building including boundary walls or fences to be erected at the corner of two streets be rounded off or splayed to such extent and height as may be necessary in the interest of the safety of the users of the streets.

Figure 13: Splaying of Street Corners



Parking and traffic control Dimensions of stalls

Regulation 31(2) and section 3(b) (7) of schedule III of 1994 Amendment

Vehicle category	Dimension of stalls			
	Angle parking		Parallel parking	
	Min. length (m)	Min. Width (m)	Min. length (m)	Min. Width (m)
Motor Cycles	2.25	0.6	2.25	0.6
Lorry	8.0	3.0	8.0	3.0
Other Vehicles	4.8	2.4	5.4	2.4

Regulation 31(2)

The dimensions of car parking stalls shall be

a) Minimum stall width 2.4 meters
b) Minimum stall length 4.8 meters
c) Minimum stall length for parellelparking5.4 meters

Regulation 31(3)

The minimum width of aisles shall confirm to the requirements specified in Form F of Schedule III

Parking Angle	One way traffic		Two way Traffic (m)
	Bays on one side (m)	Bays on two sides (m)	
Parallel	3.6	3.6	6.0
30 degree	3.6	4.2	6.3
45 degree	4.2	4.8	6.3
60 degree	4.8	4.8	6.6
90 degree	6.0	6.3	7.2

7) Access to Parking – Separate Entry and exit

Regulation 31(4)

The width of access to car parking area shall not be less than 3 meters clear of footways and other obstructions if entry and exit are separately provided and 5.5 meters if entry and exit are provided together.

Section 2(9) (a) of 1994 amendment

Only one entrance and exit point for sites with a road frontage width less than 12 m is to be permitted; provided that the authority may consider permitting not more than two entrance and exit points for sites if the road frontage width exceeds 12 m.

8) Gradient for Ramps

Regulation 31 (5)

The maximum gradient of ramps shall not be steeper than 1 in 8

Regulation 31(6)

Every such ramp shall start only beyond a distance of 6.0 m from the street edge.

9) Plot Usage – Plot Coverage and Floor Area Ratio

Regulation 25 - Plot coverage

The maximum plot coverage permissible on any site for any of the purposes specified in Form E of schedule III shall be as in conformity with the requirements specified therein.

Form E of Schedule III – Maximum lot coverage

Character of Building	Maximum lot Coverage	Minimum Open Space at the Ground Level
Dwelling units, Hotels, Guest houses and public Assembly buildings	66 2/3 %	33 1/3 %
Offices, shops, Other commercial & industrial buildings	80%	20%

Plot Coverage = Ground Floor Plinth Area × 100

Land area

Regulation 15(1) - Floor Area Ratio (Relevant part only)

The provision of any development plan approved for any development area or the provisions of any development plan under consideration shall contain the maximum floor area ratio permissible on any site provided that where no such plans are available, the maximum floor area Ratio permissible shall be determined, taking into account the characteristics of the buildings intended for the area, the location of the site and the capacity of infrastructure systems, provided that the floor area ratio permissible on any site shall not exceed 2.75.

Floor Area Ratio = Gross Floor Area of all buildings

Land Area

10) Building category and Heights

Building category

Regulation 8(1), 8(2) and 8(3)

For the purpose of these regulations, buildings shall be categorized follows.

1) Category A, means any building consisting of five or more floors including the ground floor or any building the height of which exceeds 15m above the adjoining street.

2) Category B, means any building not being a high rise building which consist of ;

i) A basement, roofs, foundations, beams and other related parts of the buildings.

ii) 2 or more floors including the ground floor where a wall or column is situated on the property boundary

iii) Pile or raft foundation

iv) Roof span exceeding 10m.

v) A place of public assembly or a public building

vi) A building, which is wind sensitive such as ware house and factories

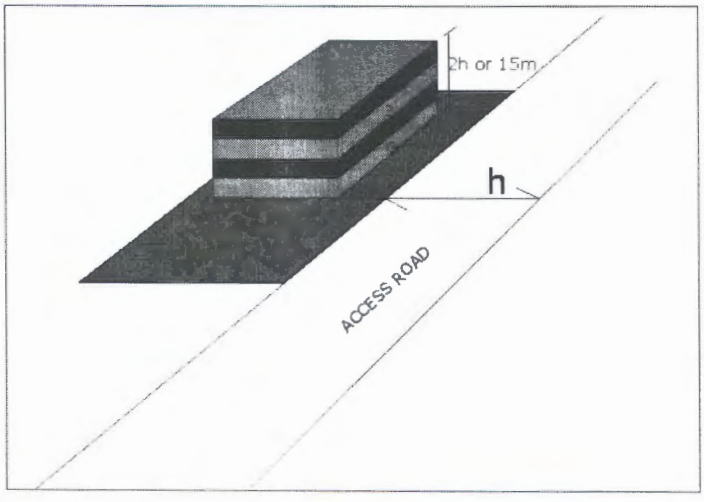
vii) Any other type of building not covered under category A and C

3) Category C, (i) includes any residential building which does not exceed 300sq.m. in extent, which is not covered under category B(ii) and (ii) includes any building other than a residential building, which does not exceed 100sq.m.in extent which is not covered under category B(ii)

Regulation 18 (2) – Low rise buildings

The maximum height of a building in other cases not being a high rise building shall not exceed 15 m. or twice the distance between any storey of a building and the further edge of the abutting street whichever is less.

