(Provisional)

MYANMAR NATIONAL BUILDING CODE 2012

PART2

ARCHITECTURE AND URBAN DESIGN

MYANMAR NATIONAL BUILDING CODE 2012

PART 1 ARCHITECTURE AND URBAN DESIGN

TABLE OF CONTENTS

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.1 USE AND OCCUPANCY CLASSIFICATION

TABLE OF CONTENTS

2.1 USE AND OCCUPANCY CLASSIFICATION

2.1.1 General

2.1.1.1 Scope

The provisions of this chapter shall control the classification of all buildings and structures as to use and occupancy. In addition that this chapter contains the requirements to cooperate with allied disciplines in architectural design.

2.1.1.2 Cooperation and coordination with other disciplines

2.1.1.2.1 General architectural design process

All design must consider the requirements of building services, structural engineering, building safety, etc. already in the designing process and to coordinate with various concern disciplines during the conceptual design stage.

2.1.1.2.2 Design of multi-storeyed buildings

The architectural design must provide spaces for mechanical and electrical components such as, transformer stations, electrical meter boxes, underground tanks, waste disposal systems, vertical and horizontal shaft etc., these should be coordinated and allocated with the respected specialists already in the process of conceptual planning stage. All these provision must conform to the respective chapter of this building code. For example: the required provision should be complied with Part 5 Building Services.

2.1.2 Classification of all Building by Use or Occupancy

2.1.2.1 General

This section defines the scope of this chapter as the provisions to control the classification of all buildings, structures, and spaces as to use and occupancy. Structures or portions of structures shall be classified with respect to occupancy in one or more of the groups listed below. A room or space that is intended to be occupied at different times for different purposes shall comply with all of the requirements that are applicable to each of the purposes for which the room or space will be occupied. Structures with multiple occupancies or uses shall comply with *Chapter 3, General Building Heights and Areas*. Where a structure is proposed for a purpose that is not specifically provided for in this code, such structure shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard involved. It defines ten groups in which structures or portions of structures shall be classified.

a) Group A: Assembly (A1 to A5)
b) Group B: Business
c) Group E: Educational
d) Group F: Factory and Industrial (F1 & F2)
e) Group H: Hazardous
f) Group I: Institutional (I1 to I5)
g) Group M: Mercantile
h) Group R: Residential (R1 to R5)
i) Group S: Storage (S1 & S2)
j) Group U: Utility and Miscellaneous (U1 to U3)

2.1.3 Assembly (Group A*)*

2.1.3.1 General

Assembly occupancy includes, among others, the use of building or portions of building or structure for people gathering for civic, social or religious functions, recreation, entertainment, education or instruction, food or drink consumption or waiting transportation. Assembly occupancies shall include a building or portions of building or tenant space used for assembly purposes with an occupant load of more than 50 persons and/or more than 500 square feet. Otherwise, it shall be classified as Group B occupancy or as part of other occupancy.

Exceptions:

a) Assembly areas that are accessory to Group E occupancies are not considered separate occupancies except when applying the assembly occupancy requirements of *Chapter 7, Accessibility.*

b) Accessory religious educational rooms and religious auditoriums with occupant loads of less than 50 are not considered separate occupancies.

Assembly occupancies shall include the following:

A-1 Assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including:

Motion picture theatres

Symphony and concert halls

Television and radio studios admitting an audience

Theatres, etc.

A-2 Assembly uses intended for food and/or drink consumption including:

Banquet halls

Night clubs

Restaurants

Bars, etc.

A-3 Assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including:

Amusement arcades

Art galleries

Bowling alleys

Community halls

Courtrooms

Dharma Halls

Dance halls

Exhibition halls

Funeral parlours

Gymnasiums

Indoor swimming pools

Indoor tennis courts

Lecture halls

Libraries

Museums

Places of religious worship: Pagodas, Temples, Churches, Mosques, etc.

Pool and billiard parlours

Waiting areas in transportation terminals, etc.

A-4 Assembly uses intended for viewing of indoor sporting events and activities with spectator seating including:

Arenas

Skating rinks

Swimming pools

Tennis courts, etc.

A-5 Assembly uses intended for participation in or viewing outdoor activities including:

Amusement park structures

Grandstands

Stadiums, etc.

2.1.4 Business (Group B)

2.1.4.1 General

Business occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include the following:

Airport traffic control towers

Ambulatory health care facilities

Veterinary

Banks

Barber and beauty shops

Car wash

Clinic-outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

Electronic data processing: public internet access centre

Laboratories: testing and research

Motor vehicle showrooms

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

Training and skill development not within a school or academic program, etc.

2.1.4.1 Definitions

The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

CLINIC, OUTPATIENT. Buildings or portions thereof used to provide medical care on less than a 24-hour basis to individuals who are not rendered incapable of self-preservation by the services provided.

2.1.5 Educational (Group E)

Educational occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any time for educational purposes of the basic education and higher education. Assembly areas of Group E occupancy having more than 50 occupant loads are considered as Group A-3 occupancy. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with assembly portion and have occupant loads of less than 50, shall be classified as A-3 occupancies.

Educational occupancies shall include the following:

Basic Education Schools

Day care

Universities and Colleges
Vocational Training Centres, etc.

2.1.5.1 Definitions

The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

DAY CARE: The use of a building or structure, or portion thereof, for educational, supervision or personal care services for more than five children older than 2 1/ 2 years of age shall be classified as a Group E occupancy.

2.1.6 Factory and Industrial (Group F*)*

2.1.6.1 General

Factory Industrial occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

2.1.6.2 Factory industrial F-1 moderate-hazard occupancy

Factory industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include the following:

Aircraft (manufacturing, not to include repair)

Appliances

Athletic equipment

Automobiles and other motor vehicles

Bakeries

Beverages: over 16-percent alcohol content

Bicycles

Boats

Brooms or brushes

Business machines

Cameras and photo equipment

Canvas or similar fabric

Carpets and rugs (includes cleaning)

Clothing

Construction and agricultural machinery

Disinfectants

Dry cleaning and dyeing

Electric generation plants

Electronics

Engines (including rebuilding)

Food processing

Furniture

Fibrous products

Jute products

Laundries

Leather products

Machinery

Metals

Millwork (sash and door)

Motion pictures and television filming (without spectators)

Musical instruments

Optical goods

Paper mills or products

Photographic film

Plastic products

Printing or publishing

Recreational vehicles

Refuse incineration

Shoes

Soaps and detergents

Textiles

Tobacco

Trailers

Upholstering

Woodworking (cabinet, etc.)

Wood; distillation, etc.

2.1.6.3 Factory industrial F-2 low-hazard occupancy

Factory industrial uses that involve the fabrication or manufacturing of non combustible materials which during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include the following:

Beverages: up to and including 16-percent alcohol content

Brick and masonry

Ceramic products

Cottage industries

Foundries

Glass products

Gypsum

Ice

Metal products (fabrication and assembly), etc.

2.1.6.4 Myanmar private industrial enterprises

As for classification of Myanmar private Industrial enterprises, shall be limited to the 1990 Private Industrial Enterprises Law for small, medium and large industries are shown in *Appendix (2.1.6.4)*.

2.1.7 High Hazardous (Group H*)*

The architectural aspects in designing of hazardous building should be referred to Part 5 Building Services, Fire Protection of this building code.

2.1.8 Institutional (Group I)

2.1.8.1 General

Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which people are provided for public service facilities and cared for or live in a supervised environment, having physical limitations because of health or age are harboured for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

2.1.8.2 Group I-1

This occupancy shall include buildings, structures or parts thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This group shall include the following:

Alcohol and drug centres

Home for Handicapped

Old aged Centres

Residential board and care facilities

Social rehabilitation facilities

Old Aged Centres, etc.

2.1.8.3 Group I-2

This occupancy shall include buildings and structures used for medical, surgical, psychiatric, nursing or custodial care for persons who are not capable of self-preservation. This group shall include the following:

Child care facilities

Detoxification facilities

Hospitals

Mental hospitals

Nursing homes (both intermediate care facilities and skilled training), etc.

2.1.8.3.1 Definitions

The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

CHILD CARE FACILITIES. Facilities that provide care on a 24-hour basis to more than five children, 2 1/2 years of age or less.

DETOXIFICATION FACILITIES. Facilities that serve patients who are provided treatment for substance abuse on a 24-hour basis and who are incapable of self-preservation or who are harmful to themselves or others.

HOSPITALS AND MENTAL HOSPITALS. Buildings or portions thereof used on a 24-hour basis for the medical, psychiatric, obstetrical or surgical treatment of inpatients who are incapable of self-preservation.

NURSING HOMES. Nursing homes are long-term care facilities on a 24-hour basis, including both intermediate care facilities and skilled nursing facilities, serving more than five persons and any of the persons are incapable of self-preservation.

2.1.8.4 Group I-3

This occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. An I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include the following:

Correctional Centres

Detention Centres

Jails

Prisons, etc.

Buildings of Group I-3 shall be classified as one of the occupancy conditions indicated as following:

2.1.8.4.1 Condition 1

This occupancy condition shall include buildings in which free movement is allowed from sleeping areas, and other spaces where access or occupancy is permitted, to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

2.1.8.4.2 Condition 2

This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

2.1.8.4.3 Condition 3

This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.

2.1.8.4.4 Condition 4

This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

2.1.8.4.5 Condition 5

This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

2.1.8.5 Group I-4 day care facilities under 2 and half years

This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage or adoption and in a place other than the home of the person cared for.

2.1.8.5.1 Adult care facility

A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and personal care services shall be classified as Group I-4.

Exception: A facility where occupants are capable of responding to an emergency situation without physical assistance from the staff shall be classified as *Group R-3.*

2.1.8.5.2 Child care facility

A facility that provides supervision and personal care on less than a 24-hour basis for more than five children 21/ 2 years of age or less shall be classified as Group I-4.

Exception: A child day care facility that provides care for more than five but no more than 100 children 21/ 2years or less of age 33, where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.

2.1.8.6 Group I-5

This occupancy shall include buildings, structures or parts thereof in which people are provided for public service facilities. This group shall include the following:

Civic administration

Fire Station

Police Station, etc.

2.1.9. Mercantile (Group M)

2.1.9.1 General

Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include the following:

Department stores

Drug stores

Fuel Stations

Markets

Motor fuel-dispensing facilities

Retail or wholesale stores

Sales rooms

2.1.10 Residential (Group R)

2.1.10.1 Residential units (Group R-1)

Residences meant for transient/permanent living facilities.

Examples are Condominium, Service Apartment, hotels, motels, vacation houses, etc.

2.1.10.2 Residential units (Group R-2)

Residences for many families, not more than 50 feet from the ground level to the highest floor level and having not more than 5 stories, for uses without the mechanical means of transportation..

Examples: Walk-up Apartments, Terrace houses, student hostels, boarding houses, orphanages, Row houses, , Shop houses, etc.

2.1.10.3 Residential units (Group R-3)

Residential occupancies where the occupants are primarily permanent in nature and not

classified as Group R-1, R-2,R-4 or I, including:

Low-rise buildings are not more than two dwelling units and 3 stories. These may be single staying or attached to other buildings of the same kind.

Examples are single family houses or detached houses, semi-detached houses, etc.

Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours, Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours, Congregate living facilities with 16 or fewer persons.

2.1.10.4 Residential units (Group R-4)

Residential occupancies shall include buildings arranged for occupancy as residential care/ assisted living facilities including more than five but not more than 16 occupants.

2.1.10.5 Residential units (Group R-5)

Residences like low-income and rural family houses.

Examples are site and services schemes' housings which were occasionally practiced for new town extension, squatter resettlement, fire and disaster victim resettlement and upgrading projects, and rural settlements, etc.

2.1.10.6 Definitions

The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

BOARDING HOUSE. A building arranged or used for lodging, with or without meals, and not occupied as a single-family unit.

CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom and/or kitchen facilities.

DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

PERSONAL CARE SERVICE. The care of residents who do not require chronic or convalescent medical or nursing care. Personal care involves responsibility for the safety of the resident while inside the building.

RESIDENTIAL CARE/ ASSISTED LIVING FACILITIES. A building or part thereof housing persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This classification shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug abuse centres and convalescent facilities.

TRANSIENT. Occupancy of a dwelling unit or sleeping unit for not more than 30 days.

2.1.11 Storage (Group S)

2.1.11.1 General

Storage Group S occupancy includes, among others, the use of a building or structure, or a

portion thereof, for storage that is not classified as a hazardous occupancy.

2.1.11.2 Moderate-hazard storage (Group S-I)

Buildings occupied for storage uses that are not classified as Group S-2, including storage of the following:

Aerosols, Levels 2 and 3

Aircraft hangar (storage and repair) I

Bags: cloth, burlap and paper

Bamboos and rattan

Baskets

Belting: canvas and leather

Books and paper in rolls or packs

Boots and shoes

Buttons, including cloth covered, pearl or bone

Cardboard and cardboard boxes

Clothing, woollen wearing apparel

Cordage

Dry boat storage (indoor)

Furniture

Furs

Glues, mucilage, pastes and size

Grains

Horns and combs, other than celluloid

Leather

Linoleum

Lumber

Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in *Table 2.1.7.1 (1)*

Photo engravings

Resilient flooring

Silks

Soaps

Sugar

Tires, bulk storage of

Tobacco, cigars, cigarettes and snuff

Upholstery and mattresses

Wax candles

2.1.11.3 Low-Hazard storage (Group S-2)

Group S-2 includes, among others, buildings used for the storage of non-combustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Group S-2 storage uses shall include the following:

Asbestos

Beverages up to and including 16-percent alcohol in metal, glass or ceramic containers

Cement in bags

Chalk and crayons

Dairy products in non waxed coated paper containers

Dry cell batteries

Electrical coils

Electrical motors

Empty cans

Food products

Foods in non-combustible containers

Fresh fruits and vegetables in non plastic trays or containers

Frozen foods

Glass

Glass bottles, empty or filled with non-combustible liquids

Gypsum board

Inert pigments

Ivory

Meats

Metal cabinets

Metal desks with plastic tops and trim

Metal parts

Metals

Mirrors

Oil-filled and other types of distribution transformers

Parking garages open or enclosed

Porcelain and pottery

Stoves

Talc and soap stones

Washers and dryers, etc.

2.1.12 Utility and Miscellaneous (Group U)

2.1.12.1 General

Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

2.1.12.2 Agricultural buildings (Group U-1)

Group U-1, Agricultural uses, including but not limited to the following:

Livestock Shelters or Buildings, including Shade Structures & Milking barns

Poultry Buildings or Shelters

Barns

Storage of equipment & machinery used exclusively in agriculture

Horticultural Structures including Crop Protection Shelters

Sheds

Grain Silos

Stables

Greenhouse

2.1.12.3 Group U-2

Group U-2 shall include, but not be limited to, the following:

Fences over 6 feet (1829 mm) high

Retaining Walls

2.1.12.4 Group U-3

Group U-3 shall include, but not be limited to, the following:

Aircraft Hangars

Carports

Private Garages, Generator Houses

Sheds, Telephone Booth, Kiosk, Media Corner

Stables

Tanks, Towers

Public Bath

Garbage Yards

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.2 ARCHITECTURE REQUIREMENTS AND SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

TABLE OF CONTENTS

2.2 ARCHITECTURE REQUIREMENTS AND SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

This section is intended for applying to buildings or structures along with the architecture, occupancy and construction requirements. Moreover, this should comply with the related rules, regulations, guidelines and standards issued by concerned Authorities such as Development Committee in respective cities, Committee for Quality Control of High-Rise Building Projects, Fire Services Department, Health, Education, Hotel, Culture, etc.

2.2.1 Health Care Buildings

2.2.1.1 General

Generally all health care buildings are divided into hospital and clinics.

The buildings belonging to "hospital category" are defined as those where the patients' care require longer than 24 hours and clinics are all where health-care personnel provision time less than 24 hours.

All health care buildings shall have proper garbage disposal system or shall have hygienic arrangements for garbage disposal.

All health care buildings shall be provided with accessibility systems in accordance with Chapter 7 of this code.

2.2.1.2 General requirement of hospitals

All hospitals, whether these are rehabilitation hospitals or healing hospitals, the followings rules shall be observed:

a) All hospital buildings shall have maximum of 4 stories and the height between the ground floor and the highest floor shall not exceed 42 feet.

b) The maximum number of beds in one patient-room in any hospital is 10.

c) Whether the patients' rooms are provided with air-conditioning systems or not, all patients' rooms are to have windows leading to outside space and with the following rules:

   1) The window areas shall be minimum of 10% of floor area.

   2) The minimum distance of building near that window in any case shall be minimum 5 ft.

d) The floor area of any patient-room shall be minimum 60 sq.ft. per bed.

e) The egress and the escape routes must be in conformity with chapters 6 of this code.

f) There shall be minimum of one toilet for 8 beds and one shower facility for 16 beds.

g) In cases of patients' rooms with more than 2 beds, separate room for the patient's attendants, individual or the nurse, shall be provided separate space. The attendants, living in the patients' rooms is not permissible.

h) All hospitals with more than 20 beds shall have mortuary with proper cooling system.

2.2.1.3 General requirement of clinics

All clinics, whether these are out-patient clinics or clinics combined with operational and other kinds of treatments, the followings rules shall be observed:

a) There shall be not more than 10 doctors in one joined consultation room.

b) There shall be physical separation between the paediatric clinics and the general clinics.

c) There shall be physical separation between the gynecological clinics and the general clinics, however paediatric clinics and the gynecological clinics can be combined.

d) The floor area of waiting room in a consultation unit shall be calculated based on the number of consultants. This shall be minimum of 200 sq.ft. per consultant.

e) The egress and the escape routes must be in conformity with chapters 6 of this code.

f) There shall be minimum of one toilet for 15 waiting chairs.

2.2.2 Educational Buildings

2.2.2.1 Groupings and class rooms

The number of children in each group for respective ages and levels and required minimum floor areas must conform to the following norms, unless otherwise define in the concerned educational authorities.

Table 2.1 Groupings and Floor Area Requirements in the Class Rooms for Respective Levels

Levels	No. of children per room	Class room Area (sq-ft per child)
Nursery children below four years	10 children	30 sq-ft per child
Kindergarten children below six years	15 children	30 sq-ft per child
Primary classes, first grade to 4th grade	25 children	25 sq-ft per child
Middle classes, fifth grade to eight grade	40 children	20 sq-ft per child
High school classes	40 children	20 sq-ft per child

All class rooms must have additional storage space for common properties of the class. For nurseries and kindergartens: there should be separate space for play areas and rest/sleeping areas. For all classes: The maximum width of all class rooms should not exceed 35 feet. Class rooms must have window areas which are not less than 15% of the floor areas and window sill heights must be not less than 3ft. And the railing height must be inconformity with section 2.5.6.3. Class rooms' heights must be minimum 9 ft. All class rooms must be connected with covered corridors or passages.

2.2.2.2 General requirements

All education building must have assembly areas which should hold at least 50% of all children with minimum floor areas of 7 sq.ft per child. For urban schools, ample parking space and delivery of children must be considered. There should be rooms for teachers with maximum eight teachers in one room and at least 80 sq-ft per teacher. There should be separate toilet facilities for teachers and children and the toilets for the students must be able to check the misuse of drugs and other illicit activities. All schools must have schools library and computer facilities. All schools must have space for facilities of physical education,

handicraft and domestic science education for the children. In addition to the open space requirements of this chapter there should be play ground around 20,000 sq-ft for all schools with more than 500 children.

2.2.2.3 Open space requirements

The requirements for open spaces of respective norms are as the following table 2.2.2.

Table 2.2 Open Space Requirements for Respective Levels

Levels	Covered open space (minimum)	Open spaces (minimum)	Open shed (minimum)
Nursery children below four years	10 sq-ft per child	10 sq-ft per child	
Kindergarten children below six years	10 sq-ft per child	10 sq-ft per child	
Primary classes, first grade to 4th grade		15 sq-ft per child	10 sq-ft per child
Middle classes, fifth grade to eight grade		20 sq-ft per child	10 sq-ft per child
High school classes		20 sq-ft per child	10 sq-ft per child

2.2.2.4 General requirements for higher educational institution

The requirements for higher educational institution are as follow:

a) The higher educational institution shall have separate compound with ample land area to provide academic and recreational facilities.

b) The higher educational institution shall provide auxiliary functions and facility such as libraries, multimedia places etc.

c) The higher educational institution shall have sport facility for students.

d) The higher educational institution shall have medical care facility for students and staffs.

2.2.3 Covered Mall and Open Mall Buildings

2.2.3.1 Scope

The provisions of this section shall apply to buildings or structures defined herein as covered mall buildings not exceeding three floor levels at any point nor more than three stories above grade plane. Except as specifically required by this section, covered mall buildings shall meet applicable provisions of this code.

Exceptions:

a) Foyers and lobbies of Business Groups B, and Residential Groups R are not required to comply with this section.

b) Buildings need not comply with the provisions of this section when they totally comply with other applicable provisions of this code.

2.2.3.2 Definitions

The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ANCHOR BUILDING. An exterior perimeter building of a group other than H having direct access to a covered mall building but having required means of egress independent of the mall.

COVERED MALL BUILDING. A single building enclosing a number of tenants and occupants, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices and other similar uses wherein two or more tenants have a main entrance into one or more malls. For the purpose of this chapter, anchor buildings shall not be considered as a part of the covered mall building. The term" covered mall building" shall include open mall buildings as defined below.

Mall. A roofed or covered common pedestrian area within a covered mall building that serves as access for two or more tenants and not to exceed three levels that are open to each other. The term "mall" shall include open malls as defined below.

Open mall. An unroofed common pedestrian way serving a number of tenants not exceeding three levels. Circulation at levels above grade shall be permitted to include open exterior balconies leading to exits discharging at grade.

Open mall building. Several structures housing a number of tenants, such as retail stores, drinking and dining establishment. entertainment and amusement facilities, offices, and other similar uses, wherein two or more tenants have a main entrance into one or more open malls. For the purpose of Chapter 4 of the International Building Code, anchor buildings are not considered as a part of the open mall building.

FOOD COURT. A public seating area located in the mall that serves adjacent food preparation tenant spaces.

GROSS LEASABLE AREA. The total floor area designed for tenant occupancy and exclusive use. The area of tenant occupancy is measured from the center lines of joint partitions to the outside of the tenant walls. All tenant areas, including areas used for storage, shall be included in calculating gross leasable area.

2.2.3.3 Lease plan

Each covered mall building owner shall provide both the building and fire departments with a lease plan showing the location of each occupancy and its exits after the certificate of occupancy has been issued. No modifications or changes in occupancy or use shall be made from that shown on the lease plan without prior approval of the building official.

2.2.3.4 Means of egress

Each tenant space and the covered mall building shall be provided with means of egress as required by *Chapter 6, Means of Egress*.

2.2.3.5 Mall width

For the purpose of providing required egress, malls are permitted to be considered as corridors but need not comply with the requirements of *Chapter 6, Means of Egress* of this code where the width of the mall is as specified in this section.

2.2.3.5.1 Minimum width

The minimum width of the mall shall be 20 feet (6096 mm). The mall width shall be sufficient to accommodate the occupant load served. There shall be a minimum of 10 feet (3048 mm) clear exit width to a height of 8 feet (2438 mm) between any projection of a tenant space bordering the mall and the nearest kiosk, vending machine, bench, display opening, food court or other obstruction to means of egress travel.

2.2.3.5.2 Minimum width open mall

The minimum floor and roof opening width above grade shall be 20 feet (9096 mm) in open malls.

2.2.3.7 Fire-resistance-rated separation

Fire-resistance-rated separation is not required between tenant spaces and the mall. Fire-resistance-rated separation is not required between a food court and adjacent tenant spaces or the mall.

2.2.3.7.1 Attached garage

An attached garage for the storage of passenger vehicles having a capacity of not more than nine persons and open parking garages shall be considered as a separate building where it is separated from the covered mall building by not less than 2-hour fire barriers constructed in accordance with *Part 5, Building Services (Fire)*.

Exception: Where an open parking garage or enclosed parking garage is separated from the covered mall building or anchor building a distance greater than 10 feet (3048 mm), the provisions of *fire-resistance rating requirements* shall apply.

Pedestrian walkways and tunnels that attach the open parking garage or enclosed parking garage to the covered mall building or anchor building shall be constructed in accordance with *Pedestrian Walkways and Tunnels, Chapter 4, Special Building and Construction*.

2.2.3.7.2 Tenant separations

Each tenant space shall be separated from other tenant spaces by a fire partition complying with *Part 5, Building Services (Fire)*. A tenant separation wall is not required between any tenant space and the mall.

2.2.3.7.3 Anchor building separation

An anchor building shall be separated from the covered mall building by fire walls complying with *Part 5, Building Services (Fire)*.

Exception: Anchor buildings of not more than three stories above grade plane that have an occupancy classification the same as that permitted for tenants of the covered mall building shall be separated by 2-hour fire-resistive fire barriers complying with *Part 5, Building Services (Fire)*.

2.2.3.8 Interior finish

Interior wall and ceiling finishes within the mall and exits shall have non-flammable materials and all floors must be of non-slip finishes.

2.2.3.9 Automatic sprinkler system

The covered mall building and buildings connected shall be equipped throughout with an automatic sprinkler system in accordance with *Part 5, Building Services*, which shall comply with the followings:

a) The automatic sprinkler system shall be complete and operative throughout occupied space in the covered mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with approved alternative protection.

b) Sprinkler protection for the mall shall be independent from that provided for tenant spaces or anchors. Where tenant spaces are supplied by the same system, they shall be independently controlled.

2.2.3.9.1 Standpipe system

The covered mall building shall be equipped throughout with a standpipe system as required by *Part 5, Building Services (Fire).*

2.2.3.10 Smoke control

Where a covered mall building contains an atrium, a smoke control system shall be provided.

Exception: A smoke control system is not required in covered mall buildings when an atrium connects only two stories.

