PENGENALAN KEPADA PERABOT JALAN

30- 31 MAC 2021 (SELASA- RABU)

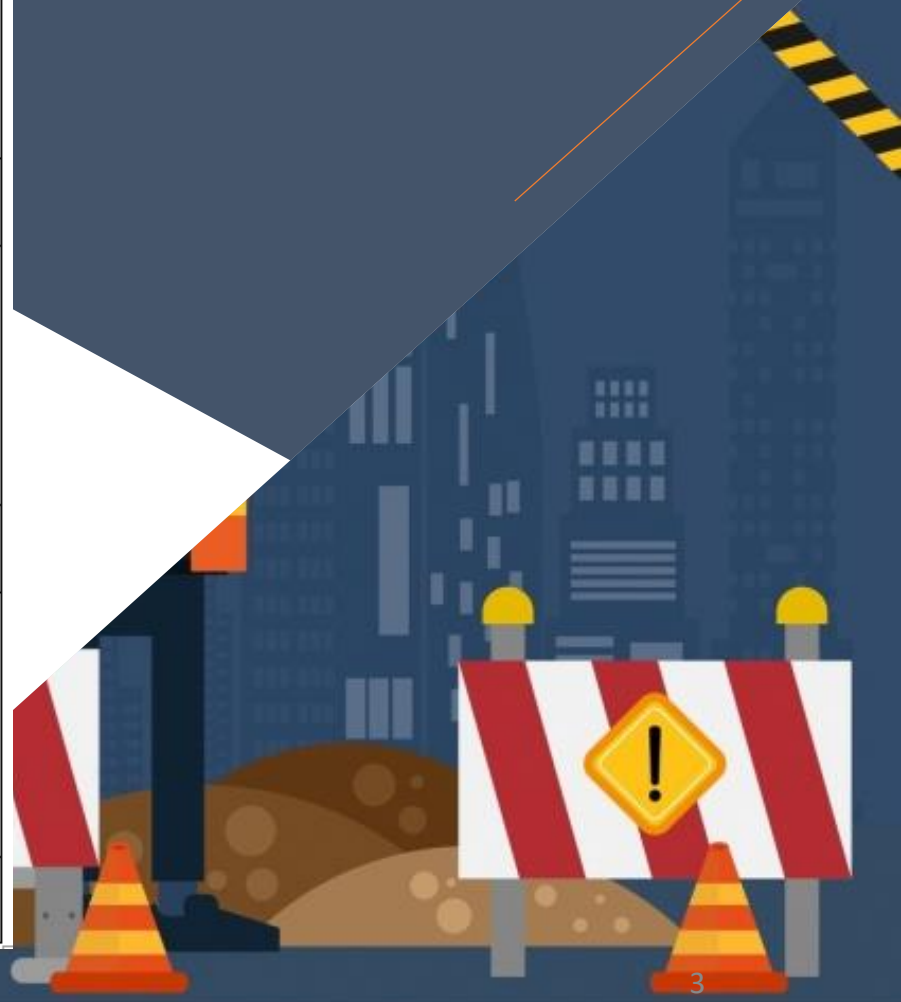
DISEDIAKAN OLEH :
Ir. NORSHIDA BINTI ISMAIL
BAHAGIAN REKABENTUK JALAN ZON SELATAN
CAWANGAN JALAN IBU PEJABAT JKR MALAYSIA

TENTATIF PROGRAM

TARIKH	MASA	PERKARA
30/03/2021 (Selasa)	8.30 pg - 10.30 pg	Pre -Test Pengenalan kepada perabot jalan **Penceramah: Ir. Norshida Binti Ismail** **Fasilitator: Pn. Seri Ashikin Binti Sofian**
	10.30 pg - 11.00 pg	**MINUM PAGI**
	11.00 pg - 1.00 ptg	Delinasi jalan dan penggunaanya **Penceramah: Pn. Seri Ashikin Binti Sofian** **Fasilitator: Ir. Norshida Binti Ismail**
	1.00 tgh - 2.30 ptg	**MAKAN TENGAHARI & REHAT**
	2.30 ptg - 4.30 ptg	Tandaan jalan dan penggunaannya **Penceramah: Pn. Seri Ashikin Binti Sofian** **Fasilitator: Ir. Norshida Binti Ismail**
	4.30 ptg - 5.00 ptg	**MINUM PETANG & BERSURAI**

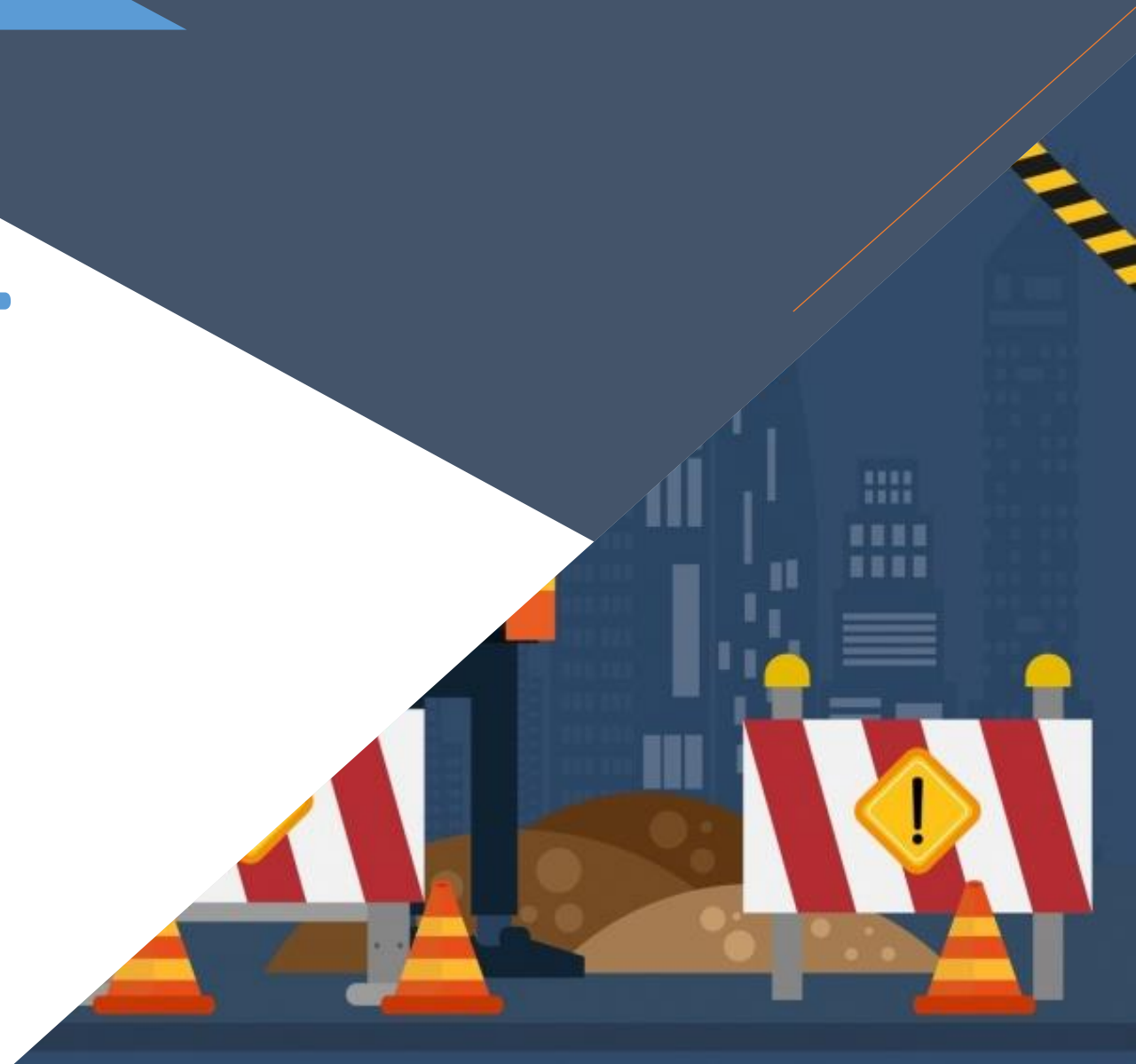
TENTATIF PROGRAM

TARIKH	MASA	PERKARA
31/03/2021 (Rabu)	8.30 pg - 10.30 pg	Papan tanda jalan dan penggunaannya **Penceramah: Pn. Nurul Aida Bt Jasni** **Fasilitator: Pn. Seri Ashikin Binti Sofian**
	10.30 pg - 11.00 pg	**MINUM PAGI**
	11.00 pg - 1.00 ptg	Hands-On rekabentuk papan tanda **Penceramah: Pn. Nurul Aida Bt Jasni** **Fasilitator: Pn. Seri Ashikin Binti Sofian**
	1.00 tgh - 2.30 ptg	**MAKAN TENGAHARI & REHAT**
	2.30 ptg - 4.30 ptg	Penghadang jalan dan penggunaannya **Penceramah: Ir. Norshida Binti Ismail** **Fasilitator: Pn. Nurul Aida Bt Jasni**
	4.30 ptg - 5.00 ptg	**MINUM PETANG & BERSURAI**



PRE TEST

(10 MINIT)



ISI KANDUNGAN KURSUS :

- OBJEKTIF KURSUS
- APA ITU PERABOT JALAN ? DAN JENIS-JENIS PERABOT JALAN
- STANDARD YANG DIGUNAKAN UNTUK REKABENTUK
- CONTOH-CONTOH APLIKASI PERABOT JALAN

OBJEKTIF KURSUS:

Diakhir kursus peserta akan dapat -

Objektif 1

Memberi pendedahan kepada pegawai dan kakitangan JKR tentang perabot jalan dengan menggunakan piawai JKR

Objektif 2

Mengetahui proses rekabentuk perabot jalan (Papan Tanda dan Tandaan Jalan) bagi memastikan rekabentuk mematuhi piawai JKR

JENIS PERABOT JALAN

(STANDARD SPECIFICATION FOR ROAD WORKS,
SECTION 6 : ROAD FURNITURE)


ANY COMMENTS !!!

APA ITU PERABOT JALAN *(Road Furniture)*

1. **Street furniture** is a collective term (used in the United Kingdom,[1] Australia[2] and Canada[3][4]) for objects and pieces of equipment installed along streets and roads for various purposes. It includes benches, traffic barriers, bollards, post boxes, phone boxes, streetlamps, traffic lights, traffic signs, bus stops, tram stops, taxi stands, public lavatories, fountains, watering troughs, memorials, public sculptures, and waste receptacles. The design and placement of furniture should take into account aesthetics, visual identity, function, pedestrian mobility and road safety.

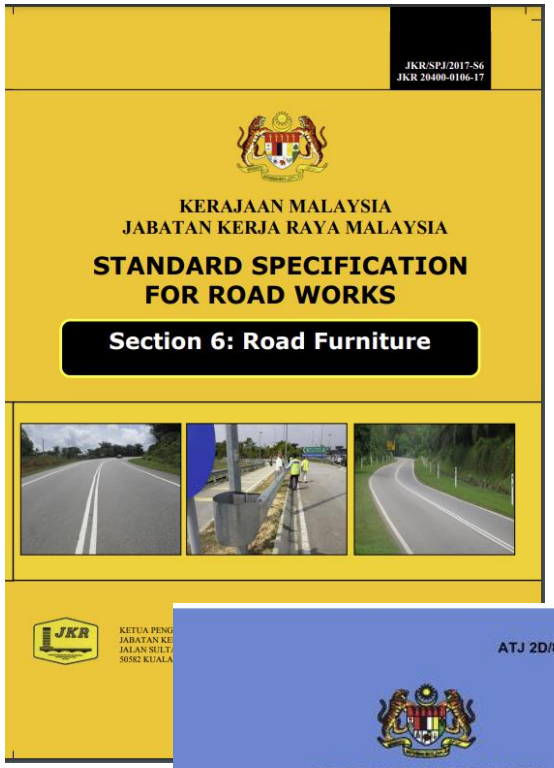
Source : "Street furniture". Cambridge Dictionaries Online. Cambridge University Press. Retrieved 10 January 2012

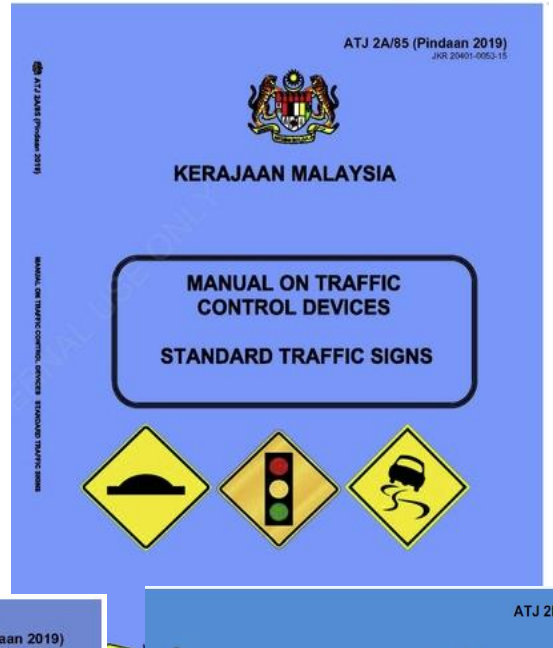
2. The term "**road furniture**" encompasses all roadside objects used for safety and control of traffic in addition to those for assisting the driver. **Road furniture** items provide drivers with the necessary warnings, rules, distance and directional information in order to travel **roads** and thoroughfares safely.

