



Mastering BOMBA question

**The objective of BOMBA question is to ensure
Future architect understand bomba (fire fighting)
requirement in relation to the by laws**

SUSAHA SOALAN
BOMBA?



WHY DO WE NEED ANSWER BOMBA QUESTION?

- Architect are Principle Submitting Person.
- Architect are responsible of their design.
- Architect are designing for public space.
- Architect must know about fire requirement.

**IT IS CRITICAL AN ARCHITECT MUST
KNOW ABOUT**

FIRE SAFETY



5 PRINCIPLE OF FIRE SAFETY?

Safety of Occupant

Safety Properties

Safety Adjacent premises

Safety to Public

Safety Firefighters

COST OF UNSAFE DESIGN?

- **Lost of life – occupant as well as firefighters**
- **Lost of property.**
- **Lost of business**
- **Lost of work**
- **Lost in term of economy**

WHY FIRE SAFETY?

To achieve this 5 principle, a building must have certain fire safety elements:

- An adequate means of escape for occupants,
- Appropriate compartmentation to contain the fire
- The ability to detect and extinguish the fire at the earliest stage.
- A structure that can withstand the fire for period of time to allow occupant to evacuate out of the building and for fire fighters to extinguish the fire.
- Adequate access for intervention by the fire brigade

CONCEPT OF FIRE SAFETY



KEHENDAK-KEHENDAK MENENTANG KEBAKARAN (KEBOMBAAN)

PASSIVE

ACTIVE

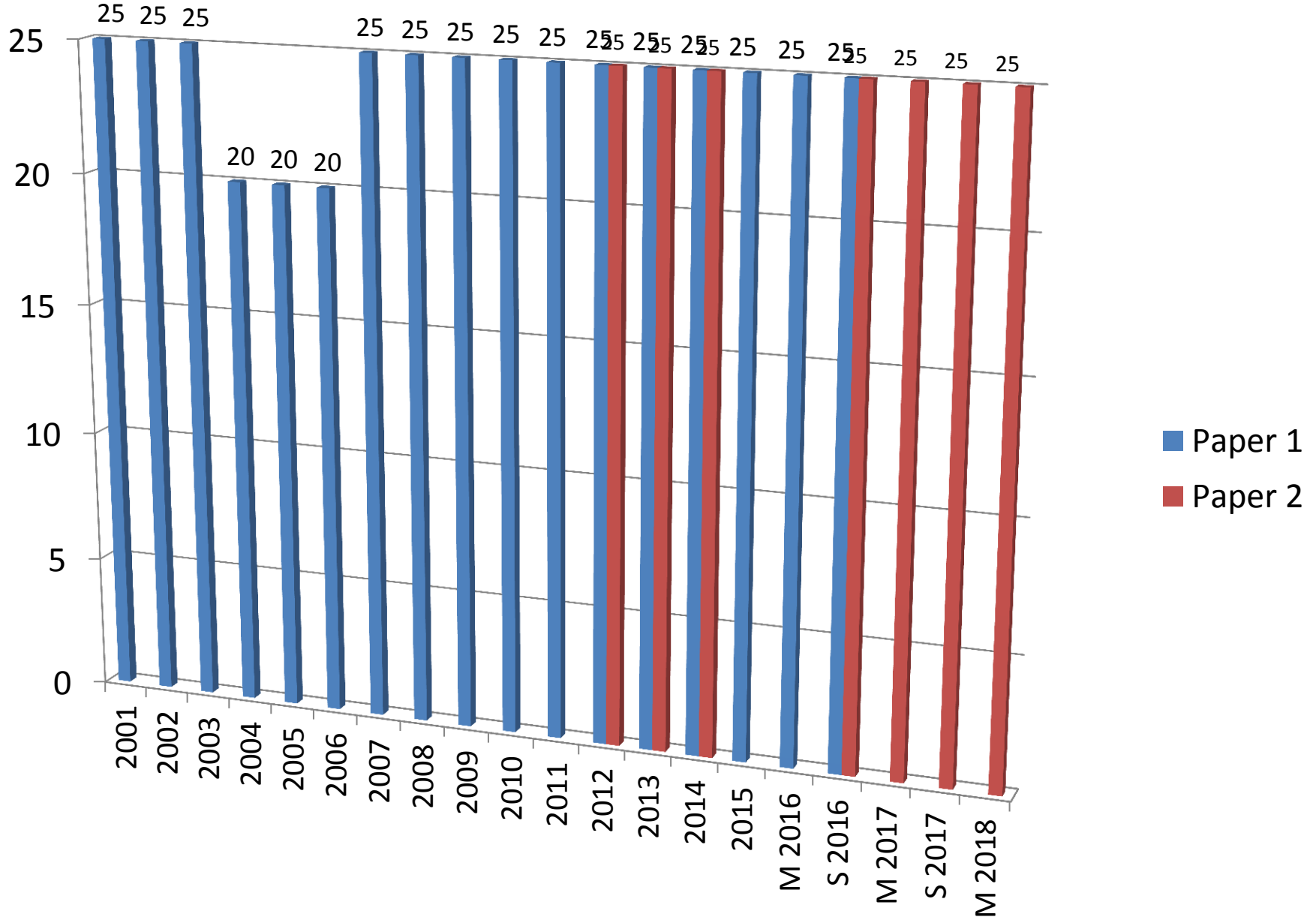
**ADA DALAM
UNDANG-UNDANG KECIL
BANGUNAN SERAGAM**

There are many pattern of bomba question

Question can come in many ways

- 1. Listing of fire requirement**
- 2. Prepare checklist for inspection**
- 3. Prepare MEMO for assistant**
- 4. Correction to plan given**
- 5. Single staircase conditions**
- 6. Calculation of fire appliances access**
- 7. Calculation of occupancy load and capacity exits**
- 8. Calculation of Schedule 6**
- 9. Advise consultant team on Bomba requirement**
- 10. Discuss understanding of concept**
- 11. Sketch on paper for bomba requirement**
- 12. Prepare tenancy agreement**
- 13. Many more**

Fire related question 2001 - 2018



Summary type of questions 2000-2017

Bil	Type of question	Year
1	Related to listing of fire requirements	2000,2001, 2002, 2003, 2005, 2007, 2008, 2012,2014
2	Related to listing of active requirements	2007, 2014, 2016
3	Related to listing of PBT checklist	2004, 2006
4	Related to single staircase	2007, 2008, 2010, 2011
5	Related to calculation of fire appliances	2010
6	Related to calculation of occupancy load	2009, 2010, 2011, 2015
7	Related to calculation of exit width & staircase	2009, 2010, 2011, 2012, 2015, 2016
8	Related to conversion of use	2003, 2009
9	Related out side the box – tenancy aggrement	2009
10	Critical thinking, sketch and concept question	2012, 2013, 2014

Questions 2001-2007

Listing of fire requirement

Bil	Type of question	Year
2001 Paper 2	Listing down fire requirements	Terrace house development, high-rise condo, shopping mal with carpark, hospital
2002	Explain Bomba requirements	High-rise condo, factory
2003	1. Explain Bomba requirements 2. Advice on conversion of 5 floor shop house office to hotel.	Walk-up apartment, high-rise condo, Shop office to Hotel
2004	Your are an authority. Prepare checklist for inspection	High-rise condo, terrace house, shopping mall with car park
2005	List down Bomba requirements	Terrace house, hospital, office with commercial podium
2006	Your are an authority. Prepare checklist for inspection	Terrace house, shopping mall with basement carpark & high-rise condo
2007	1. Explain UBBL, provision for single staircase 2. List bomba requirement for shop office 3. List active requirements for highrise apartment 4. Carparking purpose group and limit of compartmentation	Single staircase, shop office, high-rise apartment, carparking
2008	1. List bomba requirement for staircase	Single staircase requirement

Questions 2009 - 2011

Introduction of calculation

Bil	Type of question	Type of building
2009 Paper 2	1. Calculation minimum staircase exit width 2. Advise conversion of restaurant on 1st floor shop lots. 3. Tenancy agreement	Mix development Shop lots
2010 Paper 1	1. Calculation of exit width 2. Calculation of staircase width 3. Calculation of fire appliances 4. Advise on Single staircase design & height	High-rise mix use Shop lots
2011 Paper 1	1. MEMO to Assistant architect 2. Calculation of occupancy load 3. Calculation of minimum exit of minimum exit & staircase width	Single staircase High rise apartment

Questions 2012

Critical thinking question

Bil	Type of question	Type of building
2012 Paper 1	1. Advise consultant team on procedures related to fire safety requirement on:- • DO • BP • M&E approval • Fire requirement during construction • Requirement after CPC 2. Discuss understanding concept on passive containment, evacuation, rescue and fire fighting	Mix development Shop lots
2012 Paper 2	1. sketch on A3 plan on Purpose Group 2. Sketch on plan for compartmentation and list essential criteria 3. Calculation of exit width 4. Calculation no staircase 5. Sketch staircase location and compliance to dead end travel distance 6. Prepare checklist for fire requirement on passive and active to enable fireman entry to operate at upper floors during emergency	Multiple type of building such as Commercial, office, housing and apartment

Questions 2013

Critical thinking question

Bil	Type of question	Type of building
2013 Paper 1	1. Give 2 By-Law relating to:- • Life safety • Passive Containment • Fire Suppression • Fire fighting and rescue Objective and state how they apply to practice	General
2013 Paper 2	1. Prepare checklist with explanatory notes to:- • Site planning consideration with external wall requirement • Outline basic fire safety for Parcel B • Active & Passive built in facilities • Passive containment strategies Parcel D • Provision during construction for Parcel D	Parcel A: Supermarket Parcel B: Shopping Mall Parcel C: 30 storey appart. Parcel D: 8 Storey appart. Parcel E: Club house

Questions 2014 - 2016

Critical thinking question

Bil	Type of question	Type of building
2014 Paper 2	1. List passive active fire safety by height and size floor area 2. Point out mistake from building section and description:-	8 storey office building and 20 storey office tower. Mix basement/ Lobby/ Office/ Hotel/
2015 Paper 2	1. Locate fire fighting access lobby 2. Calculate occupancy load 3. Calculated horizontal and vertical width 4. Calculated staircase width	14 storey mixed development comprise of carpark, restaurant, office and penthouse office
2016 Paper 1 (Mac)	1. Calculate occupancy load 2. Calculate exit width 3. Calculate travel distance 4. List active requirements	15 storey office with open carpark
2016 Paper 1 (Sept)	1. Tabulate fire safety requirement for:- • Evacuation • Compartmentation • Fire resistance • Active fire systems • Fire appliance access	Multi purposed group:- • Pharmaceutical factory • Office tenants • collage
2016 Paper 2 (Sept)	1. Schedule 6	Tower on podium

Questions 2017 - 2018

Critical thinking question

Bil	Type of question	Type of building
2017 Paper 2 (Mac)	- Correction to section of building regarding needs of:- • Compartmentation • Staircase width • Travel distance - List main active and passive requirement according to UBBL	20 storey tower of:- • Office • Shop • Lobby, Café, M&E • 4 storey basement carpark
2017 Paper 2 (Sept)	- Calculate minimum staircase width - Cite the relevant By-Laws - List active installation accordance to UBBL	48 level tower comprising- • 4 level basement carpark • Lobby, M&E • Office suite • Restaurant & Bar • Serviced studio apartment
2018 Paper (Mac)	- Advice on fire requirement under UBBL regarding converted shop office to collage:- • Fire escapes distance • Escape capacity • Compartmentation • Active system required • Firefighting access and rescue	3 storey shop office

PLAN YOUR STRATEGIES BY KNOWING **TECHNICALITIES OF THE BOMBA QUESTIONS...**

1. REQUIREMENT

2. CALCULATION

**4 TYPES OF
BOMBA QUESTIONS**

**4. PROBLEM
SOLVING**

3. PROSES



PLAN YOUR STRATEGIES BY KNOWING **BOMBA QUESTION**

1. REQUIREMENT

- List down passive and active
- Bomba or Authority checklist

3. PROSES

- Authority proses
- DO, BP, CCC

2. CALCULATION

- Schedule 6
- Schedule 7 – Exit/Staircase

4. PROBLEM SOLVING

- Client request...
- Proposal...