2.2.3.11 Kiosks

Kiosks and similar structures (temporary or permanent) shall meet the following requirements:

a) Combustible kiosks or other structures shall not be located within the mall unless permitted by the *Part 5, Building Services (Fire).*

b) Kiosks or similar structures located within the mall shall be provided with approved fire suppression detection devices.

c) The minimum horizontal separation between kiosks or groupings thereof and other structures within the mall shall be 20 feet (6096 mm).

d) Each kiosk or similar structure or groupings thereof shall have a maximum area of 300 square feet (28 m2).

e) There shall be no function in the kiosks with open flame.

2.2.3.12 Children's playground structures

Structures intended as children's playgrounds that exceed 10 feet (3048 mm) in height and 150 square feet (14 m2) in area shall comply with Covered mall and Open mall Buildings Sections.

2.2.3.12.1 Materials

Children's playground structures shall be constructed of non-combustible materials.

2.2.3.12.2 Fire protection

Children's playground structures located within the mall shall be provided with the same level of approved fire suppression and detection devices required for kiosks and similar structures.

2.2.3.12.3 Separation

Children's playground structures shall have a minimum horizontal separation from other structures within the mall of 20 feet (6090 mm).

2.2.3.12.4 Area limits

Children's playground structures shall not exceed 300 square feet (28 m2) in area, unless a special investigation has demonstrated adequate fire safety.

2.2.3.13 Security grilles and doors

Horizontal sliding or vertical security grilles or doors that are a part of a required means of egress shall conform to the following:

a) They shall remain in the full open position during the period of occupancy by the general public.

b) Doors or grilles shall not be brought to the closed position when there are 10 or more persons occupying spaces served by a single exit or 50 or more persons occupying spaces served by more than one exit.

c) The doors or grilles shall be openable from within without the use of any special knowledge or effort where the space is occupied.

d) Where two or more exits are required, not more than one-half of the exits shall be permitted to include either a horizontal sliding or vertical rolling grille or door.

2.2.3.14 Standby power

Covered mall buildings exceeding 50,000 square feet (4645 m2) shall be provided with standby power systems that are capable of operating the emergency voice/ alarm communication system and lighting.

2.2.3.15 Emergency voice/ alarm communication system

Covered mall buildings exceeding 50,000 square feet (4645 m2) in total floor area shall be provided with an emergency voice/ alarm communication system. Emergency voice/ alarm communication systems serving a mall required or otherwise, shall be accessible to the concerned authority.

2.2.3.16 Plastic signs

Plastic signs affixed to the storefront of any tenant space facing the mall shall be limited as specified in the followings.

2.2.3.16.1 Area

Plastic signs shall not exceed 20 percent of the wall area facing the mall.

2.2.3.16.2 Height and width

Plastic signs shall not exceed a height of 36 inches (914 mm), except that if the sign is vertical, the height shall not exceed 96 inches (2438 mm) and the width shall not exceed 36 inches (914 mm).

2.2.3.17 Fire department access to equipment

Rooms or areas containing controls for air-conditioning systems, automatic fire-extinguishing systems or other detection, suppression or control elements shall be identified for use by the fire services department.

2.2.3.18 Daylight provision for mall

For the purpose of providing daylight, meant for the time of power failure, there should be minimum of 10% of the floor area of day-light provisions such as windows, etc. The furthest distance of such openings shall be less 80 feet from any point in that mall area.

2.2.4 High-Rise Buildings

2.2.4.1 Applicability

High-rise buildings shall comply with Sections 2.2.4.2 through 2.2.4.8.

Exception: The provisions of *Sections 2.2.4.2 through 2.2.4.6* shall not apply to the following buildings and structures:

a) Concerning the location of high-rise buildings designed to build in the vicinity of historical structures, the local zoning bylaws shall be observed.

b) Airport traffic control towers in accordance with *Section 2.2.11.*

c) Open parking garages in accordance with *Section 2.2.7.3*.

d) Buildings with a Group A-5 occupancy in accordance with *Assembly Group A, Chapter 1, Use and Occupancy Classification.*

e) Special industrial occupancies in accordance with *Chapter 3, General Building Height and Area*.

2.2.4.2 Automatic sprinkler system

Buildings and structures shall be equipped throughout with an automatic sprinkler system and a secondary water supply in accordance with *Part 5, Building Services (Fire).*

Exception: An automatic sprinkler system shall not be required in spaces or areas of:

a) Open parking garages in accordance with Section 2.2.7.3.

b) Telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces II or areas are equipped throughout with an automatic fire detection system.

2.2.4.2.1 Number of sprinkler risers and system design

Each sprinkler system zone in buildings that are more than 420 feet (128 m) in building height shall be supplied by a minimum of two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.

2.2.4.2.1.1 Riser location

Sprinkler risers shall be placed in exit enclosures that are remotely located in accordance with *Exit and Exit Access Doorways Section, Chapter 6, Means of Egress*.

2.2.4.2.2 Water supply to required fire pumps

Required fire pumps shall be supplied by connections to a minimum of two water mains located in different streets.

Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided the main is valued such that an interruption can be isolated so that the water supply will continue without interruption through at least one of the connections.

2.2.4.3 Emergency systems

The detection, alarm and emergency systems of high-rise buildings shall comply with *Part 5, Building Services*.

2.2.4.3.1 Standby power

A standby power system complying with *Part 5, Building Services.*

2.2.4.4 Means of egress and evacuation

The means of egress in high-rise buildings shall comply with *Chapter 6, Means of egress.*

2.2.4.5 Elevators and escalators

Elevator and escalators installation and operation in high-rise buildings shall comply with *Part 5, Building Services.*

2.2.4.6 Smoke removal

To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:

a) Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50-foot (15 240 mm) intervals.

b) The area of operable windows or panels shall not be less than 40 square feet (3.7 m2) per 50 linear feet (15 240 mm) of perimeter.

Exceptions:

1) In Group R occupancies, each sleeping unit or suite having an exterior wall shall be permitted to be provided with 2 square feet (0.19 m2) of venting area in lieu of the area specified in Item 1.

2) Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.

3) Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.

4) Any other approved design that will produce equivalent results.

2.2.4.7 Helipad

Provision of space for helipad on roof top shall be considered if required, and shall comply with *Part 3 structure and part 5 Building Services.*

2.2.4.8 Swimming pool and roof garden

Provision of space for swimming pool and roof garden inside the building or roof top shall be considered if required and shall comply with *Part 3 structure and Part 5, Building Services.*

2.2.5 Atriums

2.2.5.1 General

The provisions of this section shall apply to buildings or structures containing vertical openings defined herein as "Atriums."

2.2.5.1.1 Definition

The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoist ways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with *Mezzanines Section, Chapter 3, General Building Heights and Areas*.

2.2.5.2 Use

The floor of the atrium shall not be used for other than low fire hazard uses and only approved materials and decorations in accordance with *Part 5, Building Services (Fire)* shall be used in the atrium space.

Exception: The atrium floor area is permitted to be used for any approved use where the individual space is provided with an automatic sprinkler system in accordance with *Automatic Sprinkler Systems, Part 5, Building Services (Fire)*.

2.2.5.3 Automatic sprinkler protection

An approved automatic sprinkler system shall be installed throughout the entire building.

2.2.5.4 Fire alarm system

A fire alarm system shall be provided in accordance with *Part 5, Building Services (Fire).*

2.2.5.5 Smoke control

A smoke control system shall be installed in accordance with *Part 5, Building Services (Fire).*

Exception: Smoke control is not required for atriums that connect only two stories.

2.2.5.6 Enclosure of atriums

Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with *Part 5, Building Services (Fire).*

2.2.5.7 Standby power

Equipment required to provide smoke control shall be connected to a standby power system in accordance with *Part 5, Building Services (Fire).*

2.2.6 Underground Buildings

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.7 Motor-Vehicle-Related Occupancies

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.8 Motion Picture Projection Rooms

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.9 Stages and Platforms

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.10 Special Amusement Buildings

2.2.10.1 General

Special amusement buildings having an occupant load of 50 or more shall comply with the requirements for the appropriate Group A occupancy and *Sections 2.2.10.1 through 2.2.10.8*. Amusement buildings having an occupant load of less than 50 shall comply with the requirements for a Group B occupancy and *Sections 2.2.10.1 through 2.2.10.8*.

Exception: Amusement buildings or portions thereof those are without walls or a roof and constructed to prevent the accumulation of smoke.

2.2.10.2 Definition

The following word and term shall, for the purpose of this section and as used elsewhere in this code, have the meaning shown herein.

SPECIAL AMUSEMENT BUILDING. A special amusement building is any temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction so arranged that the means of egress path is not readily apparent due to visual or audio distractions or is intentionally confounded or is not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

2.2.10.3 Automatic fire detection

Special amusement buildings shall be equipped with an automatic fire detection system in accordance with *Fire Alarm and Detection Systems Section, Part 5, Building Services (Fire).*

2.2.10.4 Automatic sprinkler system

Special amusement buildings shall be equipped throughout with an automatic sprinkler system in accordance with *Part 5, Building Services (Fire).* Where the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.

2.2.10.5 Alarm

Actuation of a single smoke detector, the automatic sprinkler system or other automatic fire detection device shall immediately sound an alarm at the building at a constantly attended location from which emergency action can be initiated including the capability of manual initiation of requirements in *Part 5, Building Services (Fire).*

2.2.10.6 Emergency voice/ alarm communications system

An emergency voice/ alarm communications system shall be provided in accordance with *Part 5, Building Services (Fire)* which is also permitted to serve as a public address system and shall be audible throughout the entire special amusement building.

2.2.11 Aircraft-Related Occupancies

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.12 Drying Rooms

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.13 Live/Work Units

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.14 Hydrogen Cutoff Rooms

In the third phase, the details of this section will be described depending on the resources' availability.

2.2.15 Ambulatory Health Care Facilities

2.2.15.1 General

Occupancies classified as Group B ambulatory health care facilities shall comply with the provisions of Sections 2.2.15.1 through 2.2.15.6 and other applicable provisions of this code.

2.2.15.2 Smoke barriers

Smoke barriers shall be provided to subdivide every ambulatory care facility greater than 10,000 square feet (929 m2) into a minimum of two smoke compartments per story. The travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 200 feet (60 960 mm). The smoke barrier shall be installed in accordance with *Part 5, Building Services (Fire).*

2.2.15.3 Refuge area

At least 30 net square feet (2.8 m2) per no ambulatory patient shall be provided within the aggregate area of corridors, patient rooms, treatment rooms, lounge or dining areas and other low-hazard areas on each side of each smoke barrier.

2.2.15.4 Independent egress

A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

2.2.15.5 Automatic sprinkler systems

Automatic sprinkler systems shall be provided for ambulatory care facilities in accordance with *Part 5, Building Services (Fire).*

2.2.15.6 Fire alarm systems

A fire alarm system shall be provided in accordance with *Part 5, Building Services (Fire).*

2.2.16 Cyclone Shelters

In the third phase, the details of this section will be described depending on the resources' availability.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.3 GENERAL BUILDING HEIGHTS AND AREAS

TABLE OF CONTENTS

2.3 GENERAL BUILDING HEIGHTS AND AREAS

2.3.1 Definitions

The following words and definitions applied to this chapter and used in other places in this code have the meanings as described below:

AREA, building: The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls must be included in the building area if these areas are included within the horizontal projection of the roof or floor above.

BASEMENT: The portions of buildings that are partly below grade plane. A basement must be considered as a story above grade plane where the finished surface of the floor above the basement is more than 6 feet above grade plane or more than 12 feet above the finished ground level at any point. A basement is a story that is not a story above the grade plane.

EQUIPMENT PLATFORM: An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairs, and ladders necessary to access the platform.

GRADE PLANE: A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane must be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building.

HEIGHT, building: The vertical distance from grade plane to the average height of the highest roof surface.

HEIGHT, STORY: The vertical distance from top to top of two successive finished floor surfaces; and, to the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

MEZZANINE: An intermediate level or levels between the floor and ceiling of any story and in accordance with this chapter.

2.3.2 General Height and Area Limitations

The height and area for buildings of different construction types will be ruled by the intended use of the building and cannot go over the limits except as modified from the date of this code coming into force. In Protection and Preserved Zone, Cultural Heritage Regions and Conservation Zones, building heights and locations of new buildings are restricted by the relevant laws concerning the preservation and management of historic views (1998 Law, Chapter IV) and the wider setting of listed buildings, conservation zones and other historic areas and landscapes. Where a new building will affect any of these heritage assets, the developer must set out clearly the potential impact of the new development on those assets. Where there is demonstrable harm to the assets, the development will be refused permission. Each part of a building included within the inside and outside walls and fire walls, where present, will be allowed to be a separate building. Buildings and structures that are designed to accommodate special industrial processes that require large areas and unusual heights to contain cranes or special machinery and equipment are exempt from the height restrictions, such as:

- Rolling mills
- Structural metal fabrication shops and foundries

- The production and distribution of electricity
- The production and distribution of gas or steam power.

There are situations when two or more buildings are on the same building lot. When this happens, they are to be regulated as separate buildings or they will be considered as parts of one building if the height of each building and the total area of the buildings are within the limits of Tables as shown in this code. The requirements of this code that are valid to the total building will be appropriate to each building. Buildings that are Type I construction are allowed to be unlimited level heights and areas are not required to stick to the special requirements that allow unlimited area buildings, unlimited height, or increased height and areas for other types of construction in this chapter.

2.3.2.1 The limitation of area and height of buildings of different occupancy classes

Different occupancy classes (Part 2) and types of construction (Part 3,7) shall be achieved by specifying it in terms of Floor area ratio FAR, which shall take into account the various aspects that govern in specifying FAR by (Part 1).

2.3.2.1.1 Height

The height that is allowed by code will be increased in agreement with this section with the exception that the height of one-story aircraft hangars, aircraft paint hangers, and buildings used for the manufacturing of aircraft will not be limited if the building is provided with an automatic fire-extinguishing system and is entirely surrounded by public ways or yards no less in width than one and one-half times the height of the building.

2.3.2.2 Mezzanines

Mezzanines that conform to this section can be considered a portion of the story. They cannot, however, be counted as either the building area or the number of stories as regulated by this section. The area of the mezzanine must be included in determining the fire area. The clear floor height of the mezzanine cannot be less than 7 feet.

The total area of a mezzanine within a room is not allowed to be over 50% of the floor area of the room or the space that they are in and also cannot include the enclosed part of the room to determine the floor area where the mezzanine is located. When determining the allowable mezzanine area, the area of the mezzanine cannot be included in the floor area except for the following:

a) The total area of mezzanines in buildings and structures that are Type I or II for special industrial occupancies in accordance with this chapter cannot be more than two-thirds of the area in the room.

b) The total area of mezzanines in buildings and structures that are Type I or II cannot be more than one-half of the area of the room in buildings and structures that have an approved sprinkler system throughout. The sprinkler system has to be in accordance with code requirements and an approved emergency voice/alarm communication system.

c) Mezzanines are no different when talking about exits and exit routes. Each occupant of a mezzanine must have access to at least two exits where the common path of exit travel is over the limits of Chapter (6). If the exit from your mezzanine is a stairway, the maximum travel distance must include the distance traveled on the stairway measured in the plane of the tread nosing.

d) Accessible means of exits must be provided, as well as a single means of exit. If a building or structure has a mezzanine it has to be open and no obstructions are allowed in the room where the mezzanine is located, except for walls that are not more than 42 inches high, columns, and posts.

There are five exceptions to this code, and they are as follows:

a) Mezzanines or portions that are of concern are not required to be open, provided that the occupant load does not go over 10 persons.

b) Mezzanines or portions that are of concern are not required to be open to the room if at least one of the exits provides direct access to an exit from the mezzanine level.

c) Mezzanines are not required to be open to the room, provided that the total floor area of the enclosed space does not go over 10 percent of the area.

d) In industrial facilities, mezzanines used for control equipment are allowed to be glazed on all sides.

e) In Groups H and I occupancies that are no more than two stories in height above grade plane and equipped with an automatic sprinkler, a mezzanine having two or more exits is not required to be open to the room in which the mezzanine is located.

2.3.3 Allowable Floor Areas

The Allowable Floor Area of any proposed building/structure shall only be as allowed based on the Allowed Percentage of Plot Area Ratio (PAR) and floor area ratio (FAR) as specified by (Part 1).

2.3.3.1 Allowable floor area increases

The floor areas hereinabove provided may be increased in certain specific instances and under appropriate conditions, based on the existence of public space, streets or yards extending along and adjoining two or more sides of the building or structure subject to the approval of the Building Official.

2.3.4 Maximum Height of Buildings

The maximum height and number of storeys of proposed building shall be dependent upon the character of use or occupancy and the type of construction (see notes), considering end-user population density, light and ventilation, width of streets particularly of its roadway/carriageway component, off-street cum off-site parking requirements, etc. and in relation to local land use plan and zoning regulations as well as other environmental considerations. The height shall be measured from the highest adjoining side walk or ground surface, Provided that the height measured the lowest adjoining surface shall not exceed such maximum height by more than 3.00 meters or 9.84 feet; Except that towers, spires, and steeples, erected as part of a building and not used for habitation or storage are limited as to height only by structural design of combustible materials or may extend not to exceed 6.00 meters or 10.7 feet above the height limits for each occupancy group if of combustible materials.

2.3.4.1 Determination of Building Height

a) Building Height Limit (BHL) the maximum height to be allowed for building/structures based on their proposed use or occupancy; the BHL is generally determined after the application of other development controls (DC) and certain other parameters, i.e., considerations of site conditions, view, etc. (Table 2.3.4.1). The BHL shall be generally measured from the established grade line to the topmost portion of

the proposed building/structure. If applicable, the BHL may be subject to clearance requirements of the Air Transportation Office (ATO) or of the concerned military/security authorities, BHL excludes the height of permitted/allowed projections above the roof of the building/structure, e.g., signage. mast, antenna, telecom tower, beacons and the like.

b) The Building Height Limit (BHL)of any proposed building/structure shall only be as allowed under this Rule (as shown in table below) or under the duly approved city/municipal (local) zoning ordinance, whichever is more restrictive.

Table 2.3 Building Height Limit (BHL) by Type of Use or Occupancy

Character of Use or Occupancy	**Type of Building/ Structure**	**Building Height Limit (BHL)**	
		Number of allowable Storeys/floors above Established grade	**Feet / Meters above highest Grade**
Residential	Residential 1 (R-1) Hotel, Motel, High-rise residential, Condominium, Service Apt, etc.	Concerned Authority	Concerned Authority
	Residential 2 (R-2) Hostels Walk up Apt, etc.	5	50 ft
	Residential 3(R-3) Low –rise , detached houses, single family (Individual lots/units)	3	36 ft
	Residential 4(R-4)/ Residential care, assisted living	3	36 ft
	Residential 5 (R-5)/ low income family houses	1 - 2	12 ft-24 ft

Character of Use or Occupancy	**Type of Building/ Structure**	**Building Height Limit (BHL)**	
		Number of allowable Storeys/floors above Established grade	**Feet / Meters above highest Grade**
Commercial	Business (B)	3 – 5	36.0 ft/11.00ft 60.0 /18.00
	Mercantile (M-1)	6	59/ 18.00
	Mercantile (M-2)	16-60	157.4/48 00- 590/ 180 00
Educational	Schools	1 – 4	Min 9 ft / Flr
Industrial	Industrial. **1** (F-**1**)	49 ft or 15.00 meters but not exceed the duly-approved BHL in the major zone it is part of	
	Industrial. **2 (**F-**2**)	68.8 ft or 21.00 meters but not exceed the duly-approved BHL in the major zone it is part of	
	Industrial. **3** (F-**3**)	88.5 ft or 27.00 meters but not exceed the duly-approved BHL in the major zone it is part of	
Institutional		49 ft or 15.00 meters (or must follow the duly-approved BHL in the major zone it is part of)	
Parks and Open Recreational and Entertainment Spaces		49 ft or 15.00 meters (or must complement the duly-approved BHL in the major zone it is part of)	
Agricultural/ Agro-Industrial/Tourism		49 ft or 15.00 meters (or must complement the duly-approved BHL in the major zone it is part of)	
Planned Unit Development (PUD)	PUD at a reclamation area close to an operating airport	3.-15	32.8 ft or/10.00m-147.6ft/45.00m (With ATO-prescribed BHL as needed)
	PUD at a reclamation area	3-30	32.8 FT /10,0m- 98.4 ft/30-00m
	PUD at a coastal area	16-45	157.4 ft or 48.00m-442.8ft or135.00m
	PUD at a reclamation area close to an operating airport	3-25	32.8 ft or10.00m – 246ft or75,00m(with ATO- prescribed BHL as needed)
	PUD at an inland area	12-00	118 ft or36.00m-328ft or 100.00m

NOTE:

For purposes of the Code, all buildings proposed for construction shall be classified according to the following types; and should also link with Part 3, Structure.

a) Type I - shall be of wood construction. The structural elements may be any of the materials permitted by this Code.

b) Type II - shall be of wood construction with protective fire-resistant materials and one-hour fire-resistive throughout, except, that permanent non-bearing partitions may use fire- retardant treated wood within the framing assembly with one-hour resistivity.

c) Type III - shall be of masonry and wood construction. Structural elements may be any of the materials permitted by this Code provided, that the building shall be one-hour fire-resistive throughout. Exterior walls shall be of incombustible fire-resistive construction.

d) Type IV - shall be steel, iron, concrete, or masonry construction and walls, ceiling and permanent partitions, shall be of Incombustible fire- resistive construction, except, that permanent non-bearing partitions of one-hour fire-resistive construction may use fire- retardant treated wood within the framing assembly. ,

e) Type V - shall be fire-resistive. The structural elements shall be of steel, iron, concrete, or masonry construction. Walls, ceilings and permanent partitions shall be of incombustible fire-resistive construction.

Establishing Grade

a) In case of sloping grade where the building footprint running perpendicular to the Road right of way (RROW) has a difference in elevation of less than 3.00 meters, the highest adjoining natural grade (ground surface) or finished grade (sidewalk surface) shall be considered the established grade elevation;

b) In case of sloping grade where the edges of the building footprint turning perpendicular to the RROW has a difference in elevation of more than 3.00 meters, the average grade level of the building footprint shall be considered the established grade elevation ; and

c) The building/structure height shall be measured from the highest adjoining public sidewalk (finished grade) or ground surface (natural grade); Provided, that the height measured from the lowest adjoining surface shall not exceed such maximum height by more than 3.00 meters; Except, that towers, spires and steeples, erected as parts of the building and not used for habitation or storage are limited as to the height only by structural design, if completely of incombustible materials, or may extend but not exceed 6.00 meters above the prescribed building height limit (BHL) for each occupancy group, if of combustible materials

d) Maximum of sixty (60) storeys (5900 ft or 180.00 meters) for inland areas not close to airports.

2.3.5 Mixed Use and Occupancy

Buildings or parts of buildings that contain two or more occupancies or uses are classified as mixed use. This section applies to mixed use occupancy and the buildings that they occupy. The first subject of this section cover incidental uses that must comply with this section, the only exceptions are incidental use areas that serve as a dwelling or living space that do not have to

comply with this section. An incidental use area must be classified in accordance with the occupancy of that portion of the building in which it is located or the building must be classified as a mixed occupancy and will comply with this section.

Where the code allows an automatic fire-extinguishing system without a fire barrier, the incidental use area must be separated from the rest of the building by construction that is capable of resisting smoke from passing through the building. The partitions must extend from the floor to the underneath of the fire-resistance-rated floor/ceiling assembly or fire-resistance-rated roof/ceiling assembly above or to the bottom of the floor or roof sheathing or sub deck above. Doors must be self-closing or automatic closing when the detection of smoke is made. Doors also must not have any air transfer openings and cannot be undercut in excess of the clearance that is permitted in *Fire Services Department*. With some exceptions, no separation is required between accessory occupancies and the main occupancy. Where an automatic fire-extinguishing system or automatic sprinkler system is provided, only the incidental use areas need to be equipped with this system.

2.3.6 Equipment Platforms

Equipment platforms in buildings cannot be considered as a portion of the floor below and must not contribute to either the building area or the number of stories as regulated by this chapter, and may also not use the area of the equipment platform to determine the fire area. Equipment platforms cannot be part of any mezzanine and these platforms and walkways, stairs, and ladders that provide access to an equipment platform cannot be used as an exit from the building either. There are some area limitations that you must be aware of.

The total area of all equipment platforms within a room cannot be larger than two-thirds of the area of the room which they are in. If the equipment platform is located in the same room as a mezzanine, the area of the mezzanine must be determined by this chapter and the combined total area of the room that they are in. If a mezzanine is in a building that is required to have an automatic sprinkler system, equipment platforms must be fully protected by these sprinklers above and below the platform.

Width must be at least 20 feet. Where the value of width varies along the perimeter of the building, the calculation performed in accordance with Equation 5.1 must be based on the weighted average of each part of the exterior wall and open space where the value of “W” is greater than or equal to 20 feet. When “W” is more than 30 feet, a value of 30 feet must be used in calculating the weighted average, regardless of the actual width of the open space. The exception being that the quantity of “W” divided by 30 must be permitted to be a maximum of two when the building meets all requirements of this chapter except for compliance with the 60-foot public way or yard requirement, if applicable. These open spaces must be either on the same lot or dedicated for public use and must be accessed from a street or approved fire lane.

a) The automatic sprinkler system increase cannot apply to buildings with an occupancy in Group H-1.
b) The automatic sprinkler system increase must not apply to the floor area of occupancy in Group H-2 or H-3. For mixed-use buildings containing these occupancies, the allowable area must be calculated in accordance with this book, with the sprinkler increase applying only to the portions of the buildings not classified as Group H-2 or H-3.

2.3.7 Height Determination for Sky Terrace Floors

For developments with sky terrace floors, the overall height control will be relaxed, based on the proposed storey height of the development. The additional allowable height over and above the overall aggregate height for the development is tabulated:

Propose story height of development	Additional height allowable over the overall aggregate height for developments with sky terrace levels
7- 20	10.0m or 32.8 ft
21- 30	15.0m or 49.2 ft
31- 40	20.0m or 65.6 ft
41- 50	25.0m or 82 ft
50 above	30m or 98.4 ft

NOTE:

a) A sky terrace floor refers to a floor where the sky terrace areas within the 45-degree line occupy at least 60% of the floor plate, and is used for sky terrace and other communal purposes.

b) This additional height can only be distributed to sky terrace floors within the development.

c) Spaces for M&E services located directly beneath the sky terrace floor can also be included under the additional height. Drop-panels are not allowed at the soffit along the perimeter of sky terrace floors, as the intention is to encourage the provision of high volume open communal spaces.