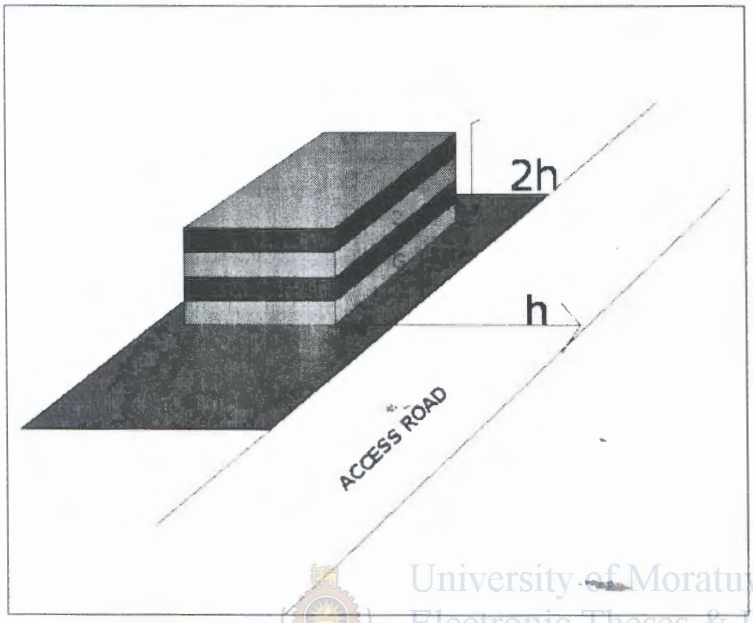
Figure 14: Building Heights Low rise Buildings Regulation 18 (2)



Regulation 29 (1) – High rise buildings

The maximum height of the building shall not exceed twice the horizontal distance between any storey of the building and the farther edge of the abutting street.

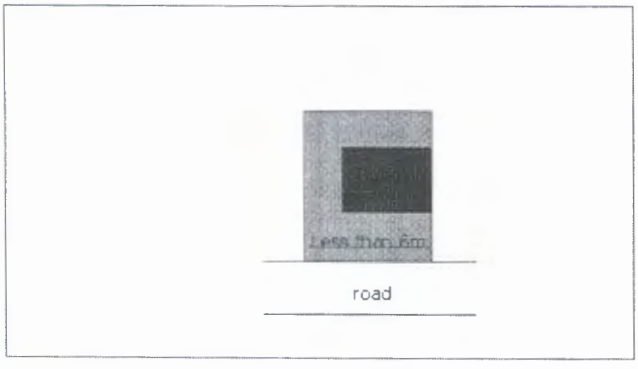
Figure 14: Low rise Buildings Regulation 29(1)



11) Regulation 18 (1) – existing lot

The maximum height of the building on an existing lot which is six (6.0) m. or less in width and or has less than one hundred and fifty (150) sq.m. in extent shall not exceed seven and a half (7.5) meters or two floors unless the authority directs otherwise.

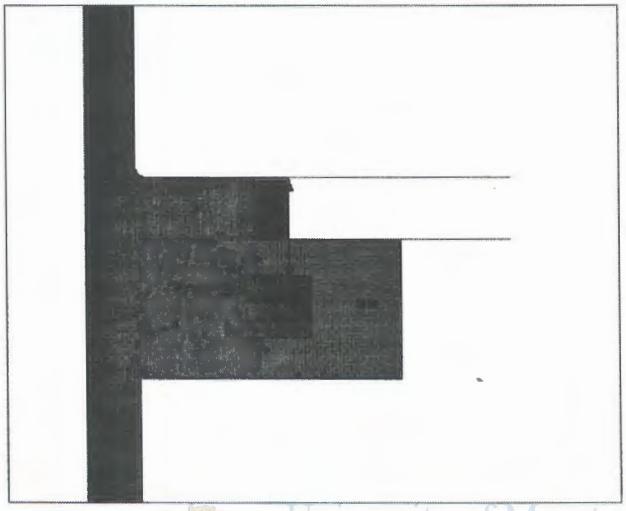
Figure 15: Existing Lot Regulation 18 (1)



Regulation 18 (3) - Building heights (site situated in a corner)

If the lot is situated in a corner, the height of the building shall be regulated by the wider of such streets so far as it abuts or will abut on the narrower street to a depth of 20 m. from the wider street.

Figure 16: Site situated in a corner Regulation 18 (3)



12) Open space around the building – Rear space and Side space

Regulation 26(2)

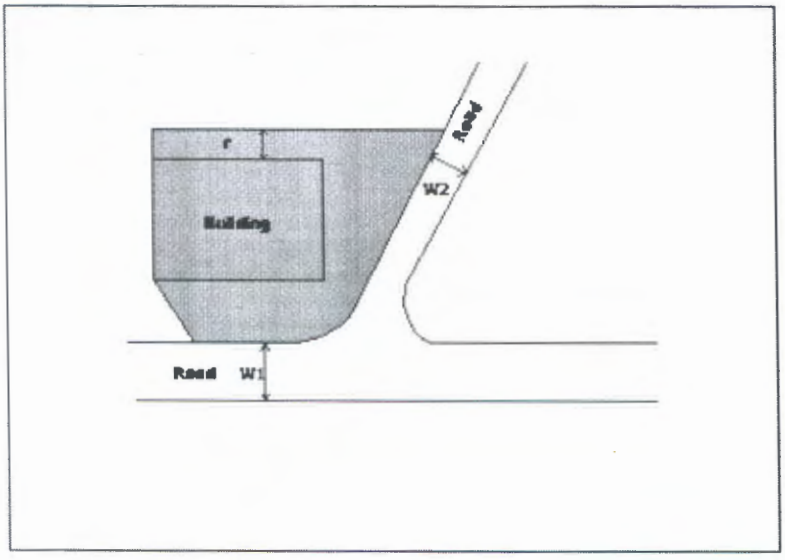
For the purpose of this regulation the rear of the building shall be deemed to be the face which is further from any street on which the building is situated.