PLAN YOUR STRATEGIES BY KNOWING **BOMBA QUESTION**



1. REQUIREMENT

CALCULATION

**3. PROBLEM
SOLVING**

4. PROSES

PASSIVE

ACTIVE

MALAYSIA

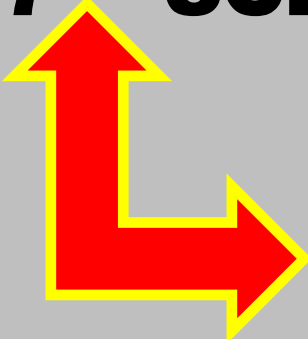
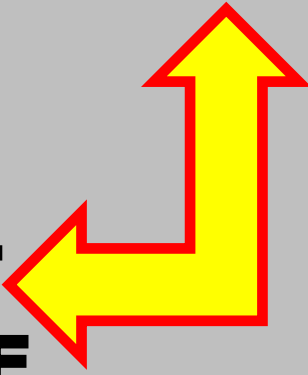
How to used UBBL?

PASSIVE

- **PART VII**
- **5TH SCHEDULE**
- **6TH SCHEDULE**
- **7TH SCHEDULE**

ACTIVE

- **PART VIII**
- **10TH SCHEDULE**

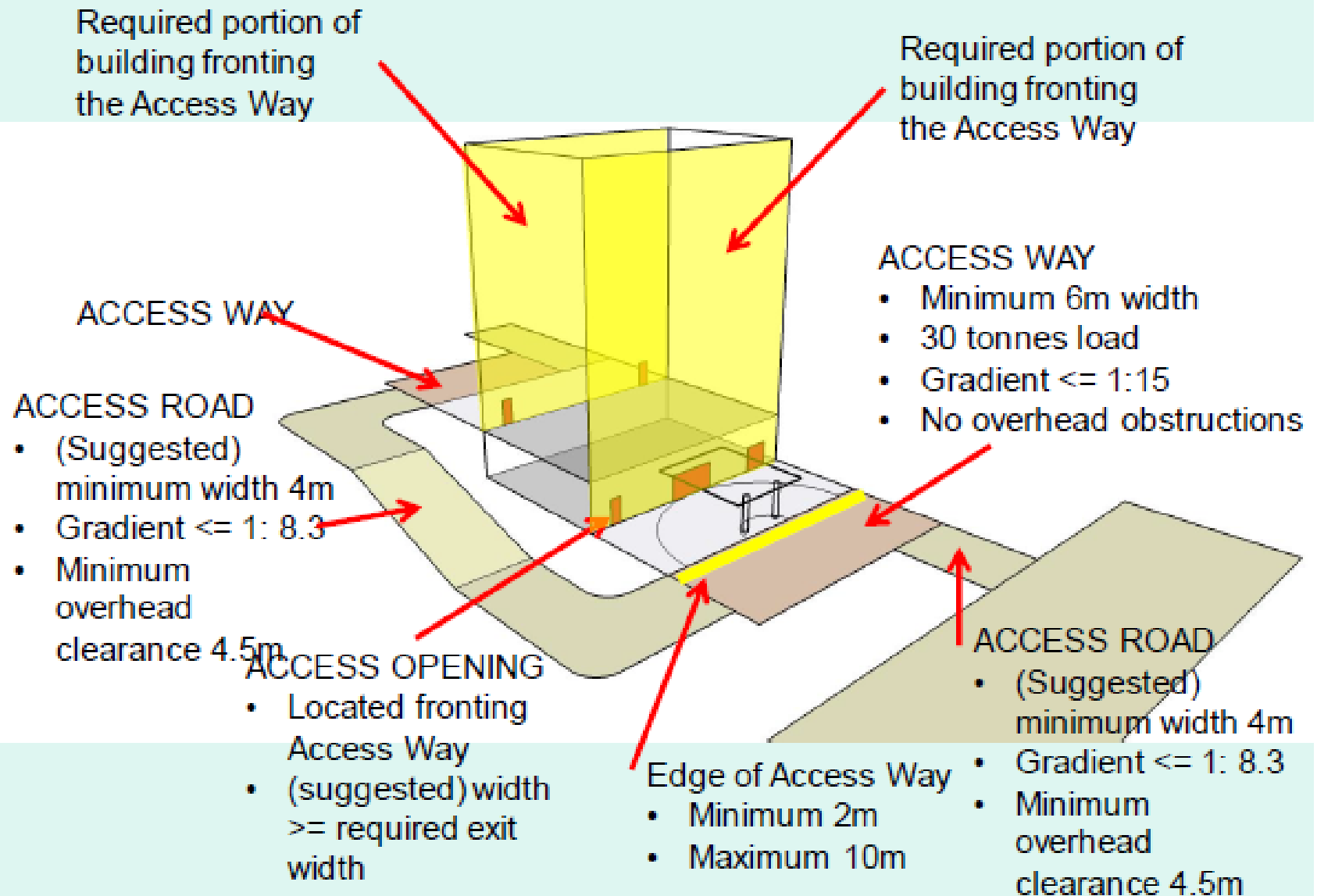
- 
- 
- 1. PURPOSE GROUP**
 - 2. BUILDING HEIGHT**
 - 3. BUILDING VOLUME**
 - 4. CALCULATION / DESIGN**

UBBL

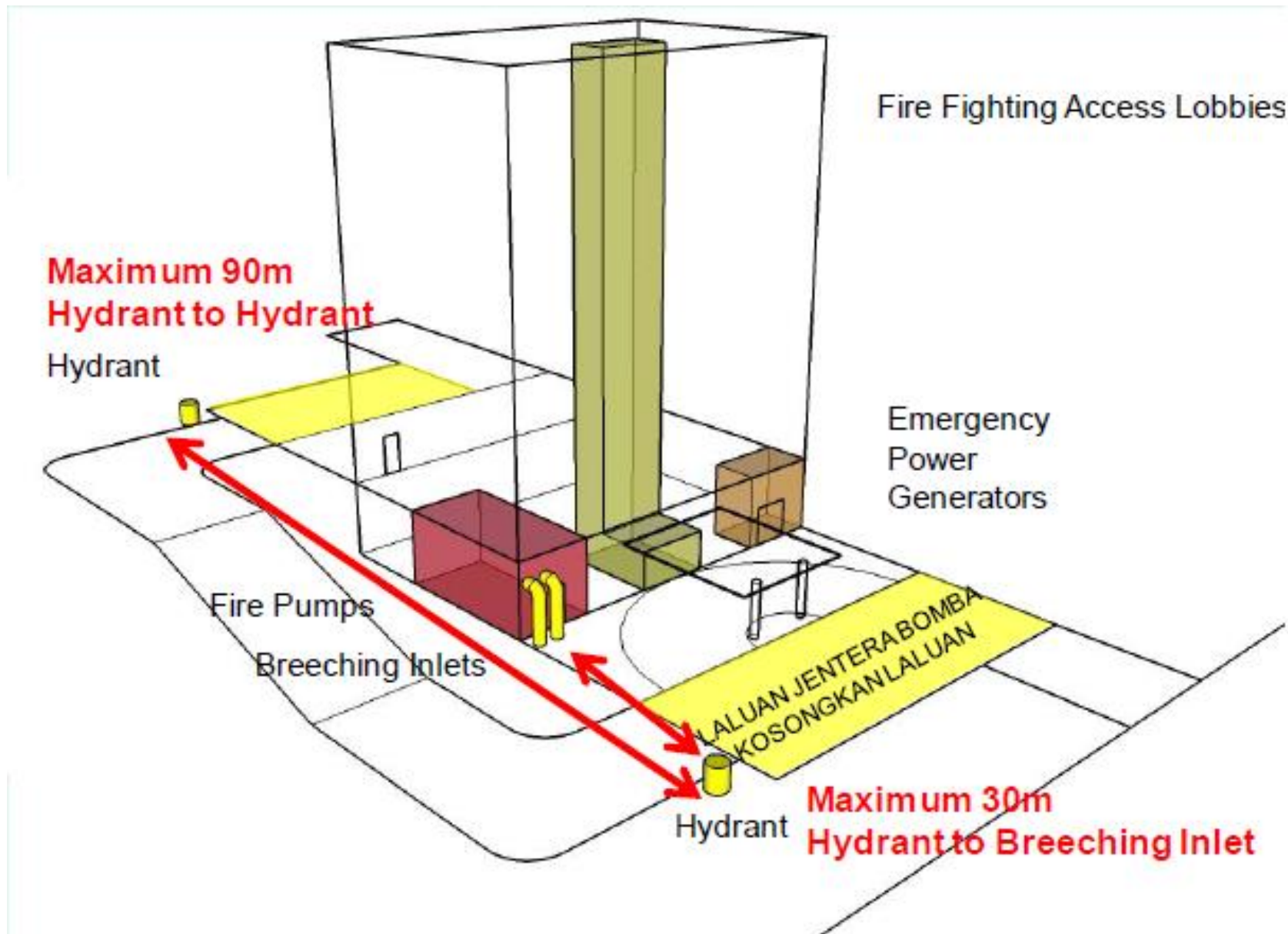
BAHAGIAN I	PERMULAAN
BAHAGIAN II	PENGEMUKAAN PELAN-PELAN UNTUK DILULUSKAN
BAHAGIAN III	RUANG KAWASAN, CAHAYA DAN PENGUDARAAN
BAHAGIAN IV	KERJA-KERJA SEMENTARA BERHUBUNGAN DENGAN KERJA-KERJA BANGUNAN
BAHAGIAN V	KEHENDAK-KEHENDAK STRUKTUR
BAHAGIAN VI	KEHENDAK-KEHENDAK PEMBINAAN
BAHAGIAN VII	KEHENDAK-KEHENDAK MENENTANG KEBAKARAN
BAHAGIAN VIII	PENGGERA KEBAKARAN. PENGESAN API. PEMADAM API DAN AKSES MENENTANG KEBAKARAN
BAHAGIAN IX	PELBAGAI
JADUAL PERTAMA.	
JADUAL KEDUA.	
JADUAL KETIGA.	
JADUAL KEEMPAT	
JADUAL KELIMA	
JADUAL KEENAM	
JADUAL KETUJUH.	
JADUAL KELAPAN.	
JADUAL KESEMBILAN.	
JADUAL KESEPULUH.	