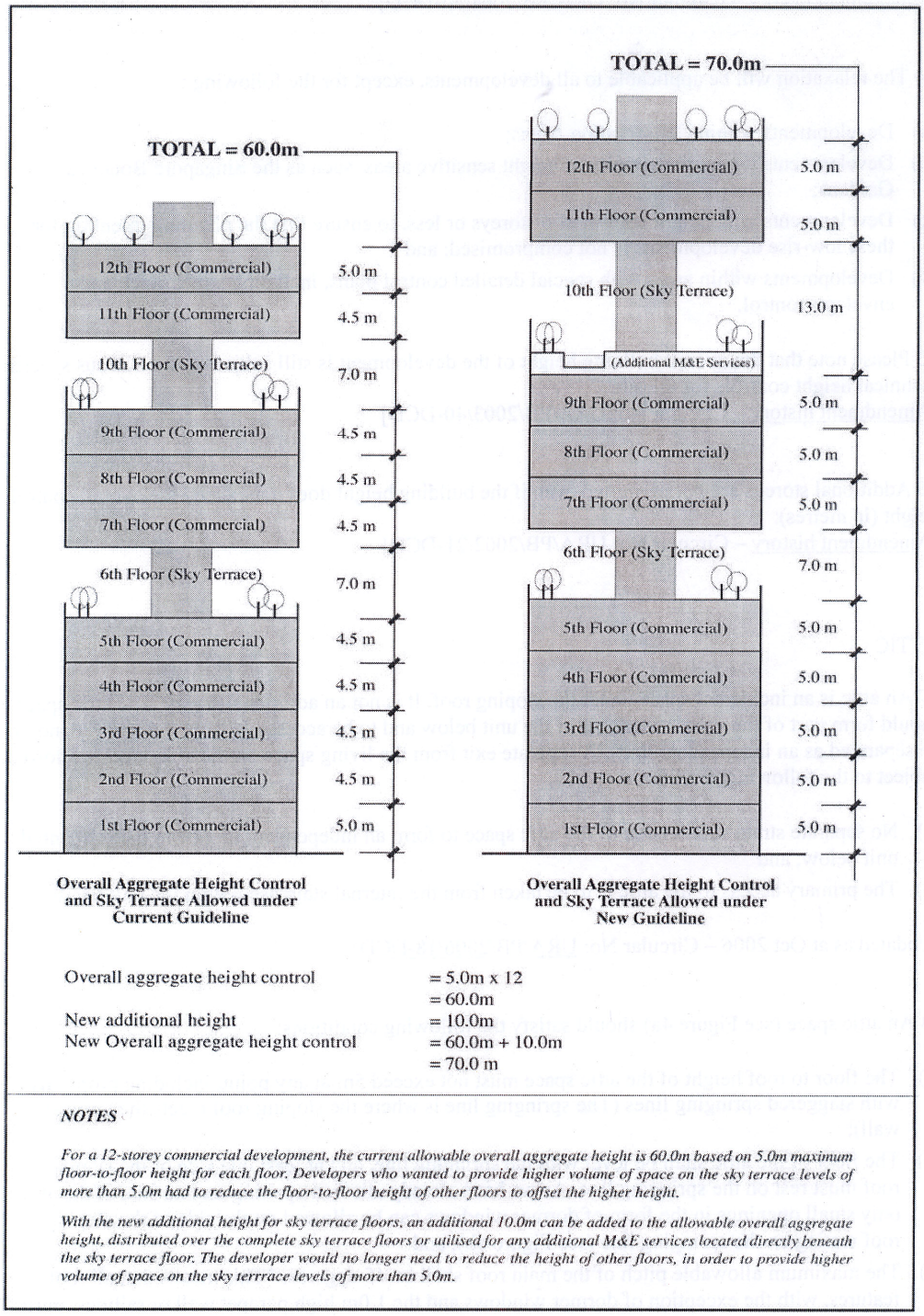

Figure 3.1 Illustration on the Relaxation of the Overall Aggregate Heights for Developments with Sky Terrace Floors

The illustration is shown as a guideline of a typical 12-storey commercial development that has an overall aggregate height of 60.0m based on 5.0m maximum floor-to-floor height for each floor, can enjoy an additional height of 10m, if the development includes at least one sky terrace floor.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.4 SPECIAL BUILDINGS AND CONSTRUCTION

TABLE OF CONTENTS

2.4 SPECIAL BUILDING AND CONSTRUCTION

2.4.1 General

2.4.1.1 Scope

The provisions of this chapter shall manage special building construction including membrane structures, temporary structures, pedestrian walkways and tunnels, automatic vehicular gates, awnings and canopies, marquees, signs, and towers and antennas.

2.4.2 Membrane Structures

2.4.2.1 General

The provisions of this section shall apply to air-supported, air-inflated, membrane-covered cable and membrane-covered frame structures, collectively known as membrane structures, erected for a period of 180 days or longer. Those erected for a shorter period of time shall comply with the *Part 5, Building Services (Fire)* and *Myanmar Fire Services Law*. Membrane structures covering water storage facilities, water clarifiers, water treatment plants, sewage treatment plants, greenhouses and similar facilities not used for human occupancy are required to meet only the requirements of *Part 3, Structural Design*. Membrane structures erected on a building, balcony, deck or other structure for any period oftime shall comply with this section.

2.4.2.2 Definitions

The following words and terms shall, for the purposes ofthis section and as used elsewhere in this code, have the meanings shown herein.

AIR-INFLATED STRUCTURE. A structure that uses air-pressurized membrane beams, arches or other elements to enclose space. Occupants of such a structure do not occupy the pressurized area used to support the structure.

AIR-SUPPORTED STRUCTURE. A building wherein the shape of the structure is attained by air pressure and occupants of the structure are within the elevated pressure area. Air-supported structures are of two basic types:

Double skin. Similar to a single skin, but with an attached liner that is separated from the outer skin and provides an airspace which serves for insulation, acoustic, aesthetic or similar purposes.

Single skin. Where there is only the single outer skin and the air pressure is directly against that skin.

CABLE-RESTRAINED, AIR-SUPPORTED STRUCTURE. A structure in which the uplift is resisted by cables or webbings which are anchored to either foundations or dead men. Reinforcing cable or webbing is attached by various methods to the membrane or is an integral part of the membrane. This is not a cable-supported structure.

MEMBRANE-COVERED CABLE STRUCTURE. A nonpressurized structure in which a mast and cable system provides support and tension to the membrane weather barrier and the membrane imparts stability to the structure.

MEMBRANE-COVERED FRAME STRUCTURE. A non pressurized building wherein the structure is composed ofa rigid framework to support a tensioned membrane which provides the weather barrier.

NONCOMBUSTIBLE MEMBRANE STRUCTURE. A membrane structure in which the membrane and all component parts of the structure are noncombustible.

2.4.2.3 Allowable floor areas

The area of a membrane structure shall not exceed the limitations set forth in *Chapter 3, General Building Heights and Areas.*

2.4.2.4 Maximum height

Membrane structures shall not exceed one story nor shall such structures exceed the height limitations in ft set forth in *Chapter 3, General Building Heights and Areas.*

Exception: Non-combustible membrane structures serving as roofs only.

2.4.2.5 Engineering design

The structure shall be designed and constructed to sustain dead loads, live loads including wind, rain or flood and seismic loads and in accordance with *Part 3, Structural Design*.

2.4.2.6 Inflation systems

Air-supported and air-inflated structures shall be provided with primary and auxiliary inflation systems to meet the minimum requirements of the following.

2.4.2.6.1 Equipment requirements

This inflation system shall consist of one or more blowers and shall include provisions for automatic control to maintain the required inflation pressures. The system shall be so designed as to prevent overpressurization of the system.

2.4.2.6.1.1 Auxiliary inflation system

In addition to the primary inflation system, in buildings exceeding 1,500 sq-ft (140 sq-m) in area, an auxiliary inflation system shall be provided with sufficient capacity to maintain the inflation of the structure in case of primary system failure. The auxiliary inflation system shall operate automatically when there is a loss of internal pressure and when the primary blower system becomes inoperative.

2.4.2.6.1.2 Blower equipment

Blower equipment shall meet all of the following requirements:

a) Blowers shall be powered by continuous-rated motors at the maximum power required for any flow condition as required by the structural design.

b) Blowers shall be provided with inlet screens, belt guards and other protective devices as required by the concerned Authority to provide protection from injury.

c) Blowers shall be housed within a weather-protecting structure.

d) Blowers shall be equipped with backdraft check dampers to minimize air loss when inoperative.

e) Blower inlets shall be located to provide protection from air contamination. The location of inlets shall be approved.

2.4.2.6.2 Standby power

Wherever an auxiliary inflation system is required, an approved standby power-generating system shall be provided. The system shall be equipped with a suitable means for automatically starting the generator set upon failure of the normal electrical service and for automatic transfer and operation of all of the required electrical functions at full power within 60 seconds of such service failure. Standby power shall be capable of operating independently for a minimum of 4 hours.

2.4.2.6.3 Support provisions

A system capable of supporting the membrane in the event of deflation shall be provided for in air-supported and air-inflated structures having an occupant load of 50 or more or where covering a swimming pool regardless of occupant load. The support system shall be capable of maintaining membrane structures used as a roof not less than 20 ft (6096 mm) above floor or seating areas. The support system shall be capable of maintaining other membranes at least 7 ft (2134 mm) above the floor, seating area or surface of the water.

2.4.3 Temporary Structures

2.4.3.1 General

The provisions of this section shall apply to structures erected for a period of less than 180 days. Tents and other membrane structures erected for a period ofless than 180 days shall comply with the *Part 5, Building Services (Fire)* and *Mynmar Fire Services Law*. Those erected for a longer period of time shall comply with applicable sections of this code.

2.4.3.1.1 Permit required

Temporary structures that cover an area in excess of 120 sq-ft (11.16 sq-m), including connecting areas or spaces with a common means of egress or entrance which are used or intended to be used for the gathering together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a permit from the concerned Authority.

2.4.3.2 Construction documents

A permit application and construction documents shall be submitted for each installation of a temporary structure. The construction documents shall include a site plan indicating the location of the temporary structure and information delineating the means of egress and the occupant load.

2.4.3.3 Means of egress

Temporary structures shall conform to the means of egress requirements of *Chapter 6, Means of Egress* and shall have a maximum exit access travel distance of 100 ft (30 480 mm).

2.4.3.4 Design and construction

The structure shall be designed and constructed to sustain dead loads, live loads including wind, rain or flood and seismic loads and in accordance with *Part 3, Structural Design*. Those erected for a shorter period of time shall comply with the *Part 5, Building Services (Fire)* and *Myanmar Fire Services Law.*

2.4.4 Pedestrian Walkways or Tunnels

2.4.4.1 General

This section shall apply to connections between buildings such as pedestrian walkways and/ or tunnels, located at, above or below grade level, that are used as a means of travel by persons. The pedestrian walkway shall not contribute to the building area or the number of stories or height of connected buildings.

2.4.4.2 Separate structures

Connected buildings shall be considered to be separate structures.

Exceptions:

a) Buildings on the same lot. Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the building height of each building and the aggregate building area of the buildings are within the limitations of *Chapter 3, General Building Heights and Areas*. The provisions of this code applicable to the aggregate building shall be applicable to each building.

b) Structurally connected buildings and buildings with multiple wings shall be considered one structure.

2.4.4.3 Construction

The pedestrian walkway shall be of noncombustible construction.

Exceptions:

Combustible construction shall be permitted where connected buildings are of combustible construction.

2.4.4.4 Contents

Only materials and decorations approved by the concerned Authority shall be located in the pedestrian walkway.

2.4.4.5 Fire Barriers between pedestrain walkways and buildings

Walkways shall be separated from the interior of the building by not less than 2 hour fire barriers constructed. This protection shall extend vertically from a point 10 ft (3048 mm) above the walkway roof surface or the connected building roof line, whichever is lower, down to a point 10 ft (3048 mm) below the walkway and horizontally 10 ft (3048 mm) from each side of the pedestrian walkway. Openings within the 10 ft (3048 mm) horizontal extension of the protected walls beyond the walkway shall be equipped with devices providing a $3/_4$-hour fire protection rating.

Exception: The walls separating the pedestrian walkway from a connected building and the openings within the 10 ft (3048 mm) horizontal extension of the protected walls beyond the walkway are not required to have a fire-resistance rating by this section where any of the following conditions exist:

a) The distance between the connected buildings is more than 10 ft (3048 mm). The pedestrian walkway and connected buildings, except for open parking garages, are equipped throughout with an automatic sprinkler system. The wall is capable of resisting the passage of smoke or is constructed of a tempered, wired or laminated glass wall and doors subject to the following:

1) The wall or glass separating the interior ofthe building from the pedestrian walkway shall be protected by an automatic sprinkler system and the sprinkler system shall completely wet the entire surface of interior sides of the wall or glass when actuated;

2) The glass shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler operates; and

3) Obstructions shall not be installed between the sprinkler heads and the wall or glass.

b) The distance between the connected buildings is more than 10 ft (3048 mm) and both sidewalls of the pedestrian walkway are at least 50 percent open with the open area uniformly distributed to prevent the accumulation of smoke and toxic gases.

c) Buildings are on the same lot.

d) Where exterior walls of connected buildings are required to have a fire-resistance rating greater than 2 hours, the walkway shall be equipped throughout with an automatic sprinkler system installed.

e) The previous exception shall apply to pedestrian walkways having a maximum height above grade of three stories or 40 ft (12 192 mm), or five stories or 55 ft (16 764 mm) where sprinklered.

2.4.4.6 Public way

The installation of a pedestrian walkway over a public right-of-way shall be subject to the approval of the applicable concerned Authority. The vertical clearance from the public right-of-way to the lowest part of a pedestrian walkway shall be 15 ft (4572mm) minimum.

2.4.4.7 Egress

Access shall be provided at all times to a pedestrian walkway that serves as a required exit.

2.4.4.8 Width

The unobstructed width of pedestrian walkways shall not be less than 36 inches (914 mm). The total width shall not exceed 30 ft (9144 mm).

2.4.4.9 Tunneled walkway

Separation between the tunneled walkway and the building to which it is connected shall not be less than 2 hour fire-resistant construction and openings therein shall be protected.

2.4.5 Awnings and Canopies

2.4.5.1 General

Awnings or canopies shall comply with the requirements of this section and other applicable sections of this code.

2.4.5.2 Definitions

The following term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

AWNING. An architectural projection that provides weather protection, identity or decoration and is wholly supported by the building to which it is attached. An awning is comprised of a lightweight frame structure over which a covering is attached.

CANOPY. A permanent structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration, and shall be structurally independent or supported by attachment to a building on one end and by not less than one stanchion on the outer end.

RETRACTABLE AWNING. A retractable awning is a cover with a frame that retracts against a building or other structure to which it is entirely supported.

2.4.5.3 Design and construction

Awnings and canopies shall be designed and constructed to withstand wind or other lateral loads and live loads as required by *Part 3, Structural Design* with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. Awnings shall have frames of noncombustible material, fire-retardant-treated wood or noncombustible covers and shall be fixed, retractable, folding or collapsible.

2.4.5.4 Public way

There should be temporary awnings which project to the public right-of-way. If it is allowed by the concerned authority, the vertical clearance from the public right-of-way to the lowest part of awning, including valances, shall be 7 ft (2134 mm) minimum and the projection to the public way shall not be more than 3 ft.

2.4.6 Marquees

2.4.6.1 General

Marquees shall comply with this section and other applicable sections of this code.

2.4.6.2 Definitions

The following term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

MARQUEE. A permanent roofed structure attached to and supported by the building.

2.4.6.3 Thickness

The maximum height or thickness of marquee measured vertically from its lowest to its highest point shall not exceed 3 ft (914 mm) where the marquee projects more than two-thirds of the distance from the property line to the curb line, and shall not exceed 9 ft (2743 mm) where the marquee is less than two-thirds of the distance from the property line to the curb line.

2.4.6.4 Roof construction

Where the roof or any part thereof is a skylight, the skylight shall comply with the requirements of *Part 3, Structural Design*. Every roof and skylight of a marquee shall be sloped to downspouts that shall conduct any drainage from the marquee in such a manner so as not to spill over the sidewalk.

2.4.6.5 Location prohibited

Every marquee shall be so located as not to interfere with the operation of any exterior standpipe, and such that the marquee does not obstruct the clear passage of stairways or exit discharge from the building or the installation or maintenance of street lighting.

2.4.6.6 Construction

A marquee shall be supported entirely from the building and constructed of noncombustible materials. Marquees shall be designed as required in *Part 3, Structural Design*. Structural members shall be protected to prevent deterioration.

2.4.6.7 Public way

If it is allowed to construct in the public right-of-way by the concerned authority, marquees with less than 15 ft (4572 mm) clearance above the sidewalk shall not extend into or occupy more than two-thirds the width of the sidewalk measured from the building. Stanchions or columns that support awnings, canopies, marquees and signs shall be located not less than 2 ft (610 mm) in from the curb line.

2.4.7 Signs

2.4.7.1 General

A sign shall not be erected in a manner that would confuse or obstruct the view of or interfere with exit signs required by means of egress or with official traffic signs, signals or devices. Within Conservation Zones and designated historic areas, signage and materials must comply with the local planning guidance intended to conserve and enhance the built environment. Commercial, advertising billboards will not be permitted in Conservation Zones, designated historic areas and landscape or sites affecting their broader setting. Signs shall not be erected, constructed or maintained so as to obstruct any fire escape or any window or door or opening used as a means of egress or so as to prevent free passage from one part of a roof to any other part thereof. A sign shall not be attached in any form, shape or manner to a fire escape, nor be placed in such manner as to interfere with any opening required for ventilation. Signs and sign support structures, together with their supports, braces, guys and anchors, shall be kept in repair and in proper state of preservation. The display surfaces of signs shall be kept neatly painted or posted at all times.

Signs which are written in any foreign language shall have a corresponding translation in English or in Myanmar. No sign or signboard shall be constructed as to unduly obstruct the natural view of the landscape, distract or obstruct the view of the public as to constitute a traffic hazard, or otherwise defile, debase or offend aesthetic and cultural values and traditions. The installation of all kinds of signs shall be such that a harmonious and aesthetic relationship of all units therein is presented.

2.4.7.2 Definitions

For the purpose of this Section, the following definitions shall apply.

ADVERTISING SIGN. Any surface or structure with characters, letters or illustrations applied thereto and displayed in any manner whatsoever out of doors for purposes of advertising or to give information regarding or to attract the public to any place, person, public performance, article or merchandise whatsoever, and which surface or structure is attached to, forms part of or is connected with any building, or is fixed to a tree or to the ground or to any pole, screen, fence or hoarding or displayed in space.

BANNER SIGN. A sign utilizing a banner as its display surface.

CANOPY SIGN. A sign affixed to the visible surface(s) of an attached or freestanding canopy.

CLOSED SIGN. An advertising sign in which at least more than fifty percent of the area is solid or tightly enclosed or covered.

COMBINATION SIGN. A sign that is supported partly by a pole and partly by a building structure.

DIRECTION SIGN. Usually included with an arrow and used for indicating a change in route or confirmation to a correct direction.

ELECTRIC SIGN. An advertising sign in which electric fittings, which are an integral part of the signs, are used

FREESTANDING SIGN. A sign principallysupported by a structure affixed to the ground, and not supported by a building, including signs supported by one or more columns, poles or braces placed in or upon the ground.

GROUND SIGN. An advertising sign detached from a building, and erected or painted on the ground or on any pole, screen, fence or hoarding and visible to the public.

IDENTIFICATION SIGN. A sign that gives specific location information, identifies specific items, for example, Parking Lot B, Building No. 5, First Aid, etc.

ILLUMINATED SIGN. An advertising sign, permanent or otherwise, the functioning of which depends upon its being illuminated by director indirect light, and other than an electric sign.

INFORMATIONAL SIGN. Used for overall information for general organization of a series of elements that is, campus plan, bus route, building layout, shopping mall plan, etc.

MARQUEE SIGN. An advertising sign attached to or hung from a marquee canopy or other covered structure projecting from and supported by the building and extending beyond the building wall, building line.

OPEN SIGN. An advertising sign in which at least fifty percent of the enclosed area is uncovered or open to the transmission of wind.

PORTABLE SIGN. Any sign not permanently attached to the ground or to a building or building surface.

PROJECTING SIGN. An advertising sign affixed to any building element and projecting more than 300 mm therefrom.

REGULATORY SIGN. Sign that gives operational requirements, restrictions or gives warnings, usually used for traffic delineation or control, for example ‘stop’, ‘No parking’, ‘one Way’, etc.

ROOF SIGN. An advertising sign erected or placed on or above the parapet or any portion of a roof of a building including signs painted on the roof of a building.

SKY SIGN. An advertising sign displayed in space like:

a) a gas filled balloon anchored to a point on the ground and afloat in the air with or without a streamer of cloth, etc; or

b) sky-writing, that is, a sign or word traced in the atmosphere by smoke discharged from an aeroplane.

SIGN. Any device visible from a public place that displays either commercial or non-commercial messages by means of graphic presentation of alphabetic or pictorial symbols or representations. Noncommercial flags or any flags displayed from flagpoles or staffs shall not be considered as signs

TEMPORARY SIGN. An advertising sign, banner or other advertising device constructed of cloth, canvas, fabric or any other light material, with or without a structural frame, intended for a limited period of display; including decorative displays for holidays or public demonstrations.

VERANDAH SIGN. An advertising sign attached to, posted on or hung from a VERANDAH.

WALL SIGN. An advertising sign, other than a projecting sign, which is directly attached to or painted or pasted on the exterior surface of or structural element of any building.

WINDOW SIGN. A sign affixed to the surface of a window with its message intended to be visible to and readable from the public way or from adjacent property.

2.4.7.3 Permits

No sign shall be erected, altered or maintained without first obtaining a permit for the same from the concerned Authority.

2.4.7.4 Maintenance and inspection

All signs for which a permit is required, together with all their supports, braces, guys and anchors shall be kept in good repair, both structurally and aesthetically, and when not galvanized or constructed of approved corrosion-resistive non-combustible materials, shall be painted when necessary to prevent corrosion. It shall be the duty and responsibility of the owner of every sign to maintain the immediate premises occupied by the sign, in a clean, sanitary and healthy condition. Every sign for which a permit has been issued and every existing sign for which a permit is required shall be inspected by the concerned Authority at least once in every calendar year.

2.4.7.5 General requirements for all signs

2.4.7.5.1 Load

Every advertising sign shall be designed so as to withstand safely the wind, dead, seismic and other loads as set out in *Part 3, Structural Design*.

2.4.7.5.2 Illumination

No sign shall be illuminated by other than electrical means and electrical devices and wiring shall be installed in accordance with the requirements of *Part 5, Building Services (Electrical and Allied Installations)*. In no case, shall any open spark or flame be used for display purposes unless specifically approved by the Authority.

2.4.7.5.3 Design and location of advertising signs

a) Sign should not obstruct any pedestrian movement, fire escape, door or window, opening used as a means for egress or fire fighting purposes.

b) No sign shall in any form or manner interfere with openings required for light and ventilation.

c) When possible signs should be gathered together into unified systems. Sign clutter should be avoided in the landscape.

d) Signs should be combined with lighting fixture to reduce unnecessary posts and for ease of illuminating the signs.

e) Information signs should be placed at natural gathering spots and included in the design of sight furniture.

f) Placement of sign should be avoided where they may conflict with pedestrian traffic.

g) Sign should be placed to allow safe pedestrian clearance vertically and latterly.

h) Braille strips may be placed along sign edges or raised letters may be used for readability for the blind and partially sighted.

i) No sign shall be attached in anyway to a tree or shrub.

j) The signs other than pertaining to building shall not be permitted to come in front of buildings such as hospitals, educational institutions, public offices, museums, buildings devoted to religious worship and buildings of national importance.

2.4.7.5.4 Materials

Materials for construction of signs or sign structures shall be of the quality and grade as specified in *Part 6, Building Materials*. Exceptions will be made in respect of sign in conservation zones, where they will conform to the planning guidance for each zone.

2.4.7.5.4.1 Use of combustibles

Wood or plastic or other 'materials of combustible characteristics similar to wood may be used for mouldings, cap pings, nailing blocks, letters and latticing where permitted and for other purely ornamental features of signs. Sign facings may be made of approved combustible materials provided the area of each face is not more than 108 sq-ft (10 sq-m) and the wiring for electric lighting is entirely enclosed in metal conduit and installed with a clearance of not less than 2 in (5 cm) from the facing material.

2.4.7.5.4.2 Glass in signs

All glass used in advertising signs, other than glass tubing used in gas discharge or similar signs, shall be of safety glass conforming to accepted standards at least 3 mm thick. Glass panels in advertising signs shall not exceed 64.58 sq-ft (6 sq-m) in area, each panel being securely fixed in the body of the sign independently of all other panels. Glass signs shall be properly protected from the possibility of damage by falling objects by the provisions of suitable protecting metal canopies, or by other approved means. Use of glass may be discouraged or avoided wherever possible for signs placed overhead.

2.4.7.5.5 Traffic control interference

No advertising sign shall be erected or maintained which interferes with or is likely to interfere with any sign or signal for the control of traffic. No advertising sign shall be placed particularly in bends and curves so as to obstruct the view of traffic at intersecting streets.

2.4.7.5.6 Draining of signs

Adequate provision for drainage shall be made in every advertising sign, where the possibility of collection of moisture exists.

2.4.7.5.7 Animated devices

Signs which contain moving section or ornaments shall have fail-safe provisions to prevent the section or ornaments from releasing and falling or shifting its centre of gravity more than 18 in (450 mm). The fail-safe device shall be in addition to the mechanism and

its housing which operate the movable section or ornament. The fail-safe device shall be capable of supporting the full dead weight of the section or ornament when moving mechanism releases.