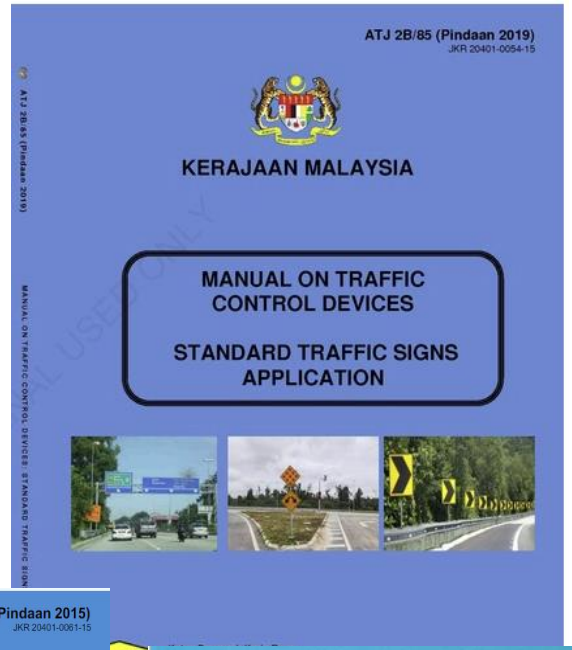
3. Road markings are used as a means of controlling and guiding traffic.

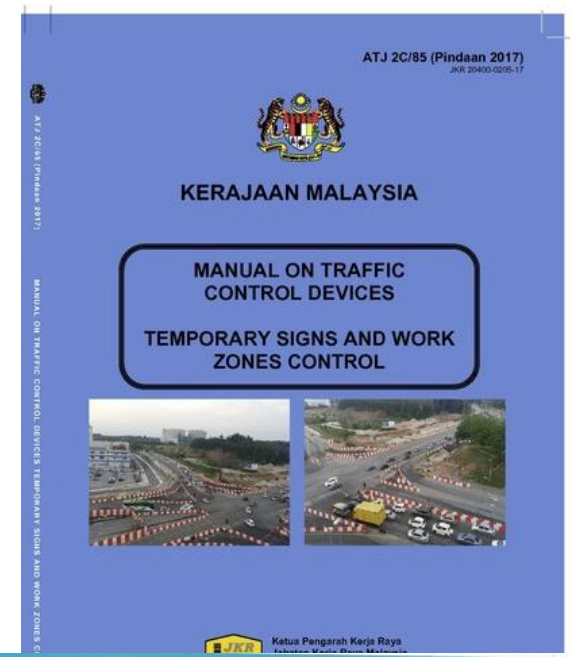
4. The term "Road furniture" encompasses all roadside objects used for safety and control of traffic in addition to those for assisting the driver.