PASSIVE		ACTIVE	
SITE PLANNING	Part VII	Part VIII	
	• 140 : Fire Appliances Access • Access Way minimum 6m, • Access Road minimum 4m, gradient not exceed 1:8.3 • Overhead clearance at least 4.5m	225 : Fire Hydrant to be located max. 90m each • Hydrant to Breeching Inlet max 30m	
BUILDING DESIGN	• 134 : Designation of purpose group • 141 : Party Wall • 142 : External wall refer to 6th Schedule • 144 : Cladding wall shall comply Class O • 145 : Reference to 6th Schedule Permitted limit of unprotected area • 146 : Relevant boundary to complied • 165 : Travel Distance • 166 : Alternative exit • 167 : Storey exit • 169 : Exit route • 171 : Horizontal exit • 173 : Exit Door • 175 : Occupancy load • 176 : Calculation of storey exit • 175 : Calculation of staircase • 179 : Place of assembly classification • 180 : Distance to calculate occupancy load • 189 : Protected corridor • 189 : Single staircase	• 226 : Automatic system for dangerous occupancy • 227 : Portable fire extinguisher • 229 : Fire fighting on 18.3m height building • 230 : Dry riser system • 231 : Wet riser system • 232 : Dry & Wet riser system in building under construction • 233 : Foam system • 235 : Fix installation • 237 : Fire alarm • 238 : Command & control center • 239 : P.A System • 242 : Fire fighting access lobby • 243 : Fire Lift • 248 : Fire appliances color • 253 : Emergency power supply	
	5 th Schedule 6 th Schedule 7 th Schedule	10 th Schedule	