2.4.7.6 Electric signs and illuminated signs

2.4.7.6.1 Material for electric signs

Every electric sign shall be constructed of non-combustible material except where the sign is purely a flood-lit sign.

2.4.7.6.2 Installation of electric signs and illuminated signs

Every electric sign and illuminated sign shall be installed in accordance with *Part 5, Building Services (Electrical and Allied Installations)*.

2.4.7.6.3 Colour

No illuminated sign in red, amber or green colour shall be erected or maintained within a horizontal distance of 32.8 ft (10 m) of any illuminated traffic sign.

2.4.7.6.4 Height

All advertising signs illuminated by light other than a white light at height of less than two storeys or 20 ft (6 m) above the ftpath, whichever be the greater height, shall be suitably screened so as to satisfactorily prevent any interference with any sign or signal for the control of traffic.

2.4.7.6.5 Intense illumination

No person shall erect any sign which is of such intense illumination as to disturb the residents in adjacent or nearby residential buildings. Not with standing any permission given for such erection, any such sign which after erection is, in the opinion of the Authority, of such intense illumination as to disturb the occupants of adjacent or nearby buildings shall, on the order of the Authority, be suitably altered or removed by the owner of the site concerned within such reasonable period as the Authority may specify.

2.4.7.6.6 Hours of operation

No electric sign, other than those necessary in the opinion of the Authority in the interest of public amenity, health and safety, shall be operated between midnight and sunrise.

2.4.7.6.7 Flashing, occulting and animated

No flashing, occulting or animated advertising signs, the periodicity of which exceeds 30 flashes to the minute, shall be erected so that the lowest point of such signs is less than 30 ft (9 m) above the ground level.

2.4.7.7 Ground signs

2.4.7.7.1 Material

Every ground sign exceeding 20 ft (6 m) in height together with frames, supports and braces shall be constructed of non-combustible material except as in 2.4.7.5.4.1.

2.4.7.7.2 Dimensions

No ground sign shall be erected to a height exceeding 30 ft above the ground. Lighting reflectors may extend beyond the top or face of the sign.

2.4.7.7.3 Supports and anchorage

Every ground sign shall be firmly supported and anchored to the ground. Supports and anchors shall be of treated timber in accordance with good practice, or metal treated for corrosion resistance or masonry or concrete.

2.4.7.7.4 Site cleaning

The owner of any site on which aground sign is erected shall be responsible for keeping such part of the site as is visible from the street, clean, sanitary, un-offensive and free of all obnoxious substances and unsightly conditions to the approval of the Authority.

2.4.7.7.5 Obstruction to traffic

No ground sign shall be erected so as to obstruct free access to or egress from any building.

2.4.7.7.6 Set Back

No ground sign shall be set nearer to the street line than the established building line.

2.4.7.7.7 Bottom clearance

The bottom line of all ground signs shall be at least 2 ft above the ground, but the intervening space may be filled with open lattice work or platform decorative trim.

2.4.7.8 Roof signs

2.4.7.8.1 Material

Every roof sign together with its frames, supports and braces, shall be constructed of non-combustible material, except as in 2.4.7.5.4.1. Provision shall be made for electric grounding of all metallic parts; and where combustible materials are permitted in letters or other ornamental features, all wiring and tubing shall be kept free and insulated there from.

2.4.7.8.2 Dimensions

No roof sign shall exceed the following heights on buildings of heights:

Table 2.4.1 Dimensions for Roof Signs

No.	Height of Building	Height of Sign (Max)
1.	Not exceeding four storeys or 59 ft (18m)	6.56 ft (2 m)
2.	Five to eight storeys or exceeding 59 ft (18m) but not exceeding 118 ft (36m)	9.84 ft (3 m)
3.	Exceeding eight storeys or 118 ft (36m), provided that in calculating the height of such signs, signs placed one above the other, or on planes at different levels of the same building shall be deemed to be one sign, whether or not such signs belong to different owners	16.4 ft (5 m)

2.4.7.8.3 Location

a) No roof sign shall be so placed on the roof of any building as to prevent free passage from one part of the roof to another.

b) No roof sign shall be placed on or over the roof of any building unless the entire roof construction is of non-combustible material.

2.4.7.8.4 Projection

No roof sign shall project beyond the existing building line of the building of which it is erected or shall extend beyond the roof in any direction.

2.4.7.8.5 Supports and anchorage

Every roof sign shall be thoroughly secured and anchored to the building on or over which it is erected. All loads shall be safely distributed to the structural members of the building.

2.4.7.8.6 Clearance

Roof signs shall be so constructed as to leave a clear space of not less than 6 ft (1829 mm) between the roof level and the lowest part of the sign and shall have at least 5 ft (1524 mm) clearance between the vertical supports thereof.

2.4.7.9 Verandah signs

2.4.7.9.1 Material

Every verandah sign shall be constructed entirely of non-combustible material except as in 2.4.7.5.4.1.

2.4.7.9.2 Dimensions

No verandah sign exceed 3.28 ft (1 m) in height. No verandah sign hanging from a verandah shall exceed 8.2 ft (2.5 m) in length and 50 mm in thickness, except that verandah box signs measuring not more than 200 mm in thickness, measured between the principal faces of the sign and constructed entirely of metal wired glass may be erected.

2.4.7.9.3 Alignment

Every verandah sign shall be set parallel to the building line, except that any such sign hanging from a verandah shall be set at right angles to the building line.

2.4.7.9.4 Location

Verandah signs, other than hanging signs only, shall be placed in the following locations:

a) Immediately above the eaves of the VERANDAH roof in such a manner as not to project beyond the rear of the roof gutter;

b) Against but not above or below the VERANDAH parapet or balustrade provided such parapet or balustrade is solid and the sign does not project more than 20 cm from the outside face of such parapet or balustrade; or

c) On the VERANDAH beams or parapets in the case of painted signs.

2.4.7.9.5 Height of hanging VERANDAH signs

Every VERANDAH sign hanging from a VERANDAH shall be fixed in such a manner that the lowest point of such sign is not less than 8 .2 ft (2.5 m) above the pavement.

2.4.7.9.6 Projection

Except as provided for in 2.4.7.9.4, no VERANDAH sign shall extend outside the line of the VERANDAH to which it is attached.

2.4.7.10 Wall signs

2.4.7.10.1 Material

Every wall sign exceeding 43 sq.-t (4 sq-m) in area shall be constructed of non-combustible material except as in 2.4.7.5.4.1.

2.4.7.10.2 Dimensions

a) The total area of any wall sign shall not exceed 215 sq.ft (20 sq.m) for every 49 ft (15 m) of building frontage to the street to which such sign faces; except that in the case of a wall sign, consisting only of the name of a theatre or cinema, the total area of such sign shall not exceed 2153 sq.ft (200 sq.m).

b) No wall sign which exceeds 323 sq.ft (30 sq.m) in area shall be located on any wall not directly facing the road; provided that any such sign or signs shall not exceed 25 percent of the side wall area visible from the street.

2.4.7.10.3 Projection

No wall sign shall extend above the top of the wall or beyond the ends of the wall to which it is attached. At any place where pedestrians may pass along a wall, any wall sign attached thereto shall not project more than 7.5 cm there from within a height of 8.2 ft (2.5 m) measured from the level of such place.

2.4.7.10.4 Supports and attachment

Every wall sign attached to walls shall be securely attached. Wooden blocks or anchorage with wood used in connection with screws, staples or nails shall not be considered proper anchorage, except in the case of wall signs attached to walls of wood.

2.4.7.11 Projecting signs

2.4.7.11.1 Material

Every projecting sign and its support and framework shall be constructed entirely of non-combustible material.

2.4.7.11.2 Projection and height

No projecting sign or any part of its supports or frame work shall project more than 6.56 ft (2 m) beyond the building; however it shall not project beyond the plot line facing the street; when it projects into the street it shall be at clear height of 8.2 ft (2.5 m) from the road.

a) The axes of all projecting signs shall be at right angles to the main face of the building. Where a V-construction is employed for the faces, the base of the sign against the building shall not exceed the amount of the overall projection.

b) No projecting signs shall extend above the eaves of a roof or above the part of the building face to which it is attached.

c) The maximum height of a projecting sign shall be related to the height of the building to which it is attached in the following manners:

Table 2.4.2 Dimensions for Projecting Signs

No.	Height of Building	Height of Sign (Max)
1.	Not exceeding four storeys or 59 ft (18m)	30 ft (9 m)
2.	Five to eight storeys or exceeding 59 ft(18m) but not exceeding 118 ft(36m)	39 ft (12 m)
3.	Exceeding eight storeys or 118 ft (36 m)	49 ft (15 m)

2.4.7.11.3 Supports and attachment

Every projecting sign shall be securely attached to a building so that movement in any direction is prevented by corrosion-resistant metal brackets, rods, anchors, supports, chains or wire ropes so designed and arranged that half the number of such fixing devices may safely support the sign under all circumstances. Staples or nails shall not be used to secure any projecting sign to any building.

2.4.7.12 Marquee signs

2.4.7.12.1 Materials

Marquee signs shall be constructed entirely of metal or other approved non-combustible materials.

2.4.7.12.2 Height

Such sign shall not exceed 6.56 ft (2 m) in height nor shall they project below the fascia of the marquee nor lower than 8.2 ft (2.5 m) above the ftpath.

2.4.7.12.3 Length

Marquee signs may extend the full length but in no case shall they project beyond the ends of the marquee.

2.4.7.13 Sky Signs

In the case of the sky signs, the regulations laid down by the concerned Authority concerned shall apply.

2.4.7.14 Temporary advertising signs, travelling circus signs, fair signs and decorations during public rejoicing

2.4.7.14.1 Types

None of the following advertising signs shall be erected or maintained, other than as temporary signs erected in accordance with 2.4.7.14.2:

a) Any advertising sign which is painted on or fixed on to or between the columns of a VERANDAH,

b) Any advertising sign which projects above or below any fascia, bearer, beam or balustrade of a VERANDAH or balcony,

c) Any advertising sign which is luminous or illuminated and which is fixed to any fascia bearer, beam or balustrade of any splayed or rounded corner of a VERANDAH or balcony,

d) Any streamer sign erected across a road,

e) Any sign not securely fixed so as to prevent the sign swinging from side to side;

f) Any advertising sign made of cloth, paper mache, or similar or like material but excluding licensed paper signs on hoardings or fences,

g) Any advertising sign on a plot used or intended to be used exclusively for residential purposes, other than a brass plate or board preferably not exceeding 600 mm x 450 mm in size, affixed to the fence or entrance door or gate of a dwelling, and in the case of a block of flats, affixed to the wall of the entrance hall or entrance door of any flat and

h) Any sign on trees, rocks, hillsides and similar natural features.

2.4.7.14.2 Requirements for temporary signs

All temporary advertising, travelling circus and fair signs and decorations during public rejoicing shall be subject to the approval of the Authority and shall be subjected to the approval of the Authority and shall be erected so as not to obstruct any opening and to minimize fire risk.

The advertisement contained on any such sign shall pertain only to the business, industry or other pursuit conducted on or within the premises on which such sign is erected or maintained. Temporary advertising signs shall be removed as soon as tom or damaged and in any case within 14 days after erection unless extended.

The Authority shall be empowered to order the immediate removal of any temporary advertising sign or decoration, where, in its opinion such action is necessary in the interests of public amenity and safety.

2.4.7.14.2.1 Pole signs

Pole signs shall be constructed entirely of non-combustible materials and shall conform to the requirements for ground or roof signs as the case may be. Such signs may extend beyond the street line if they comply with the provisions for projecting signs.

2.4.7.14.2.2 Banner and cloth signs

Temporary signs and banners attached to or suspended from a building, constructed of cloth or other combustible material shall be strongly constructed and shall be securely attached to their supports. They shall be removed as soon as torn or damaged, and in no case later than 14 days after erection; except, that permits for temporary signs suspended from or attached to a canopy or marquee shall be limited to a period of 10 days.

2.4.7.14.2.3 Maximum size

Temporary signs shall not exceed 108 sq.ft (10 sq.m) in area.

2.4.7.14.2.4 Projection

Temporary signs of cloth and similar combustible construction shall not extend more than 300 mm over or into a street or other public space except that such signs when constructed without a frame may be supported flat against the face of a canopy or marquee or maybe suspended from the lower fascia thereof but shall not extend closer to the ftpath than 8.2 ft (2.5 m).

2.4.7.14.2.5 Bill boards

Bill boards set up by the Authority shall be used for temporary signs, symbols, bills for entertainment, etc, so that other walls of the city are not defaced.

Bills for entertainment and other functions shall not be affixed on to building walls other than the bill boards. The organization responsible for such bills and posters shall be held responsible for any such defacement and non-removal of signs.

2.4.8 Telecommunication and Broadcast Towers

2.4.8.1 Location and access

Towers shall be located such that guy wires and other accessories shall not cross or encroach upon any street or other public space, or over above-ground electric utility lines, or encroach upon any privately owned property without the written consent of the owner of the encroached-upon property, space or above-ground electric utility lines.

2.4.9 Swimming Pool Enclosures

2.4.9.1 General

Swimming pools shall comply with the requirements of this section and other applicable sections of this code.

2.4.9.2 Definition

The following word and term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

SWIMMING POOLS. Any structure intended for swimming, recreational bathing or wading that contains water over 24 inches (610 mm) deep. This includes in-ground, above-ground and on-ground pools; hot tubs; spas and fixed-in-place wading pools.

2.4.9.3 Public swimming pools

Public swimming pools shall be completely enclosed by a fence at least 4 ft (1290 mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

2.4.9.4 Residential swimming pools

Residential swimming pools shall comply with the followings.

2.4.9.4.1 Barrier height and clearances

The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, the barrier is authorized to be at ground level or mounted on top of the pool structure, and the maximum vertical clearance between the top ofthe pool structure and the bottom of the barrier shall be 4 inches (102 mm).

2.4.9.4.1.1 Openings

Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

2.4.9.4.1.2 Solid barrier surfaces

Solid barriers which do not have openings shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.

2.4.9.4.1.3 Closely spaced horizontal members

Where the barrier is composed ofhorizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed $1^3/_4$ inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cut outs shall not exceed $1^3/_4$ inches (44 mm) in width.

2.4.9.4.1.4 Widely spaced horizontal members

Where the barrier is composed ofhorizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed $1^3/_4$ inches (44 mm) in width.

2.4.9.4.1.5 Chain link dimensions

Maximum mesh size for chain link fences shall be a $2^1/_4$ inch square (57 mm square) unless the fence is provided with slats fastened at the top or the bottom which reduce the openings to no more than $1^3/_4$ inches (44 mm).

2.4.9.4.1.6 Diagonal members

Where the barrier is composed of diagonal members, the maximum opening formed by the diagonal members shall be no more than $1^3/_4$ inches (44 mm).

2.4.9.4.1.7 Gates

Access doors or gates shall comply with the requirements of Sections 2.4.9.4.1.1 through 2.4.9.4.1.6 and shall be equipped to accommodate a locking device. Pedestrian access doors or gates shall open outward away from the pool and shall be self-closing and have a self-latching device.

2.4.9.4.1.8 Dwelling wall as a barrier

Where a wall of a dwelling serves as part of the barrier, the following shall apply:

Doors with direct access to the pool through that wall shall be equipped with an alarm that produces an audible warning when the door and/or its screen, if present, are opened. In dwellings not required to be Accessible units, the deactivation switch shall be located 54 inches (1372 mm) or more above the threshold of the door. In dwellings required to be Accessible units, the deactivation switch(es) shall be located at 54 inches (1372 mm) maximum and 48 inches (1219 mm) minimum above the threshold of the door.

2.4.9.4.1.9 Pool structure as barrier

Where an above- ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps, then the ladder or steps either shall be capable of being secured, locked or removed to prevent access, or the ladder or steps shall be surrounded by a barrier which meets

the requirements of Sections 3109.4.1.1 through 3109.4.1.8. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

2.4.9.4.2 Indoor swimming pools

Walls surrounding indoor swimming pools shall not be required to comply with Section 2.4.9.4.1.8.

2.4.9.4.3 Prohibited locations

Barriers shall be located so as to prohibit permanent structures, equipment or similar objects from being used to climb the barriers.

2.4.10 Automatic Vehicular Gates

2.4.10.1 General

Automatic vehicular gates shall comply with the requirements of this section and other applicable sections of this code.

2.4.10.2 Definition

The following word and term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

VEHICULAR GATE. A gate that is intended for use at a vehicular entrance or exit to a facility, building or portion thereof, and that is not intended for use by pedestrian traffic.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.5 INTERIOR ENVIRONMENT

TABLE OF CONTENTS

2.5 INTERIOR ENVIRONMENT

2.5.1 Scope

The provisions of this chapter shall govern ventilation, lighting, and courtyards, room dimensions and materials associated with the interior spaces of buildings. Exceptions to the provisions of this chapter are permitted for listed and historic buildings (see *Chapter 10*).

2.5.2 General

The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

2.5.2.1 Definitions

ATTIC: It means a room at the top of the house under the roof.

COURTYARD: It is an enclosed area surrounded by a building or parts of a building which is open to the sky.

GRADE: The grade (also called slope, incline, gradient, pitch or rise) of a physical feature, topographic landform or constructed element, refers to the amount of inclination of that surface to the horizontal.

HEADROOM**:** It means the clear vertical distance between the finished floor level or the lowest part of the room and the underside of the ceiling or the lower surface of the cover of that room.

RAMP: It means the sloping part of surface which joins two different levels.

SUNROOM ADDITION: A one-storey addition added to an existing building with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.

HABITABLE SPACE: It means any inner space meant for human occupation of more than 8 hours per day.

OCCUPIED SPACE: It means any space used by human beings as storage or similar functions but not for living and sleeping.

2.5.3 Ventilation

2.5.3.1 General

All habitable inner spaces shall be provided with natural ventilation, or mechanical ventilation.

2.5.3.2 Attic spaces

Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch (25 mm) of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

2.5.3.2.1 Openings into attic

Exterior openings into the attic space of any building intended for human occupancy shall be covered sufficiently to prevent the entry of undesirable animals and insects.

2.5.3.3 Under-floor ventilation

The space between the bottom of the floor joists and the earth under any building except spaces occupied by a basement or cellar shall be provided with ventilation openings through foundation walls or exterior walls. Such openings shall be placed so as to provide cross ventilation of the under-floor space.

2.5.3.4 Ceiling ventilation

The space between the ceiling and the roof shall be provided with openings for ventilation which shall be protected from intrusion of birds, insects and other animals.

2.5.3.5 Natural ventilation

Natural ventilation of an occupied space shall be through windows, doors, louvers or other openings to the outdoors. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.

2.5.3.5.1 Ventilation area required

All habitable spaces which are meant for human occupation of more than 8 hours daily shall be provided with openings of minimum 10 percent to the floor area for natural ventilation.

Exception : Exterior openings required for ventilation in stairwell, corridors, etc. shall be in accordance with fire safety requirements, Part 5 Building Services (Fire).

2.5.3.5.1.1 Openings below grade

Where openings below grade shall be required outside horizontal clear space measured perpendicular to the opening shall be one and one-half times the depth of the opening. The depth of the opening shall be measured from the average adjoining ground level to the bottom of the opening.

2.5.3.5.1.2 Openings for basement

The openings for basement shall have an area of not less than 10 percent of the floor area of the interior room or space. If enough natural ventilation cannot be provided, mechanical ventilation is required according to Part 5 Building Services.

2.5.3.5.1.3 Bathrooms

Rooms containing bathtubs, showers, spas and similar bathing fixtures shall have an area of not less than 4 percent of the floor area of the interior room or space if cannot be provided mechanically ventilated.

2.5.3.6 Mechanical space

The ventilation for mechanical space such as lift machine room, electrical room, generator room, etc. shall be provided in accordance with Part 5 Building Services.

2.5.3.7 Openings on courtyards

Where natural ventilation is to be provided by openings onto courtyards, such courtyards shall comply with Section 2.5.5.

2.5.3.8 Artificial or mechanical ventilation

This system may be regarded as generally desirable in all rooms occupied by more than 50 persons, where the space per occupant is less than 3 cu-m (105.86 cu-ft).

2.5.4 Lighting

2.5.4.1 General

Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings or artificial light. Exterior glazed openings shall open directly onto a public way or onto a yard or court.

2.5.4.2 Natural light

The minimum net glazed area shall not be less than 8 percent of the floor area of the room.

2.5.4.2.1 Exterior openings

Exterior openings required for natural light shall open directly onto a public way, or courtyard. Exceptions:

a) Required exterior openings are permitted to open into a roofed porch where the porch:

1) Has a ceiling height of not less than 7 feet (2134 mm).

2) Has a longer side at least 65 percent open and unobstructed.

2.5.4.3 Artificial light

The artificial light shall be illuminated in accordance with Part 5 Building Services (Lighting).

2.5.5 Courtyards

2.5.5.1 General

This section shall apply to courtyards adjacent to exterior openings that provide natural light or ventilation. Such courtyards shall be on the same property as the building.

2.5.5.2 Courtyards

Courtyards shall not be less than 10 feet in width for one- and two-storey buildings. For buildings more than two stories in height, the minimum width of the courtyard shall be increased at the rate of 0.1 of the height increase of each additional storey.

2.5.5.3.1 Courtyard access

Access shall be provided to the bottom of courtyards for cleaning purposes.

2.5.5.3.2 Air intake

Courtyards more than two stories in height shall be provided with a horizontal air intake at the bottom not less than 10 square feet (0.93 m^2) in area and leading to the exterior of the building unless abutting a public way.

2.5.5.3.3 Courtyard drainage

The bottom of every courtyard shall be properly graded and drained to a public sewer or other approved disposal system.

2.5.6 Internal Spaces

2.5.6.1 Unit sizes and room dimensions

The floor are not including public stair of smallest residential unit for one family in the urban areas is 500 square feet or at least 100 square feet per person, allowable to take the lesser figure. The minimum room size meant for human habitation of more than 6 hours daily is 60 clear square feet. The width of such habitable room in a residential building shall be not less than 6 feet.

2.5.6.2 Room height

2.5.6.2.1 Residential buildings

2.5.6.2.1.1 The minimum clear height of room in residential buildings excluding shop houses shall be:

a) For living rooms, bedrooms and kitchens, not less than 8 feet;
b) For bathrooms, water-closets, latrines, porches, balconies, verandas, garages and like, not less than 6.5 feet;

2.5.6.2.1.2 The minimum average height of rooms with sloping ceilings in residential buildings excluding shop houses shall be:

a) For living rooms, bedrooms and kitchens, not less than 8 feet;
b) For attic rooms used as bedrooms, the minimum height immediately at roof edges is 4 feet, however the average room height must be 8 feet when used as bedroom;
c) The minimum headroom of other habitable rooms or space inside any building be 7.5 feet;
d) The minimum headroom for bathrooms, water-closets, latrines, porches, balconies, verandas, garages and the like, not less than 6.5 feet;

(Provided that not part of any room shall be less than 6.5 feet, for attics not less than 4 feet in height and average height means more than 80% of the ceiling area of the room under consideration.)

2.5.6.2.2 Others

a) In shop houses and retail shops, the height of areas used as shops shall be not less than 9.5 feet and the height or areas used as residential purposes shall follow the room heights of residential units.
b) In schools, the height of rooms used for teaching shall not be less than 9.5 feet headroom.
c) In hospitals, the height of rooms used for the accommodation of patients shall not be less than 9.5 feet head room.
d) In hospitals, the height of the rooms used for operation, treatment etc. shall conform to concerned codes of respective literature.
e) The height of any room in a factory in which any person works shall not be less than 9.5 feet headroom.
f) The height of any basement not being used as human habitation shall be 7 feet minimum.
g) Where the part of the ground floor is left open for use as car park or covered garden or for similar purpose, the height of such ground floor shall be not less than 8 feet.

h) The headroom of areas meant only for car parking shall be not less than 8 feet.
i) The headroom at stair cases shall not be less than 7 feet and the height of any covered footway shall be not less than 8 feet.
j) The height of rooms in public areas shall not be less than 11 feet (excluded are the areas such as water-closets, lavatories, cloakrooms, corridors and rooms).
k) Where a balcony is provided in public resort or public places, the heights between the finished floor level and the ceiling over such balcony, shall be not less than 9.5 feet.
l) The height of non-habitable rooms on public places, such as water-closets, lavatories, corridors, etc, shall not be less than 8 feet.

Exception: When the clear room height is considered, the required height for all electrical and mechanical services such as duct lines, fire extinguishing systems, etc. should be noticed.

2.5.6.3 Inner connecting space widths

a) Clear minimum width of inner connecting spaces (corridors, passages, etc.) in the residential units, or units with not more than 10 persons occupancy, shall be minimum 3 feet 6 inches, and if these are longer than 15 feet, or if these are used by more than 75 occupants, and number of doors, door widths and width of openings shall comply with fire safety requirements.
b) Clear minimum width of inner connecting spaces (corridors, passages, etc.) in the building with public access, must be 6 feet.

2.5.6.4 Doors and openings

All doors entering any habitable room shall have minimum clear height of 6.5 feet and width of 2.75 feet.

a) All doors entering toilets and kitchens in residential units shall have minimum height of 6.5 feet and width of 2.75 feet.
b) All exit doors shall open outwards and number of doors, door widths and width of openings shall comply with section 2.6 Means of Egress.
c) Where the space beneath a roof is enclosed by a ceiling, access to such space shall be provided for inspection, cleaning and repairs by means of an opening with minimum 2.5 feet width in any direction.

2.5.7 Stairs, Steps, Ramps and Lifts

2.5.7.1 Stairs

Stair in this chapter means only for internal stair whereas, the exit stair is described in *chapter 6-Means of Egress* of this part and emergency stair is in *Part 5- Building Service (Fire)* of this code.

a) All staircases shall be properly lighted and ventilated.

b) All stairs in residential units have a landing after 12 risers maximum, in all other buildings there shall be not more than 16 risers between each such landing.

c) All stairs shall have non-slip surface.

d) In cases where stairs or steps begin after the doors and other openings, the distance between such openings and the beginning of stairs/ steps shall normally be the same as the width of the respective stairs, but minimum of 3 feet shall be required.

e) Timber staircases may be permitted for the following building types, provided these are not more than three storeys in height:

1) Detached residential buildings; duplex houses and terrace houses;

2) In the upper floors of shop houses other than from the ground floor to the first floor provided that it is located within the protected area for its full height; and

3) Other similar types of buildings of low fire risk.