Provided that where the building is situated on more than one street, the rear of the building, unless the authority otherwise directs shall be deemed to be the face which is farthest from the widest of such streets.

Regulation 26(4)

In sites of irregular shapes where it is impracticable to provide an open space to the entire width of the building in the rear, the authority may direct that the open space in the rear shall be left as it deems appropriate having regard to the circumstances of the case.

Figre 17: Regulation 26 (2) & 26(4)



Regulation 26(1)

There shall be in the rear of every building and belonging exclusively to it an open space of not less than three (3.0) meters extending along the entire width of the building unless the rear of the building abuts on to a public street not less than six (6.0) meters in width.

Provided that where the building consists of a ground floor and no further storeys are proposed to be added the width of such rear open space may be reduced to 2.25 meters.

Figre 18 Regulation 26 (1) Rear Space

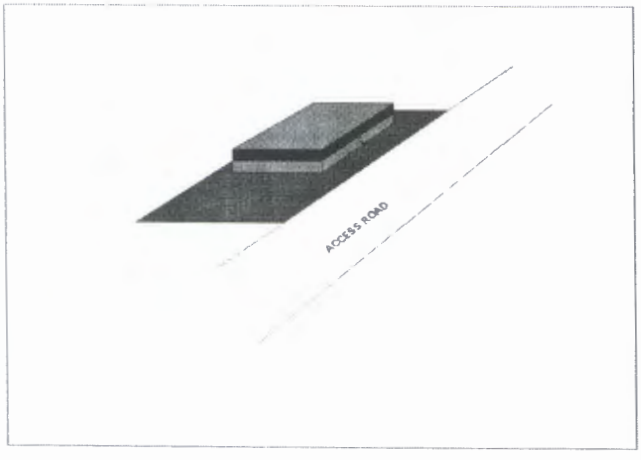
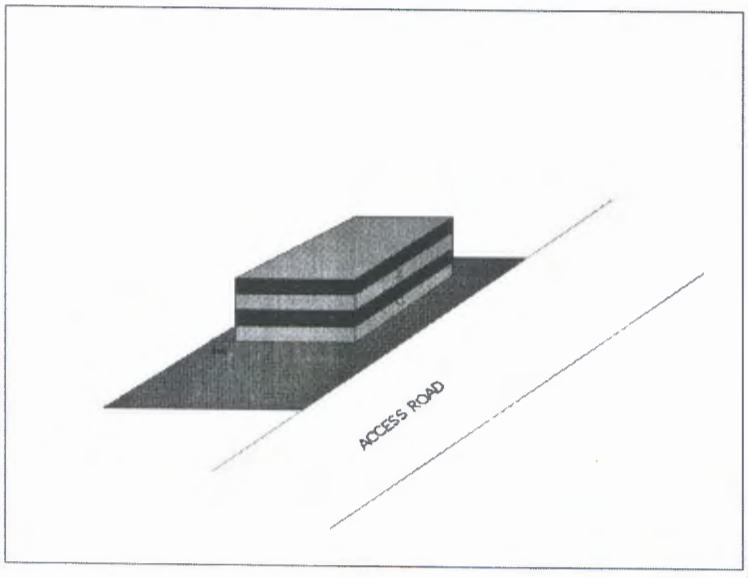


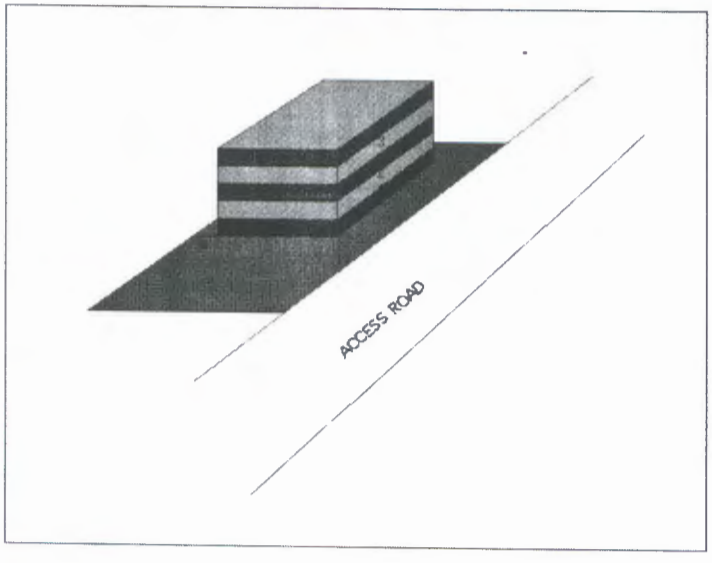
Figure 19 Regulation 26 (1)



Regulation 30 (2) – Rear space high rise Buildings.