Site planning for fire requirement



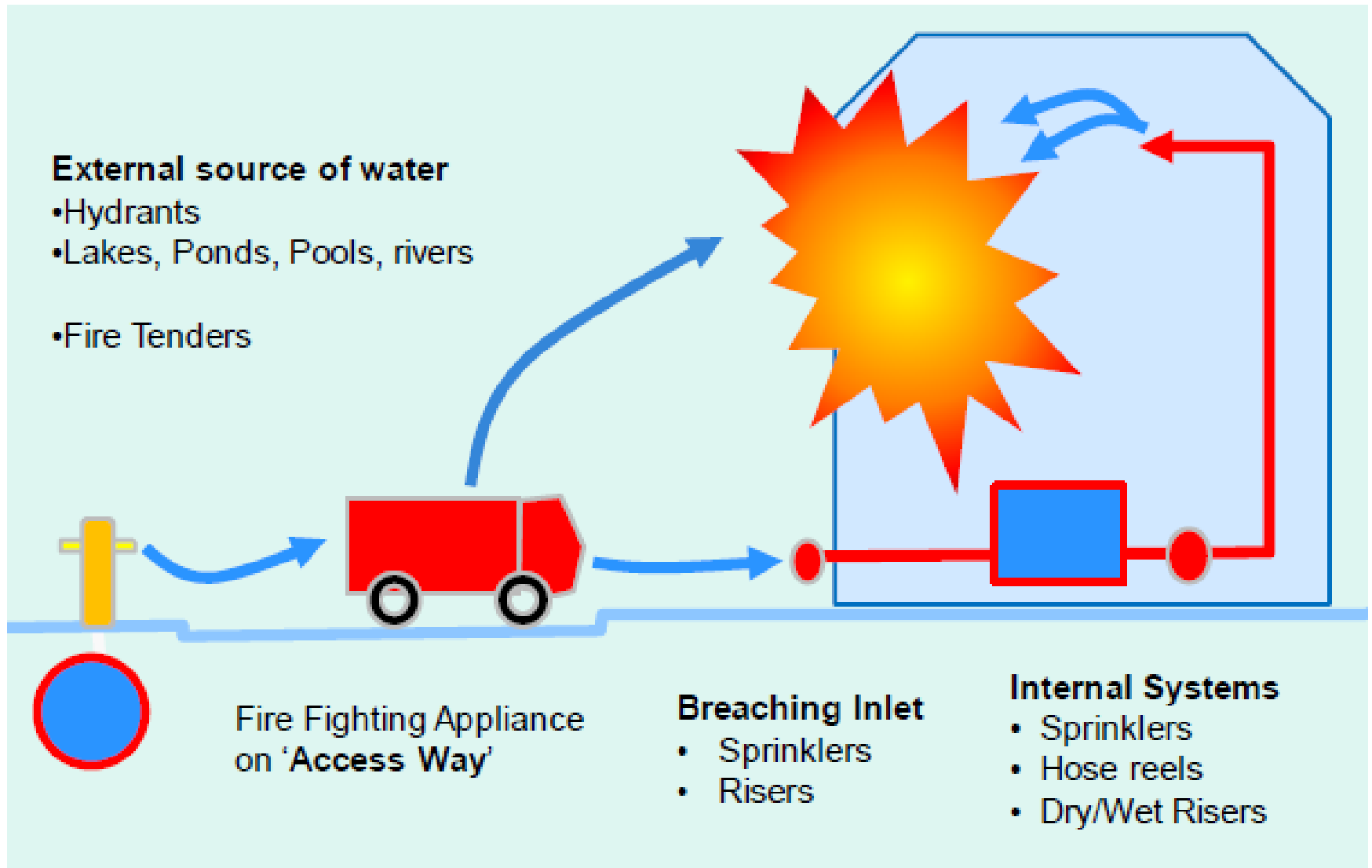
Site planning for fire requirement



Site planning for fire requirement



Site planning for fire requirement



Capacity of exits

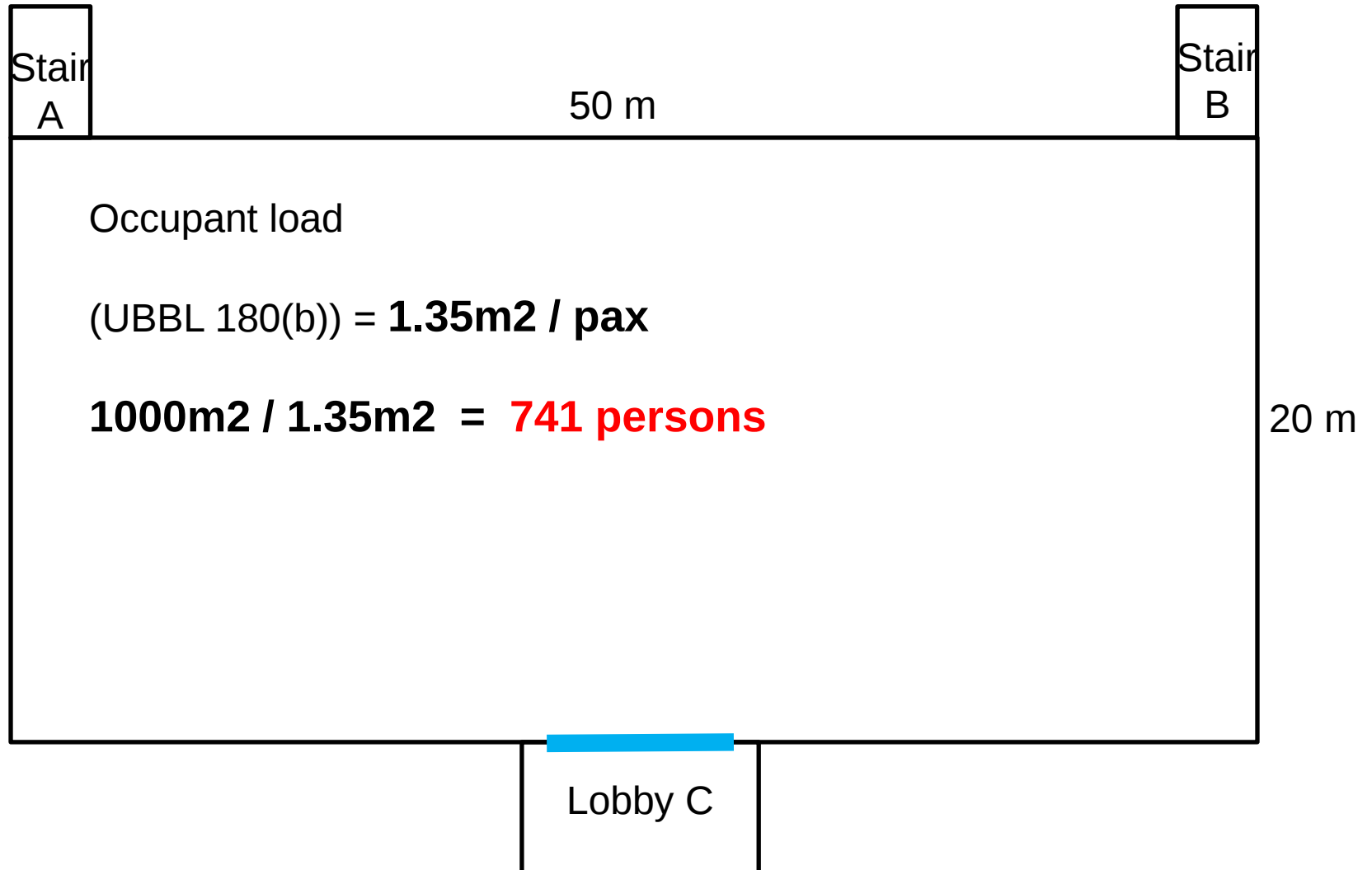
UBBL 175, 176, 178

7th Schedule

- Occupant load
- Exit width
- Application of horizontal exit

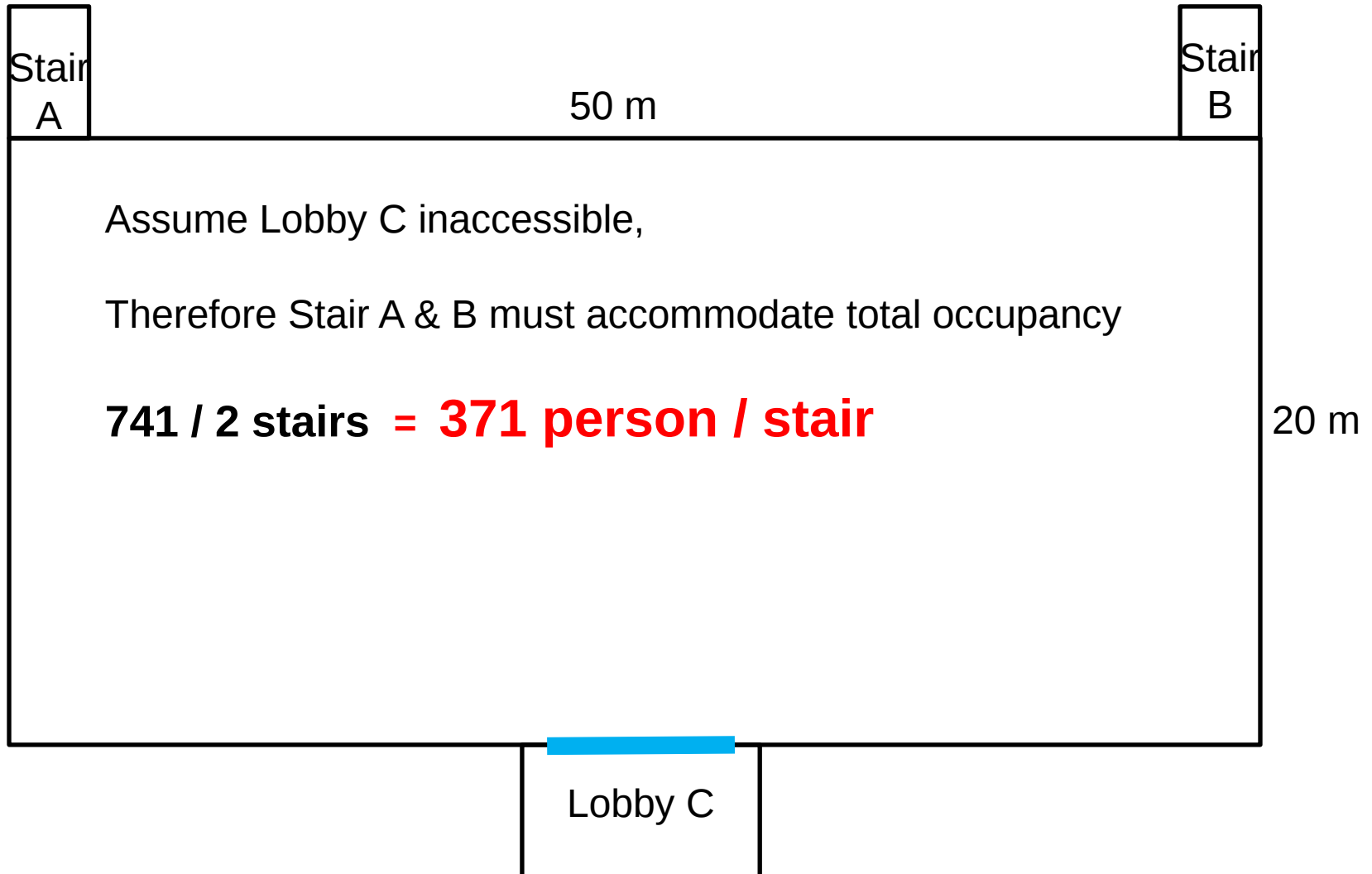
Sample calculation

Scenario 1 : upper floor assembly area in an institutional building



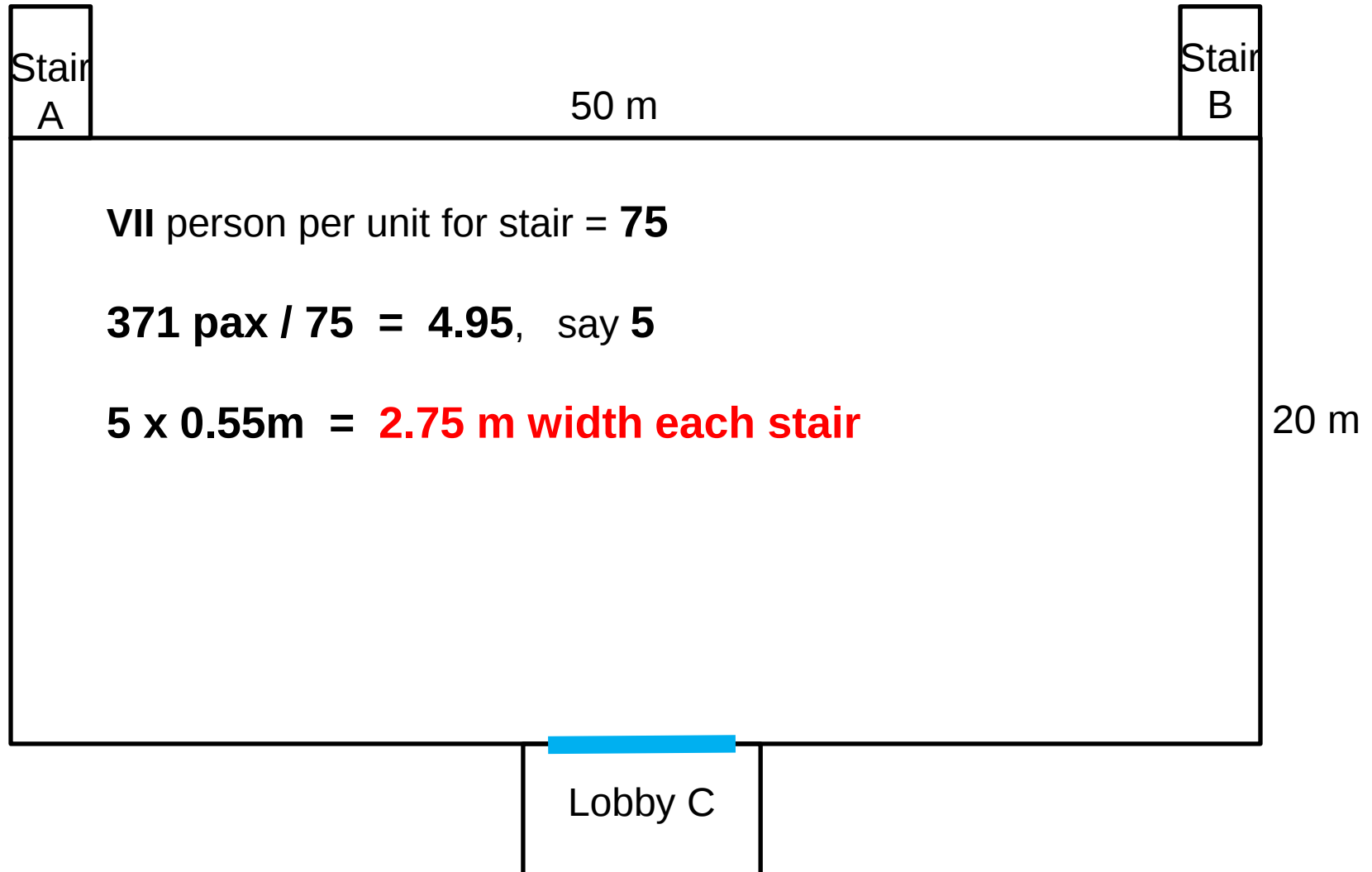
Sample calculation

Scenario 1 : upper floor assembly area in an institutional building



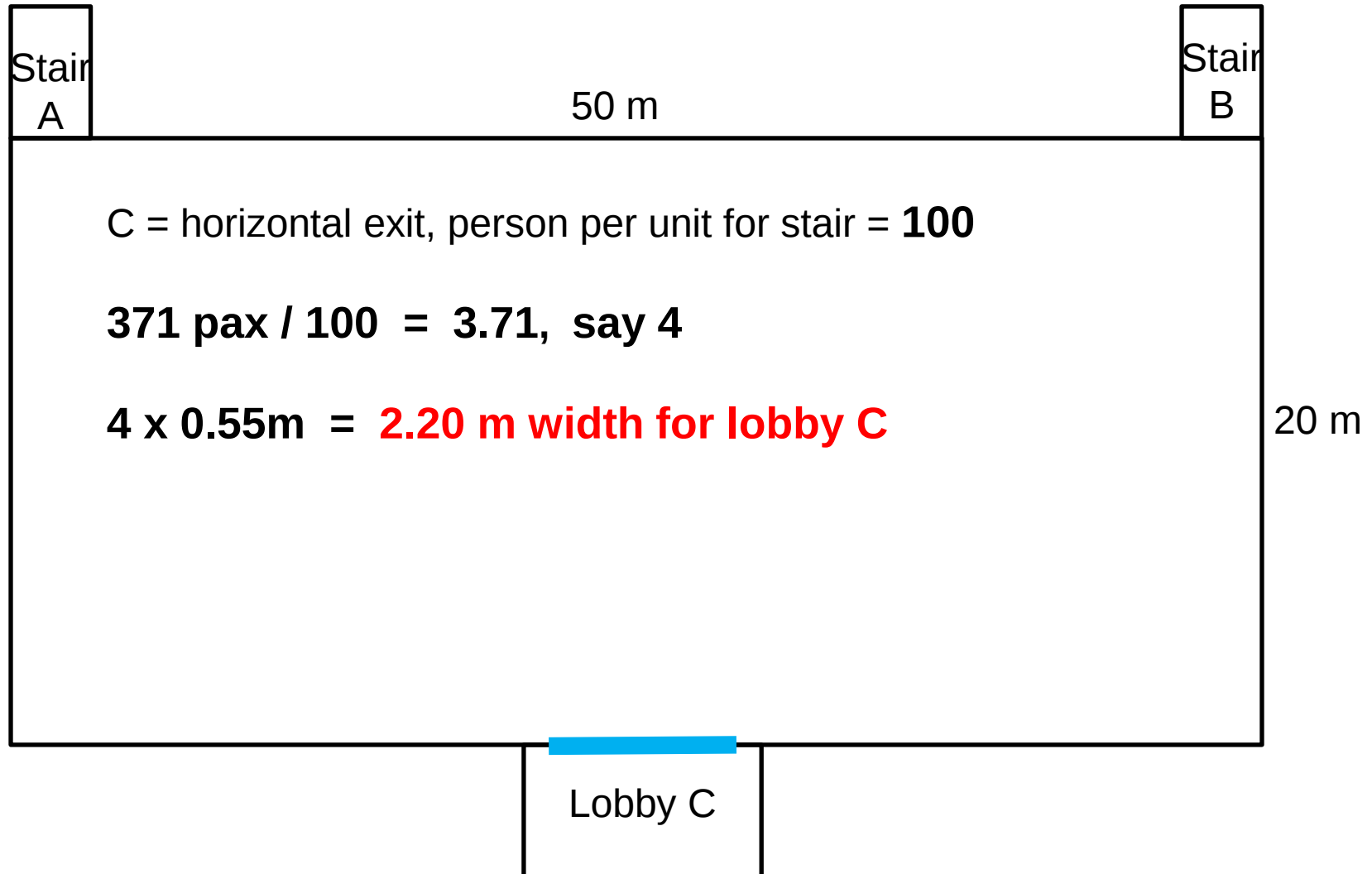
Sample calculation

Scenario 1 : upper floor assembly area in an institutional building



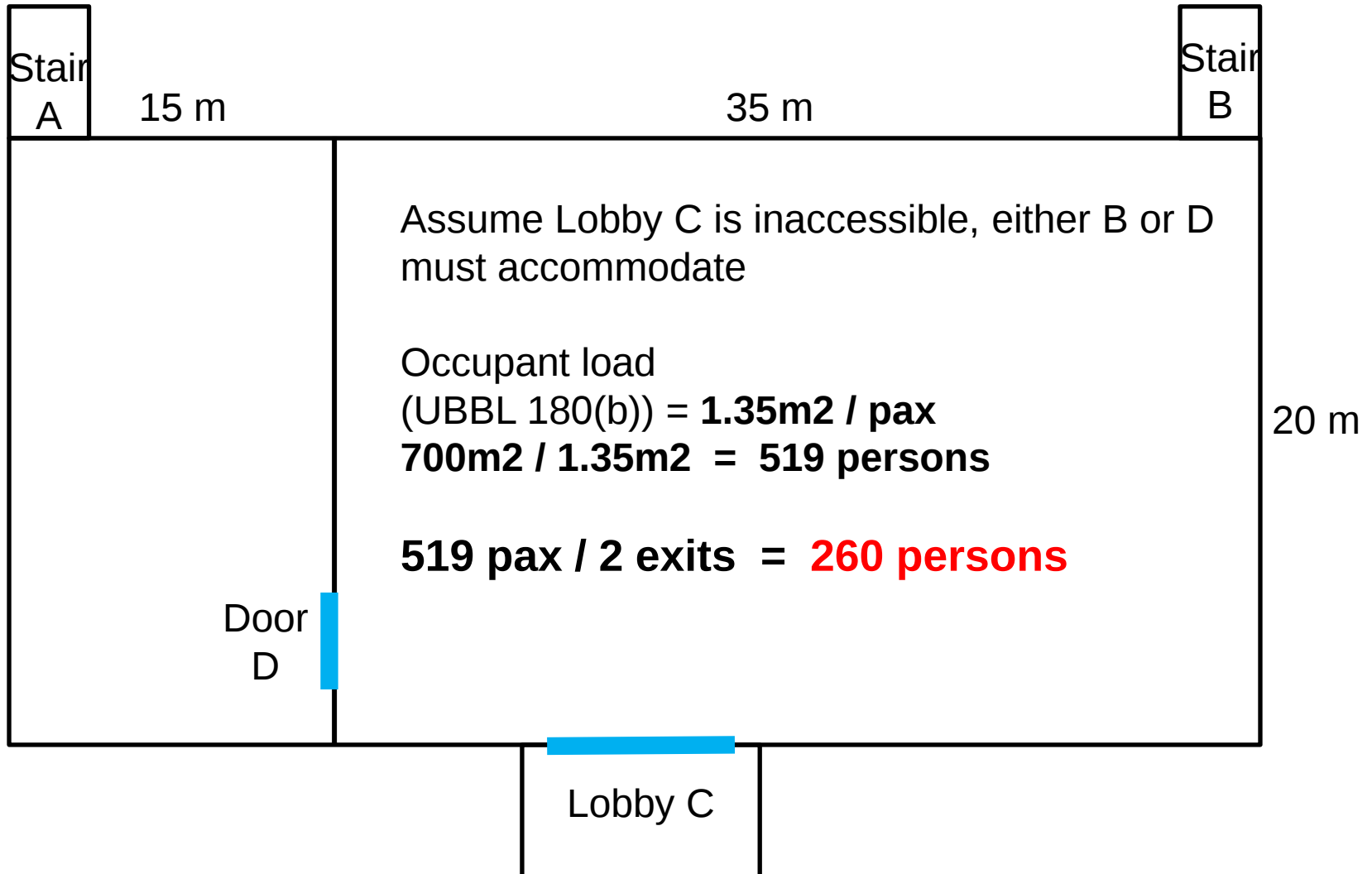
Sample calculation

Scenario 1 : upper floor assembly area in an institutional building



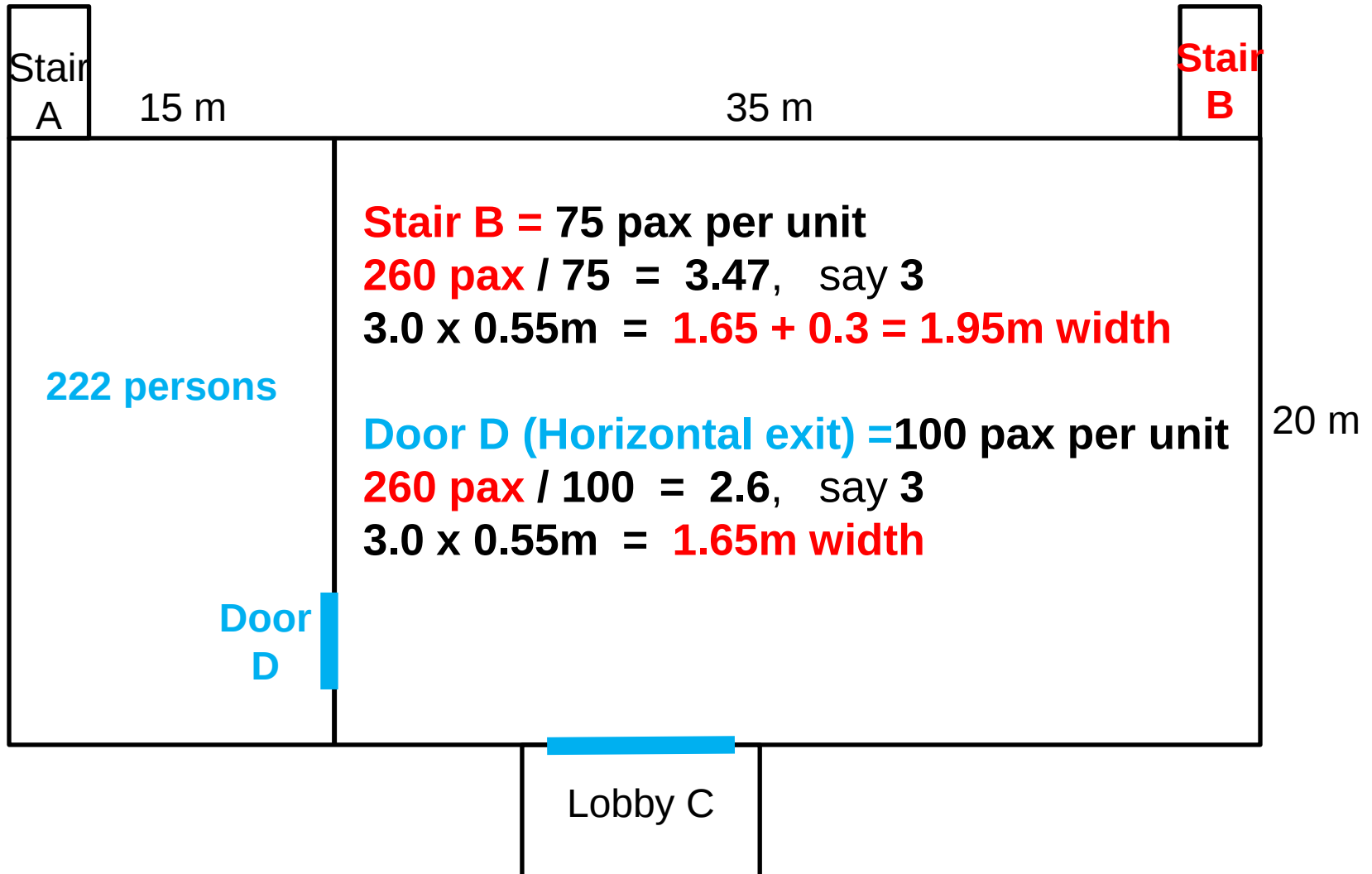
Sample calculation

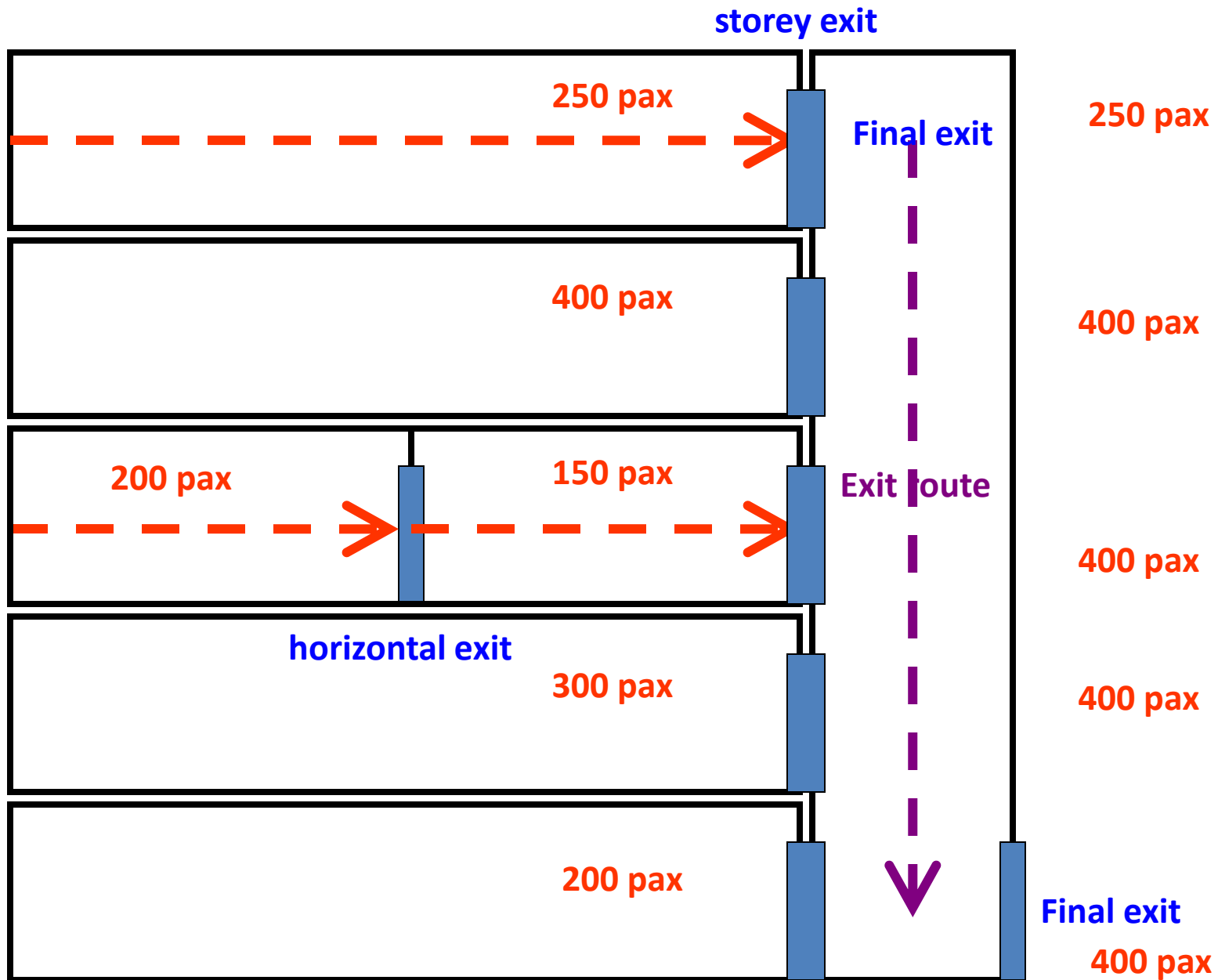
Scenario 1 : upper floor assembly area in an institutional building



Sample calculation