2.5.7.1.1 Stair widths

1) Clear minimum width of inner stairs in detached houses, duplex and terrace houses, meant for use of single families, or units with less than occupancy of 10 people other than shop houses shall be 3 feet, and 3.5 feet from wall to wall.

2) Clear minimum width of stairs in shop houses shall be 4 feet.

3) Clear minimum width of stairs in multi-storeyed residential buildings meant for usage of less than 10 families and not more than 4 storeys shall be 4.5 feet, and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

4) Clear minimum width of stairs in multi-storeyed residential buildings meant for usage of more than 10 families and more than 4 storeys, shall be 5 feet and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

5) Clear minimum width of stairs in public buildings with limited access excluding the shopping centres must be 5 feet and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

6) Clear minimum width of stairs of buildings with public access such as offices, post offices, railway stations, etc. excluding the shopping centres must be 6 feet and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

7) Clear minimum width of stairs in shopping centres with less than 3000 square feet and more than one storey shall be 6 feet and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

8) Clear minimum width of stairs in shopping centres with more than 3000 square feet shopping area shall be 8 feet and these must conform to tables 2.5.1 and 2.5.2, as well as these must have approval from the fire department at the design stage.

9) Clear minimum width of stairs in schools, with more than 100 children, shall be 6 feet and these must conform to tables 2.5.1 and 2.5.2.

10) Clear minimum width of hospitals, and the buildings of health care, shall be 6 feet and these must conform to tables 2.5.1 and 2.5.2.

11) The widths of landings are normally the same as respective stairs, and as minimum, these shall follow the width and heights given in this paragraph.

2.5.7.1.2 Stair ratios

a) The dimensions of the riser and the tread of stairs in a building throughout all storeys or in a staircase shall be uniform and consistent.

b) Stair ratios for inner stairs in (R3) detached houses, duplex and terrace houses, which are not more than 3 storeys for single families, or units with less than 10 persons occupancy, must be calculated with the two given formulas:- 2R + T= between 23 and 26 inches, and R+T=between 16 and 18 inches, and R should not be more than 8 inches and T should not be less than 10 inches. (Where R is the riser in inches; T is the tread in inches)

c) Stair ratios for inner stairs in public buildings, including offices with more than occupancy of 10 persons, must be calculated with the given formulas:- 2R + T= between 23 and 26 inches, and R+T=between 16 and 18 inches, where R shall not be more than 7 inches, T shall not be less than 10 inches. (Where R is the riser in inches; T is the tread in inches)

2.5.7.1.3 Spiral staircases

Spiral staircases may be permitted as a secondary staircase not as an exit stair in multi storeyed buildings where the topmost floor does not exceed 50 feet in height.

2.5.7.2 Steps

Dimension of steps shall conform to the formulas given below:-

a) Steps in stadiums, cinema halls, theatres and similar buildings where many people use together at the same time, must be calculated with the two given formulas:- 2R + T= more than 36 inches, and R+T= more than 30 inches, R should not be more than 7 inches, T should be more than 24 inches, (where R is the riser in inches; T is the tread in inches)

b) Steps in pagodas, parks and in similar places must be calculated with the two given formulas:- 2R + T= more than 30 inches, and R+T= more than 24; R should not be more than 7 inches, (where R is the riser in inches; T is the tread in inches)

2.5.7.3 Railings

The design of railings shall conform to following points

a) All stairs having more than 6 risers must have railings on both sides, where the wall at one side can substitute the railing for stairs with clear width up to 5 feet, over the stair width of 5 feet, railings shall be constructed on both sides.

b) All handrails shall project not more than 4 inches into the stair width and shall be located not less than 3 inches of the end /beginning of the stairs.

c) Net railing height at stairs (measured from finished surface of stair to the top of railing) shall not exceed 3 feet and the spacing of balustrades or similar openings below the hand railing level shall be less than 6 inches.

d) Net railing height of balconies, terraces, flat roofs and similar structures at buildings with less than 2 stories and not more than 25 feet above the ground level shall not be lower than 3 feet (measured from floor finishing to the top of railing) and the spacing of balustrades or similar openings below the hand railing level shall be less than 6 inches.

e) Net railing height, (measured from floor finishing to the top of railing) of balconies, large windows reaching to the floor level, terraces, flat roofs and similar structures at buildings with more than 3 stories or more than 35 feet above the ground level shall not be lower than 3.5 feet, and the spacing of balustrades or similar openings below the hand railing level should be less than 6 inches.

f) Net railing height of stairs, balconies, terraces and similar structures at schools shall not be lower than 4 feet (measured from floor finishing to the top of railing) and there shall be not horizontal divisions in the railing to avoid children stepping on the railings.

g) Staircases exceeding 8 feet in width shall be provided with intermediate handrail and the distances of handrails shall be maximum 8 feet away from each other.

h) All steps with more than 6 risers shall have an intermediate landing of minimum 3 feet in length.

2.5.7.4 Protection at elevated areas

Every flat roof, balcony or other elevated areas located at 4 feet or more above the adjacent area where normal access is provided shall be protected along the edges with suitable railings, parapets or similar elements with not less than the height given in the paragraph 38 mentioned above.

2.5.7.5 Ramps

The design of ramps shall conform to following points:-

a) All ramps meant for wheel chair of handicapped persons must have the slopes less than 10 %, (Rise: run ratio 1:10).

b) All ramps meant for light motor vehicles less than 2 tons net weight must have the slopes, less than 16 %, (Rise: run ratio 1: 6.25).

c) All ramps meant for medium heavy vehicles less than 5 tons net weight must have the slopes less than 14 %, (Rise to run ration 1:7.2).

d) The clear headroom of ramps at the entering points into the buildings, meant for light vehicles less than 2 tons shall not be lower than 7 feet, and meant for entrance of heavy vehicles with less than 5 tons shall not be less than 9 feet.

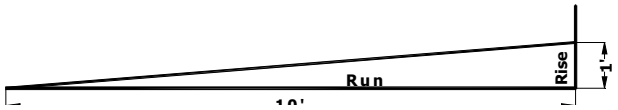

Figure 2.5.2 Schematic figure showing gradient of ramps (rise: run ratio)

2.5.8 Mechanical Vertical Transport in Buildings

2.5.8.1 Lifts and escalators

a) Adequate number of lifts shall be provided in all residential buildings with more than 50 feet from the ground floor level up to the topmost habitable floor.

b) All office buildings with more than 4 stories or higher than 40 feet from the ground floor level, shall be equipped with adequate number of lifts.

c) All buildings with public dealing functions like banks, shopping centres, hospitals, etc., which have more than 3 storeys and higher than 30 feet from ground level to the topmost floor, shall be equipped with adequate number of lifts or similar facilities.

d) In the shopping centres with more than 3 storeys and more than 5000 square feet shopping area, shall be equipped with adequate number of additional mechanical means of vertical transport, such as lifts, escalators, etc.

e) In places where mechanical means of vertical transportation, such as escalators or lifts are provided, ordinary stairs designed in line with these codes are necessary.

f) The capacity of vertical transportation, size and number of lifts shall follow the norms and standards based on calculations done by qualified engineers of the respective field.

2.5.9 Access to Unoccupied Spaces

2.5.9.1 Crawl spaces

Crawl spaces shall be provided with aminimum of one access opening not less than 18 inches by 24inches (457 mm by 610 mm).

2.5.9.2 Attic spaces

An opening not less than 20 inches by 30inches (559 mmby 762 mm) shall be provided to any attic areahaving a clear height of over 30 inches (762 mm). A 30-inch(762 mm) minimum clear headroom in the attic space shall beprovided at or above the access opening.

2.5.10 Surrounding Materials

2.5.10.1 Floors

In other than dwelling units, toilet and bathingroom floors shall have a smooth, hard, nonabsorbent surfacethat extends upward onto thewalls at least 6 inches (152 mm).

2.5.10.2 Walls

Walls within 2 feet (610 mm) of urinals andwater closets shall have a smooth, hard, nonabsorbent surface,to a height of 4 feet (1219 mm) above the floor, and except forstructural elements, the materials used in such walls shall be ofa type that is not adversely affected by moisture.

Exceptions: Dwelling units, sleeping units and toilet rooms those are not accessible to the public andwhich have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensersand soap dishes, provided on or within walls, shall be installedand sealed to protect structural elements from moisture.

2.5.10.3 Showers

Shower compartments and walls above bathtubswith installed shower heads shall be finished with asmooth, nonabsorbent surface to a height not less than 70inches (1778 mm) above the drain inlet.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.6 MEANS OF EGRESS

TABLE OF CONTENTS

2.6 MEANS OF EGRESS

2.6.1 Means of Egress System

Building or portions of any occupied portions shall be provided with the means of egress systems: the exit access, the exit and the exit discharge in accordance with this chapter. Exemptions from this code are permitted in the case of listed buildings that have been adaptive for alternative use under an agreed Conservation Management Plan. In this case, provision must be made for safe egress with the agreement of the planning authority.

2.6.2 General Requirements for Means of Egress

2.6.2.1 Ceiling Heights

Minimum ceiling heights of the exit routes shall not less than 7 feet 6 inches (2286 mm).

2.6.2.2 Protruding objects

Any protruding objects which extend below ceiling shall not be more than 25% of ceiling area of a means of egress and must provide 80 inches minimum headroom.

Exception: Door closer and stops shall not reduce less than 78 inches.

Any horizontal projections from either side shall not be more than 4inches over any walking surface between the heights of 27 inches and 80 inches.

Any horizontal projections shall not reduce the minimum clear width of accessible routes.

2.6.2.3 Floor surface

Surface of floors of means of egress shall be a slip resistant surface.

2.6.2.4 Level changes

Where elevation changes is less than 12 inches, slopes not greater than 5% slope shall be used. Minimum 2 risers of steps shall be used at locations not required to be accessible by chapter 7 concerning the accessibility of building.

2.6.2.5 Egress continuity

The path along means of egress shall not be interrupted by any building elements, such as walls, furniture, vehicles etc.

2.6.2.6 Elevators, escalators and moving walks

Elevators, escalators and moving walks shall not be used in required means of egress system.

2.6.3 Occupant Load

The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 2.6.1.

Table 2.6.1 Maximum Floor Area Allowances Per Occupant

Function of Space	Floor area in sq-ft per person
Accessory storage areas, mechanical ,equipment room,	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross

Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly, Gaming floors (keno, slots, etc.)	11 gross
Assembly with fixed seats	no.of seats + wheel chair space
Assembly without fixed seats	
Concentrated (chairs only-not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms-other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
H-5 Fabrication and manufacturing areas	200 gross
Function of Space	**Floor area in sq-ft per person**
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross

Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library Reading rooms Stack area Locker rooms	 50 net 100 gross 50 gross
Mercantile Areas on other floors Basement and grade floor areas Storage, stock, shipping areas	 60 gross 30 gross 300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools Rink and pool Decks	 50 gross 15 gross
Stages and platforms	15 net
Warehouses	500 gross

gross = Gross floor area of a building, means the total floor area calculated based on center of exterior walls, including the circulation area such as stairs , corridors, etc. but excluding the technical area without floors shafts, ducts, lift wells etc

net = Net floor area of a room or of a units means total floor calculated based on center of the walls of respective room or of unit.

2.6.3.1 Mixed occupancy

Where building is designed for different types of occupancies or different purposes at the same time, the exit requirements shall meet the more stringent requirements of each building section and function of the respective portions.

2.6.3.2 Multiple occupancy or use

Where a building is designed for multiple purposes involving different activities at different times, the greatest number of occupants shall form the basis for determining the egress requirements.

2.6.3.3 Egress convergence

Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.

2.6.3.4 Fixed seating

For areas having fixed seats and aisles, the occupant load shall be determined by the number of fixed seats installed. The occupant load for areas in which fixed seating is not installed, such as waiting spaces and wheelchair spaces, shall be determined in accordance with the following table and added to the number of fixed seats.

2.6.4 Exit Access

An exit access shall not pass through a room which can be locked and to prevent egress.

Means of egress from dwelling units shall not lead though other sleeping areas or toilet area.

2.6.5 Exit and Exit Access Doorways from Space

Two exits or exit access doorways shall be provided if the occupant load of the space exceeds as per table.

Table 2.6.2 Spaces with One Exit or Exit Access Doorway

A, B, Ea, F, M, U	49
H-l, H-2, H-3	3
H-4, H-5, I-1,I-3, I-4, R	10
S	29

a. Day care maximum occupant load is 10.

Number of exits shall be complying with the following table.

Table 2.6.3 Minimum no. of Exits Per Occupant Load

Occupant Load (persons per storey)	Minimum no of Exits(per storey)
1-500	2
501-1000	3
More than 1000	4

Whenever there are two exit doors or two exit access doorways are required, the distance between the two exits are at least equal to or more than half the furthest distance from one point to another of that particular room and each exit shall be of equal capacity.

2.6.6 No. of Exit Staircase or Exits per Storey

Minimum two independent exit staircases of other exit shall be provided from every storey of a building unless otherwise permitted under other provision of this chapter.

2.6.6.2 All buildings apart from R1a, R2, R3 and R5

Only one exit shall be required if it complies with the following table.

Table 2.6.4 No. of Exit Staircase or Exits Per Storey

Storey	Occupancy	Maximum occupants per floor and travel distance
First story or basement	A, Bb, Ea, Fb, M, U, Sb	49 occupants and 75 feet travel distance
	H-2, H-3	3 occupants and 25 feet travel distance
	H-4, H-5, I, R	10 occupants and 75 feet travel distance
	S	29 occupants and 100 feet travel distance
Second story	B, F, M,	29 occupants and 75 feet travel distance

a) Day care occupancies shall have a maximum occupant load of 10.

b) Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system and shall have maximum travel distance of 100ft.

2.6.6.1 R1a, R2, R3 and R5

Means of escape for a building shall comply with the provision of cl.2.6.9 Exit stairs and 2.6.10 Exit discharge. In a block of residential apartments or maisonettes, at least two independent exit staircases or other exits from every storey unless otherwise permitted.

2.6.6.1.1 In a block of residential apartments or maisonettes not exceeding 24m in habitable height, one exit staircase only may be allowed to serve every upper storey, subject to:

a) The exit staircase shall comply with the requirements of cl.2.6.9 Exit stairs & 2.6.10 Exit discharge.

b) If the building consists of more than four storeys, approach to the exit staircase on all storeys shall be through smoke stop lobby or external corridor.

c) Access to the building for fire fighting appliances being provided for in compliance with the requirements in Part 5, Fire.

2.6.6.1.2 In a block of residential apartments or maisonettes exceeding 24 m in height, one exit staircase only may be allowed to serve every upper storey, subject to -

a) The height not exceeding 60 m unless otherwise permitted by the Relevant Authority, and

b) The single exit staircase shall serve not more than four apartments or maisonettes at each storey level, and

d) Travel distance from the most remote exit door to the exit staircase from each apartment or maisonette shall not exceed 15 m, and

e) Exit staircase shall comply with the requirements of cl.2.6.9 Exit stairs & 2.6.10 Exit discharge.

f) Approach to the exit staircase shall be through cross-ventilated lobby. The ventilation openings having a minimum width of 2000mm and a minimum height of 1200mm shall be unobstructed from parapet wall or balustrade level upwards and be positioned on opposite sides of the lobby such that they provide cross-ventilation throughout the entire space of the lobby. Where multiple ventilation openings are provided on opposite sides of the lobby, the minimum width and height of each opening shall not be less than 1000 mm and 1200mm respectively, provided the aggregate width of the openings at each opposite side is not less than 2000mm.

g) Fire lift shall be provided to comply with the requirements of fire department, and

h) Wet rising main shall be provided to comply with the requirements of fire department, and

i) Access to the building for fire fighting appliances shall be provided to comply with the requirements of fire department.

2.6.7 Exit Access Travel Distance

Exit access travel distances are determined by type of occupancy and shall comply with the table given below in these codes.

Table 2.6.5 Exit Access Travel Distance

Type of Occupancy	Max Travel Distance (ft) (One-way travel)		Max Travel Distance (ft) (Two-way travel)		Max Dead End (ft)	
	Unsprin-klered	Sprin-klered	Unsprin-klered	Sprin-klered	Corridor	
					Unsprin-klered	Sprin-klered
High hazard	35	65	65	115	50	65
Industrial buildings (factories, workshops, godown/ warehouse)	50	80	100	200	50	65
Dormitories, hotels	50	100	145	245	50	65
Shops	50	80	145	200	50	65
Offices	50	100	145	245	50	65
Places of public resort &	50	80	145	200	50	65

car parks						
School & educational buildings	50	100	145	245	50	65
Hospitals	50	80	100	145	50	65
Hotels, boarding houses(a)	50	65	100	145	50	65
Blocks of flats/ maisonettes	50b	100b	100	245	50	65
	65c	130c	145c			
Detached, semi-detached & terrace House, including townhouses	NR	NR	NR	NR	NR	NR

a) Measurement travel distance is from the guestroom door to exit.

b) Measurement travel distance is the most remote bedroom door to exit.

c) Maximum measurement travel distance, most remote bedroom door to exit shall not exceed 50 ft and when it is measured along the external corridor, the total travel distance shall not exceed 65ft.

2.6.8 Egress Width

The total width of means of egress shall not be less than the total occupant load serves by means of egress multiply by defined width per occupant load as per table and the minimum width must conform to the following table.

Table 2.6.6 Egress Width

Type of Occupancy	**Door openings per person (inch)**				**Min width (ft)**	
	To outdoors at ground level (inches)	**Other exit & corridor doors**	**Stair-cases**	**Ramps Corridors Exits Passageways**	**Stairs**	**Corridor**
High hazard	0.4	0.5	0.65	0.4	3.5	3.5
Industrial buildings (factories, workshops, godown/ warehouse)	0.2	0.25	0.35	0.2	3.5	3.5
Dormitories, hotels	0.4	0.5	0.65	0.4	3.5	3.5

Shops	0.2	0.25	0.35	0.2	3.5	3.5
Offices	0.2	0.25	0.35	0.2	3.5	3.5
Places of public resort & car parks	0.2	0.25	0.35	0.2	3.5	3.5
School & educational buildings	0.2	0.25	0.35	0.2	3.5	5(a)
Hospitals	0.65	0.65	1.25	0.65	3.5	6.5(b)
Hotels, boarding houses	0.4	0.5	0.65	0.4	3.5	3.5
Blocks of flats/ maisonettes	0.4	0.5	0.65	0.4	3.5(c)	3.5
Detached, semi-detached & terrace House, including townhouses	NR	NR	NR	NR	3	3

a) Applies to corridors serving classrooms. Other corridors shall have a minimum width of 3ft 6 inches.

b) Applies to corridors serving patients. Other corridors shall have a minimum 3ft 6 inches.

c) Staircase within maisonette serving as an internal access to be at least 3ft width.

The maximum width of exit staircase shall be not more than 6 feet 6 inches. Where staircase exceed 6 feet 6 inches in width, handrails shall be used to divide the staircase into sections of not less than 3 feet 6 inches of width or more than 6 feet 6 inches of width.

2.6.9 Exit Stairs

All exit stairs shall be constructed minimum 1 hour rated construction.

All exit stairs (except for R1a, R2, R3 and R5 which are not more than 3 storeys) riser heights shall be 7 inches maximum and 4 inches minimum.

All stairs in shall be not more than 16 risers between each such landing.

Stair threads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser heights or between the largest and smallest tread depth shall not exceed 3/8 inch in any flight of stairs.

The width of landings shall not be less than the width of stairways they serve.

Winder stairs are not permitted in means of egress stairways except within a dwelling unit. Where circular/geometric staircases are used as exit staircases, the width of threads measured at the narrower end shall be not less than 4in in residential buildings and at a distance of 2ft from the narrower end shall be not less than 9in in residential buildings.

Spiral stair cases as exist stair can be used at residential detached and semi detached buildings not more than 3 storey.

2.6.9.1 Internal exit stair

An internal exit stair which serves as an exit shall be enclosed.

All services such as pipe/duct installation shall not be located inside protected staircase and no wash room is allowed to be located inside staircase.

There shall be no unprotected openings of occupancy area within 4ft horizontally and 10 ft vertically below any part of the ventilation opening in the external wall of internal exit staircase. Exceptional cases are public and commercial buildings like hotels and offices etc. which are properly provided and maintained with mechanical ventilation and lighting facilities as per Building services chapter.

The width of stair case shall be complying with egress width table.

If the stair serves more than 6 storey, smoke stop lobby shall be added.

2.6.9.2 External exit stair

a) An exit stair which serves as an exit must be located outside of the building or at least one side of staircase must be external wall and the external exit staircase shall be located so as to lead directly to a street or open space with direct access to street.

b) The stair must be naturally ventilated with a minimum unobstructed opening area, larger or equal to 20% of area of stair case.

c) There shall be no unprotected openings within 3 m horizontally or within 3 m vertically below, or adjacent or facing.

Exception: For residential walk apartments which are located in CBD, having back lane and can't comply with cl.2.6.9.b, the building can be accessible by fire engine and it shall has one fireman-stair at the back of flat.

2.6.10 Exits Discharge

All exits shall be discharge at ground level directly into a safe exterior space within its own property or public space.

Exception: In sprinkler protected building, maximum 50% of the total building exits are allowed to discharge directly to the ground level circulation space subject to the following:

a) The discharge point shall be at a location in the circulation space at ground level with direct access and within sight of a safe exterior open space.

b) The maximum distance of the discharge point to exterior open space is 30ft.

The sprinkler system shall conform to the Building services chapter.

2.6.11 Exit Passage Way

Exit passage way can be used as a horizontal extension of a vertical exit viz exit staircase or a passage leading from a courtyard to an open exterior space, complying with the requirements of travel distance and exit discharge.

2.6.11.1 Internal exit passage way

a) Exit passageways that serve as a means of escape shall be minimum 1 hour rated construction.

b) The enclosure walls of an exit passageway shall have not more than two exit doors opening into the exit passageway

c) Exit doors opening into an exit passageway shall have fire resistance rating as required for exit doors opening into exit staircases, fitted with automatic self-closing device.

d) The minimum width and capacity of exit passageway shall comply with Cl.2.6.8 Egress Width

e) Changes in level along an exit passageway requiring less than two risers shall be by a ramp complying with the provisions under Cl.2.6.2

f) If the exit staircase which connects to the internal exit passageway is pressurised, the internal exit passageway shall not be naturally ventilated but shall be mechanically ventilated.

2.6.11.1 External exit passageway

a) An external exit passageway can be used as a required exit in lieu of an internal exit passageway. The external wall between the exit passageway and the rest of the floor space can have ventilation openings of non-combustible construction, fixed at or above a level 1.8m (7ft), measured from the finished floor level of the passageway to the sill level of the openings and such ventilation openings shall be located not less than 3.0 m (10ft) from any opening of an exit staircase, and

b) An external exit passageway may not be subjected to the limitations of a maximum of two exit doors opening into the exit passageway, and

c) An external exit passageway may be roofed over provided the depth of the roofed over portion shall not exceed 3m to avoid smoke logging, and

d) An external exit passageway may be enclosed on the open side by only a parapet wall of not less than 1.0 m or more than 1.1m (3ft 4in) in height and the vertical height of the

unobstructed ventilation opening measured from the parapet wall up to the top edge of the opening or eaves of overhang shall not be less than 1.2m (4ft), Exception: if external passage way is used on ground between building and fence, the farthest edge of roof or slab above the exit passage shall be 3ft apart from fence and the passage shall have minimum width of 4 ft.

e) Exit doors opening into an external exit passageway shall have fire resistance for at least half an hour and fitted with automatic self-closing device.

2.6.12 Exit Doors

2.6.12.1 Exit doors opening

Exit doors opening into exit staircases and exit passageways shall not impede the egress of occupants when such doors are swung open, and all doors which open into the corridor, shall not hinder movement of occupants. The corridor's clear width shall at least remain to be half of the required clear width as stipulated under Table B when such door(s) is swung open.

Exit doors and exit access doors shall open in the direction of exit travel:

a) When leading to an access doors shall open in the direction of exit access way

b) When used in exit enclosure, including smoke stop and fire fighting lobbies in a building. It shall not apply to doors of individual residential units that open directly into an exit enclosure, or

c) When serving a high hazard area, or

d) When serving a room or space with more than 50 persons.

2.6.12.2 Locking of staircase and smoke stop/ fire lift lobby doors

One way locking device is allowed to be protected to doors of exit staircase, smoke stop/ fire lift lobby in the following situations, provided only one-way locking device is used, e g .panic bolt or thumb turn locking device:

a) Exit door between staircase shaft and occupancy area; and

b) Exit access door between smoke/ fire fighting lobby and occupancy area; and

c) Exit door between staircase shaft and smoke stop lobby; and

d) Exit door between staircase shaft and circulation area; and exit access door between smoke stop/ fire fighting lobby and circulation area.

2.6.13 Means of Egress Lighting

Emergency lighting system must be provided along Exit Access and Exits, Exits discharge.

2.6.14 Accessible Means of Egress

Accessible egress must be provided if there is "accessible place". Refer to Chapter 7.

2.6.15 Smoke Stop Lobby

A separate lobby adjoining the exit access way and exit stair with a minimum rated 1 hour construction.

Its area shall be minimum 30sq-ft and if it serves as a fire fighting lobby, floor area shall not be smaller than 60sq-ft and width no dimension less than 6ft 6 inches.

There shall be permanent fixed ventilation openings in the external wall of lobby, not less than 15 percent of the floor area or mechanical ventilation comply with Building services chapter.

There shall be no unprotected openings of occupancy area within 4ft horizontally and 10 ft vertically below any part of the ventilation opening.

2.6.16 Exit Sign

All signage showing the emergency exit route must be visible from distance of 100 ft and they shall not be covered by other elements.

2.6.17 Emergency Escape/ Refuge Area

In the third phase, the details of this section will be described depending on the resources' availability.