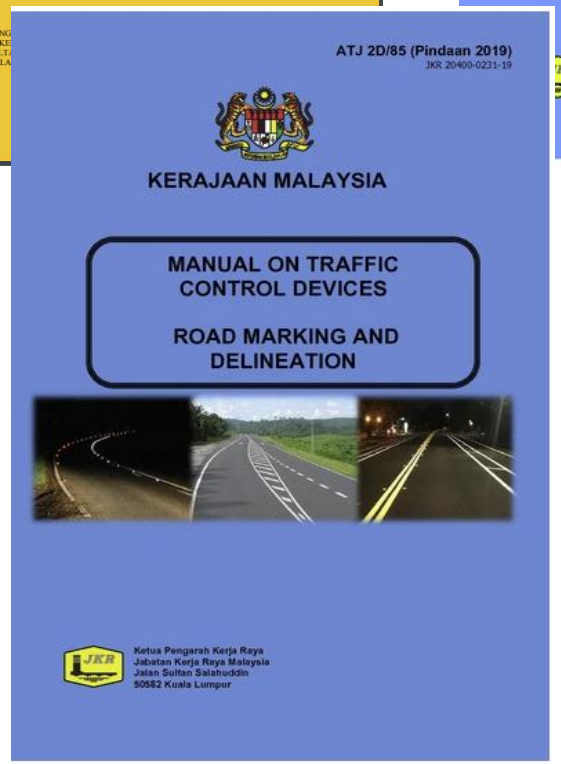
RUJUKAN STANDARD YANG DIGUNAKAN UNTUK REKABENTUK



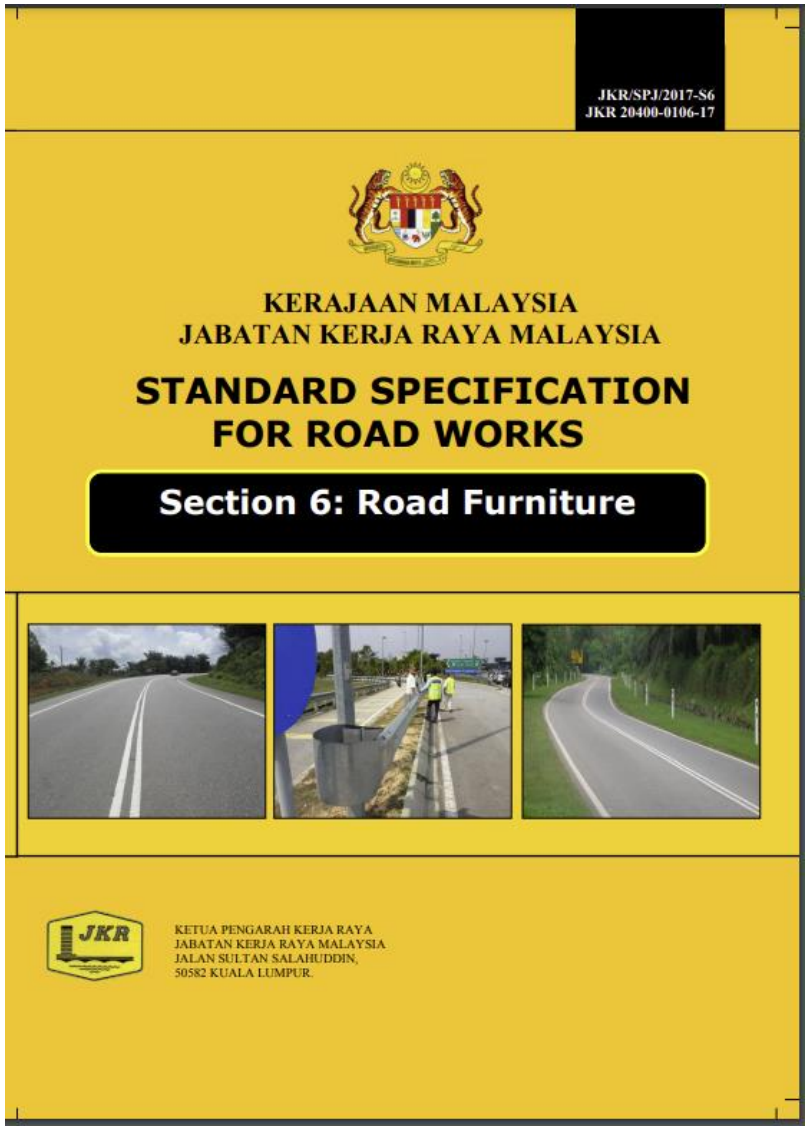








http://jpedia.jkr.gov.my/index.php/Guides_and_Standards:_Cawangan_Jalan



1.CORRUGATED SHEET STEEL BEAM HIGHWAY GUARDRAIL

2. TRAFFIC SIGNS

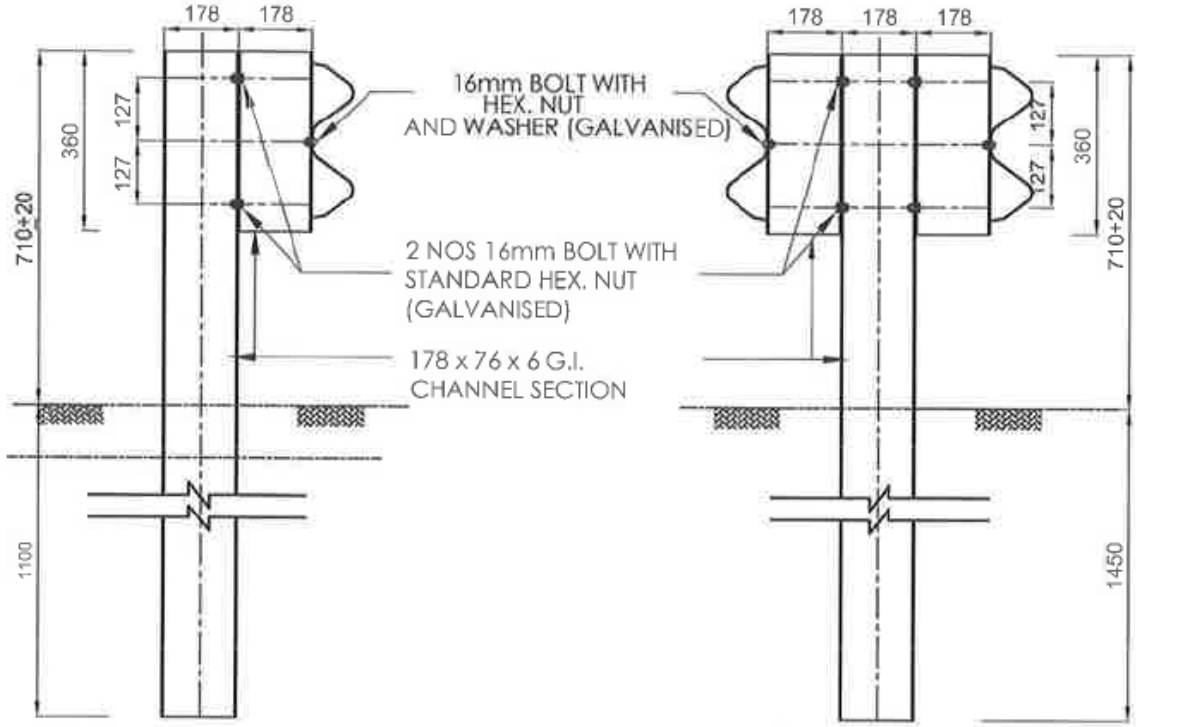
3. ROAD MARKINGS

4. CONCRETE KERB

5. WIRE ROPE BARRIER SYSTEM

6. DELINEATOR POST

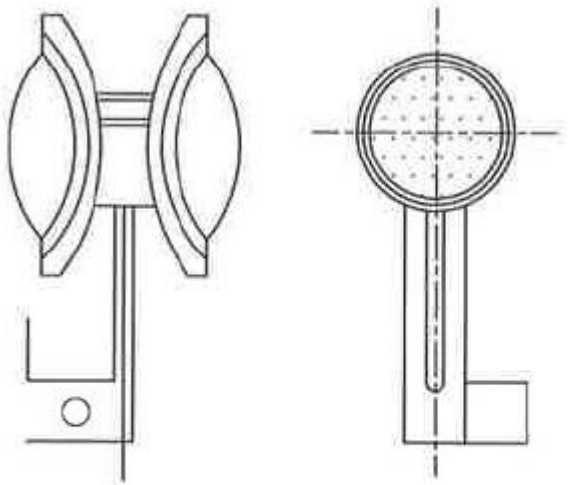
CORRUGATED SHEET STEEL BEAM HIGHWAY GUARDRAIL



SINGLE MOUNTED TYPE

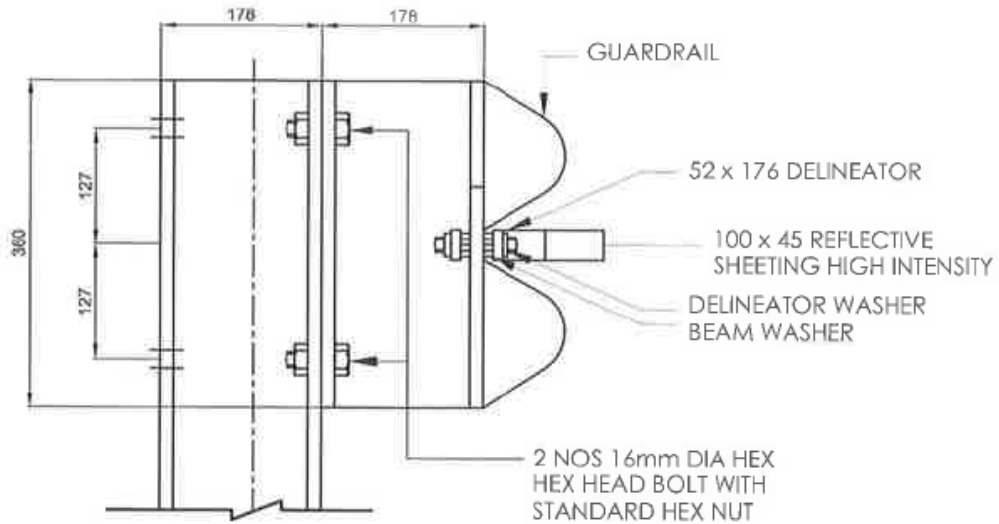
DOUBLE MOUNTED TYPE

TYPICAL GUARDRAIL SYSTEMS



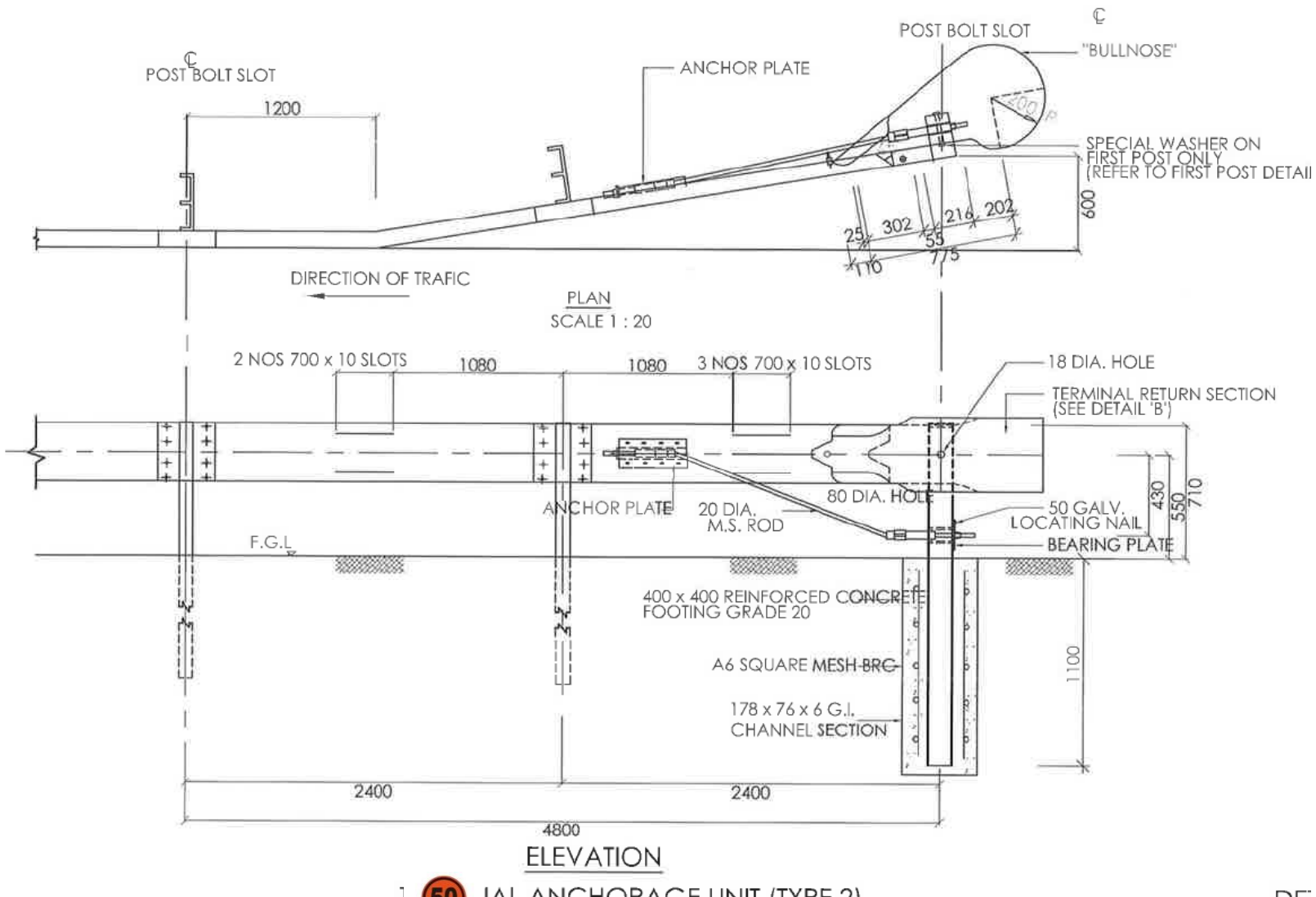
TYPE C

DELINEATORS ON GUARDRAILS



DELINEATORS ON GUARDRAILS

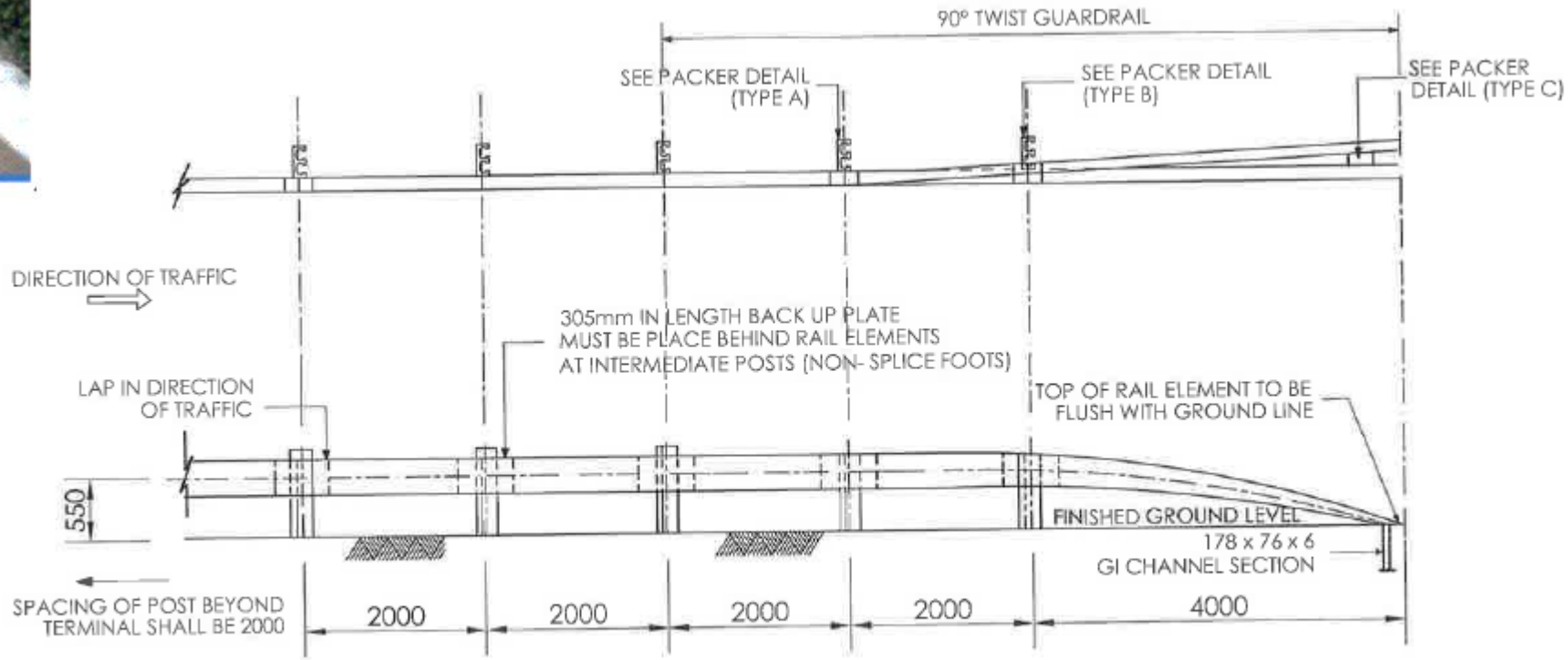
TYPE 2



IAL ANCHORAGE UNIT (TYPE 2)

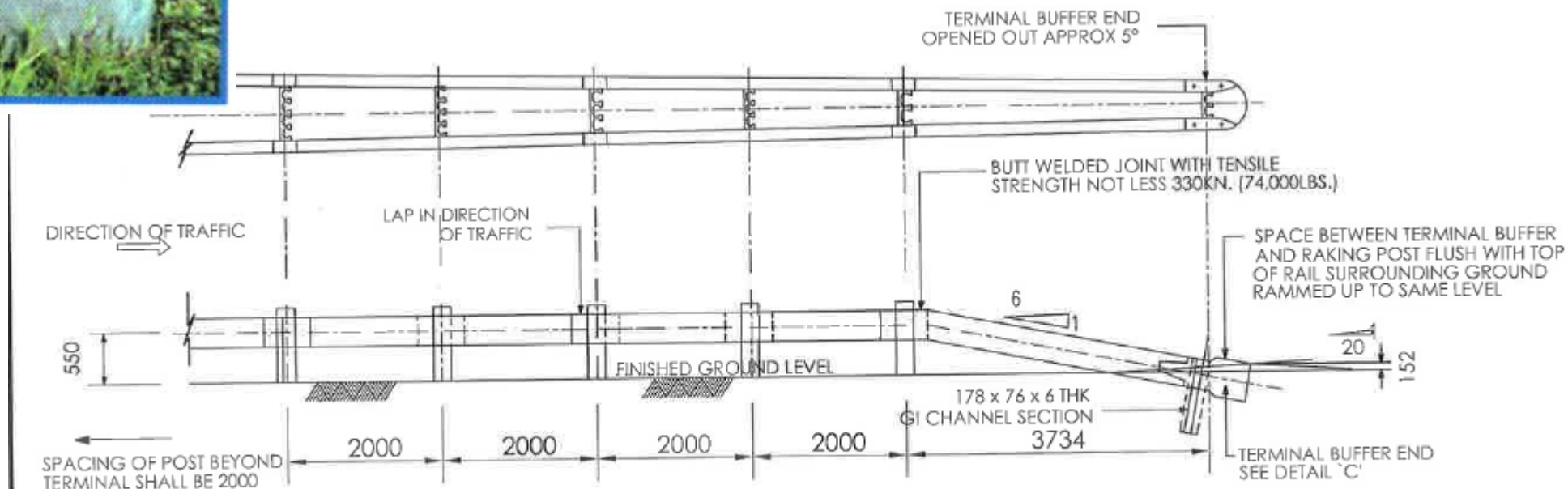
DE

TYPE 3



TERMINAL UI ° TWIST (TYPE 3)