Scenario 1 : upper floor assembly area in an institutional building





CALCULATION

➤ Schedule 7 – Exit/Staircase

REQUIREMENT

➤ List down passive and active

QUESTION 4

(25 marks)

The provided conceptual schematic drawing (see next page) are for a 48 level tower block on 4 levels of basement in Kuala Lumpur, comprising the following:

B1 – B4	Basement Car Park
Levels 1 – 2	Lobby, Public Space and Services
Levels 3 – 24	Office Suites
Level 25	Mechanical Services
Level 26	Restaurant and Bar
Levels 27 – 48	Serviced Studio Apartments

Based on the schematic sketch given, and without changing the design:

a) Calculate the minimum staircase widths for the three main zones of:

- Serviced Studio Apartments
- Restaurant / Bar
- Office Suites

Cite the relevant By-Laws.

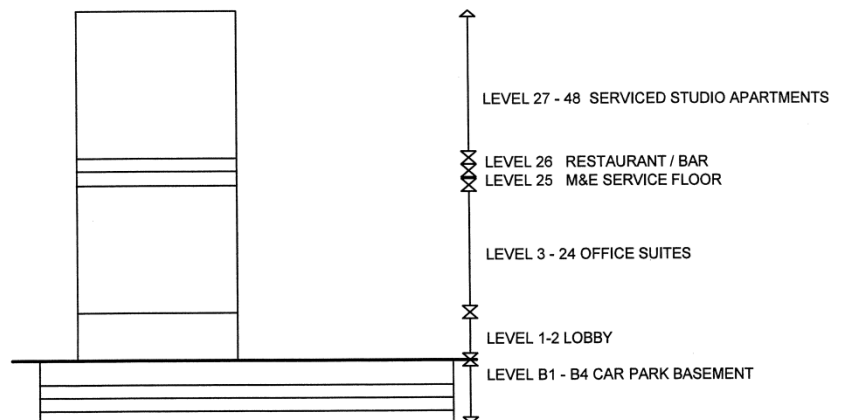
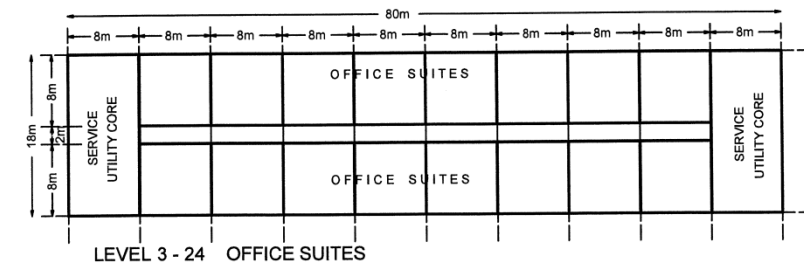
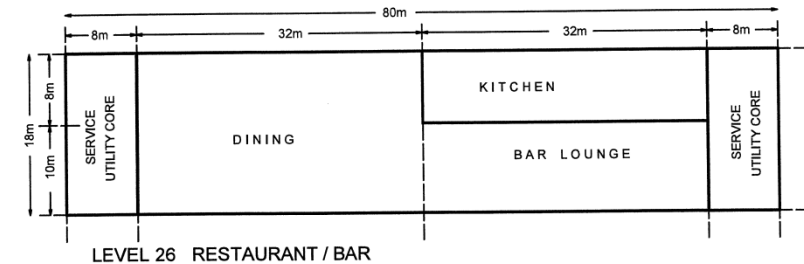
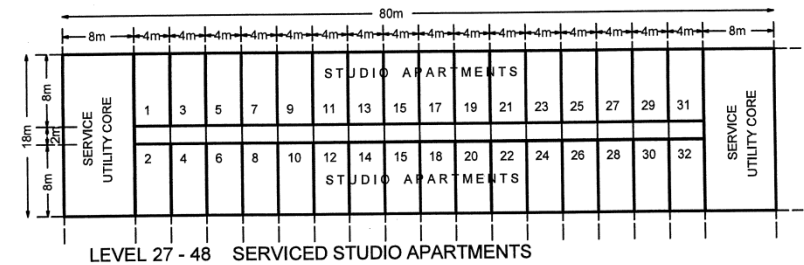
(15 marks)

b) List the Active Electrical and Mechanical Fire Safety installations that are required to be installed in accordance with the UBBL 1984 requirements.