2.6.18 Special Requirements

2.6.18.1 Hospitals

a) All multi-storey hospitals with patients care of more than 24 hours must have all vertical transportation system (fire escape bed lift) only for the patients if the hospital is more than 4 storeys and

b) Every storey shall have fire escape lobby or balcony that is designed for 2 hour fire rating.

2.6.18.2 Definitions

FIREMAN STAIR: The stairs generally meant for usage of fireman in case of emergency. The fireman stairs must be able to stand minimum 1000 pounds.

FIRE ESCAPE BED LIFT: Lift is to be used for the evacuation of patients in beds including wheelchairs or physically disabled, in a fire emergency, although it can be use as a passenger lift during normal time.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.7 ACCESSIBILITY

TABLE OF CONTENTS

2.7 ACCESSIBILITY

2.7.1 Scope

The provisions of this chapter shall control the design and construction of facilities for accessibility to physically disabled persons.

2.7.2 Scoping Requirements

All public buildings shall be accessible for the meant for handicapped persons and must have minimum one accessible toilet comply with this chapter. Minimum provision for disabled persons based on building types shall be as per following table.

Table 2.7.1 Scoping Requirements

Type of Building	Minimum provision
All public transportation building	At least one space shall be accessible to use publice transport.
Banks	At least one accessible service desk shall be provided for every 10 service desk.
Hotels	At least one guest room shall be provided for every 250 guestrooms or part and thereof.
Concert halls, Stadium, Cinema and public resort	At least one wheel chair space shall be provided for every 500 seats or part thereof.
Religious Building (If occupancy load is more than 1000)	The main worship shall be made accessible in accordance with this chapter.
Hostels and Halls	At least one level, preferably access level, shall be provided with facilities in accordance with 2.7.3.
Shopping Mall (if ground floor area is more than 10,000sq-ft)	At least ground floor shall be accessible in accordance with 2.7.3.
School	At least ground floor shall be accessible in accordance with 2.7.3.
Car parks	At least one car parking stall shall be reserved for first 100 parking stall and at least stalls shall be provided if the parking lots is more than 100.

2.7.3 Minimum Requirements

2.7.3.1 Parking lot

a) Minimum size of 16ft long and 11 ft wide parking lot shall be provided in accordance with 2.7.2.

b) Accessible parking lots shall be located as close as possible to accessible entrance.

2.7.3.2 Entrances and doors

a) At least one accessible entrance shall be provided near to parking lot reserved for disable persons.

b) Clear opening of doors for the wheelchair shall be minimum3 ft.

c) Door handles shall be easily handled and lever handles are preferred to door knobs.

d) Door handles and other hard ware shall be located not more than 3ft6in from finished floor and not less than 3ft.

e) Minimum clear space of 4ft 6in x 4ft 6inshall be provided where a door opens against the direction of approach.

2.7.3.3 Corridors and walk ways

a) Minimum width of corridor and walkway shall be 4ft and waiting area

b) Turn about, minimum space of 4ft 6in x 4ft 6in shall be provided at or within 12ft of dead end and in front of accessible doors along corridor.

c) Recesses or turn about shall be spaced at a maximum of 40ft interval.

2.7.3.4 Handrail

a) All grip rails and handrail shall be not less than 1 in diameter and not more than 2 in. and it shall have minimum 1.75 in. spacing from the surface of doors and walls.

b) Handrails must be provided on both sides of the ramp and should not be installed beyond the width of any crossing not to obstruct pedestrian flow.

2.7.3.5 Buttons and switches

All buttons for the wheelchair bound such as switches, controls and lift buttons shall be located at not more than 4ft 9 in and not less than 3ft 3 in.

2.7.3.6 Ramps

a) All ramps meant for the wheelchairs must be the slopes less than 1:10 (rise: run ratio) and the minimum 4 ft. clear width of ramp shall be provided.

b) The maximum horizontal run of ramp is 30 ft. and minimum 6 ft. wide of landing shall be provided at every 30 ft. horizontal run.

c) If horizontal run is less than 1 ft. the ramp gradient can be steeper till up to 1:8.

2.7.3.7 Counter and desk

Writing or service counters for disabled person shall be not more than 2ft. 5 in. high and clear space below counter shall have minimum dimensions of 3 ft. wide x 1 ft. 9 in. deep x 2 ft.5 in. high.

2.7.3.8 Washrooms and Toilets

The dimensions of water closet compartment for wheelchair bound shall be accordance with the dimensions as shown in fig. 2.7.1.

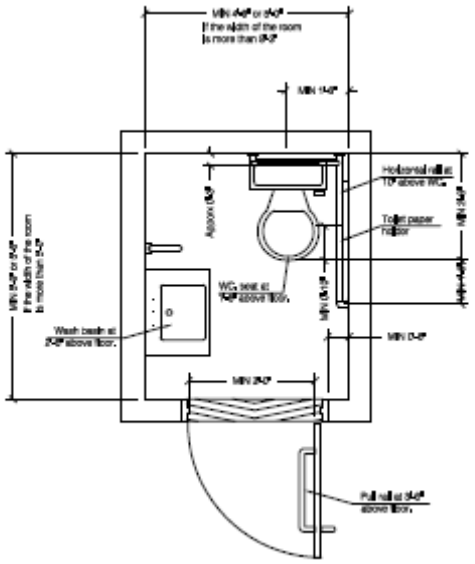

Figure 2.7.1 Spacing in Toilets for Disabled Persons

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.8 EXTERIOR WALLS

TABLE OF CONTENTS

2.8 EXTERIOR WALLS

2.8.1 Scope

The provisions of this chapter shall establish the minimum requirements for exterior walls; exterior wall coverings; exterior wall openings; exterior windows and doors; architectural trim; balconies and similar projections; and bay and oriel windows.

2.8.2 Definitions

ADHERED MASONRY VENEER. Veneer secured and supported through the adhesion of an approved bonding material applied to an approved backing.

ANCHORED MASONRY VENEER. Veneer secured with approved mechanical fasteners to an approved backing.

BACKING. The wall or surface to which the veneer is secured.

EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS). EIFS are nonstructural, nonload-bearing, exterior wall cladding systems that consist of an insulation board attached either adhesively or mechanically, or both, to the substrate; an integrally reinforced base coat and a textured protective finish coat.

EXTERIOR INSULTATION AND FINISH SYSTEMS (EIFS) WITH DRAINAGE. An ELFS that incorporates a means of drainage applied over a water- resistive barrier.

EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees(1.05 rad) or greater with the horizontal plane.

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather- resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, facias, gutters and leaders.

EXTERIOR WALL ENVELOPE.A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space, from the detrimental effects of the exterior environment.

METAL COMPOSITE MATERIAL (MCM). A factory-manufactured panel consisting of metal skins bonded to both faces of a plastic core.

METAL COMPOSITE MATERIAL (MCM) SYSTEM. An exterior wall covering fabricated using MCM in a specific assembly including joints, seams, attachments, substrate, framing and other details as appropriate to a particular design.

VENEER. A facing attached to a wall for the purpose of providing ornamentation, protection or insulation, but not counted as adding strength to the wall.

WATER- RESISTIVE BARRIER. A material behind an exterior wall covering that is intended to resist liquid water that has penetrated behind the exterior covering from further intruding into the exterior wall assembly.

2.8.3 Performance Requirements

The provisions of this section shall apply to exterior walls, wall coverings and components thereof.

2.8.3.1 Weather protection

Exterior walls shall provide the building with a weather-resistance exterior wall envelope. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer, and a means for draining water that enters the assembly to the exterior. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim.

2.8.3.2 Prevention of dampness

Damp rising from the ground up into the superstructure not only damages the masonry units, but also accelerates the decaying of timber and bamboo elements. Damp-Proof Course (dpc) shall be installed according to the manual of the manufacturers to prevent the penetration of dampness and moisture into the building. Where any part of the walls of a building is subject to water pressure, that portion of the floor or wall below ground level shall be waterproof.

2.8.3.3 Structural

Exterior walls, and the associated openings, shall be designed and constructed to resist safely the superimposed loads required by *Part 3- Structural Design*.

2.8.3.4 Fire resistance

Exterior wall shall be fire-resistance rated as required by *Part 5- Building Service (Fire)*.

2.8.3.5 Flood resistance

Exterior walls extending below the design flood elevation shall be resistant to water damage in flood hazard areas. The electrical mechanical and plumbing system components shall not be mounted on or penetrate through exterior walls that are designed to break away under flood loads.

2.8.4 Materials

Materials used for the construction of exterior walls shall comply with the provisions of this section. Materials not prescribed herein shall be permitted, provided that any such alternative has been approved. All wall cladding over 10 feet from the floor must have safety arrangement to protect falling of these material on the occupant.

2.8.4.1 Water-resistive barrier

A minimum of one layer of approved materials, shall be attached to the studs or sheathing, with flashing as described in Section 2.8.3.1, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall venner.

2.8.4.2 Bamboo

Bamboo which is used for special and temporary shelter in public usage shall be mature and free from damage. It is preferable to use treated bamboo be used. The treatment may be carried out in a traditional manner. One of the simplest ways is to soak the bamboo in running water continuously for two to three weeks.

2.8.4.3 Wood

Exterior walls of wood construction shall be designed and constructed in accordance with *Part 3- Structural Design*.. Wood shall be performed according to the wood section in Material Chapter. Locally available timber can be used. Treated timber is preferable to untreated timber. The treatment may be done in a traditional manner.

2.8.4.4 Masonry

Exterior walls of masonry construction shall be designed and constructed in accordance with Masonry Section in *Part 3- Structural Design*.. Masonry units, mortar and metal accessories used in anchored and adhered veneer shall meet the physical requirements of Masonry Section in Material Chapter. The backing of anchored and adhered veneer shall be of concrete, masonry, steel framing or wood framing.

2.8.4.5 Metal

Exterior walls of formed steel construction, structural steel or lightweight metal alloys shall be designed and constructed in accordance with *Part 3- Structural Design*. and shall be performed according to Aluminium and Other Light Metals and Their Alloys Section in Material Chapter.

2.8.4.6 Concrete

Exterior walls of concrete construction shall be designed and constructed in accordance with Concrete Section in *Part 3- Structural Design*.. Concrete shall be performed according to Concrete Section in Material Chapter.

2.8.4.7 Glass-unit masonry

Exterior walls of glass-unit masonry construction shall be designed and constructed in accordance with Glass-unit masonry Section in *Part 3- Structural Design*..

2.8.4.8 Stone Venner

Exterior walls of stone venner construction shall be designed and constructed in accordance with *Part 3- Structural Design*. Stone shall be performed according to *Part 6- Material*.

2.8.4.9 Exterior insulation and finish systems

Exterior insulation and finish systems (EIFS) with or without drainage shall govern the materials, construction and quality for use as exterior wall coverings.

2.8.5 Projections in Brickwork

All projections in brickwork shall be corbelled gradually and no projection shall extend more than 9 inches from the face of any wall.

2.8.6 Recess

Where a recess in the load-bearing building is made in an external wall or a division wall (party wall):-

a) The wall at the back of the recess shall not be less than 4.5 inches thick at an external wall and 9 inches thick at a division wall;

b) A sufficiently strong members like lintel or arch of noncombustible material shall be built over the recess area;

c) If a recess or opening is made at the edge of a division wall or of an external wall, there shall be a space of not less than 1.5 feet between the beginning of opening and the extreme end of the wall.

2.8.7 Installation of Wall Coverings

2.8.7.1 Exterior covering materials in brick walls

In all cases where 4.5 inches brick walls or non-load-bearing walls of other materials should be attached to reinforced concrete frames, or other structural members, such walls shall be properly secured to the structural members.

2.8.7.2 Cement plaster

Cement plaster applied to exterior walls shall conform to the requirements specified in Cement and Concrete Section in *Part 6- Material*.

2.8.7.3 Fastening

Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other approved corrosion-resistant fasteners or the approved manufacturer's installation instructions.

2.8.8 Exterior Doors and Windows

The openings of exterior walls shall be provided the overhead sun shade and similar projections for weather protection. Exterior doors and windows shall be installed in accordance with approved manufacturer's instructions and shall be performed according to *Part 6- Material*.. Fastener size and spacing shall be provided in such instructions and shall be calculated based on maximum loads and spacing. Any parts of the exterior doors and windows shall be water-proof. The protective bars and safety glazing are required for any fixed or operable opening extended to floor finished level. The protective bars or sill height of operable openings shall be 3 feet above adjacent floor finished level that is more than 30 inches above exterior ground level. The insulating glass shall be installed if required to give weather protection.

2.8.8.1 Curtain walls

Any parts or members of curtain walls shall be water-proof and installed in accordance with approved manufacturer's instructions. The approved flexible fire barrier material that provides an effective firestop and smoke seal for perimeter voids and accommodates dynamic movement between the curtain wall and the floor shall be provided.

2.8.9 Balconies and Similar Projections, Bay and Oriel Windows

Balconies and similar projections, bay and oriel windows shall conform to the type of construction required for the building to which they are attached. Exterior balconies attached to or supported by wall required to be of masonry, shall have brackets or beams constructed of incombustible materials. 3 feet height railings shall be provided for balconies, landings, or porches which are more than 30 inches above exterior ground level.

2.8.10 Metal Composite Materials (MCM)

The provisions of this section shall govern the materials, construction and quality of metal composite materials (MCM) for use as exterior wall coverings.

2.8.10.1 Exterior wall finish

MCM used as exterior wall finish or as elements of balconies and similar projections and bay and oriel windows to provide cladding or weather resistance.

2.8.10.2 Architectural trim and embellishments

MCM used as architectural trim or embellishment shall comply with durability and fire resistance rating.

2.8.10.3 Structural design

MCM systems shall be designed and constructed to resist wind loads as required by Structural Design Chapter for components and cladding.

2.8.10.4 Weather resistance

MCM systems shall comply with Section 2.8.3 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's installation instructions.

2.8.10.5 Durability

MCM systems shall be constructed of approved materials that maintain the performance characteristics required in Section 2.8.15. for the duration of use.

2.8.10.6 Fire-resistance rating

Where MCM systems are used on exterior walls required to have a fire-resistance rating in accordance with Section 2.8 evidence shall be submitted to the building official that the required fire-resistance rating is maintained.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.9 ROOF CONSTRUCTION, ROOF COVERING AND ROOF TOP STRUCTURES

TABLE OF CONTENTS

2.9 ROOF CONSTRUCTION, ROOF COVERING AND ROOF TOP STRUCTURES

2.9.1 General

2.9.1.1 Scope

Roofing construction, roof coverings and rooftop structures shall be as specified in this code and as otherwise required by this chapter.

2.9.1.2 Definitions

ATTIC STOREY: Any storey situated wholly or partly in a roof, so designed, arranged, or built as to be used for business, storage, or habitation.

CHHIMNEY CLASSIFICATIONS:

a) RESIDENTIAL APPLIANCE TYPE

A factory-built or masonry chimney suitable for removing products of combustion from residential type appliance producing combustion gases not in excess of 538°C measured at the appliance flue outlet.

b) LOW-HEAT APPLIANCE TYPE

A factory-built masonry or metal chimney suitable for removing-the product of combustion from fuel-burning low-heat appliances producing combustor gases not in excess of 538°C under normal operating conditions but capable of Producing, combustible gases of 760°C during intermittent forced firing for periods up to one hour. All temperatures are measured at the appliance flue outlet.

c) MEDIUM-HEAT APPLIANCE TYPE

A factory built masonry or metal chimney suitable for removing -the products of combustion from fuel-burning medium-heat appliances producing combustion gases not in excess of 1093°C measured at the appliance flue outlet.

CHIMNEY CONNECTOR: The pipe which connects a flue-burning appliance to a chimney.

CHIMNEY LINER: The lining materials of fire clay or other approved material.

CHIMNEY, MASONRY: The chimney of solid masonry units bricks, stones, listed hollow unit masonry units, or reinforced concrete.

INCOMBUSTIBLE MATERIAL: When referred to as structural material, means brick, stone, terracotta, concrete, iron, steel, sheet metal, or tiles, used either singly or in combination.

INCOMBUSTIBLE ROOFING: A covering of not less than two thicknesses of roofing' felt and a good coat of tar and gravel or tin, corrugated iron or other approved fire-resisting material with standing seam on lap joint.

INTERLAYMENT is a layer of felt or no bituminous saturated felt not less than 18 inches (457 mm) wide, shingled between each course of roofing material.

METAL ROOF COVERING is metal shingles or sheets for application on solid roof surfaces, and corrugated or otherwise shaped metal streets or sections for application on roof frame-works or on solid roof surfaces.

PENT HOUSE: An enclosed, unoccupied structure above the roof of a building, other than a tank, tower, spire, dome cupola or bulkhead.

POSITIVE ROOF DRAINAGE**:** The drainage condition in which consideration has been made for all loading deflections of the roof deck, and additional slope has been provided to ensure drainage of the roof within 48 hours of precipitation.

ROOF COVERING**:** Roof covering is a durable exterior surface material that provides weather protection for the building at the roof.

ROOFING ASSEMBLY: Roofing assembly includes the roof deck, substrate or thermal barrier, insulation, vapour retarder, underlayment, inter-laymen, base plies, roofing plies, and roof covering that is assigned a roofing classification.

ROOF VENTILATION**:** The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, attics, cathedral ceilings or other enclosed spaces over which a roof assembly is installed.

SCUPPER**:** An opening in a wall or parapet that allows water to drain from a roof.

UNDERLAYMENT is one or more layers of felt, sheathing paper, no bituminous saturated felt or other approved material over which a roofing system is applied.

2.9.2 Roof Covering

Roof covering for all buildings shall be either fire-retardant or ordinary depending upon the fire-resistive requirements: of the particular type of construction. The use of combustible roof insulation shall be permitted in all type of construction provided it is covered with approved roof covering applied directly thereto.

2.9.3 Roof Trusses

All roofs shall be so framed and tied into the framework and supporting walls so as to form an integral part of the whole building. Roof trusses shall have all joints well fitted and shall have all tension members well tightened before any load is placed in the truss. Diagonal and sway bracing shall be used to brace all roof trusses. The allowable working stresses of materials in trusses shall conform to this Code. Camber shall be provided to prevent sagging.

2.9.3.1 Attics

2.9.3.1.1 Access

An attic access opening shall be provided in the ceiling of the top floor of buildings with a combustible ceiling or roof construction. The opening shall be located in a corridor or hallway of buildings of three (3) or more stories in height and readily, accessible in buildings of any height. An opening shall not be less than 600 millimetres square (23.4") or 600 millimetres diameter (0.78"). The minimum clear headroom of 800 millimeters (31.2") shall be provided above the access opening.

2.9.3.1.2 Area separation

Enclosed attic spaces of combustible construction shall be divided into horizontal areas not exceeding 250 sq. meters (2691 sq.ft) by fire-resistive partitions extending from the ceiling to the roof. Except, that where the entire attic is equipped with approved automatic fire-extinguishing system, the attic space may be divided into areas not to exceed 750 sq. meters (8073 sq.ft). Openings in the partitions shall be protected by self-closing doors.

2.9.3.1.3 Draft stops

Regardless of the type of construction, draft stops shall be installed in trusses roofs, between roof and bottom chords or trusses, in all buildings exceeding 2000 sq.meter (21528 sq.ft). Draft stops shall be constructed as for attic area separations.

2.9.3.1.4 Ventilation

Enclosed attics including rafter spaces formed where ceilings are applied direct to the underside or roof rafters shall be provided with adequate ventilation protected against the entrance of rain.

2.9.4 Roof Drainage System

2.9.4.1 Roof drains

Roof drains shall be installed at low points of the roof and shall be adequate in size to discharge all tributary waters.

2.9.4.2 Overflow drains and scuppers

Where roof drains are required adequate overflow drains shall be provided.

2.9.4.3 Concealed piping

Roof drains and overflows drains, when concealed within the, construction of the building, shall be installed in accordance with the provisions of this Code.

2.9.4.4 over public property

Roof drainage water from a building shall not be permitted to flow over public property except for Group "R" and "U_1" Occupancies.

2.9.5 Flashing

Flashing and counter flashing shall be provided at the juncture of the roof and vertical surfaces.

2.9.6 Skylights

All skylights shall be constructed with metal frames except those for Groups "R" and "U_1" Occupancies, Frame's of skylights shall be designed to carry loads required for roofs. All skylights the glass of which is set at an angle of less than 45° from the horizontal, if located above the first storey, shall be set at least 100 millimeters (4") above the roof. Curbs on which the skylights rest shall be constructed of incombustible materials except for Types I or II Construction.

Spacing between supports in one direction for flat wired glass in skylights shall not exceed 625 millimeters (24"). laminated glass may have supports 1.50 meters (5") apart in the direction of the corrugation, All glass in skylights shall be laminated glass; Except, that skylights over vertical shafts extending through two (2) or more storey shall be glazed with plain glass as specified in the Code. Provided, that wired glass may be used in ventilation equal to not less than one-eight (1/8) the cross-sectional area of the shaft but never less than 1.20 meters (4") provided at the top of such shaft. Any glass not wired glass shall be protected above and below with a screen constructed of wire not smaller than 2.5 millimeters (0.098") in diameter with a mesh not larger than 25 millimeters (0.98"). The screen shall be substantially supported below the glass.

Ordinary glass may be used in the roof and skylights for greenhouses. Provided that height of the greenhouses at the ridge does not exceed 6.00 meters (19.6 ft) above the grade. The use of wood in the frames of skylights will be permitted in greenhouses outside of highly restrictive Fire Zones

if the height of the skylight does not exceed 6.00 meters (19.6 ft) above the grade, but in other cases metal frames and metal sash bars shall be used.

Glass used for the transmission of light, if placed in floors or sidewalks, shall be supported by metal or reinforced concrete frames, and such glass shall not be less than 12.5 millimeters (0.5") in thickness. Any such glass over 100 sq. centimeters (15.5 sq.inches) in area shall have wire mesh embedded in the same or shall be provided with, a wire screen underneath as specified for skylights in the Code. All portions of the floor lights or sidewalk lights shall be of the same strength as required for floor or sidewalk construction, except in cases where the floor is surrounded by a railing not less 1.10 meters (3.6 ft) in height, in which case the construction shall be calculated for not less than roof loads.

2.9.7 Penthouses and Roof Top Structures

2.9.7.1 Height

No penthouse or other projection above the roof in structures of other than Type V construction shall exceed 8.40 meters (28 ft) above the roof when used as an enclosure for tanks or for elevators which run to the roof and in all other cases shall not extend more than 3.60 meters (12 ft) in height with the roof.

2.9.7.2 Area

The aggregate area of all penthouses and other roof structures shall not exceed 50% of the area of the supporting roof.

2.9.7.3 Prohibited uses

No penthouse, bulkhead, or any other similar projection above the roof shall be used for purposes other than shelter of mechanical equipment or shelter of vertical shaft openings in the roof. A penthouse or bulkhead used for purposes other than that allowed by this Section shall conform to the requirements of the Code for an additional storey.

2.9.7.4 Construction

Roof structures shall be constructed with walls, floors, and roof as required for the main portion of the building except in the following cases:

On Types III and IV constructions, the exterior walls and roofs of penthouses which are 1.50 meters (4.5 ft) or more from an adjacent property line may be of one-hour fire-resistive incombustible construction.

Walls not less than 1.50 meters (4.5 ft) from an exterior wall of a Type IV construction may be of one-hour fire-resistive incombustible construction. The above restrictions shall not prohibit the placing of wood flagpoles or similar structures on the roof of any building.

2.9.8 Chimneys

2.9.8.1 Structural design

Chimneys shall be designed, anchored, supported, reinforced constructed, and installed in accordance with generally accepted principles of engineering. Every chimney shall be capable of producing a draft at the appliance not less than that required for the safe operation of the appliance connected thereto. No chimney shall support any structural load other than its own weight unless it is designed to act as a supporting member. Chimneys in a wood-framed building shall be anchored laterally at the ceiling line and at each floor line which is more than 1.80 meters (6 ft) above grade, except when entirely within the framework or when designed to be free standing.

2.9.8.2 Walls

Every masonry chimney shall have walls of masonry units, bricks, stones, listed masonry chimney units, reinforced concrete or equivalent solid thickness of hollow masonry and lined with suitable liners in accordance with the following requirements.

2.9.8.2.1 Masonry chimneys for residential type appliances

Masonry Chimneys shall be constructed of Masonry units or reinforced concrete with walls not less than 100 millimeters (4 in) thick: or rubble stone masonry not less than 300 millimeters (12 in) thick. The chimney liner shall be in accordance with the code.

2.9.8.2.2 Masonry chimneys for low heat appliances

Masonry Chimneys shall be constructed of Masonry units or reinforced concrete with walls not less than 200 millimeters (8 in) thick. Expect that rubble stone masonry not less than 300 millimeters (12 in) thick. The chimney liner shall be in accordance with the code.

2.9.8.2.3 Masonry chimneys for medium-heat appliances

Masonry chimneys for medium-heat appliances shall be constructed of solid masonry units of reinforced concrete not less than 200 millimeters (8 in) thick. Except, that stone masonry shall be not less than 300 millimeters (12 in) thick and, in addition shall be lined with not less than 100 millimeters (4 in) of firebrick laid in a solid bed of fire clay mortar with solidly filled head, bed, and wall joints, starting not less than 600 millimeters (24 in) below the chimney connector entrance, Chimneys extending 7.50 meters (22.5 ft) or less above the chimney connector shall be lined to the tap.

2.9.8.2.4 Masonry chimneys for high-heat appliances

Masonry chimneys for high-heat appliances shall be constructed with double walls of solid masonry units or reinforced concrete not less than 200 millimeters (8 in) in thickness, with an air space of not less than 50 millimeters (2 in) between walls. The inside of this Interior walls shall be of firebrick not less than 100 millimeters (4 in) in thickness laid in a solid bed of fire clay mortar with solidly filled head, bed, and Wall joints.