There shall be in the rear of every building an open space of at least one quarter the height of the building extending along the entire width of building.

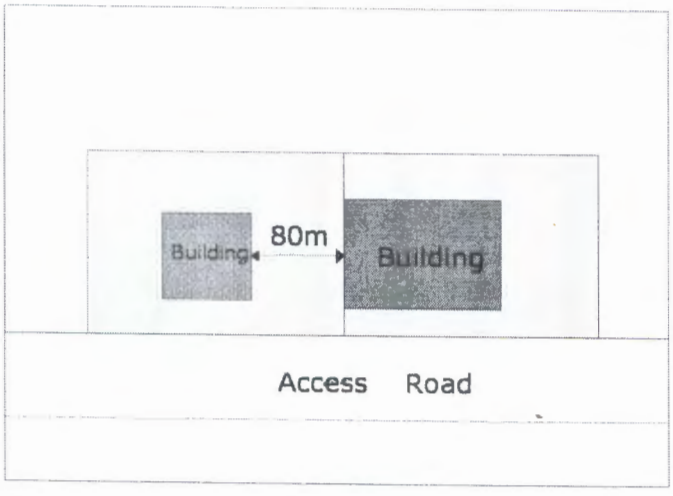
Figure 20: High rise Buildings Regulation 30 (2)



Regulation 26(5) – side space low rise Buildings

In the case of buildings where an open space is intended to be provided on the site for purpose of access, maintenance of the building in separating it from adjoining properties, such open space shall in no case be less than 80 cm. in width.

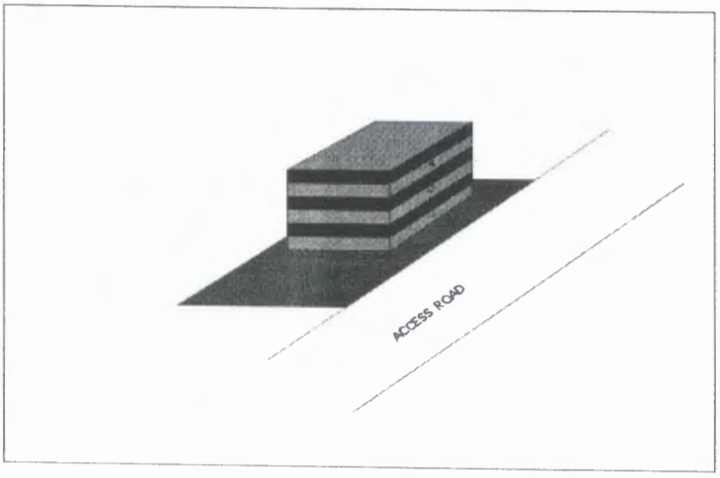
Figure 21 Low rise buildings Regulation 26 (5)



Regulation 30(1) – side space High rise Buildings

There shall be in the least on one side of the building, not being the front or rear side, between the building and the boundary of the site a minimum open space of at least one quarter of the height of the building or 5.5 meters whichever is less.

Figure 22 High rise Buildings Regulation 30(1)



Annexure III

Analysis of Professonal perception Survey

In order to get the ideas and perception of Town planners regarding the existing planning and building regulations of UDA, questionnaire survey was carried out. Accordingly, 20 Town planning professionals were interviewed during the month of May 2009. The interviewed town planners are represented in different geographical areas in the country. The questionnaire sheet is attached in the annexure. Results of the questionnaire survey can be summarized as follows.

1. Practice of the planning and building regulations by Town Planners

	Practice	Not practice	Total
Number	20	0	20
Percentage %	100%	0	

2. Satisfactory of the current practice of the Planning and Building regulations.

	Satisfied	Some extent	Not satisfied	Total
Number	6	9	5	20
Percentage %	30%	45%	25%	100

3. Appropriateness of Planning and Building regulations for their representative areas.

	Appropriate	Some extent	Not Appropriate	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

4. Applicability of Planning and Building Regulations

Regulations	Applicability					
	Can Practice		Some Extent		Can not Practice	
Plot size	12	60 %	4	20 %	4	20%
Road frontage of Plot	16	80%	1	5 %	3	5%
Open Space	19	95%	1	5%		0%
Access	12	60%	2	10%	6	30%
Street lines	10	50%	3	15%	7	35%
Turning circles	11	55%	2	10%	7	35%
Building lines	7	35%	4	20%	9	45%
Splaying of street corner	14	70%	3	15%	3	15%
Parking	8	40%	5	25%	7	35%
Gradient for Ramps	15	75%	2	10%	3	15%
Plot coverage	16	80%	3	15%	1	5%
Floor Area Ratio	10	50%	5	25%	5	25%
Building category	12	60%	3	15%	5	25%
Building heights	12	60%	3	15%	5	25%
Rear space	13	65%	2	10%	5	25%
Side space	12	60%	4	20%	4	20%

5. Satisfactory of land subdivision regulations

	Satisfied	Some extent	Not satisfied	Total
Number	7	5	8	20
Percentage %	35%	25%	40%	

6. Problems found in land subdivision approving

	Problems found	Some extent	Problems not found	Total
Number	9	6	5	20
Percentage %	45%	30%	25%	