(10 marks)

(see plan on next page)

48 LEVEL TOWER BLOCK ON 4 LEVEL BASEMENT



QUESTION 4

(25 marks)

The provided conceptual schematic drawing (*see next page*) are for a 48 level tower block on 4 levels of basement in Kuala Lumpur, comprising the following:

B1 – B4	Basement Car Park
Levels 1 – 2	Lobby, Public Space and Services
Levels 3 – 24	Office Suites
Level 25	Mechanical Services
Level 26	Restaurant and Bar
Levels 27 – 48	Serviced Studio Apartments

Based on the schematic sketch given, and without changing the design:

a) Calculate the minimum staircase widths for the three main zones of:

- i. Serviced Studio Apartments → 5
- ii. Restaurant / Bar → 5
- iii. Office Suites → 5

Cite the relevant By-Laws.

(15 marks)

b) List the Active Electrical and Mechanical Fire Safety installations that are required to be installed in accordance with the UBBL 1984 requirements.

(10 marks)

(*see plan on next page*)

MAJLIS PEPERIKSAAN SENIBINA

LEMBAGA ARKITEK MALAYSIA

PEPERIKSAAN PROFESIONAL BAHAGIAN III

Kertas : 2/2018

No. Indeks :

No. Soalan	Kesongan ruangan ini
Soalan 4 (a)	
i) Pangapuri Studio Seris	
- Kumpulan Maksud : III (Kediaman Lain)	
- Cari Beban Kependudukan (Occupancy Load)	
$= \frac{\text{Luas Ruang}}{\text{Beban Pendudukan Semalar pusing}} \rightarrow \text{Ubbi 175: Penghitungan beban pendudukan}$	
$= \frac{80 \text{ m} \times 18 \text{ m}}{24 \text{ m}^2} \rightarrow \text{Ubbi 176: Pengiraan lebar pintu dalam tingkal.}$	
$= \frac{1440 \text{ m}^2}{24 \text{ m}^2}$	
$= 60 \text{ orang}$	
$\therefore \text{Beban Kependudukan} = 60 \text{ orang}$	
- Cari lebar minima untuk tangga	
$= \frac{\text{Beban Kependudukan}}{\text{Muatan Keluar (Tangga)}}$	
$= \frac{60}{45} = 1.33 \text{ unit} \rightarrow \text{Ubbi 177 (a): Pengiraan bilangan tangga & lebar tangga}$	
Ambil 1.0	
$\therefore 1.0 \times 550$	
$= 550 + 300 \rightarrow \text{Ubbi 181: Lebar Jalan Keluar}$	
$= 850$	
$\therefore \text{Lebar minimum } 900 \text{ mm} \rightarrow \text{Ubbi 177 (e) Pengiraan bil. tangga dari bilangan tangga}$	

MAJLIS PEPERIKSAAN SENIBINA

LEMBAGA ARKITEK MALAYSIA

PEPERIKSAAN PROFESIONAL BAHAGIAN III

Kertas :

No. Indeks :

No. Soalan	Kesongan ruangan ini
Soalan 4 (a)	
ii) Restoran & Bar	
- Kumpulan Maksud : VII (Tempat Perhimpunan)	
- Cari Beban Pendudukan (Occupancy Load)	
$= \frac{\text{Luas Ruang}}{\text{Beban Pendudukan Semalar pusing}}$	
$= \frac{64 \text{ m} \times 18 \text{ m}}{1.35 \text{ m}^2} \rightarrow \text{Ubbi 180 (b): Standard jarak utk kila beban pendudukan}$	
$= \frac{1152 \text{ m}^2}{1.35 \text{ m}^2} \rightarrow \text{Ubbi 175: Penghitungan beban pendudukan}$	
$= 853.3 \text{ orang}$	
$\therefore \text{Beban Pendudukan} = 854 \text{ orang}$	
- Kila lebar minima utk. tangga	
$= \frac{\text{Beban Pendudukan}}{\text{Muatan Keluar (Tangga)}}$	
$= \frac{854}{75} = 11.38 \text{ unit} \rightarrow \text{Ubbi 177 (a): Pengiraan bilangan tangga dari beban tangga}$	
$\therefore \text{Ambil } 11.0$	
$= 11 \times 550$	
$= 6050 + 300 \text{ mm} \rightarrow \text{Ubbi 181: Lebar Jalan Keluar}$	
$= 6350 \text{ mm}$	

MAJLIS PEPERIKSAAN SENIBINA

LEMBAGA ARKITEK MALAYSIA

PEPERIKSAAN PROFESIONAL BAHAGIAN III

Kertas :

No. Indeks :

No. Soalan	Soalan 4 (a)	Keongka- rusangan [a]
iii)	Pejabat Suites	
	- Kumpulan Maksud : IV (Pejabat)	
	- Ciri Beban Pendudukan (Occupancy Load)	
	$\frac{\text{Luas Ruang}}{\text{Beban Pendudukan}} \frac{1}{m^2}$	
	= $\frac{80 \times 18}{10} \rightarrow$ Ubb1 175: Perhitungan beban pendudukan	
	= 144 orang Ubb1 176 (a)(b)(c): Pengiraan lebar pintu keluar tingkat	
	$\therefore$ Beban Pendudukan = 144 orang	
	- Kira lebar minima tangga	
	= Beban Pendudukan	
	Muatan Keluar (Tangga)	
	= $\frac{144}{60} \rightarrow$ Ubb1 176 (d): Pengiraan lebar pintu keluar tingkat	
	= 2.4 unit (e)	
	$\therefore$ Ambil 2 unit	
	= $2 \times 550 \rightarrow$ Ubb1 181: Lebar jalan keluar	
	= $1100 + 300$	
	= 1400 mm Lebar tangga bagi pejabat	
	$\therefore$ Walaubagaimana pun memandarkannya di Atas 26 bandar Restaurant	
	Lebar tangga bagi minimum bagi Pejabat juga akan	
	menyikut kelebaran minima tangga bagi Restaurant.	
	iaitu 6350 mm lebar.	

QUESTION 4

(25 marks)

The provided conceptual schematic drawing (*see next page*) are for a 48 level tower block on 4 levels of basement in Kuala Lumpur, comprising the following:

B1 – B4	Basement Car Park
Levels 1 – 2	Lobby, Public Space and Services
Levels 3 – 24	Office Suites
Level 25	Mechanical Services
Level 26	Restaurant and Bar
Levels 27 – 48	Serviced Studio Apartments

Based on the schematic sketch given, and without changing the design:

a) Calculate the minimum staircase widths for the three main zones of:

- i. Serviced Studio Apartments → 5
- ii. Restaurant / Bar → 5
- iii. Office Suites → 5

Cite the relevant By-Laws.

(15 marks)

b) List the Active Electrical and Mechanical Fire Safety installations that are required to be installed in accordance with the UBBL 1984 requirements.

(10 marks)

(see plan on next page)

QUESTION 4

(25 marks)

The provided conceptual schematic drawing (*see next page*) are for a 48 level tower block on 4 levels of basement in Kuala Lumpur, comprising the following:

B1 – B4	Basement Car Park
Levels 1 – 2	Lobby, Public Space and Services
Levels 3 – 24	Office Suites
Level 25	Mechanical Services
Level 26	Restaurant and Bar
Levels 27 – 48	Serviced Studio Apartments

Based on the schematic sketch given, and **without changing the design:**

a) Calculate **the minimum staircase widths** for the **three main zones of:**

- i. Serviced Studio Apartments → **5**
- ii. Restaurant / Bar → **5**
- iii. Office Suites → **5**

Cite the relevant By-Laws.

(15 marks)

b) List the **Active Electrical and Mechanical Fire Safety installations** that are required to be installed in accordance with the **UBBL 1984 requirements.**

(10 marks)

10 point for 10 marks!!!

(*see plan on next page*)

ACTIVE...

- Sprinkler
- Hose Reel
- Extinguisher
- Wet Riser
- Fire Hydrant
- Co2 System
- Fire Alarm
- Bomba Lif
- Command & Control
- P.A System
- Fire Fighting Acces Lobby
- Emergency Power System

2014 Paper 2

QUESTION 3

(25 marks)

- (a) When the topmost floor of a building is beyond the reach of the fire rescue appliances, the By-Laws impose additional requirements with respect to fire-safety provisions. List the passive and active fire safety provisions for the following buildings :-

- (i) 8-storey office building (topmost floor 30m and 5000 sq.m.
maximum gross area/floor).

(5 marks)

PASSIVE FIRE SAFETY PROVISION

- This building fall under **Purpose Group III : Office**
- Building must be in Island site because volume of building more then 112,000m³.
- Limit of Compartmentation must be base on 5th Schedule
- At least minimum **2 exit** way must be incorporate to design.
- Max travel distance: Dead End 15m, Non-sprinkler 45m, Sprinkler 60m.

ACTIVE FIRE SAFETY PROVISION

- **Fire Hydrant** must incorporate in design 90m apart.
- **Dry Riser** must incorporate in design for building more than 18.3m height.
- **Hose Reel** and also must be incorporate.
- **Automatic Fire Detection** and **Manual Break Glass** both must be incorporate.
- **Bomba Lif** must be install for building more than 18m

2014 Paper 2

QUESTION 3

(25 marks)

- (a) When the topmost floor of a building is beyond the reach of the fire rescue appliances, the By-Laws impose additional requirements with respect to fire-safety provisions. List the passive and active fire safety provisions for the following buildings :-

- (ii) 20-storey office tower (topmost floor 80m and 5000 sq.m. maximum gross area/floor. 137 238)

(5 marks)

PASSIVE FIRE SAFETY PROVISION

- This building fall under Purpose Group III : Office
- Building must be in Island site because volume of building more then 112,000m³.
- Limit of Compartmentation must be base on 5th Schedule
- At least minimum 2 exit way must be incorporate to design.
- Max travel distance: Dead End 15m, Unsprinkler 45m, Sprinkler 60m.
- All staircase must be **Pressurize** and going up to the rooftop.