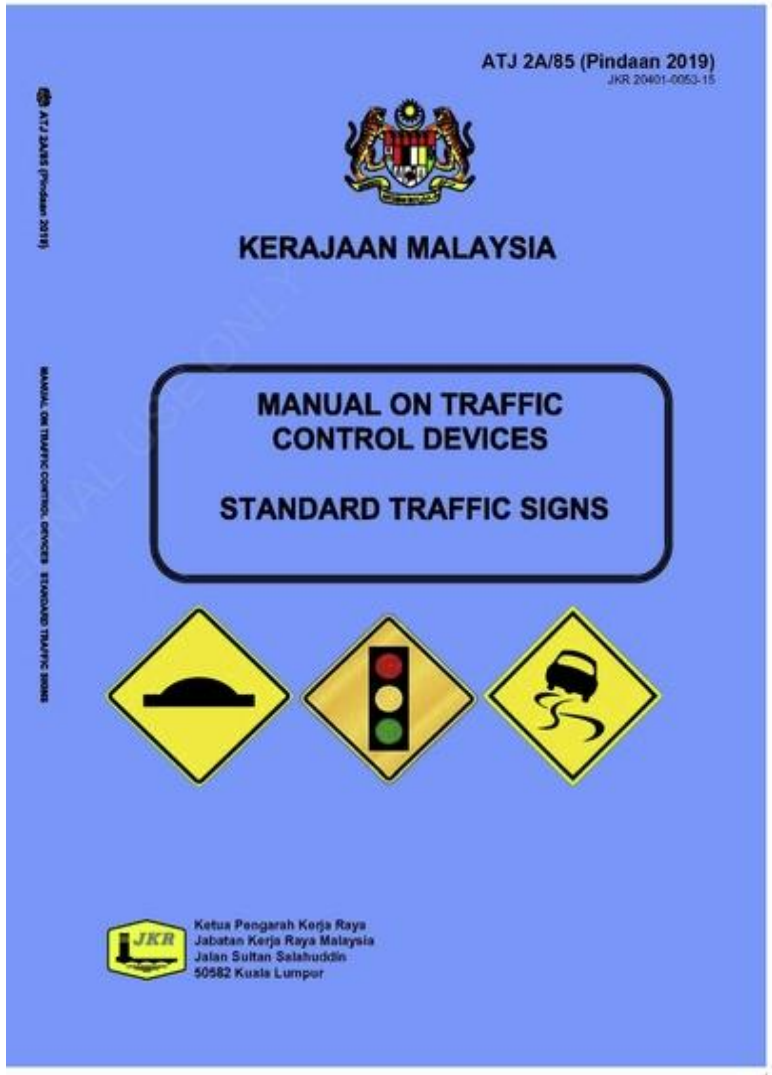
TYPE 4

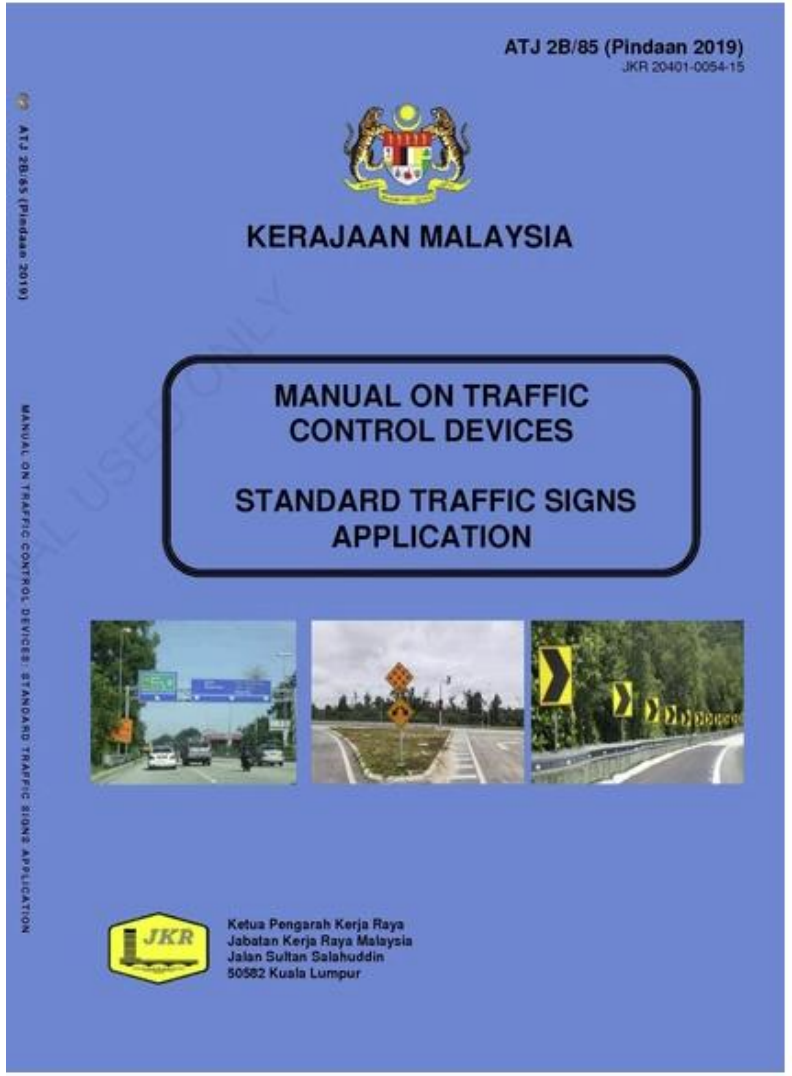


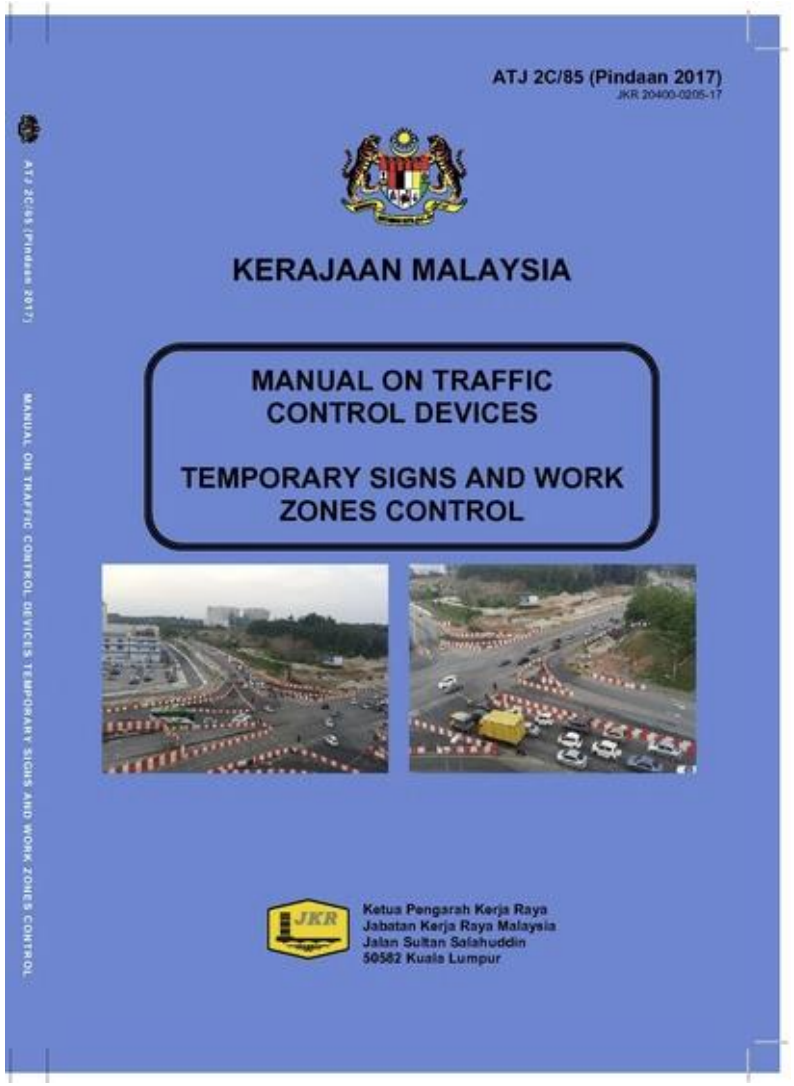
ELEVATION

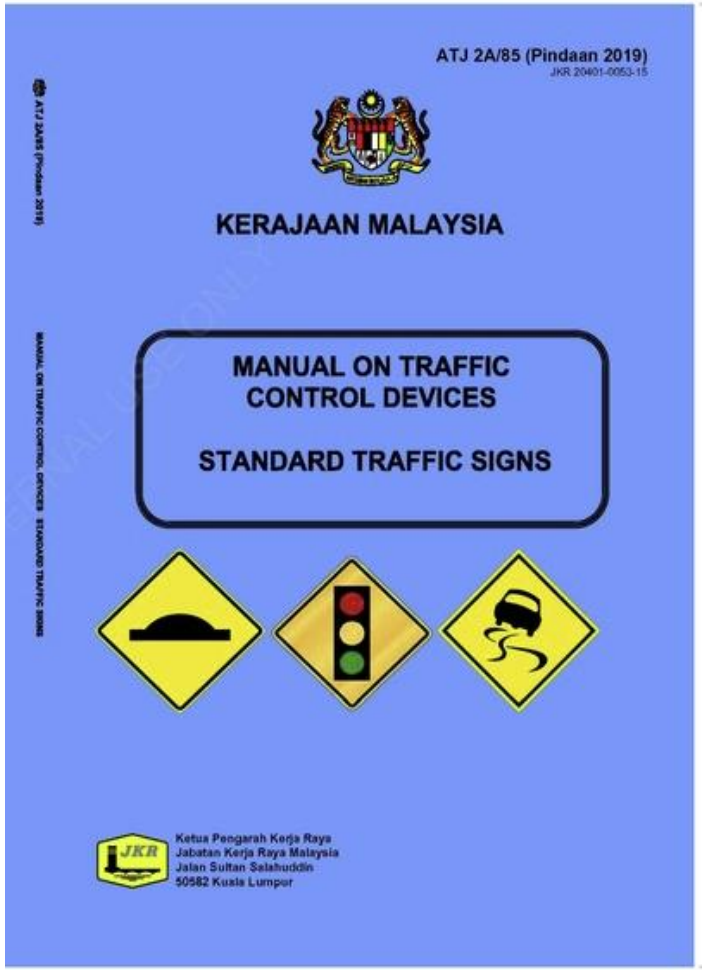
TERMINAL UNIT (TYPE 4)

TRAFFIC SIGNS









The purpose of traffic control devices and warrants for their use is to help ensure road safety by providing for the orderly and predictable movement of all traffic (motorised and non-motorised), and to provide the necessary guidance and warnings to ensure the safe and informed operation of every road user on the road.

Function of Traffic Signs

Traffic signs are used to regulate, warn or guide road users. Traffic signs should be used only where necessary and justified by factual data and studies in deriving its necessity and use. Traffic signs are important where specific regulations are to be applied at places or at times only, or in the case where hazards are not self-evident. They also provide information to the highway routes, directions, destinations and points of interest. Traffic signs are commonly not needed to confirm rules of the road. The functionality of traffic signs is classified as follows:

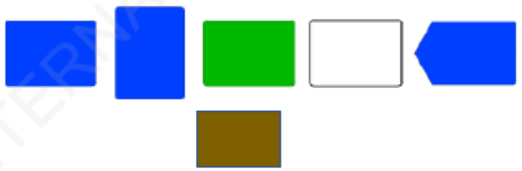
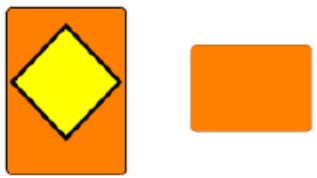
(a) As a regulatory sign to provide notice of traffic laws and regulations and for the authority to impose precise requirements upon the actions of road users. Regulatory signs give notice of traffic laws and regulations, can refer in this document to Section 2A where RP – regulatory prohibitive and RM – regulatory mandatory.

(b) As a warning danger sign to call attention to conditions on, or adjacent to, roads that are potentially hazardous to traffic operations and to call attention to potentially hazardous roadway conditions or unusual traffic movements which are not readily apparent to on-coming traffic. They impose the responsibility upon the individual road user to employ added caution, can refer to Section 2B where WD – warning danger. In Road Transport Rules, all warning danger is also defined as "danger (D).

(c) Temporary signs are used to notify road users of specific hazards which may be encountered when temporary operations are underway and consist of standard temporary sign drawings and their application in the work zones (Refer to the latest version of Arahan Teknik (Jalan) 2C/85).

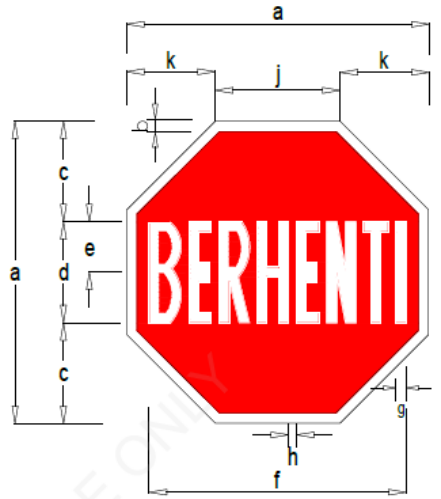
(e) As a destination sign to be placed at overhead structures such as gantry or butterfly gantry to provide a guide for road users to destination routes.

SIGN TYPES, SHAPES AND COLOURS

REGULATORY	
WARNING	
GUIDE	
TEMPORARY	

RP 1. STOP AT INTERSECTION

A sign placed at an intersection indicating that driver is required to stop before entering a priority or major road. This sign is octagonal in shape.