7. Factors Consideration in land subdivision approving

Factors	Considered	Some extent	Not considered
Plot size	20(100%)		
Road frontage of Plot	18(90%)	2(10%)	
Open Space	17(85%)	3(15%)	
Access	16(80%)	4(20%)	
Recreation facilities	1(5%)	4(20%)	15(75%)
Turning circles	20(100%)		
Landscape plan		1(5%)	19(95%)
Street lines	18(90%)	2(10%)	
Building lines		3(15%)	17(85%)
Reservations (canal, tank, River)		2(10%)	18(90%)
Soil and sub soil conditions		1((5%)	19(95%)
Ground water			20(100%)
Drainage system	2(10%)	1(5%)	17(85%)
Flooding	2(10%)	3(15%)	15(75%)
Slope angle	1(5%)	3(15%)	16(80%)
Other natural Hazards			20(100%)
Water supply	18(90%)	2(10%)	
Sewage disposal	1(5%)	2(10%)	17(85%)
Solid waste	1(5%)	1(5%)	18(90%)
Telecommunication & electricity	2(10%)	1(5%)	17(85%)
Fire protection	19(95%)	1(5%)	
Noise and vibration	4(20%)	1(5%)	15(75%)
Oder, Smoke and Dust	2(10%)	4(20%)	14(70%)

8. Provision of guidelines in regulations to determine the plot sizes

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

Provision of regulations to consider the recreational facilities in land subdivisions

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

10. Practicability of turning circles of land subdivisions

	Can Practice	Some extent	Cannot Practice	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

11. Provision of any regulation to keep Building lines in approved land subdivisions (when the roads are not gazette)

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

12. Provision of any regulation to consider water supply in land subdivision

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

13. Provision of any guidelines in Planning and Building Regulation to protect the ground water

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

4. Provision of any regulation regarding reservations of River, Tank, and Canal

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

5. Provision of any regulation regarding drainage system in land subdivisions

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

16. Indication of drainage system in blocking out plans by developers

	Indicated	Some extent	Not indicated	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

17. Demarcation of drainage system within the road width

	Demarcated	Some extent	Not Demarcated	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

18. Utilization of 10% of open space in land subdivisions for the recreational development

	Can Utilized	Some extent	Can not Utilized	Total
Number	8	7	5	20
Percentage %	40%	35%	25%	

19. Provision of any regulations regarding solid waste disposal within the blocking out

	Provided	Some extent	Not provided	Total
Number	7	8	5	20
Percentage %	35%	40%	25%	

M.Sc.in Town and Country Planning

Department of Town and Country Planning

University of Moratuwa.

No:

Questioner survey on Planning and Building Regulations of UDA 1986

Profession: Town Planner

Date:……..

A) Designation:……..
B) Working experience in Town Planning: Years……
C) Names of the Local Authorities Attending Planning committees:……
……

Are you Practice the Planning and building Regulations?

Yes		No	

Are you satisfied with the current practice of Planning and Building Regulations?

Yes		Some Extent		No	

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Are all P. & Building Regulations Pragmatic to your area?

Yes		Some Extent		No	

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4). Applicability of Planning and Building Regulations (please tick)

Type of Regulation	Can practice	Some Extent	Cannot practice	If cannot please provide the reasons	Your suggestions
Plot size					
Road frontage of Plot					
Open Space					
Access					
Street lines					
Turning circles					
Building lines					
Splaying of street corner					
Parking					
Gradient for Ramps					
Plot coverage					
Floor Area Ratio					
Building category					
Building heights					
Rear space					
Side space					

5). Are you satisfied with the land subdivision regulations?

Yes		Some Extent		No	

If not what are reasons?.....

.....

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). Have you found any problems when approving Land Subdivisions in your area?

Yes		Some Extent		No	

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). Do you consider following factors when approving land subdivision plans.

Type of factors	yes	Some Extent	No	Is it included in Pl. & Building regulations? (Yes/No)
Plot size				
Road frontage of Plot				
Open Space				
Access				
Recreation facilities				
Turning circles				
Landscape plan				
Street lines				
Building lines				
Reservations (canal, tank, River)				
Soil and sub soil conditions				
Ground water				
Drainage system				
Flooding				
Slope angle				
Other natural Hazards				
Water supply				
Sewage disposal				
Solid waste				
Telecommunication & electricity				
Fire protection				
Noise and vibration				
Oder, Smoke and Dust				

3). have you provided any guidelines in regulations to determine the plot sizes?

Yes		Some Extent		No	

If not, how do you defined?.....

9) Have you provided any regulations to consider the recreational facilities in land subdivisions?

Yes		Some Extent		No	

.....

10) Is it practicable turning circles of land subdivisions in your area?

Yes		Some Extent		No	

.....
.....

11) Have you provided any regulation to keep Building lines in approved land subdivisions?(when the roads not gazette)

Yes		Some Extent		No	

If No, what is the legal background.....

12). Have you provided any regulation to consider water supply in land subdivision?

Yes		Some Extent		No	

If not provided water supply, what is the minimum plot size in your area?.....

13). Do you find any guidelines in Planning and Building Regulation to protect the ground water?

(Distance between well and septic tank)

Yes		Some Extent		No	

If No, How do you keep the distance between well and septic tank? .....

.....
.....