2.9.8.2.5 Masonry chimneys for incinerators installed in multi-storey buildings (apartment-type incinerators)

Chimneys for incinerators installed in multi-storey buildings using the chimney passageway as a refuse chute where the horizontal grate area of combustion chamber does not exceed 0.80 sq. Meters shall have walls of solid masonry or reinforced concrete, not less than 100 millimeters thick with, a chimney lining as specified in the Code. If the grate area of such an incinerator exceeds 0.80 sq. meters, the walls shall not be less than 100 millimeters of firebrick except that higher than 9.00 meters (27") above the roof of the combustion chamber, common brick alone 200 millimeters in thickness may be used.

2.9.8.2.6 Masonry chimneys for commercial and industrial type incinerators

Masonry chimneys for commercial and industrial type Incinerators of a size designed for not more than 110 kilograms of refuse per hour and having a horizontal grate area not exceeding 0.50 sq. meter shall have walls of solid masonry or reinforced concrete not less than 100 millimeters thick with lining of not less than 100 millimeters (4 in) of firebrick, which lining shall extend for not less than 12.00 meters (36 ft) above the roof of the combustion chamber If the design capacity of grate area of such an

inclneratorexceeds110 kilograms per hour and 0.80 sq. meter (80 sq ft) respectively, walls shall not be less than 200 millimeters (8 in) thick, lined with not less than 1 00 millimeters (4 in) of firebrick extending the full height of the chimney.

2.9.8.3 Linings

Fire clay chimney lining shall not be less than 15 millimeters (1/2 in) thick. The lining shall extend from 200 millimeters (8 in) below the lowest inlet or, in the case of fireplace, from the throat of the fireplace to a point above enclosing masonry walls, Fire clay chimney linings shall be installed ahead of the construction of the chimney as it Is carried up, carefully bedded one on the other in the fire clay mortar, with close-fitting joints left smooth on the inside. Firebrick not less than 500 millimeter thick maybe used in place of fireclay chimney.

2.9.8.4 Area

No chimney passageway shall be smaller in area, than the vent connection of the appliance attached thereto.

2.9.8.5 Height

Every masonry chimney shall extend at least 600 millimeters (24 in) above the part of the roof through which it passes and at least 600 millimeters (24 in) above the highest elevation of any part of a building within 3.00 meters (9") to the chimney.

2.9.8.6 Corbelling

No masonry chimney shall be corbelled from a wall more than 150 millimeters, (6 in) nor shall a masonry chimney is corbelled from a wall which is less than300 millimeters (12 in) in thickness unless it projects equally on each side of the wall. In the second storey of a two-storey building of Group “R” Occupancy, corbelling of masonry chimneys on the exterior of the enclosing walls may equal the wall thickness. In every case the corbelling shall not exceed 25 millimeters (10 in) projection for each course of brick.

2.9.8.7 Change in size or shape

No change in the size or shape of a masonry chimney shall be made within a distance of 150 millimeters (6 in) above or below the roof joints or rafters where the chimney passes through the roof.

2.9.8.8 Separation

When more than one passageway is contained in the same chimney, masonry separation at least 100 millimeters (4 in) thick bonded into the masonry wall of the chimney shall be provided to separate passageways.

2.9.8.9 Inlets

Every inlet to any masonry chimney shall enter the side thereof and shall be of not less than millimeters thick metal or 16 millimeters refractory material.

2.9.8.10 Clearance

Combustible materials shall not be placed within 50 millimeters of smoke chamber or masonry chimney walls when built within a structure or within 25 millimeters (10 in) when the chimney is built entirely outside the structure.

2.9.8.11 Termination

All incinerator chimneys shall terminate in a substantially constructed spark arrester having a mesh not exceeding 20 millimeters.

2.9.8.12 Cleanout

Cleanout openings shall be provided at the base of every masonry chimney.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.10 EXISTING STRUCTURES AND HISTORIC BUILDINGS

TABLE OF CONTENTS

2.10 EXISTING STRUCTURES AND HISTORIC BUILDINGS

2.10.1 General

2.10.1.1 Scope

The provisions of this chapter control work related to the alteration, repair, addition and change of occupancy and adaptive reuse of all existing structures as well as heritage buildings. All of these activities need to comply with relevant portions of this chapter as well as related regulations and by laws.

2.10.1.2 Maintenance

Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the relevant planning authority shall have the authority to inspect a building or structure before making the decision. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in heritage buildings and existing structures. Where a building is found to be unsafe, Section C5 (Unsafe Buildings) of PART 1 of this Code will apply.

2.10.1.3 Building materials

Building materials shall comply with the requirements of this section.

2.10.1.3.1 Existing materials

Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the relevant planning authority to be dangerous to life, health or safety. Where such conditions are determined to be dangerous to life, health or safety, they shall be mitigated or made safe.

2.10.1.3.2 New and replacement materials

Materials permitted by Part 6, Material for new construction shall be used. In listed heritage buildings and unlisted buildings in conservation zones all new work should match the original in respect of materials used and in detailed execution. Only materials and construction methods approved in the Conversation Management Plan for each building will be permitted. Materials shall be permitted for repairs and alterations, if no hazard to life, health or property is created. Hazardous materials shall not be used where Part 6, Material would not permit their use in buildings of similar occupancy, purpose and location.

2.10.2 Definitions

For the purposes of this chapter and as used elsewhere in the code, the following words and terms shall have the meanings shown herein and they are mainly used for providing access to heritage buildings and existing structures for disable persons.

CONSERVATION MANAGEMENT PLAN. It is a document that explains what the building or site is why it is culturally significant, how the significance is vulnerable or sensitive to change and sets outs the policies for managing that significance in any future use or development. The CMP will include detailed information concerning the most significant elements of a building or site and suggested measures to conserve them. It may also suggest options of adaptive reuse of

buildings and sites, so that the inherent significance is retained while permitting continued use and thus maintaining the building and site for future generations.

DANGEROUS. Any building or structure or portion shall be deemed dangerous if each of them has collapsed, partially collapsed, moved off its foundation or lacks the support of ground necessary to support it or there exists a significant risk of collapse, detachment or dislodgment of any portion, member, appurtenance or ornamentation of the building or structure under service loads.

EXISTING STRUCTURE. A structure erected prior to the date of adoption of this code, or one for which a legal building permit has been issued.

PRIMARY FUNCTION. A primary function is a major activity for which the facility is intended.
SUBSTANTIAL STRUCTURAL DAMAGE. A condition if in any story, the vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of the structure in any horizontal direction has been reduced by more than 20 percent from its pre-damage condition; or the capacity of any vertical gravity load-carrying component' or any group of such components, that supports more than 30 percent of the total area of the structure 's floor(s) and roof(s) has been reduced more than 20 percent from its pre-damage condition and the remaining capacity of such affected elements, with respect to all dead and live loads, is less than 75 percent of that required by this code for new buildings of similar structure, purpose and location.

TECHNICALLY INFEASIBLE. An alteration of a building or a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

2.10.3 Additions

2.10.3.1 General

Additions to any building or structure shall comply with the requirements of this code for new construction. Alterations to the heritage and existing building or structure shall be made to ensure that the heritage and existing building or structure together with the addition are no less conforming with the provisions of this code than the heritage and existing building or structure was prior to the addition. An existing building together with its additions shall comply with the height and area provisions of Chapter 3, General Building Heights and Areas.

2.10.3.2 Flood hazard areas

For buildings and structures in flood hazard areas, any addition that constitutes substantial improvement (basically having a value of 50% market value of the existing structure) of the heritage building or existing structure, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design. For buildings and structures in flood hazard areas, any additions that do not constitute substantial improvement or substantial damage of the heritage existing structure, are not required to comply with the flood design requirements for new construction.

2.10.3.3 Existing structural elements carrying gravity load

Any existing gravity load-carrying structural element for which an addition and its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened' supplemented, replaced or otherwise altered as needed to carry the increased load required by this code for new structures.

Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased shall be considered an altered element subject to the requirements of Section 2.10.4.3. Any existing element that will form part of the lateral load path for any part of the addition shall be considered an existing lateral load-carrying structural element subject to the requirements of Section 2.10.3.4.

2.10.3.3.1 Design live load

Where the addition does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the addition. If the approved live load is less than that required by Part 3, Structural Design, Live Load Section, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the addition does result in increased design live load, the live load required by Part 3, Structural Design, Live Loads Section shall be used.

2.10.3.4 Existing structural elements carrying lateral load

Where the addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall be shown to meet the requirements of Part 3, Structural Design, Wind Loads and Earthquake Loads.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Part 3, Structural Design, Wind Loads and Earthquake Loads Sections. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.

2.10.3.4.1 Seismic

Seismic requirements for alterations shall be in accordance with part 3 structure of this code.

2.10.4 Alterations

2.10.4.1 General

Except as provided by Section 2.10.1.3 or this section, alterations to any building or structure shall comply with the requirements of the code for new construction. Alterations to listed heritage buildings require prior consent and must conform to the Conservation Management Plan and be consistent with the general principles for conservation. Alterations shall be such that the heritage and existing building or structure is no less complying with the provisions of this code than the existing building or structure was prior to the alteration.

2.10.4.2 Flood hazard areas

For buildings and structures in flood hazard areas, any alteration that constitutes substantial improvement of the existing structure shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design. For buildings and structures in flood hazard areas, any alterations that do not constitute substantial improvement or substantial damage of the existing structure are not required to comply with the flood design requirements for new construction.

2.10.4.3 Existing structural elements carrying gravity load

Any existing gravity load-carrying structural element for which an alteration causes an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the alteration shall be shown to have the capacity to resist the applicable design gravity loads required by this code for new structures.

2.10.4.3.1 Design live load

Where the alteration does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the alteration. If the approved live load is less than that required by Part 3, Structural Design, Live Loads Section, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the alteration does result in increased design live load, the live load required by Part 3, Structural Design, Live Loads Section of this code shall be used.

2.10.4.4 Existing structural elements carrying lateral load

Except as permitted by Section 2.10.4.5, where the alteration increases design lateral loads in accordance with Part 3, Structural Design, Wind Loads and Earthquake Load Sections or where the alteration decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Part 3, Structural Design, Wind Loads and Earthquake Load Sections of this code.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is no more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Part 3, Structural Design, Wind Loads and Earthquake Load Sections of this code. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.

2.10.4.4.1 Seismic

Seismic requirements for alterations shall be in accordance with this section. Where the existing seismic force-resisting system is a type that can be designated ordinary, values of R, Ω_o and C_d for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of a detailed intermediate or special system.

2.10.4.5 Voluntary seismic improvements

Alterations to existing structural elements or additions of new structural elements that are not otherwise required by this chapter and are initiated for the purpose of improving the performance of the seismic force-resisting system of an existing structure or the performance of seismic bracing or anchorage of existing nonstructural elements shall be permitted, provided that an engineering analysis is submitted demonstrating the following:

a) The altered structure and the altered nonstructural elements are no less in compliance with the provisions of this code with respect to earthquake design than they were prior to the alteration.

b) New structural elements are detailed and connected to the existing structural elements as required by Part 3, Structural Design.

c) New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by Part 3, Structural Design.

d) The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

e) That in the case of heritage buildings and unlisted buildings in conversation zones, the alterations shall be approved by an expert conservation structural engineer with demonstrable specialist experience of repairing and strengthening historic buildings and structures and have prior consent and conform to the general conservation principles.

2.10.4.6 Means of egress capacity factors

Alterations to any existing building or structure shall not be affected by the egress width factors for new construction in determining the minimum egress widths or the minimum number of exits in an existing building or structure. The means of egress shall be considered as complying means of egress for any alteration if, in the opinion of the building code official, they do not constitute a distinct hazard to life.

2.10.5 Repairs

2.10.5.1 General

Buildings and structures, and parts thereof, shall be repaired in compliance with Section 2.10.1.2. Work on nondamaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter. Routine maintenance required by Section 2.10.1.2, ordinary repairs exempt from permit with work exempt from Part 1, Planning Environment, Administration and Legislation, Permit section, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

2.10.5.1.1 Dangerous conditions

Regardless of the extent of structural or nonstructural damage, the relevant planning authority shall have the authority to require the elimination of conditions deemed dangerous.

2.10.5.2 Substantial structural damage to vertical elements of the lateral force-resisting system

A building that has sustained substantial structural damage to the vertical elements of its lateral force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Sections 2.10.5.2.1 through 2.10.5.2.3.

2.10.5.2.1 Evaluation

The building shall be evaluated by a registered engineer/ architect, and in the case of listed heritage buildings, a conservation engineer/ architect and the evaluation findings shall be submitted to the code official. The evaluation shall establish whether the damaged building, if repaired to its predamage state, would comply with the provisions of Part 3, Structural Design, wind and earthquake loads. Evaluation for Part 3, Structural Design, earthquake loads shall be required if the substantial structural damage was caused by or related to earthquake effects or if the building is in Part 3, Structural Design, Seismic Design Category C, D, E or F.

Wind loads for this evaluation shall be those prescribed in Part 3, Structural Design, Wind Loads Section. Earthquake loads for this evaluation, if required, shall be permitted to be 75 percent of those prescribed in Part 3, Structural Design, Earthquake loads Section. Values of R, Wo and Cd for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of an intermediate or special system.

2.10.5.2.2 Extent of repair for compliant buildings

If the evaluation establishes compliance of the predamage building in accordance with Section 2.10.5.2.1, then repairs shall be permitted that restore the building to its predamage state using materials and strengths that existed prior to the damage.

2.10.5.2.3 Extent of repair for noncompliant buildings

If the evaluation does not establish compliance of the predamage building in accordance with Section 2.10.5.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations, including wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by the code in effect at the time of original construction or as required by this code, whichever are greater. Earthquake loads for this rehabilitation design shall be those required for the design of the predamage building, but not less than 75 percent of those prescribed in Part 3, Structural Design, Earthquake Loads Section. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

2.10.5.3 Substantial structural damage to gravity load-carrying components

Gravity load-carrying components that have sustained substantial structural damage shall be rehabilitated to comply with the applicable provisions of this code for dead and live loads. Existing gravity load-carrying structural elements shall be permitted to be designed for live loads approved prior to the damage. Nondamaged gravity load-carrying components that receive dead, live loads from rehabilitated components shall also be rehabilitated or shown to have the capacity to carry the design loads of the rehabilitation design. New structural

members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

2.10.5.3.1 Lateral force-resisting elements

Regardless of the level of damage to vertical elements of the lateral force-resisting system, if substantial structural damage to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall be evaluated in accordance with Section 2.10.5.2.1.

2.10.5.4 Less than substantial structural damage

For damage less than substantial structural damage, repairs shall be allowed that restore the building to its predamage state using materials and strengths that existed prior to the damage. New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

2.10.5.5 Flood hazard areas

For buildings and structures in flood hazard areas, any repair that constitutes substantial improvement of the existing structure, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design. For buildings and structures in flood hazard areas, any repairs that do not constitute substantial improvement or substantial damage of the existing structure, are not required to comply with the flood design requirements for new construction.

2.10.6 Fire Escapes

2.10.6.1 Where permitted

Fire escapes shall be permitted only as provided for in Chapter 6, Means of Egress.

2.10.6.2 Construction

The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved non-combustible materials.

2.10.7 Glass Replacement

2.10.7.1 Conformance

The installation or replacement of glass shall be as required for new installations.

2.10.8 Change of Occupancy

2.10.8.1 Conformance

No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancies or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancies. Subject to the approval of the relevant planning authority, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

2.10.8.2 Certificate of occupancy

A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

2.10.8.3 Stairways

Existing stairways in a heritage and existing structure shall not be required to comply with the requirements of a new stairway where the existing space and construction will not allow a reduction in pitch or slope.

2.10.8.4 Change of occupancy

When a change of occupancy results in a structure being reclassified to a higher occupancy category, the structure shall conform to the seismic requirements for a new structure of the higher occupancy category. Where the existing seismic force-resisting system is a type that can be designated ordinary, values of R, Ω_o and C_d for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of a detailed, intermediate or special system.

Exceptions:

a) Specific seismic detailing requirements of this code or Part 3, Structural Design, Earthquake Loads Section for a new structure shall not be required to be met where it can be shown that the level of performance and seismic safety is equivalent to that of a new structure. Such analysis shall consider the regularity, over strength, redundancy and ductility of the structure within the context of the existing and retrofit (if any) detailing provided.

b) When a change of use results in a structure being reclassified from Part 3, Structural Design, Occupancy Category I or II to Occupancy Category III and the structure is located in a seismic map area where $S_{DS} < 0.33g$, compliance with Part 3, Structural Design, the seismic requirements of this code and Earthquake Loads Section are not required.

2.10.9 Historic Buildings

2.10.9.1 Heritage Areas and Buildings

The heritage areas are determined by the Ministry of Culture under the 1998 "Protection and Preservation of Cultural Heritage Regions Law", and areas, zones or buildings indentified and determined by local authorities (for example, the Yangon City Development Council) of regional authorities which are intended to preserve and enhance the heritage character of such areas or buildings. In relation to activities in these areas, the following points shall be observed:-

a) Where the local authority considers new development to be appropriate, a high standard of design will be expected. Approval must be attained first at the planning stage from the concerned institutions.

b) When designing buildings in the heritage areas, the character of the zones shall be maintained. Special regard should be given to such matters as scale, height, form, massing, detailed design and quality of materials in the interests of harmonising the new development with its neighbours. Density and type of development is an intrinsic part of the character of conservation areas.

c) The proportion and location of new buildings must give deference to the heritage monuments visually and to maintain the silhouette as well as the visual axis in the environment of heritage monuments.

d) Adaptive reused of listed buildings is encouraged to prevent their deterioration. The relevant authority must approve a Conservation Management Plan (CMP) for the building, and oversee compliance with the CMP.

e) Under chapter IV, paragraph 7 of the "Protection and Preservation of Cultural Heritage Regions Law", The Ministry of Culture may direct the relevant trusts or institution who are taking care of the ancient monument to do so without altering the original ancient form and structure and the original ancient workmanship.

f) Under chapter IV, paragraph 6 of the "Protection and Preservation of Cultural Heritage Regions Law", The Ministry of Culture may direct to be dismantled a building which is not an ancient monument and which obstructs the view of an ancient monument or surrounding natural landscape within the cultural heritage region.

g) The provisions of this code relating to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the relevant planning authority to not constitute a distinct life safety hazard.

h) On completion of the development the developer will repair the footways and carriageways around the building to a standard specified by the authority and, where appropriate include any necessary tree planting or landscaping as part of the development cost.

2.10.9.2 Flood hazard areas

Within flood hazard areas, where the work proposed constitutes substantial improvement, the building shall be brought into compliance with Part 3, Structural Design, Flood Loads Section.

Exception: Historic buildings that are:

a) Listed or preliminarily determined to be eligible to be listed buildings,

b) Determined by the Concerned Department as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or

c) Designated as historic under a state or local historic preservation program that is approved by the Concerned Department.

The historic buildings need not meet new construction requirements for any category of renovation or reuse, including change in occupancy, when the buildings are not judged by building official to constitute distinct life-safety hazard.

2.10.10 Accessibility for Existing Buildings

2.10.10.1 Scope

The provisions of Sections 2.10.11.1 through 2.10.11.9 apply to maintenance, change of occupancy, additions and alterations to existing buildings, including those identified as historic buildings.

2.10.10.2 Maintenance of facilities

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

2.10.10.3 Change of occupancy

Existing buildings that undergo a change of group or occupancy shall comply with this section.

2.10.10.3.1 Partial change in occupancy

Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 2.10.10.5 and 2.10.10.6.

2.10.10.3.2 complete change of occupancy

Where an entire building undergoes a change of occupancy, it shall comply with Section 2.10.10.3.1 and shall have all signage complying with Signage Section.

2.10.10.4 Additions

Provisions for new construction shall apply to additions. An addition that affects the accessibility to, or contains an area of, a primary function shall comply with the requirements in Section 2.10.10.7.

2.10.10.5 Alterations

A building, facility or element that is altered shall comply with the applicable provisions in Chapter 7, Accessibility of this code.

2.10.10.6 Scoping for alterations

The provisions of Sections 2.10.10.7.1 through 2.10.10.7.6 shall apply to alterations to existing buildings and facilities.

2.10.10.6.1 Entrances

Accessible entrances shall be provided in accordance with Chapter 7, Accessibility, Accessible Entrances Section.

2.10.10.6.2 Ramps

The slope of ramps in or providing access to existing buildings or facilities shall comply with Chapter 7, Accessibility.

2.10.10.7 Historic buildings

These provisions shall comply with Chapter 7, Accessibility to apply to buildings and facilities designated as historic structures that undergo alterations or a change of occupancy. Accessible entrances or toilet facilities shouldn't threaten or destroy the historic significance of the building or facility.

2.10.11 Investigation

For proposed work covered by this section, the building owner shall cause the existing building to be investigated in accordance with the provisions of this section.

2.10.11.1 Structural analysis

The owner shall have a structural analysis of the existing building by certified engineer made to determine adequacy of structural systems for the proposed alteration, addition or change of

occupancy. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter 3, Structural Design.

2.10.11.2 Submittal

The results of the investigation as required in Section 2.10.12.4, along with proposed compliance alternatives, shall be submitted to the relevant planning authority.

2.10.11.3 Determination of compliance

The relevant planning authority shall determine whether the existing building, with the proposed addition, alteration or change of occupancy, complies with the provisions of this section.

2.10.11.2 Application Forms and Submission Requirements

Applications on buildings should be made and the information required should be provided.

In addition to the normal requirements, the following is required for applications within the urban conservation areas which should comply with part 1 of this code :

1) When an application involves the demolition of a building within an area, A two streetscape elevations (scale 1:100) are required, one indicating the relationship of the existing building with adjacent buildings, and another showing the new construction in the context of the streetscape;

2) When an application involves the opening of a garage or construction of a garage cluster, a block plan (scale 1:500) is required, indicating the site in relation to the street network and the street width adjacent to the site access. Proper elevations are to be submitted of the entrance to the garage cluster along the street alignment, including drawings of the adjacent facades on either side of he main site entrance;

3) Elevations (scale 1:50) should show in detail all materials and colour schemes proposed. Any signage and/or advertisements proposed on commercial premises are to be included in the elevations. In particularly sensitive cases 1:20 detailed drawings will be required;

4) When an application involves construction in a backyard/garden or courtyard, photographs showing all sides of the backyard/garden or courtyard are required.

PART 2 ARCHITECTURE AND URBAN DESIGN

SECTION 2.11 URBAN DESIGN AND ENVIRONMENT

TABLE OF CONTENTS

2.11 URBAN DESIGN AND ENVIRONMENT

2.11.1 Urban Design and Outside spaces

2.11.1.1 Zoning regulations

The regulations regarding the "Urban Design Portion" of this code are to follow in addition to the regulations written in the TWG I of "Myanmar National Building Codes", and the Zoning Regulations of the respective towns and urban areas, where available, and are to apply in all areas of the Republic of the Union of Myanmar.

2.11.1.2 Definitions

Unless otherwise specifically defined, the meanings are to be interpreted as the followings:

ACCESS WAY: It means driveway that provides to the parking place and these do not have parking stalls adjacent to them

CONSERVATION ZONE: It means an area designating by the concerned authority as being of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance.

LISTED BUILDING: It means a building which is included in a list complied or approved by the Ministry of Culture, the local administrative authority to be of historical and/ or cultural significance. Any object or structure fixed to the building, which has formed part of the land and is comprised within the cartilage of the building is treated as part of the building. Building is defined as including any structure or erection and any part of a building.

ROW BLOCK: It means buildings with the lengths more than two times the widths of respective buildings

FLOOR AREA IN SHOPPING FACILITIES: It means total floor area of shops, shopping centres and other shopping facilities; this include storage areas, staff area and circulation area

SHOPPING AREA: It means areas in shops and shopping centres, where people have direct access and where items for sales are placed or displayed. The areas like stores, offices, etc. belonging to the staff areas are not included.

STOREY: It means the space between the upper surface of every floor and the surface of the floor next above it, or if there be no such floor, then the underside of the ceiling or roof or other covering above the respective floor.

BOUNDARY OR BOUNDARY LINE: It means the official line that divides one area of land from another.

BUILDING LINE: It means the line prescribed by either the competent authority beyond which no part of a building may project, except as otherwise permitted by the relevant respective laws or these codes.

BUILDING SPACING: It means the space between buildings to maintain in order to provide ventilation, light, etc., to avoid disturbances in noise and view, and to leave space for infrastructural systems.

BUILT ENVIRONMENT: It means areas of the environment, where human beings reside or occupy to practice their activities; contrary to natural environment, to which forests, woods, etc. belong, which are not directly or rarely intervened by human beings.

BUILT-UP AREA: It means the area occupied by a building on the land or on the premises.

BUILT-UP AREA RATIO: It means the ratio between the built-up area and the total land area. This is the same as plinth area ratio.

PLINTH AREA RATIO: It means the ratio between the plinth area and the total land area. This is the same as built-up area ratio.

FLOOR AREA INDEX (FAI) OR FLOOR AREA RATIO (FAR): Floor area index means the total gross floor area (GFA) divided by the land area belonging to the particular building and floor area ratio means the ratio of the above mentioned areas. There are zonal FAI indicating the floor area densities of zones and estates FAI which indicates the floor area densities of estates.

For the purpose of urban planning, the floors which are only covered but not within the walls, such as terraces, verandahs, balconies are calculated as 50 % of the floors.

GROSS FLOOR AREA (GFA): It means the total floor area calculated based on centre of exterior walls, including the circulation area such as stairs, corridors, etc. but excluding the technical area without floors shafts, ducts, lift wells etc.

CUL-DE-SAC: It means a street or lane closed at one end and can be also called dead-end street.

CBD OR CENTRAL BUSINESS DISTRICT: It means area or locality in a city or town having business, cultural and other functions concentrated in that district or locality.

DEPTH: In respect of a building, means the measured distance between the front line of the building and the back line of the rear main wall which separates the main building from the open space or in case of row blocks, the side shorter than the longer side.

DETACHED BUILDING: It means any building not attached to any other buildings. Normally, single family houses are detached building.

DIVISION WALL OR (PARTY WALL) It means a wall forming part of a building and used or constructed for separation of adjoining buildings belonging to different owners or occupants or constructed to be occupied by different persons constructed at the abutting common boundary.

DUPLEX HOUSE: It means any building with two residential units designed to be abutting to each other separated by a division wall. Each unit has its own separate entrance and each unit shall have one or more storeys used only by the same people.