ACTIVE FIRE SAFETY PROVISION

- **Fire Hydrant** must incorporate in design 90m apart.
- **Wet Riser** must incorporate in design for building more than 30.5m height
- **Hose Reel** and **Sprinkler System** also must be incorporate in the design.
- **Automatic Fire Detection** and **Manual Break Glass** both must be incorporate.
- **Bomba Lif** must be install for building more than 18m
- **Command & Control Center** must be incorporate

QUESTION 4**(25 marks)**

You are the Lead Consultant and the Principal Submitting Person for a mixed-development project on 8 hectares of land which is to be implemented in phases as follows:

PARCEL	BUILDING DESCRIPTION
Parcel A (1.5 hectares)	- single storey supermarket block of 4,200 sq. m. gross floor area, inclusive of public facilities. - an open carpark.
Parcel B (2 hectares)	- 3 to 4-storey shopping mall block (8,000 sq. m. per floor) - 2 levels of carpark basements below the shopping mall (approx. 10,000 sq. m. net area per floor). - an open carpark.
Parcel C (1.5 hectares) Phase 1	- 30-storey apartment block comprising of 240 apartment units. - lobby & recreational area on Ground and First floors. - an open carpark.
Parcel D (2.5 hectares) Under construction	- 8-storey hotel block comprising of 200 rooms & 12 suites. - public facilities, function & meeting rooms, kitchen and restaurant, recreational facilities and main lobby on Ground, First and Second floors. - single-level basement services area. - an open carpark.
Parcel E (0.5 hectares)	2-storey club house.

Prepare a checklist together with explanatory notes on the provision of fire-safety requirements under the Uniform Building By-Laws (UBBL), 1984 for the following:

- (a) The site planning considerations together with external wall requirements of the whole development.

(3 marks)

- (b) Outline the basic fire-safety requirements for Parcel B.

(6 marks)

- (c) The active and passive built-in facilities required for Parcel C in order to comply with UBBL, 1984.

(8 marks)

- (d) The passive containment strategies for Parcel D.

(5 marks)

- (e) The provisions of fire-fighting facilities during construction of Parcel D.

(3 marks)**Parcel A (1.5 hectares)**

- BL225 - Fire Hydrant to be located at 90m each.
- BL140 - All building exceed 7000m³ must locate in front road/open area not less 12m or can be reached by Bomba appliances.
- BL145 - Reference to 6th schedule – Ant side of building shall comply with requirement relating permitted limit of unprotected areas.
- BL146 - Relevant boundary to comply 6th Schedule.

QUESTION 4**(25 marks)**

You are the Lead Consultant and the Principal Submitting Person for a mixed-development project on 8 hectares of land which is to be implemented in phases as follows:

PARCEL	BUILDING DESCRIPTION
Parcel A (1.5 hectares)	- single storey supermarket block of 4,200 sq. m. gross floor area, inclusive of public facilities. - an open carpark.
Parcel B (2 hectares)	- 3 to 4-storey shopping mall block (8,000 sq. m. per floor) - 2 levels of carpark basements below the shopping mall (approx. 10,000 sq. m. net area per floor). - an open carpark.
Parcel C (1.5 hectares) Phase 1	- 30-storey apartment block comprising of 240 apartment units. - lobby & recreational area on Ground and First floors. - an open carpark.
Parcel D (2.5 hectares) Under construction	- 8-storey hotel block comprising of 200 rooms & 12 suites. - public facilities, function & meeting rooms, kitchen and restaurant, recreational facilities and main lobby on Ground, First and Second floors. - single-level basement services area. - an open carpark.
Parcel E (0.5 hectares)	2-storey club house.

Prepare a checklist together with explanatory notes on the provision of fire-safety requirements under the Uniform Building By-Laws (UBBL), 1984 for the following:

- (a) The site planning considerations together with external wall requirements of the whole development.

(3 marks)

- (b) Outline the basic fire-safety requirements for Parcel B.

(6 marks)

- (c) The active and passive built-in facilities required for Parcel C in order to comply with UBBL, 1984.

(8 marks)

- (d) The passive containment strategies for Parcel D.

(5 marks)

- (e) The provisions of fire-fighting facilities during construction of Parcel D.

(3 marks)**Parcel A (1.5 hectares)**

- BL225 - Fire Hydrant to be located at 90m each.
- BL140 - All building exceed 7000m³ must locate in front road/open area not less 12m or can be reached by Bomba appliances.
- BL145 - Reference to 6th schedule – Ant side of building shall comply with requirement relating permitted limit of unprotected areas.
- BL146 - Relevant boundary to comply 6th Schedule.

Parcel B (2 hectares)**Purpose Group VII (Class B) : Place of Assembly
Passive Strategies**

- BL225 - Fire Hydrant to be located at 90m each.
- BL140 – This building 32,000m³ must be 1/6 minimum perimeter building locate in front road/open area not less 12m or can be reached by Bomba appliances.
- BL146 - Relevant boundary and limit of unprotected areas to comply Schedule 6th.

Active Strategies

- Refer to 10th Schedule :
 - Automatic Sprinkler & Hose Reel
 - Manual Fire Electric Fire Alarm
 - Generators
- BL238 - Command & Control Centre
- BL235 – Installation of CO₂ System

QUESTION 4**(25 marks)**

You are the Lead Consultant and the Principal Submitting Person for a mixed-development project on 8 hectares of land which is to be implemented in phases as follows:

PARCEL	BUILDING DESCRIPTION
Parcel A (1.5 hectares)	- single storey supermarket block of 4,200 sq. m.gross floor area, inclusive of public facilities. - an open carpark.
Parcel B (2 hectares)	- 3 to 4-storey shopping mall block (8,000 sq. m. per floor) - 2 levels of carpark basements below the shopping mall (approx. 10,000 sq. m. net area per floor). - an open carpark.
Parcel C (1.5 hectares) Phase 1	- 30-storey apartment block comprising of 240 apartment units. - lobby & recreational area on Ground and First floors. - an open carpark.
Parcel D (2.5 hectares) Under construction	- 8-storey hotel block comprising of 200 rooms & 12 suites. - public facilities, function & meeting rooms, kitchen and restaurant, recreational facilities and main lobby on Ground, First and Second floors. - single-level basement services area. - an open carpark.
Parcel E (0.5 hectares)	2-storey club house.

Prepare a checklist together with explanatory notes on the provision of fire-safety requirements under the Uniform Building By-Laws (UBBL), 1984 for the following:

- (a) The site planning considerations together with external wall requirements of the whole development.

(3 marks)

- (b) Outline the basic fire-safety requirements for Parcel B.

(6 marks)

- (c) The active and passive built-in facilities required for Parcel C in order to comply with UBBL, 1984.

(8 marks)

- (d) The passive containment strategies for Parcel D.

(5 marks)

- (e) The provisions of fire-fighting facilities during construction of Parcel D.

(3 marks)**Parcel C (1.5 hectares)**

Assume each floor 3m. Total height (30storey X 3m=90m)

Active built-in facilities required:-

- BL225 - Fire Hydrant to be locates at 90m each.
- BL231 – To provide Wet Riser system
- BL235 – To provide Co2 System at the Sub-Station
- BL237 – To provide Alarm System
- BL238 – To provide Fire Command Centre with fire control panel
- BL239 : To provide Communication System

Passive Strategies

- BL136 – Compartment wall and Floor
- BL140 – This building must be locate in front road/open area not less12m or can be reach by Bomba appliances.
- BL146 - Relevant boundary and limit of unprotected areas to complied 6th Schedule.
- BL157 – To equip with Fire fighting staircase (Protected staicase)
- BL165 - Max travel distance: Dead End 10m, Unsprinkler 30m, Sprinkler 45m.
- BL166 - At least minimum 2 exit way must be incorporate to design.
- BL195 - All staircase must going up to the rooftop.

QUESTION 4**(25 marks)**

You are the Lead Consultant and the Principal Submitting Person for a mixed-development project on 8 hectares of land which is to be implemented in phases as follows:

PARCEL	BUILDING DESCRIPTION
Parcel A (1.5 hectares)	- single storey supermarket block of 4,200 sq. m.gross floor area, inclusive of public facilities. - an open carpark.
Parcel B (2 hectares)	- 3 to 4-storey shopping mall block (8,000 sq. m. per floor) - 2 levels of carpark basements below the shopping mall (approx. 10,000 sq. m. net area per floor). - an open carpark.
Parcel C (1.5 hectares) Phase 1	- 30-storey apartment block comprising of 240 apartment units. - lobby & recreational area on Ground and First floors. - an open carpark.
Parcel D (2.5 hectares) Under construction	- 8-storey hotel block comprising of 200 rooms & 12 suites. - public facilities, function & meeting rooms, kitchen and restaurant, recreational facilities and main lobby on Ground, First and Second floors. - single-level basement services area. - an open carpark.
Parcel E (0.5 hectares)	2-storey club house.

Prepare a checklist together with explanatory notes on the provision of fire-safety requirements under the Uniform Building By-Laws (UBBL), 1984 for the following:

- (a) The site planning considerations together with external wall requirements of the whole development.

(3 marks)

- (b) Outline the basic fire-safety requirements for Parcel B.

(6 marks)

- (c) The active and passive built-in facilities required for Parcel C in order to comply with UBBL, 1984.

(8 marks)

- (d) The passive containment strategies for Parcel D.

(5 marks)

- (e) The provisions of fire-fighting facilities during construction of Parcel D.

(3 marks)**Parcel D**

Assume each floor 3m. Total height (8 storey X 4m=32m)

Purpose Group III : Other Residential**Passive Containment Strategies:-**

- BL136 – Limit of Compartment wall refer to 5th Schedule
PG:III Height >28m = 2000m², 5000m³
- BL137 – Floor to constructed as compartment floors
- BL140 – This building must be locate in front road/open area not less 12m or can be reach by Bomba appliances.
- BL145 - Reference to 6th schedule – Compartment wall to be construct between Hotel, Common area and Basement parking
- BL146 - Relevant boundary to complied 6th Schedule.
- BL165 - Max travel distance: Dead End 10m, Unsprinkler 30m, Sprinkler 45m.
- BL166 - At least minimum 2 exit way must be incorporate to design.
- BL168 – To provide at least 2 exit staircase.
- BL195 – All Exit staircase must go to Rooftop
- BL197 – Protected lobby to be provided if the staircase not natural ventilated.

QUESTION 4**(25 marks)**

You are the Lead Consultant and the Principal Submitting Person for a mixed-development project on 8 hectares of land which is to be implemented in phases as follows:

PARCEL	BUILDING DESCRIPTION
Parcel A (1.5 hectares)	- single storey supermarket block of 4,200 sq. m.gross floor area, inclusive of public facilities. - an open carpark.
Parcel B (2 hectares)	- 3 to 4-storey shopping mall block (8,000 sq. m. per floor) - 2 levels of carpark basements below the shopping mall (approx. 10,000 sq. m. net area per floor). - an open carpark.
Parcel C (1.5 hectares) Phase 1	- 30-storey apartment block comprising of 240 apartment units. - lobby & recreational area on Ground and First floors. - an open carpark.
Parcel D (2.5 hectares) Under construction	- 8-storey hotel block comprising of 200 rooms & 12 suites. - public facilities, function & meeting rooms, kitchen and restaurant, recreational facilities and main lobby on Ground, First and Second floors. - single-level basement services area. - an open carpark.
Parcel E (0.5 hectares)	2-storey club house.

Prepare a checklist together with explanatory notes on the provision of fire-safety requirements under the Uniform Building By-Laws (UBBL), 1984 for the following:

- (a) The site planning considerations together with external wall requirements of the whole development.

(3 marks)

- (b) Outline the basic fire-safety requirements for Parcel B.

(6 marks)

- (c) The active and passive built-in facilities required for Parcel C in order to comply with UBBL, 1984.

(8 marks)

- (d) The passive containment strategies for Parcel D.

(5 marks)

- (e) The provisions of fire-fighting facilities during construction of Parcel D.