14) Have you provided any regulation regarding reservations of River, Tank, and Canal?

Yes		Some Extent		No	

If No, How do you keep above reservations?

.....

15. Have you provided any regulation regarding drainage system in land subdivisions?

Yes		Some Extent		No	

6. Do the developers indicate drainage system in blocking out plans?

Yes		Some Extent		No	

7. Is the drainage system within the road width?

.....

.....

8). Do you think that 10% of open space in land subdivisions can utilize for the recreational evelopment?

Yes		Some Extent		No	

f not why

.....

9) Have you provided any regulations regarding solid waste disposal within the blocking out?

Yes		Some Extent		No	

0). what are the factors should be included in planning and building regulations?

.....

.....

.....

1). What are the lacking factors in Planning and Building :egulations.....

.....

2). any suggestions for the land subdivision regulations?

.....

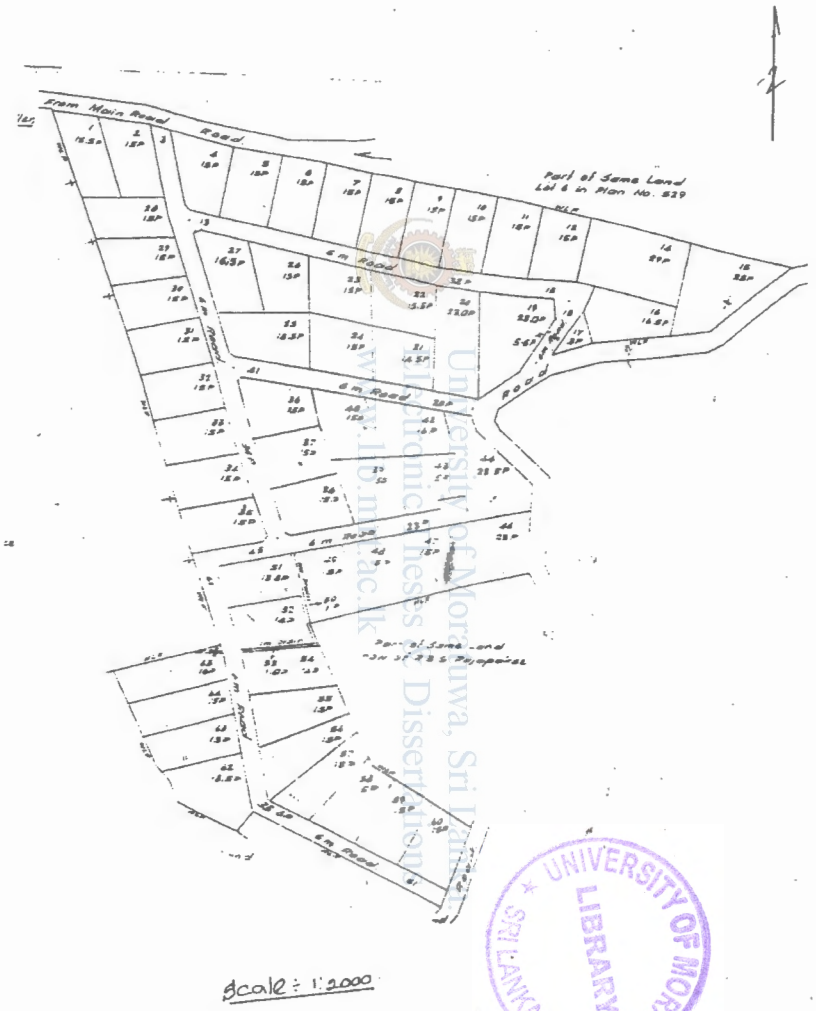
.....

.....

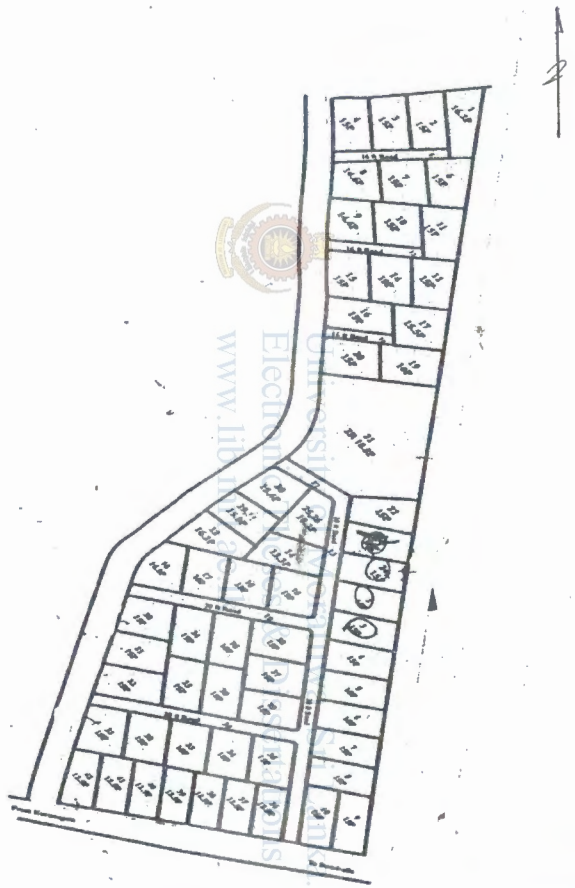
.....