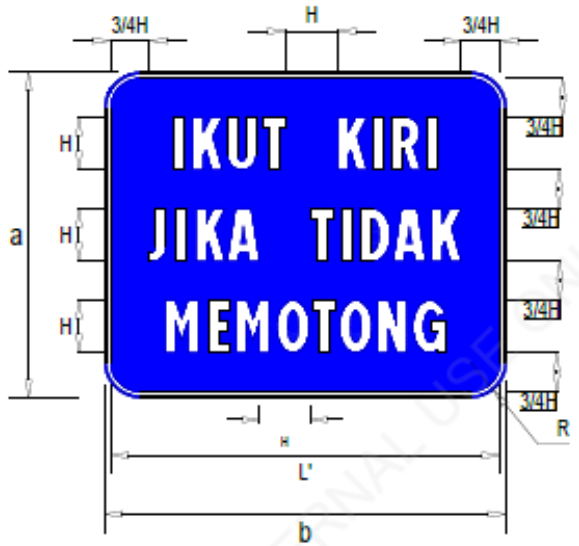
Colour:

Background	-	Red
Border	-	White
Lettering	-	White

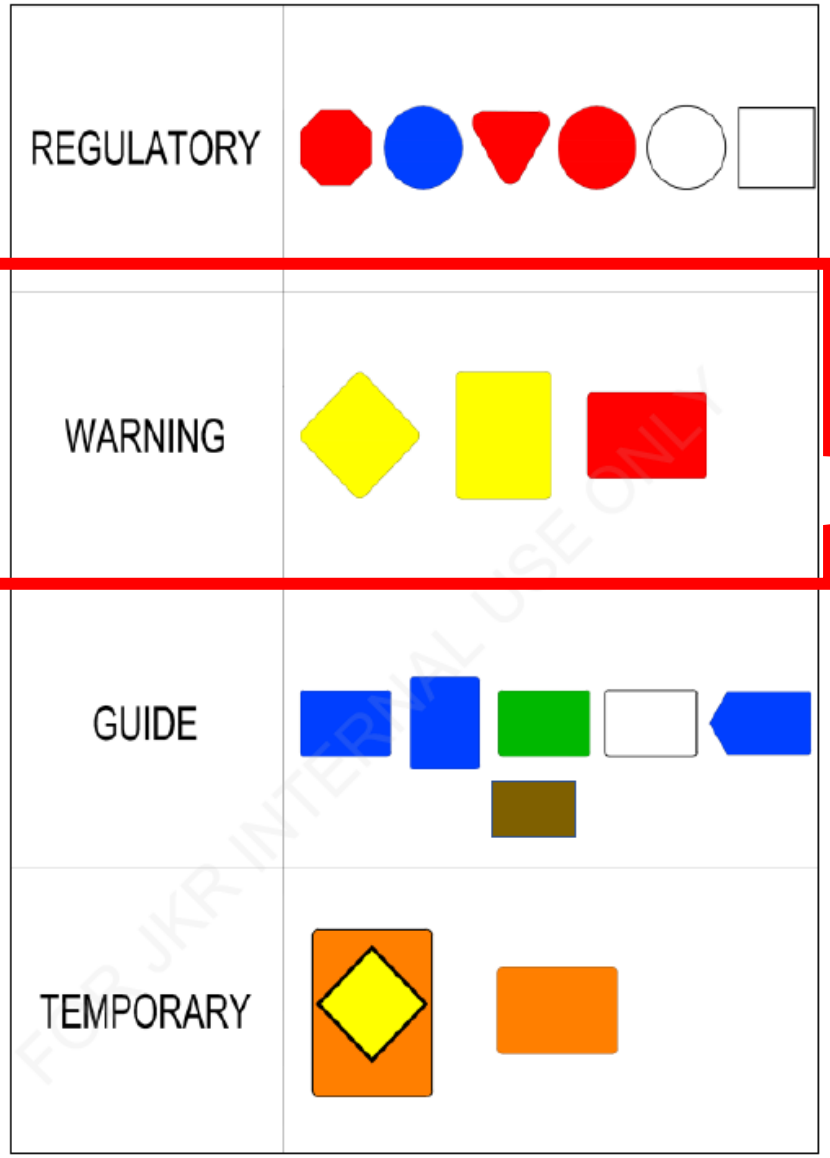
SIGN	DIMENSIONS (mm)									
	a	b	c	d	e	f	g	h	j	k
Minimum	600	20	200	200	100	510	20	15	250	180
Other size	900	30	300	300	150	765	30	25	370	260

RM 6. USE LEFT LANE UNLESS OVERTAKING

A sign indicating that vehicles are required to take the left most lane unless they wish to overtake other vehicles.



SIGN TYPES, SHAPES AND COLOURS



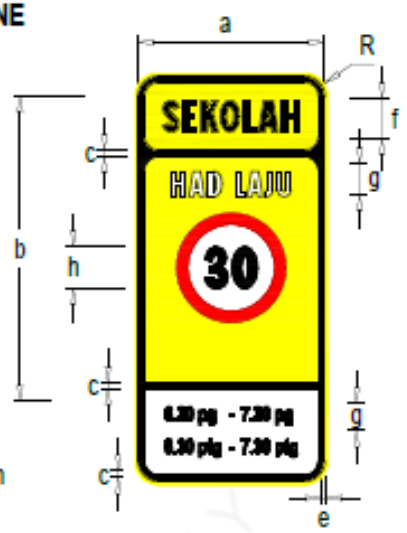
WD. 42 ADVANCE WARNING FOR SCHOOL ZONE

Used at approach to school zone as a reminder to road users that they have to slow down

COLOUR :

Background	-	Yellow
Border	-	Black
Lettering	-	Black

LETTERING:
Ccrige Narrow with height as specified
Note:
School operating time can be changed according to situation

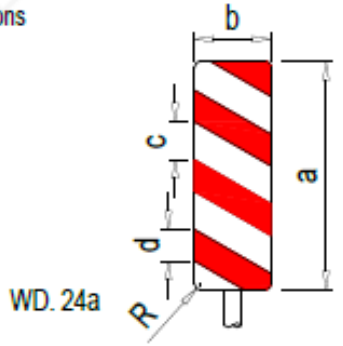


WD. 24a & 24b OBSTRUCTION MARKER

Used to delineate bridge ends, underpass and other obstructions within the shoulder. Also used when the roadway clearance between bridge parapets is less than the width of the pavement on the approach to the bridge. Used at the approach to locations where rock or earth from hillsides or cut slopes may fall on to the roadway

SIGNS	DIMENSIONS (mm)				
	a	b	c	d	R
Minimum	900	300	150	150	40

COLOUR :
White background
with sloping red stripes



WD. 24a

WD. 24b

SIGN TYPES, SHAPES AND COLOURS

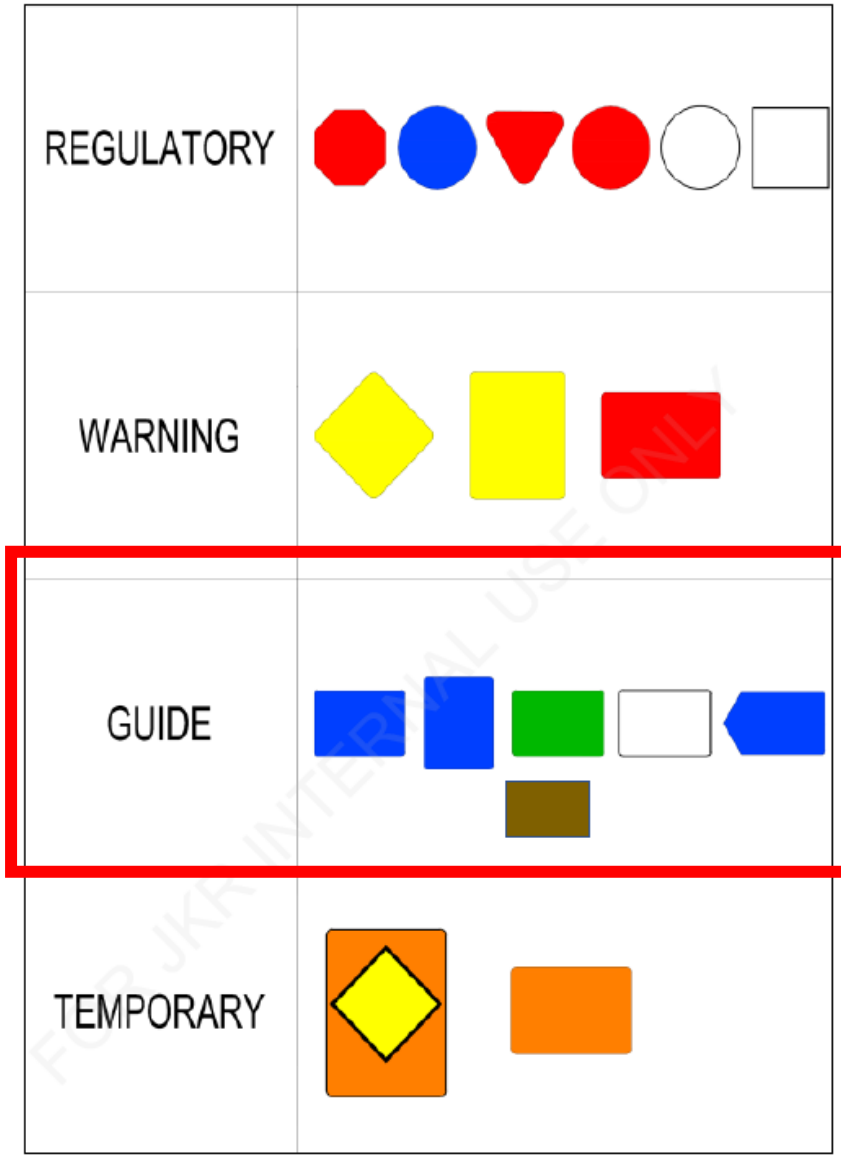
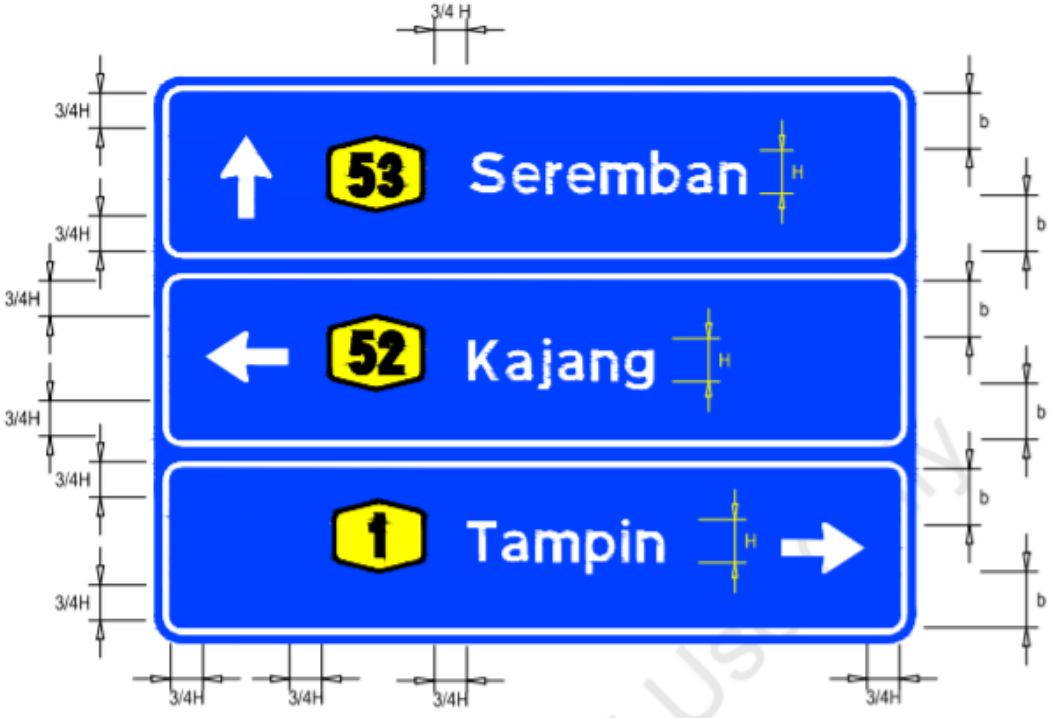
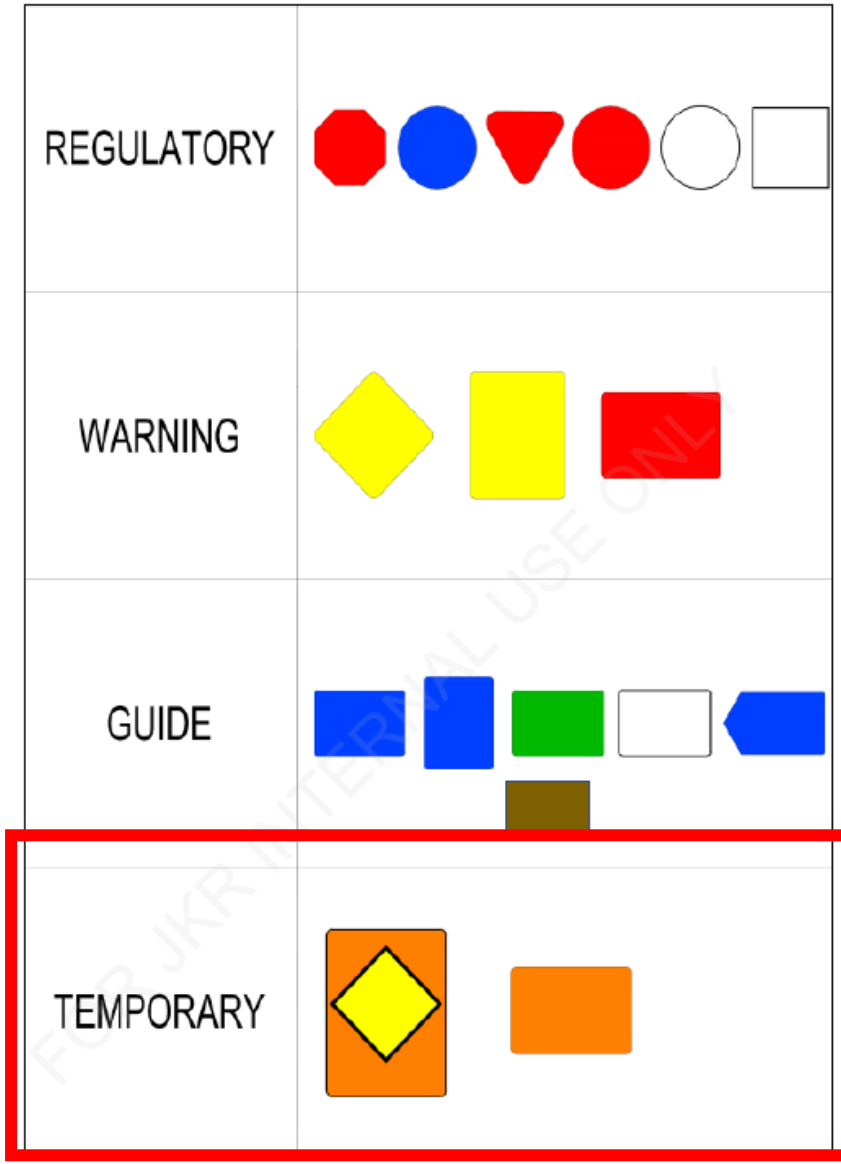
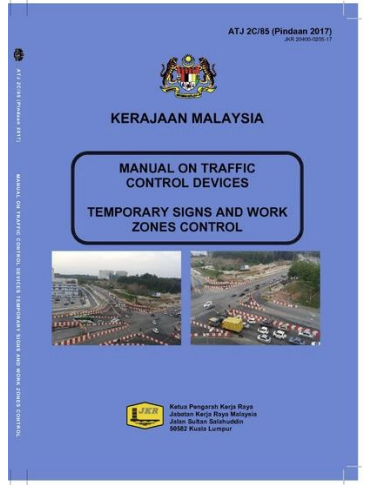