(3 marks)**Parcel D**

Assume each floor 3m. Total height (8 storey X 4m=32m)

Purpose Group III : Other Residential**Passive Containment Strategies:-**

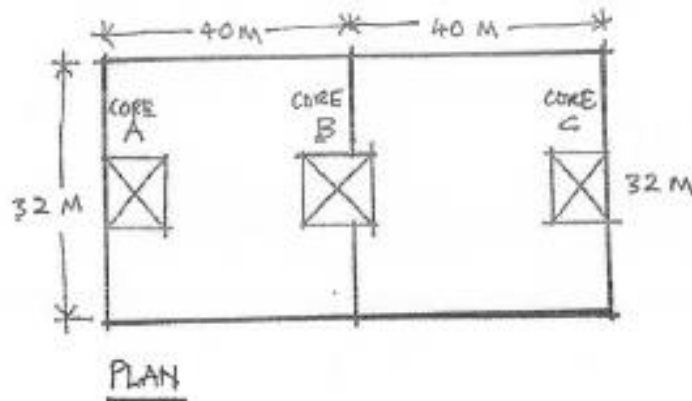
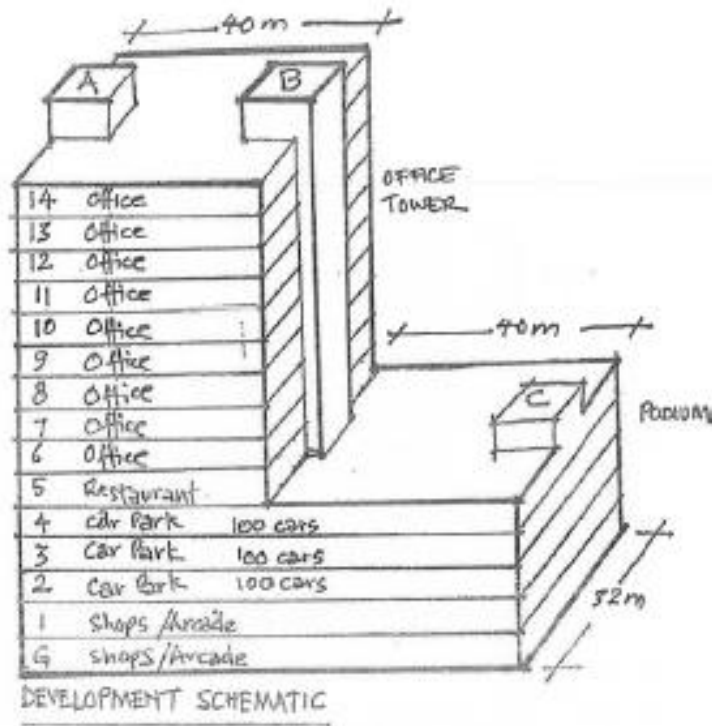
- BL136 – Limit of Compartment wall refer to 5th Schedule
PG:III Height >28m = 2000m², 5000m³
- BL137 – Floor to constructed as compartment floors
- BL140 – This building must be locate in front road/open area not less 12m or can be reach by Bomba appliances.
- BL145 - Reference to 6th schedule – Compartment wall to be construct between Hotel, Common area and Basement parking
- BL146 - Relevant boundary to complied 6th Schedule.
- BL165 - Max travel distance: Dead End 10m, Unsprinkler 30m, Sprinkler 45m.
- BL166 - At least minimum 2 exit way must be incorporate to design.
- BL168 – To provide at least 2 exit staircase.
- BL195 – All Exit staircase must go to Rooftop
- BL197 – Protected lobby to be provided if the staircase not natural ventilated.

Parcel E (under construction)

- BL232 – Any Wet or Dry Riser for building under construction at least 1 riser must be install following the progress of the building.
- BL52 – Any building more than 18.3m, all riser must be install according to the progress of construction.

SOALAN 3

(25 markah)



Lakaran di atas menunjukkan Reka Bentuk Skematic bagi sebuah pembangunan pelbagai kegunaan seperti berikut :-

Tingkat Bawah Tanah =	Arked membeli belah	2,400 m ² gross
- Tingkat 1		1,800 m ² nett
Tingkat 2- 4	= Tempat letak kereta	2,800 m ² gross
	100 kereta setiap tingkat	
Tingkat 5	= Restoran	1,500 m ² gross
		700 m ² nett
Tingkat 6 - 12	= Pejabat-Pejabat	1,500 m ² gross
		1,200 m ² nett
Tingkat 13-14	= Pejabat 'Penthouse'	1,200 m ² gross
		900 m ² nett

Andaikan terdapat tiga (3) teras tangga (staircase cores) yang diperuntukkan dalam bangunan seperti yang ditunjukkan dalam rajah di atas, dengan mengambil kira dari segi aspek kos.

- (a) Di manakah anda akan menempatkan akses lobi pencegahan kebakaran (Fire Fighting access lobby), dan mengapa.

(4 markah)

- Di Core B
- Ini adalah kerana lokasi Core B dapat menghubungkan semua tingkat.
- UUK 229 akses lobi pencegahan kebakaran hendaklah disediakan di setiap tingkat dengan jarak paling jauh tidak melebihi 45.75m.
- Core B terletak dalam radius < 45.75m

Lakaran di atas menunjukkan Reka Bentuk Schematic bagi sebuah pembangunan pelbagai kegunaan seperti berikut :-

Tingkat Bawah Tanah = - Tingkat 1	Arked membeli belah	2,400 m ² gross 1,800 m ² nett
Tingkat 2- 4	= Tempat letak kereta 100 kereta setiap tingkat	2,800 m ² gross
Tingkat 5	= Restoran	1,500 m ² gross 700 m ² nett
Tingkat 6 – 12	= Pejabat-Pejabat	1,500 m ² gross 1,200 m ² nett
Tingkat 13-14	= Pejabat 'Penthouse'	1,200 m ² gross 900 m ² nett

Andaikan terdapat tiga (3) teras tangga (*staircase cores*) yang diperuntukkan dalam bangunan seperti yang ditunjukkan dalam rajah di atas, dengan mengambil kira dari segi aspek kos.

- (a) Di manakah anda akan menempatkan akses lobi pencegahan kebakaran (Fire Fighting access lobby), dan mengapa. (4 markah)

- (b) Kira beban penghunian yang perlu bagi setiap tingkat.

(5 markah)

Floor	area	PG	Occupancy Load Factor	Calculation	Occupancy Load
Ground – 1 st Shopping Arcade	2,400m2 gross 1,800m2 nett	V	3 gross	2,400/3	800
2 nd -4 th floor 100 carpark	2,800 gross	-	2 pax/car	100 X 2	200
5 th floor Restaurant	1,500m2 gross 700m2 nett	VII (UBBL 180)	1.35 m2/ person (UBBL 180)	700/1.35	518.5
6 th – 12 th floor office	1,500m2 gross 1,200m2 nett	IV	10 gross	1,500/10	150
13 th – 14 th floor Penthouse office	1,200m2 gross 900m2 nett	IV	10 gross	1,200/10	120

Andaikan terdapat tiga (3) teras tangga (*staircase cores*) yang diperuntukkan dalam bangunan seperti yang ditunjukkan dalam rajah di atas, dengan mengambil kira dari segi aspek kos.

- Di manakah anda akan menempatkan akses lobi pencegahan kebakaran (Fire Fighting access lobby), dan mengapa. (4 markah)
- Kira beban penghunian yang perlu bagi setiap tingkat. (5 markah)
- Kira keluasan keluar masuk melintang dan menegak (horizontal and vertical exit width) yang perlu bagi setiap tingkat. (6 markah)

Floor	PG	Occupancy Load
Ground – 1 st Shopping Arcade	V	800
2 nd -4 th floor 100 carpark	-	200
5 th floor Restaurant	VII (UBBL 180)	518.5
6 th – 12 th floor office	IV	150
13 th – 14 th floor Penthouse office	IV	120

Horizontal Exit Factor	Calculation	Horizontal exit
100	800/100V	80
100	200/100	20
100	518.5/100	51.85
100	150/100	15
100	120/100	12

Vertical Exit Factor	Calculation	Horizontal exit
60	800/60	13.3
60	200/60	3.3
75	518.5/75	6.91
60	150/60	2.5
60	120/60	2

Andaikan terdapat tiga (3) teras tangga (*staircase cores*) yang diperuntukkan dalam bangunan seperti yang ditunjukkan dalam rajah di atas, dengan mengambil kira dari segi aspek kos.

- (a) Di manakah anda akan menempatkan akses lobi pencegahan kebakaran (Fire Fighting access lobby), dan mengapa. (4 markah)
- (b) Kira beban penghunian yang perlu bagi setiap tingkat. (5 markah)
- (c) Kira keluasan keluar masuk melintang dan menegak (horizontal and vertical exit width) yang perlu bagi setiap tingkat. (6 markah)
- (d) Kira lebar tangga A,B dan C yang perlu untuk turun dari tingkat atas ke bawah. (10 markah)

Floor	Vertical Exit (unit)	Calculation Total Staircase Saiz	Nos of Staircase	Calculation individual staircase saiz	Economic staircase saiz
Ground – 1 st Shopping Arcade	13.3	Not required	3	Not required	1.9 m
2 nd -4 th floor 100 carpark	3.3	$(3 \times 0.55) + 0.3 = \mathbf{1.95m}$ (UBBL 181)	3	$1.95 / (3-1) = 0.95m$ =1.1m minimum staircase saiz	1.9 m
5 th floor Restaurant	6.91	$(7 \times 0.55) + 0.3 = \mathbf{3.8m}$ (UBBL 181)	3	$3.8 / (3-1) = 1.9m$	1.9 m
6 th – 12 th floor office	2.5	$(2.0 \times 0.55) + 0.3 = \mathbf{1.4m}$ (UBBL 181)	2	$1.4m / (2-1) = 1.4m$	1.4 m
13 th – 14 th floor Penthouse office	2	$(2 \times 0.55) + 0.3 = \mathbf{1.1m}$	2	$1.1 / (2-1) = 1.1m$	1.1 m

MATRIX ACTIVE AND PASSIVE

PURPOSE GROUP		ACTIVE		PASSIVE			
		Part VIII	Schedule 10	Part VII	Schedule 5	Schedule 6	Schedule 7
I	SMALL RESIDENTIAL	NA	NA	NA	Purpose Group only	CALCULATION • External Wall	NA
II	INSTITUTIONAL	• Fire hydrant • Sprinkler • Portable Fire Extinguisyer	• Sistem Pemadam Kebakaran • Sistem Penggera Kebakaran • Pencahayaan Cecemasan	• Compartment • Staircase • Fire Door • Exit way • Internal Finished • Lighting & ventilation • Fire Fighting Acces	• Compartment		CALCULATION • Maksimum Travel Distance • Occupancy Load • Exit Capacity
III	OTHER RESIDENTIAL	• Fire fighting on 18.3m building • Dry Riser • Wet Riser					
IV	OFFICE	• Foam • Permanent installation (Co2)					
V	SHOP	• Fire alarm • Fire Command & Control					
VI	FACTORY	• Fire fighting access lobby • Bombs Lift • Water Storage					
VII	PLACE OF ASSEMBLEY	• Certification when complete • Emergency Power System					
VIII	STORAGE & GENERAL						

IMPORTANT TERM MUST KNOW

- 1. FINAL EXIT (UBBL 133)**
- 2. ALTERNATIVE EXITS (UBBL 166)**
- 3. STOREY EXIT (UBBL 167,174)**
- 4. HORIZONTAL EXIT (UBBL 171)**
- 5. EXIT ROUTE (UBBL 169)**

IMPORTANT TERM MUST KNOW

7TH SCHEDULE

1. DEAD END

2. TRAVEL DISTANCE

3. DIRECT DISTANCE

4. OPEN PLAN

THANK YOU

Ar Fadillah Zain b Hasirun