THANK YOU

Reference: KU 1 Land sub division



Reference KU 2 Land sub division



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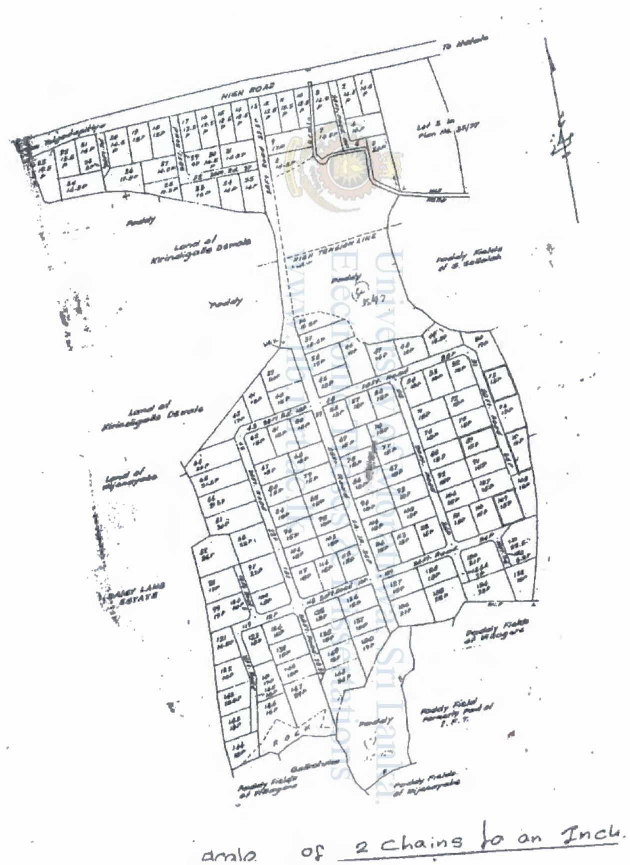
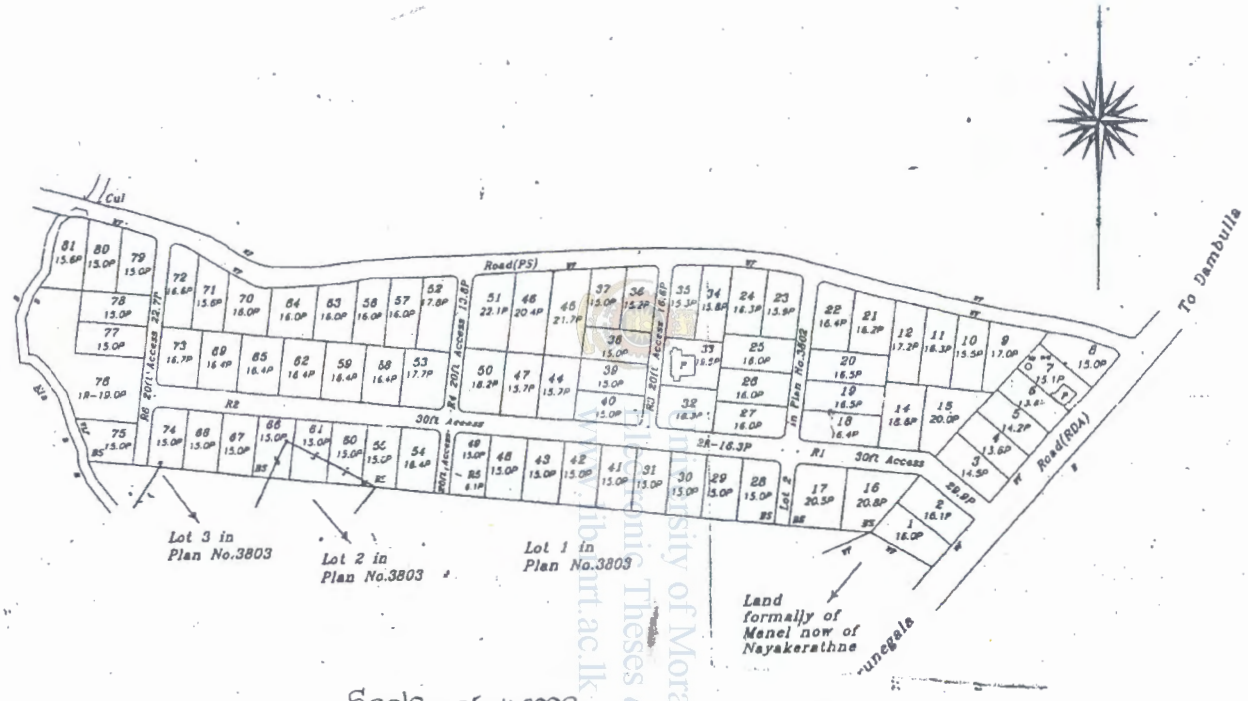