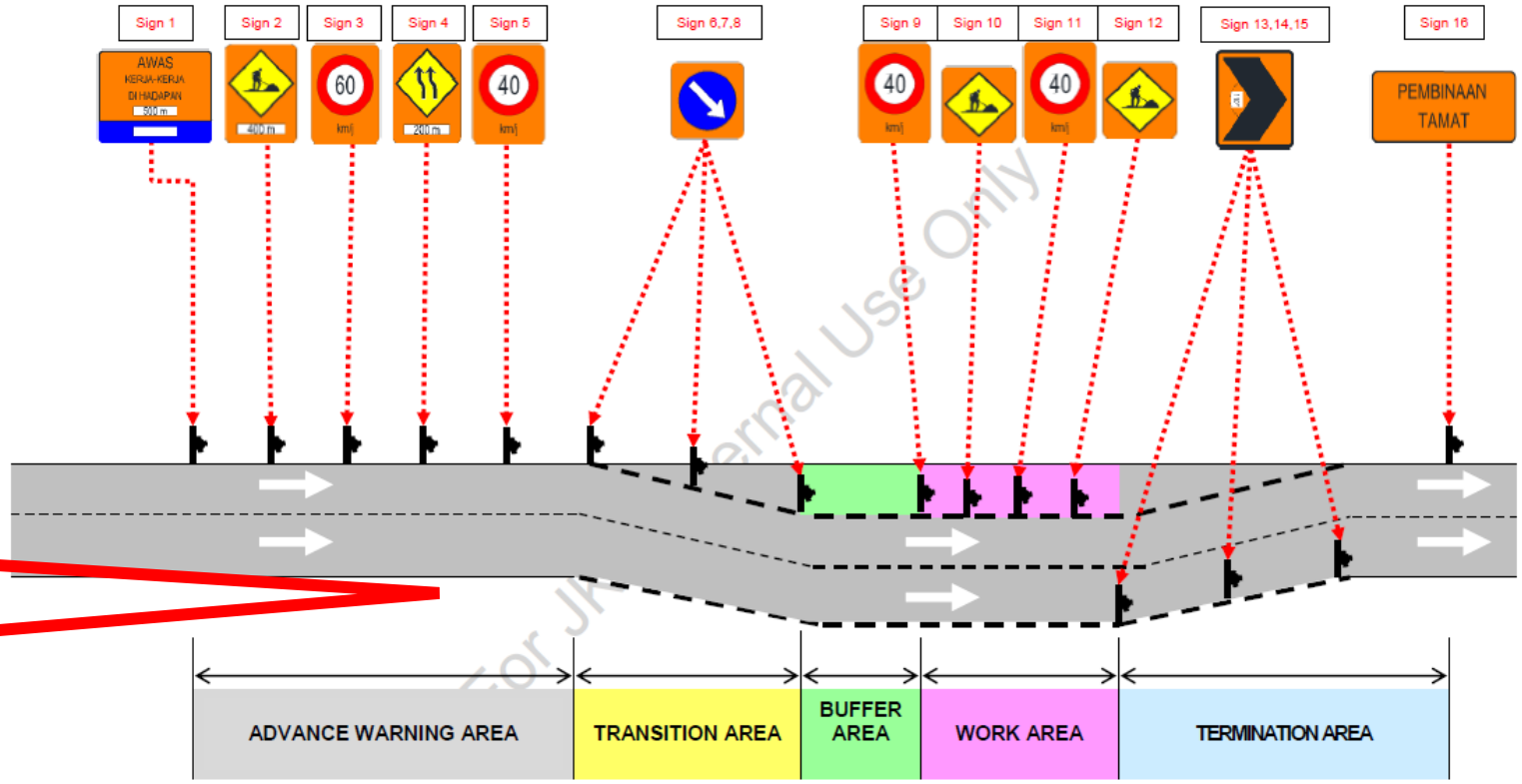
FIGURE 3.3 : LAYOUT DESIGN OF DIRECTIONAL SIGNS



SIGN TYPES, SHAPES AND COLOURS







(*Notes: For three (3) lanes/direction road and above , the signages to be installed on both sides)

FIGURE 6.8: OVERALL SIGN ARRANGEMENTS FOR THE TYPICAL WORK ZONE

ROAD MARKINGS

Road markings and delineations are used as a means to regulate and guide traffic or pedestrians, give advance warning or they may impose restrictions to road users which are supported by road traffic regulations. They may be used either alone or to supplement other traffic control devices.

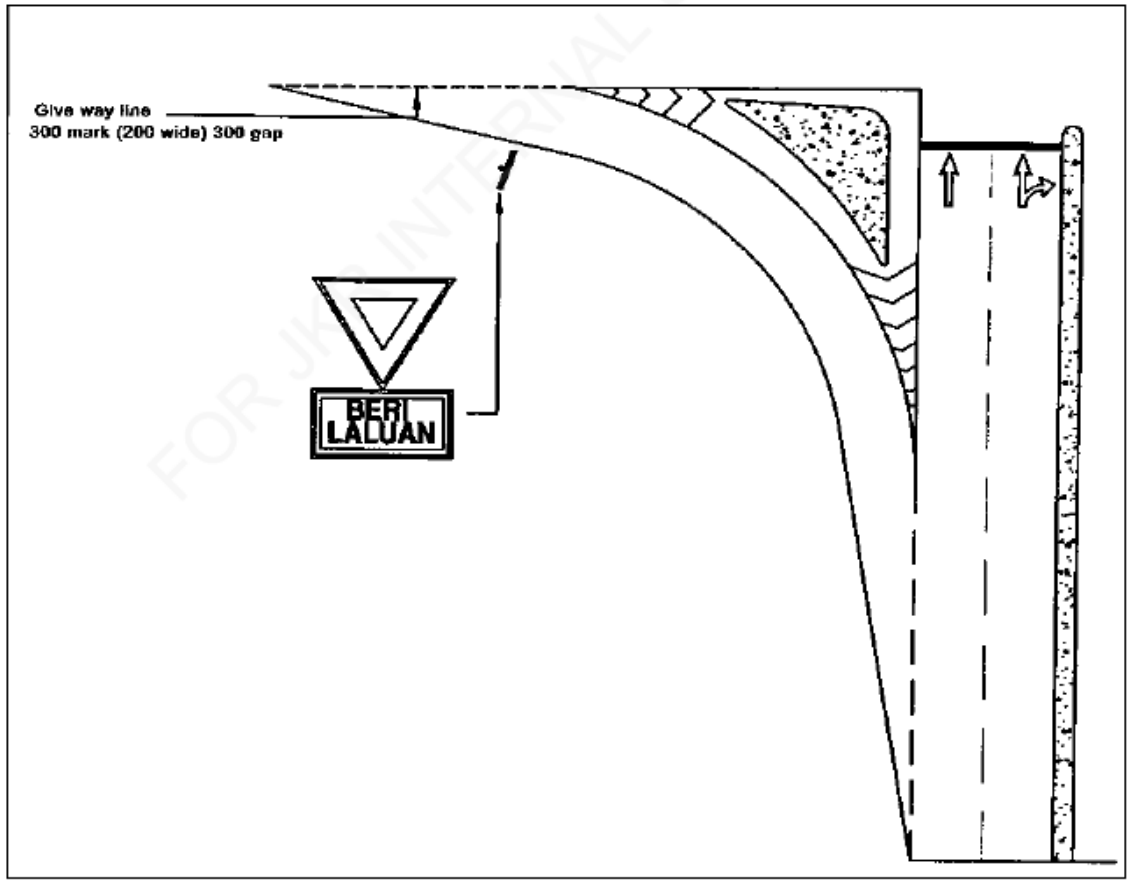


FIGURE 3.12 : PAVEMENT MARKINGS AT 'BERI LALUAN' SIGNS

Source : STD DRW/S6 (Pindaan 2014) Standard Drawings for Road Works Section 6: Road Furniture

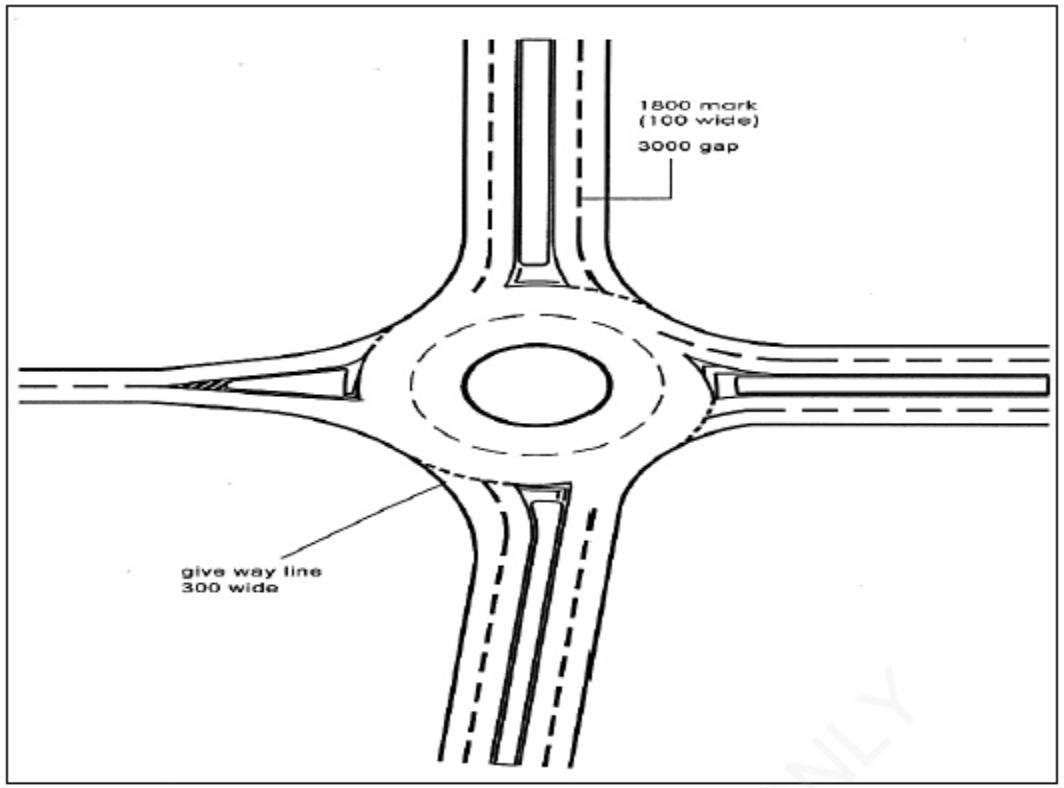


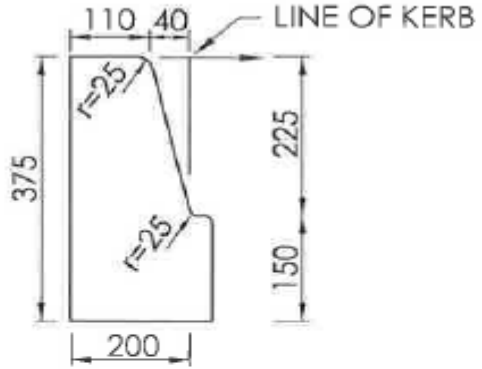
FIGURE 3.13 : PAVEMENT MARKINGS AT ROUNDABOUT

Source : REAM-GL 8/2004 Guidelines on Traffic Control & Management Devices (Part 4 Pavement Marking & Delineation)

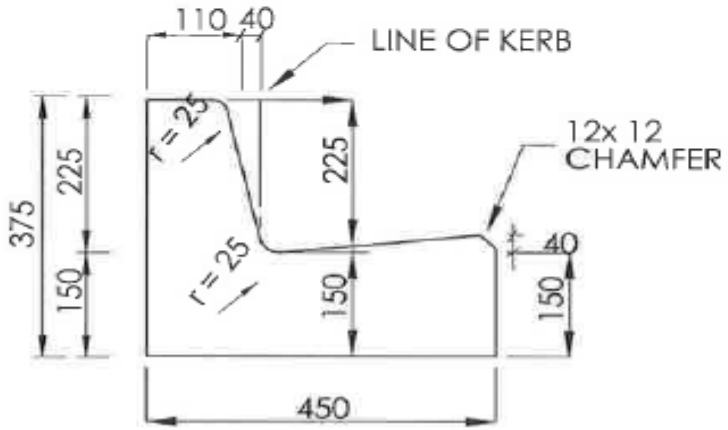
CONCRETE KERB

TYPE OF KERB

1. BARRIER KERBS



B1



B2

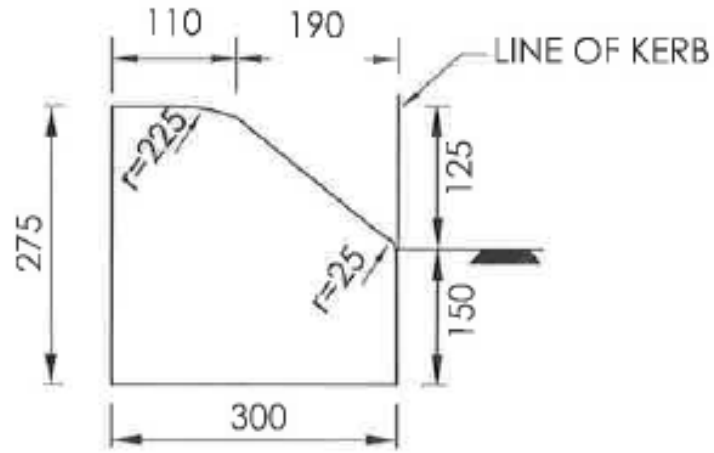
USE

Barrier kerbs are used to inhibit vehivles from leaving the roadway. They are recommended for use in built-up areas adiacent tp footpaths or car parks with considerable pestrian traffic and the design speed should be less than 70kph.