EXTERNAL WALL: It means an outer wall of a building and not immediately adjoining a wall of another building.

FIRE WALL: It means any wall of materials having the fire resistance as required under Part 9 and 10 of these codes and constructed to be used for the separation of adjoining buildings or premises or separation of parts of building to prevent or reduce the spreading of fire from one building to another or from one part of a building to another part of that building.

GREEN AREA: It means not occupied by any structures including the traffic and parking areas and covered only by grass and trees or bear land covered by vegetations.

GROUND STOREY: It means the storey at the ground level of a building to which there is an entrance from outside on or above the level of the ground.

HUMAN HABITATION: It means usage of people as living, sleeping, studying or other functions where the people stay more than 6 hours per day.

HUMAN SETTLEMENT: It means areas where human beings reside or occupy to practice their activities.

INFRASTRUCTURE: It means the systems or part of systems like roads, water supply, electricity, waste disposal, etc. that are essential for proper functioning of human settlements, group of buildings or separate buildings.

PARKING AISLE: It means an access lane or driveway with adjacent parking stalls.

PARKING STALL: It means space for a parking of motor vehicle, a car or a motor cycle parking lot.

PLOT: It means land area defined by the concerned authority with measurements.

POINT BLOCK: It means a building with the lengths less than two times the widths of respective buildings.

SETBACK DISTANCE: It means the distance, a building or any part of a building has to maintain from other buildings, boundary line or any other element.

TERRACE HOUSE: It means any building with more than three residential units designed to be in a row. Each unit has its own separate entrance and each unit may have more than one storey but used only by the same family and the units are separated by division wall.

LANES FOR MOTOR CYCLES: It shall be provided at the side of pedestrian footways, where it is possible and are required at motor vehicle free zones such as parks and green areas.

LANES FOR SLOW-MOVING VEHICLES: Lanes such as bicycles and tricycles shall be provided at the side of roads where it is possible and are required at motor roads planned besides the busy streets or as required in the detailed plans of respective settlements.

FIRST CLASS AREA: Area which is defined by authorities of the respective towns and cities which have basically residential characters with larger plot sizes.

2.11.1.3 Classification of roads

All roads outside the urban areas are classified as follows:

a) UNION HIGHWAY ROADS OR INTER-REGION ROADS:

These are roads planned to connect from one region to others and are free of all vehicles which are not motorized and which maximum speed 50 miles per hours. These are roads planned to connect from one region to others must have minimum of two lanes in one direction in addition to one side lane meant for emergency stopping or for police and lifesaving vehicles. The lane widths must have minimum 14 feet each and the side lane width shall be minimum 8 feet.

b) TOWNSHIP ROADS:

Township roads are the roads connecting between the rural settlements or between the rural settlements or connecting between small urban centres.

Such roads must have the minimum of two lanes and shoulders on each side where each lane having minimum 12 feet and shoulders minimum 4 feet. For such rural roads, there shall be pedestrian path at least at one side with minimum of 6 feet width.

c) RURAL ROADS:

Rural roads are the roads connecting between the rural settlements or between the rural settlements and their urban centres.

Such roads must have the minimum of two lanes and shoulders on each side where each lane having minimum 10 feet and shoulders minimum 3 feet. For such rural roads, there shall be pedestrian path at least at one side with minimum of 5 feet width.

d) URBAN ROADS:

All urban roads have the following classifications:

1) Urban Avenues/ Boulevard: Urban Avenues are the roads connecting zones in the urban areas and are longer than 5 miles. These are roads must have minimum of two lanes in one direction in addition to paved platforms on each side. The urban avenues must have a green dividing strip minimum in the middle and the lane widths must have minimum 14 feet each and the platform width shall be minimum 6 feet.

2) Urban Main Road: Urban main roads are the roads connecting one the zone in the urban areas and which are not longer than 5 miles. These are roads must have minimum of two lanes in one direction in addition to paved platforms on each side. The lane widths must have minimum 12 feet each and the platform width shall be minimum 5 feet.

3) Feeder Roads: Feeder roads are the roads connecting collector roads and urban avenues or the urban main roads where several collector roads are connected. These are roads which have minimum two lanes in addition to paved platforms on each side. The lane widths must have minimum 12 feet each and the platform width shall be minimum 4 feet.

4) Collector Roads: Collector roads are the roads connecting between the feeder roads and residential areas. These are roads which have minimum two lanes in addition to paved platforms on each side. The lane widths shall have minimum 12 feet each and the platform width shall be minimum 4 feet.

5) Residential roads: Residential roads are the roads in the residential areas. These are roads which have minimum two lanes in addition to paved platforms on each side. The lane widths shall have minimum 10 feet each and the platform width shall be minimum 4 feet.

6) Short residential roads: Residential roads serving less than 4 units can be of one lane unless the roads do not exceed 300 feet in length, and these roads must be consist of two lanes if these served more than 4 units and longer than 300 feet.

7) Cul-de-sacs: All cul-de-sacs longer than 300 feet in length must have the minimum width of 20 feet, such cul-de-sacs must be provided turning circle.

8) One Way roads: One way roads can be planned in the residential areas meant only for one direction. These have minimum lane widths of 14 feet.

9) Service roads: Service roads are the roads where the usage is limited only to delivery vehicles. These roads shall have minimum road width of 10 feet.

10) All gradient roads longer than 300 feet must have maximum gradient for 10%.

11) The gradients of minor roads adjoining the major roads must have the maximum gradient of 12%.

2.11.2 Environmental Issues

a) Every building to be erected shall generally be considered as non-disturbing and non-polluting to the environment, for that reason the first and foremost consideration of all architects is the "Environmental Issue".

b) Whenever any building is planned, the architect should first make the environmental assessments, these include:-

1) The role and position of the planned building in the environment, whether or not the building to be constructed is disturbing to environment visually or physically.

2) The building to be constructed shall consider the laws concerning the conservation of heritage in Myanmar.

c) The concepts on sources of infrastructure and waste disposal of the building, during the construction process and after the completion of building.

d) The expected traffic generated during and after the building completion.

e) The concept of facilities for entering, parking and departing the building

f) The concept for public facilities such as green areas, schools, shopping, social amenities, etc.

2.11.3 Urban Densities

a) In conservation zones and the CBD areas of cities and towns, or in the areas defined as high density zones, the densities should be in line with by-laws and zoning plans of respective towns where available (TWG 1).

b) Outside conservation zones and CBD areas or outside quasi such areas, the following estate densities should be maintained

1) In multi-storeyed residential estates, estate floor area index should not exceed 1.5

2) In multi-storeyed residential estates, the built-up area ratio shall not be more than 0.7 (total built-up area/open area including traffic area <0.3)

3) In the areas with single family units or duplexes, there shall not be more than 20 units per acre

c) Outside conservation zones and CBD areas or outside quasi CBD areas, the open space for buildings abutting a street shall be:-

1) In respect of other buildings used for non-residential purposes, not less than one-tenth of the built-up area of the building lot;

2) In respect of a building with mixed residential and commercial buildings, not less than one-third of the built-up area of the building lot;

d) The plot sizes in the urban settlements are defined in TWG 1 of this code, and these are to be followed accordingly.

2.11.4 Open Spaces

a) There shall be not less than 10 square feet per child of play area for educational buildings meant for children younger than 6 years.

b) There shall be not less than 15 square feet per child of play area for educational buildings meant for children between 7 to 16 years.

c) There shall be not less than 20 square feet per child of play area for educational buildings meant for students of age above 16 years.

d) In the residential areas with multi-storeyed units, there shall be minimum of 200 square feet per family as play and recreation areas, additional to parking and road areas.

2.11.4.1 For the purpose of counting the open space

a) Half the width of the backline abutting a building can be counted as open space;

b) Balconies, passage-ways and sun-shades may project over any open space provided these do not project more than 5 feet and have 10 feet clear height from the ground level, such projection can be counted as open space and not as built-up area;

c) The open space provided between the street and the setback for a building line and legally not belonging to the lot where the building is constructed, shall not be counted as open space;

d) The structures such as septic tanks, drains covers, and other elements meant for building services, can be counted as open spaces, provided that people can step on these for purpose using these areas for activities such as drying cloths or children playing, and if these are not built higher than 2 feet above the ground.

e) In the residential areas, the parking spaces and road areas can be counted as open spaces but not as play and recreation areas.

f) Where open space not abutting a backline is provided for, such open space shall have a minimum clear width of not less than 8 feet.

2.11.4.2 Alteration of open spaces

Whenever any open space has been provided in connection with any building, no person shall, without the approval in writing of the local authority:-

a) Make any alteration in such open spaces; or

b) Construct a roof over any portion thereof so as to diminish the area of such open space, provided that the local authority in its discretion may issue such a permit if the authority is satisfied that the free movement of air is not impeded or hindered and environmental quality of the area under consideration is not reduced by such alteration.

c) The local authority may, by notice in writing, the owner or any person acting in contravention of this part, instruct to remove any such alteration or roof or otherwise to do such works as will restore such open spaces.

2.11.5 Building Spacing

2.11.5.1 Spaces between buildings and setback distances

a) For detached buildings in the areas defined as first class areas or quasi equivalent to such areas, which are not more than 3 stories, there shall be minimum of 6 feet clear

space measured between external walls of the building and the boundary of the plot; and 3 feet clear space between the extreme projections of the buildings such as roof edges, gutters, etc. In cases where the buildings exceed 3 stories, the space mentioned here shall increase with the rate of 1 foot or one tenth of floor to floor height for every increase of a story (or floor to floor height, whichever is greater) and the space shall be up to 10 feet between external walls of the building and boundary.

b) For areas outside conservation zones and Central Business District which are not defined as first class areas there shall be minimum of 3 feet clear space between external walls of the building or any elements of the building and one side of the plot shall have the minimum space of 6 feet clear space, and the boundary of the plot, if the building does not exceed three stories. In cases where the buildings exceed 3 stories, the space mentioned here shall increase with the rate of 1 foot or one tenth of floor to floor height for every increase of a story (or floor to floor height, whichever is greater) and the space shall be up to 6 feet between external walls of the building and boundary.

c) For duplex houses and terrace houses, clear space of 3 feet must be maintained between the extreme projections of the buildings (roof edges, balconies, etc.) and the boundary of the plot.

d) For multi-storeyed residential buildings, in the estates outside CBD areas or quasi equivalent to such areas, unless otherwise mentioned in the specific bye-laws of some cities:-

1) For multi-storeyed row blocks with several units parallel and in front to front position, the wall to wall distance shall be not less than the height of the higher building, in the cases where the building heights are different, and minimum 50 feet must be maintained for driveway, parking, aprons and platforms

2) For multi-storeyed row blocks with several units parallel to each other and having back to back position, the wall to wall distance shall be not less than half the height of the higher building, in the cases where the building heights are different and minimum of 30 feet must be maintained as service back lane meant for septic tanks, other infrastructural requirements and as free spaces.

3) For buildings where the gable side abuts the longitudinal side of the building, the space between the buildings shall be not less than half the height of the higher building; in the cases the building heights are different and minimum of 30 feet shall be provided for free flow of air and for other infrastructural requirements. (the different cases are shown in Figure 1 and 2)

4) For multi-storeyed point blocks with several units facing each other, the spacing shall be not less than half the height of the higher building, and that distance shall be minimum 40 feet for residential road and for other infrastructural requirements.

(Multi-storeyed point blocks in these codes are defined in part I of these codes)

e) For buildings in the CBD areas or quasi equivalent to such areas, the building spacing rules are to follow the local codes wherever available.

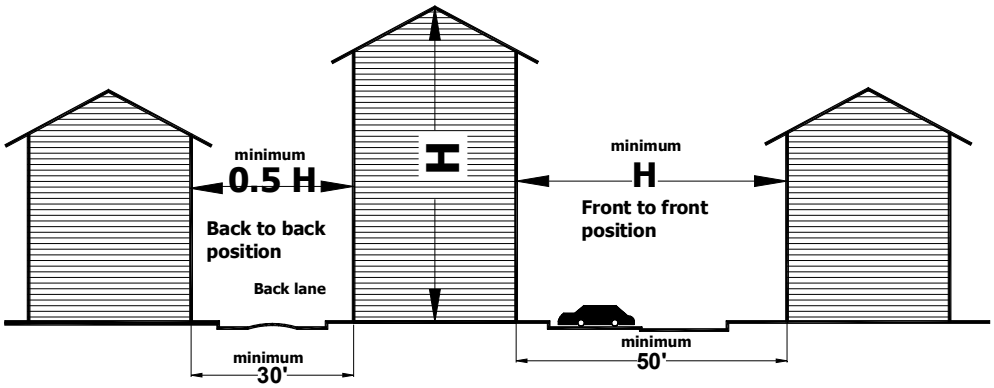

Figure 2.11.1 Schematic Figure Showing Spacing of Row Blocks,

Front to Front and Back to Back Positions and Distances

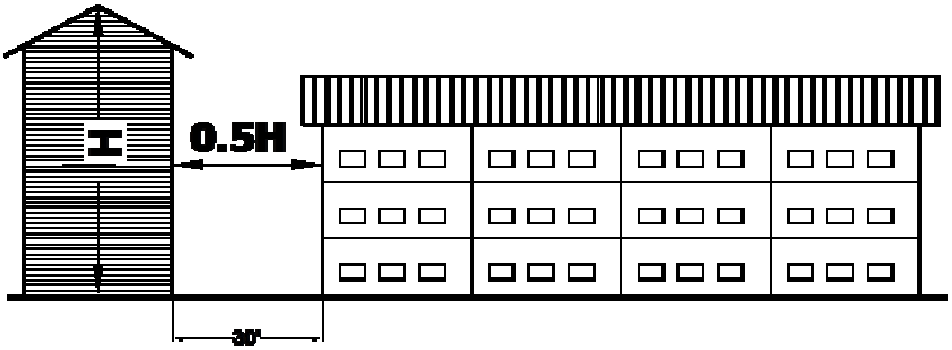

Figure 2.11.2 Schematic Figure Showing Spacing of Row Blocks,

Gable to Longitudinal Side and Distance

2.11.5.2 Fences or walls

Fences or walls to the boundaries of detached properties other than the boundary which abuts the street or backline shall be constructed to a maximum height of 6 feet in the case of solid fences or walls and to a maximum height of 9 feet in the case of fences which are so constructed as to permit the passage of light and air.

2.11.5.3 Spaces on the street network

a) Where a building is erected at the junction of two streets and in cases where the degree of splay or rounding off is not shown on the layout plan or any statutory maps, modification or replacement thereof maintained by the competent planning authority, the corner of such building shall be splayed or rounded off to a height of not less than 15 feet above the street level at the point of intersection of the street lines so that no part of the building below this height shall project beyond the straight line drawn across the corner of the building plot joining each street line at a point 10 feet from the point of intersection of the street lines.

b) Where buildings abut on a street, there shall not be permanent structures like verandahs, balconies, sun-shades, canopies, etc. built beyond the property line of respective buildings.

2.11.5.4 Walkways and covered walkways

a) The width of any covered or uncovered walkway shall not be less than 7 feet if the walkway is in a confined walls and not less than 4 feet in the open space.

b) Where there is a change in levels along the walkway there shall be steps with risers not exceeding 7 inches and treads not less than 16 inches or a pedestrian ramp of gradient not exceeding 10 % or rise: run ratio of 1:10. (see also part 5 of these codes)

c) Where a service road is designed in the residential areas, the walkway is required to be provided along the street.

2.11.6 Roads and Parking Spaces

a) The width of one lane of the road for motor vehicles is minimum 12 feet, in the residential areas; the paved area of the road meant for both ways must be at least be 16 feet with 2 feet shoulder at both sides.

b) The internal turning radius of roads in the residential areas shall be 12 feet minimum and the internal turning radius of parking access way shall be 10 feet minimum.

c) Parking (A parking stall means a space for a parking of motor car and a parking aisle means an access lane or driveway with adjacent parking stalls.) The general requirement for parking spaces for cars shall be:

1) Minimum dimensions of parking stalls are 8 feet width and 16 feet in length when stalls are perpendicular to or with angle to the aisles.

2) Minimum dimensions of parking stalls are 8 feet width and 18 feet in length when stalls are parallel to the aisles.

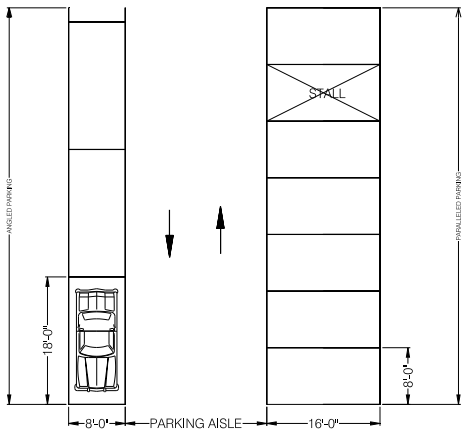

Figure 2.11.3 Position of Parking Stalls and Required Dimensions (Above figure)

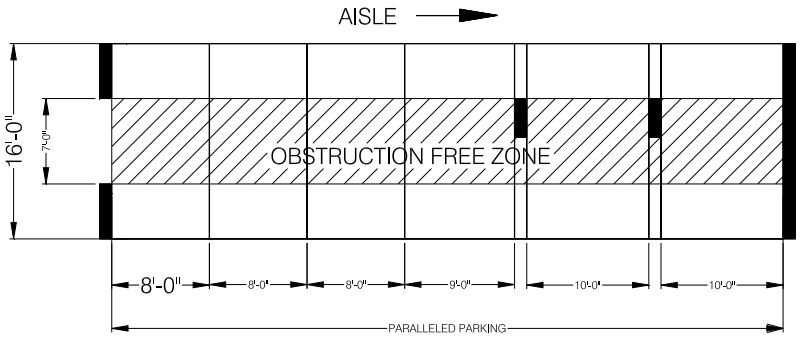

Figure 2.11.4 Places to Maintain Obstruction Free Zones and Parking Stalls with Adjacent Obstructions

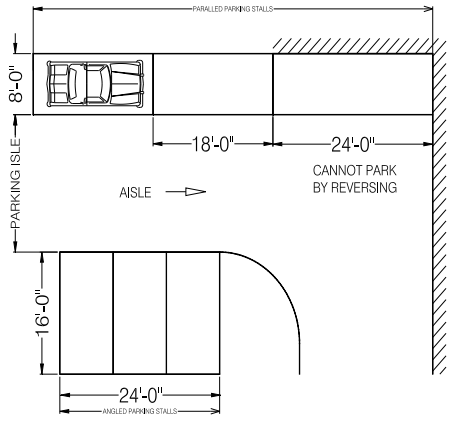

Figure 2.11.5 Parking Stalls which Cannot Park by Reversing

(For parallel parking, where a car cannot be parked by reversing, the length of stall shall be 24'.)

2.11.6.1 The minimum width of parking aisle

The minimum width of parking aisle shall be as follows:

Table 2.11.1 Minimum Widths of Parking Aisles

Parking Angle	One -way traffic flow		Two -way traffic flow
	Stalls on 1 side	Stalls on 2 sides	Stalls on 1 or 2 sides
Parallel	12'	12'	18'
30	12'	14'	18'
45	14'	16'	18'
60	16'	16'	20'
90	18'	18'	20'

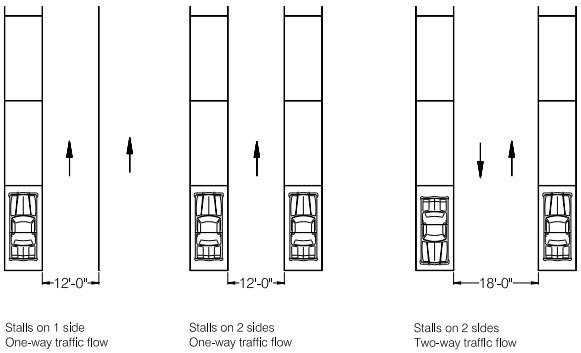

Figure 2.11.6 Dimensions of Parallel Parking Aisles

30°-60° Angled Parking Aisle

'A' refers to the width of parking aisle

Minimum dimension of 90° angled parking aisle

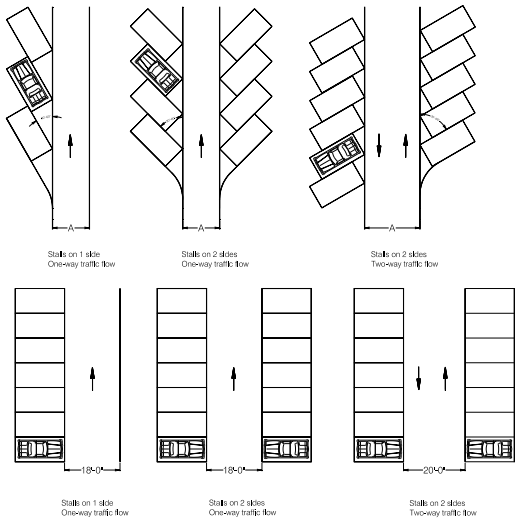

Figure 2.11.7 Dimensions of Parking Aisles with Parking Stalls at Different Angles

2.11.6.2 Clearway Ramps and Access-Ways

Design and dimensions of Clearway Ramps and Access-Ways are to conform to table 2, presented below. (Clearway Ramps are inclined floors that provide access between two levels; they do not have parking stalls adjacent to them. Access-Ways are driveways that provide access to the parking stalls.)

a) The slope of curved ramp shall be that of the centre line of its path.

b) Adequate blending of ramp grades at floor levels shall be provided, this can be achieved by the provision of straight slope 9 ft. to 12 ft. long at half the grade of the ramps.

c) The clear ramps and access-ways shall have physical separations (with raised brickwork, concrete blocks, etc.) if these are used in two directions at one level, with minimum height of 9 inches above the driveway level.

d) There shall be a straight landing of minimum 30 feet in length every after 160 feet of ramps with gradients given in the table below.

Table 2.11.2 Type of Ramps and Access Ways and Widths

Type of Ramps and Access ways	Minimum width
Straight clearway ramp and access way	11 ft. for single-lane 10 ft. (per lane) for multi lane
Innermost lane of curved clearway ramp and access way	12 ft. for single-lane 11 ft. per lane for multi lane
Outside lane of curved clearway ramp and access way	12 ft. for single-lane 10 ft. (per lane) for multi lane
Inside radius of curved clearway ramp	15 ft.
Maximum and preferred gradient of clearway ramps and access ways for vehicles	1: 6.25 (16%) for light vehicles less than 2 tons 1:7.2(14%) for medium vehicles less than 5 tons Preferred gradient 1:8.3 (12%) (see also paragraph 40)

2.11.6.3 Minimum headroom

The headroom for car parking shall not be less than 8 ft. The clear headroom of ramps at the entering points to the buildings shall not be less than 7 ft.

2.11.6.4 Heavy vehicle parking spaces

Heavy vehicles include Lorries, trailers, containers, coaches and other similar commercial vehicles. These are categorized into three groups.

a) Rigid-framed vehicles of length <25'-0"

b) Rigid-framed vehicles of length >=25'-0"

c) Articulated vehicles such as prime movers,20',40' and 45'

Table 2.11.3 Minimum Dimensions Required for Heavy Vehicles Parking

Items	Rigid-framed vehicles of length <25'		Rigid-framed vehicles of length <= 25'		Articulated vehicles, eg. Prime movers, 20'40' and 45' trailers	
Dimensions of parking stall:						
-Parallel parking	30'-6"x10'-0"		46'-0"x11'-0"		63'-0"x11'-0"	
-Angled parking	25'-0"x10'-0"		40'-0"x11'-0"		46'-0"x11'-0"	
Width of parking aisle:	1-Way flow	2-Way flow	1-Way flow	2-Way flow	1-Way flow	2-Way flow
-Parallel parking	12'-0"	24'-0"	15'-0"	24'-0"	15'-0"	24'-0"
-30 parking	12'-0"	24'-0"	15'-0"	24'-0"	22'-0"	24'-0"
-45 parking	16'-0"	24'-0"	18'-0"	24'-0"	32'-0"	32'-0"
-60 parking	21'-0"	24'-0"	22'-0"	24'-0"	36'-0"	36'-0"
-90 parking	30'-0"	30'-0"	36'-0"	36'-0"	40'-0"	40'-0"
Width of clear Access way: per lane	1-Way flow	2-Way flow	1-Way flow	2-Way flow	1-Way flow	2-Way flow
-On straight -On Curve	15'-0" 15'-0"	24'-0" 25'-0"	15'-0" 15'-0"	24'-0" 25'-0"	15'-0" 15'-0"	24'-0" 30'-0" 6.0m for 20'
Inside turning radius of curve	20'-0"		20'-0"		20'-0"	
Maximum gradient of ramp:						
-Straight ramp	1:12 or 8.3%		1:12 or 8.3%		1:15 or 6.7.%	
-Curved ramp	1:15 or 6.7%		1:15 or 6.7%		1:20 or 5%	
Headroom Clearance	14'-0"		14'-0" exclude double-decker		15'-0", 16'-0"at ramp	

2.11.6.5 Motor cycle parking

Motor cycle parking stall can be provided in any available space within parking, the stalls should not obstruct movement of other vehicles and pedestrians. Minimum dimensions of motor-cycle parking stall 3 ft. x 8 ft.

2.11.6.6 Type of Building

a) In the urban residential areas with multi-storeyed units, there should be minimum one parking space for one residential unit, planned separately as parking lots or in the

garages. The road and parking areas cannot be counted as play and green areas as required in part 2, paragraph 6 of these codes.

b) For shopping centres, there shall be minimum one parking space for 1000 square feet sales floor area, planned separately as parking lots or as parking spaces.

c) For offices in the urban areas, there should be minimum one parking space for 10 employees, planned separately as parking lots or as parking space.

d) For other commercial establishments like banks, restaurants, clubs, hotels, etc. the additional calculation for parking requirements must be submitted together with planning and building permit.

2.11.7 Landscaping and Recreation Areas

In the third phase, the details of this section will be described depending on the resources' availability.

PART 2 ARCHITECTURE AND URBAN DESIGN

2.12 Aarchitecture for Energy Efficiency and Green

In the third phase, the details of this section will be described depending on the resources' availability.