Reference: KU 3 Land sub division



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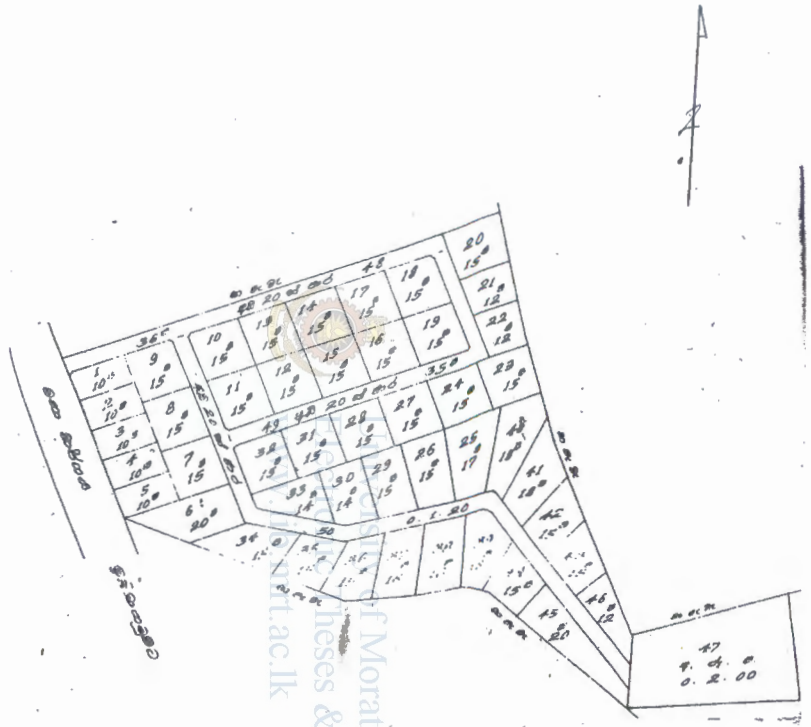

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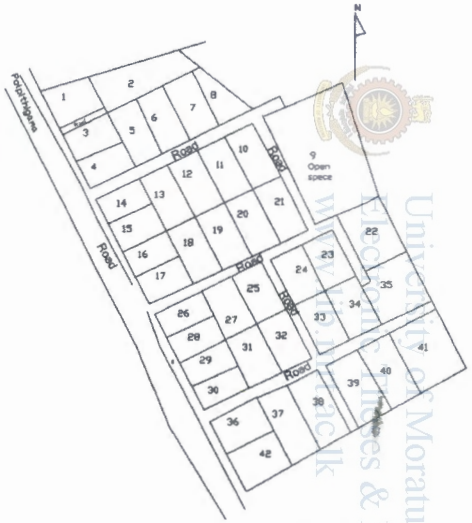
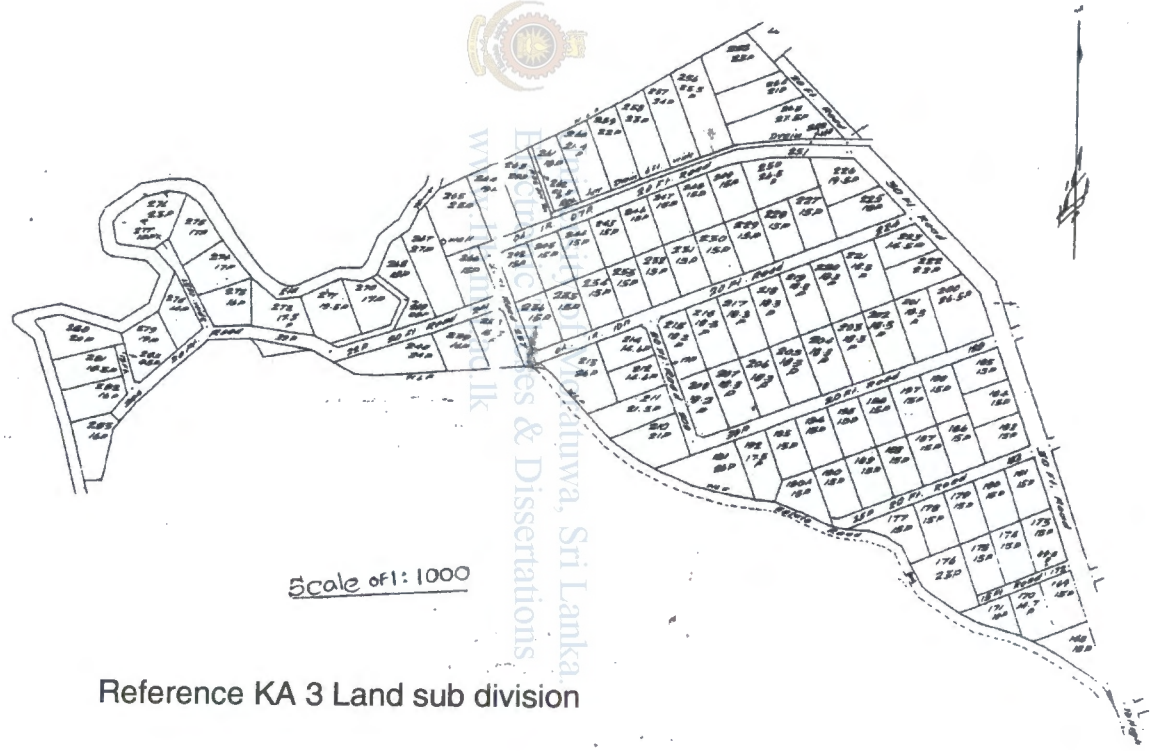
Reference KA 1 Land sub division



Reference KA 2 Land sub division



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Reference KA 3 Land sub division

Reference BA 1 Land sub division

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Reference BA 2 Land sub division