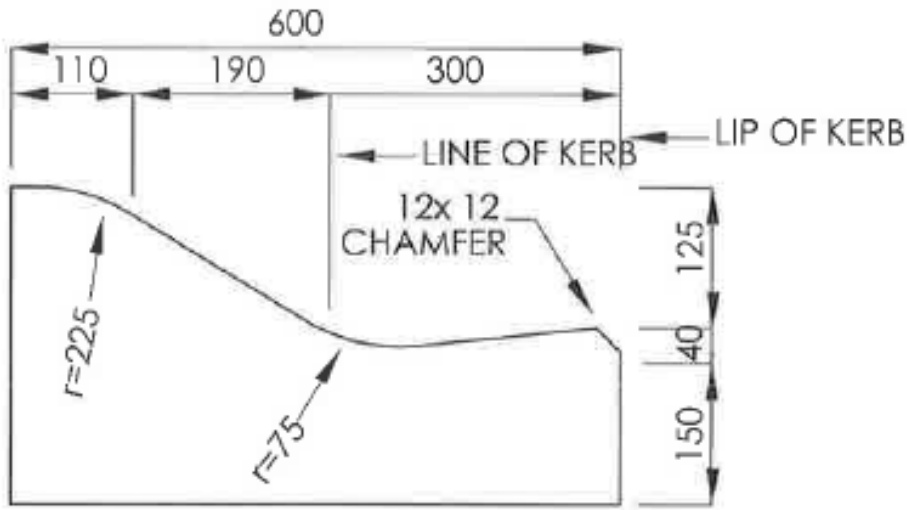
Type B1 kerb is generally used at outer curve of the superelevated sections.

Type B2 kerb shoulder be used for normal cross section stretch and the superelevated sections at inner curve to collect surface run off.

2. SEMI-MOUNTABLE KERBS



SM1

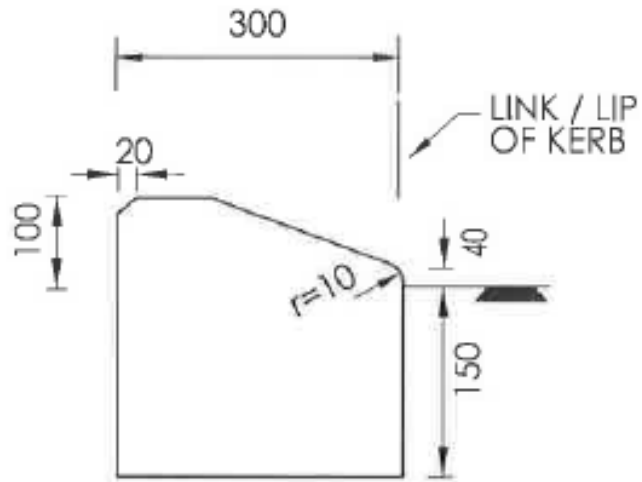


SM2

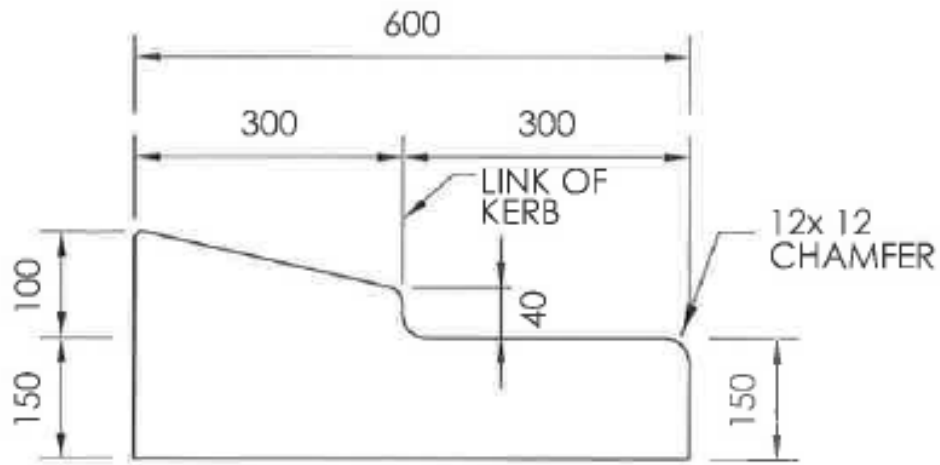
Normally used for delineation and drainage on all intersections. It is suitable for all roads including expressways. It is also for use on bridges which is offset from bridge railing.

TYPE OF KERB

3. MOUNTABLE KERBS



M1



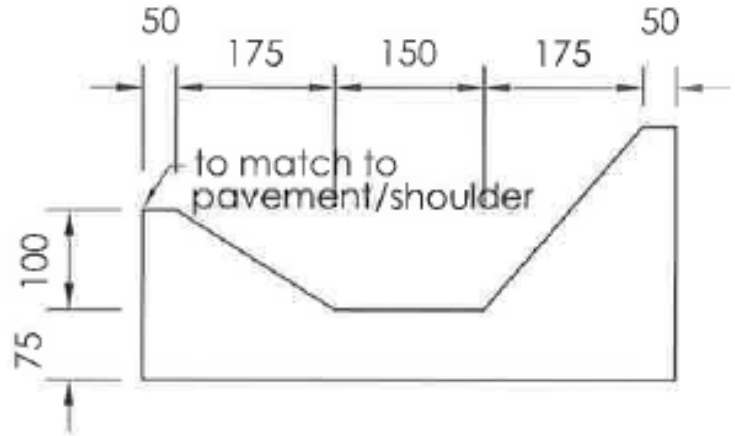
M2

USE

Mountable kerbs type M1 and M2 are designed to discourage most traffic most traffic from mounting a traffic island. Roundabout or median except for long or over-dimensional vehicles.

Types M2 kerbs are designed to collect surface runoff and to allow vehicles to cross over and to park clear of the carriageway during emergency.

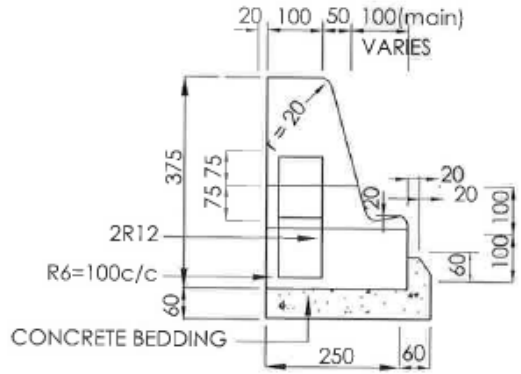
3. CHANNEL KERBS



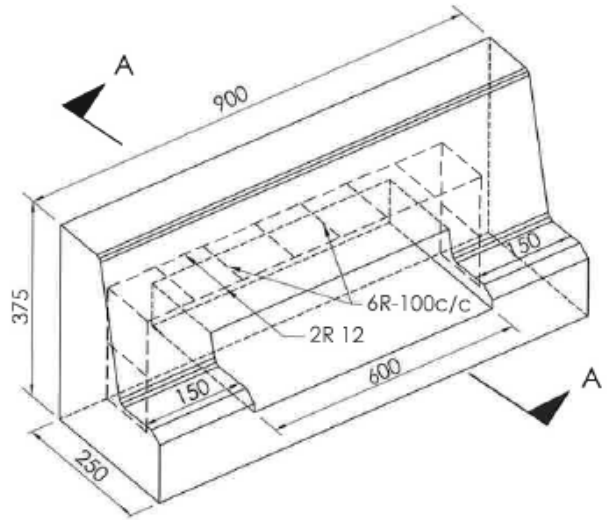
Channel kerb could be used along the paved shoulder where the surface runoff is considerably large. It is normally used on embankment where drain has to be placed along the paved shoulder immediately in front of barrier (Guardrail / New Jersey Barrier). It was designed to minimize the averse effects of the channel on the steering and vehicles shoulder be able to drive over this channel safely.

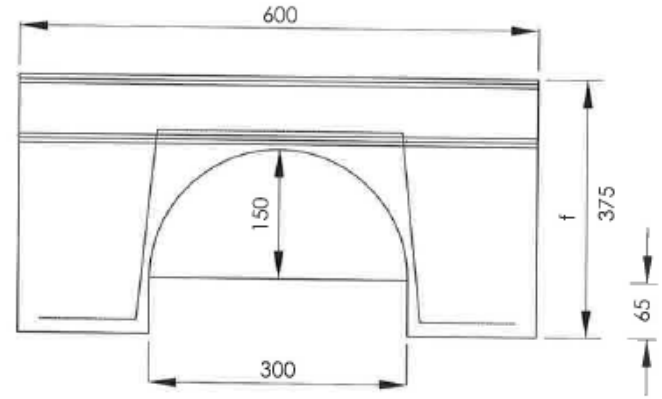
NOTES:

1. CONCRETE FOR CAST INSITU OR PRECAST CONCRETE KERB SHALL BE GRADE 30/20.
2. CONCRETE BEDDING SHALL BE GRADE 15/20
3. THE FINISHED KERB SHALL BE TRUE TO LINE, GRADE AND LEVEL WITHIN +/-5mm AND SHALL PRESENT A SMOOTH APPEARANCE FREE FROM KINKS AND DISTORTION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE

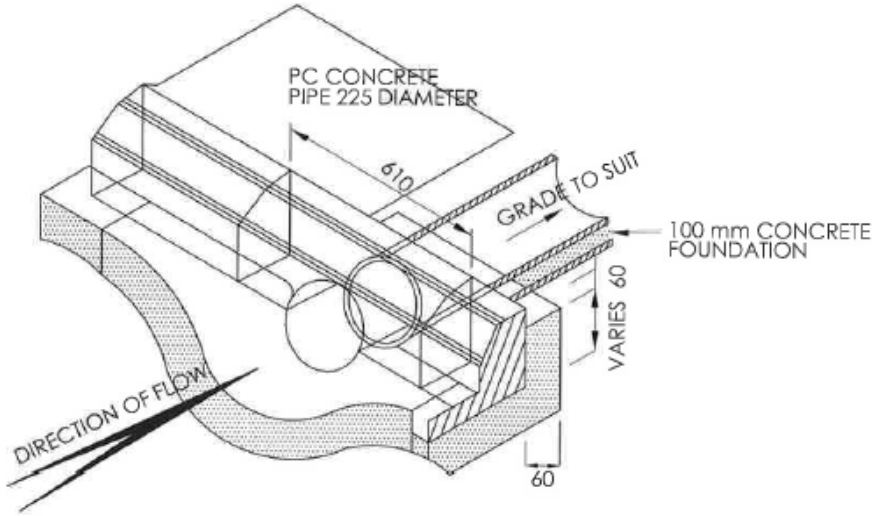


SECTION A-A

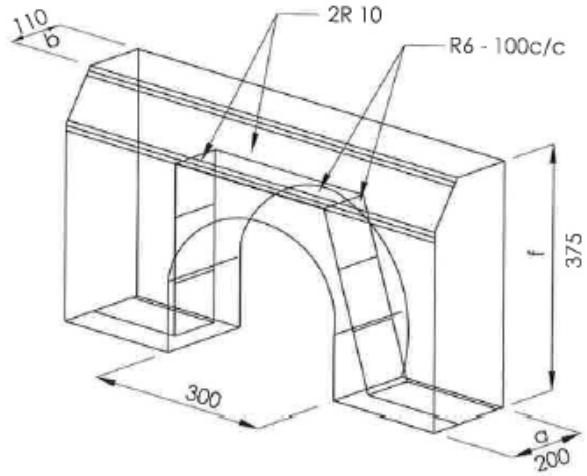




FRONT VIEW OF KERB



ISOMETRIC VIEW-KERB
INLET WITH CONCRETE PIPE



ISOMETRIC VIEW OF KERB
WITH ROUND OPENING

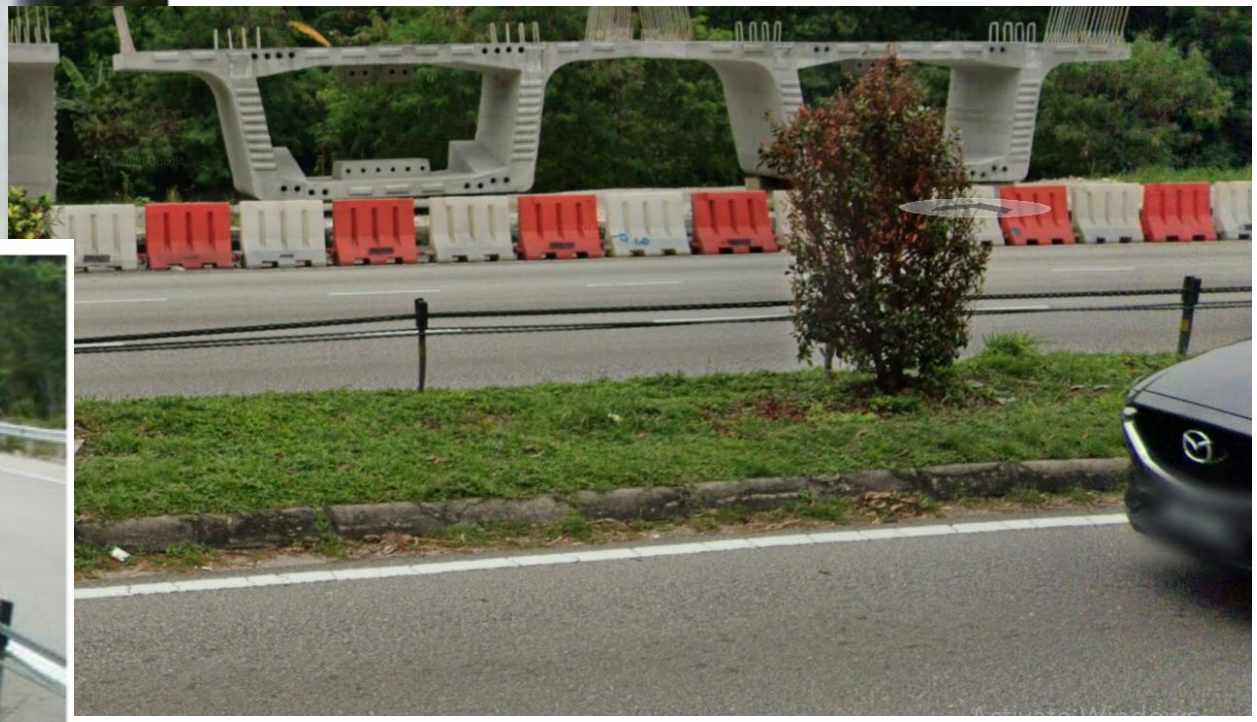
NOTES:

1. CONCRETE FOR CAST INSITU OR PRECAST CONCRETE KERB SHALL BE GRADE 30/20.
2. CONCRETE BEDDING SHALL BE GRADE 15/20
3. THE FINISHED KERB SHALL BE TRUE TO LINE, GRADE AND LEVEL WITHIN +/-5mm AND SHALL PRESENT A SMOOTH APPEARANCE FREE FROM KINKS AND DISTORTION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE

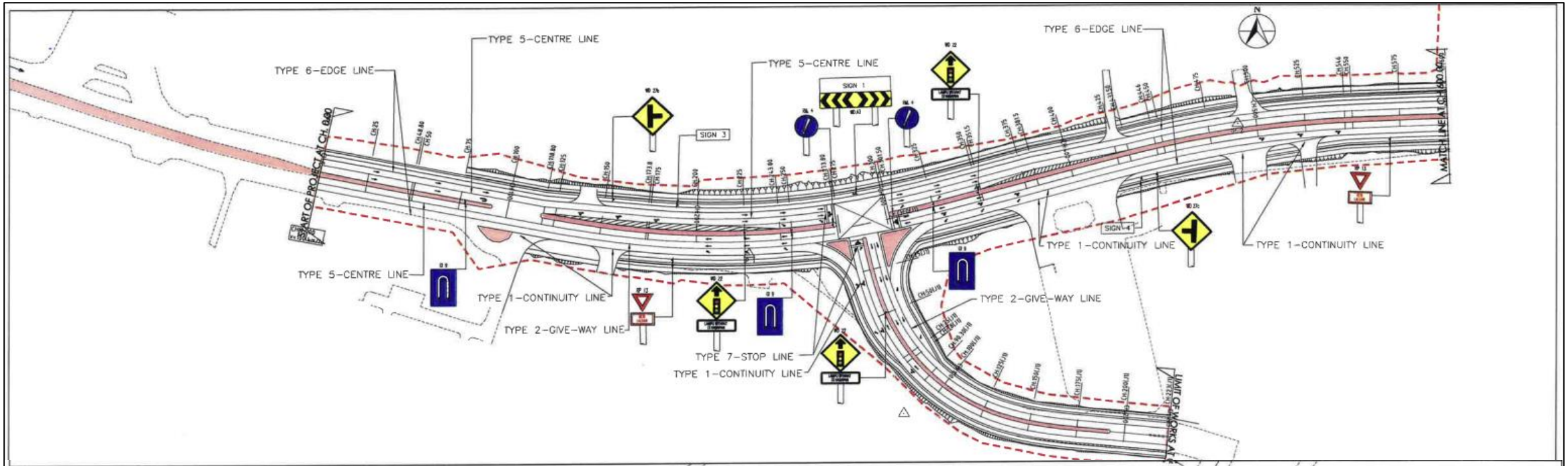
WIRE ROPE BARRIER SYSTEM

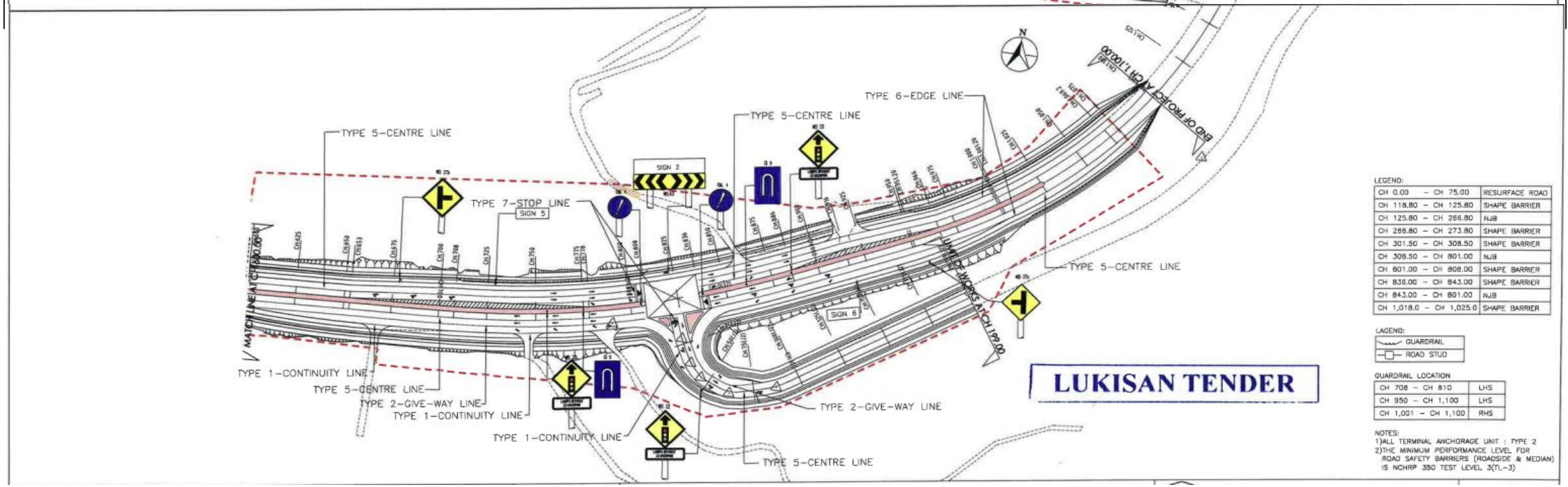
- Wire Rope Safety Barriers (WRSBs) are flexible **type of longitudinal traffic barrier** which utilizes the energy management principle.
- **It absorbs the dynamic impacting kinetic energy through the posts, anchors and the pre-tensioned wire ropes whereby the posts are designed to collapse progressively on impact**
- **It guides the collided vehicle forward away from the line of traffic** as it deflects, rather than deflected it into the flow of traffic, with potentially lethal consequences
- WRSBs keep vehicles damage to a minimum and reduce the risk of serious injury.
- Upon impact, WRSBs deflect more than other barrier types, resulting in relatively less vehicle damage and occupant injury
- However this deflection occurs only momentarily at the instance of impact and is not permanent
- WRSBs are more forgiving to vehicle occupants when performing their function of containing and redirecting which have lest the roadway, or travel lane in the case of media application

WIRE ROPE BARRIER SYSTEM



CONTOH-CONTOH APLIKASI PERABOT JALAN





LUKISAN TENDER

LEGEND:

CH 0.00 – CH 75.00	RESURFACE ROAD
CH 118.80 – CH 125.80	SHAPE BARRIER
CH 125.80 – CH 266.80	NJB
CH 266.80 – CH 273.80	SHAPE BARRIER
CH 301.50 – CH 308.50	SHAPE BARRIER
CH 308.50 – CH 801.00	NJB
CH 801.00 – CH 808.00	SHAPE BARRIER
CH 836.00 – CH 843.00	SHAPE BARRIER
CH 843.00 – CH 801.00	NJB
CH 1,018.0 – CH 1,025.0	SHAPE BARRIER

LAGEND:

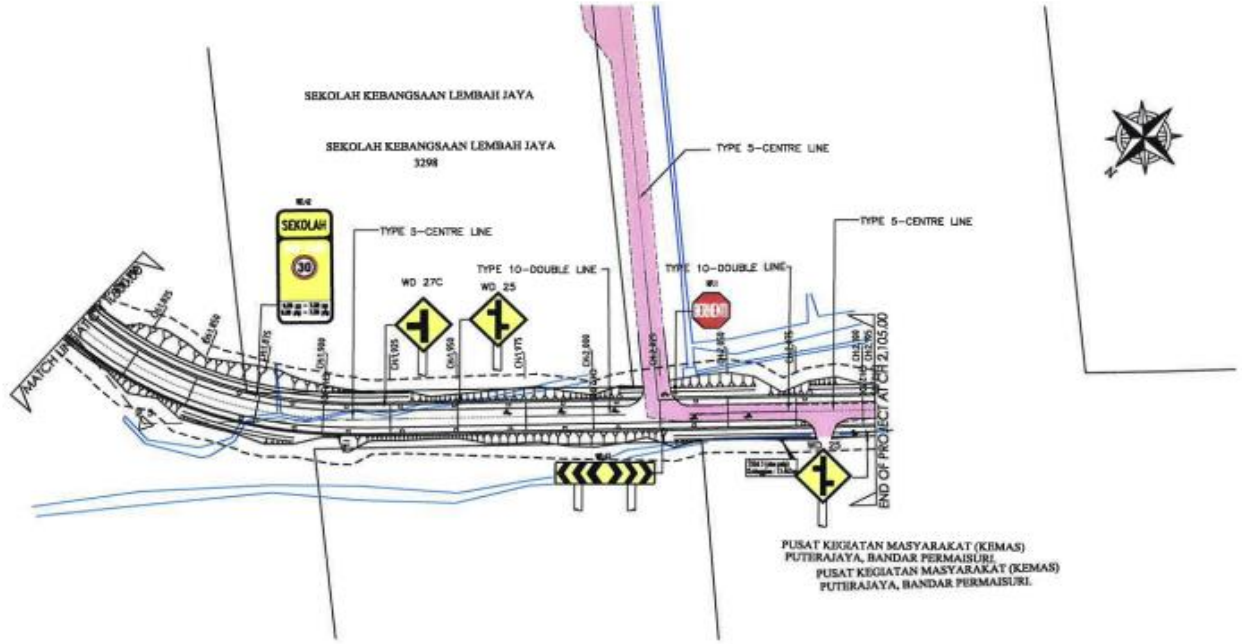
	GUARDRAIL
	ROAD STUD

GUARDRAIL LOCATION

CH 708 – CH 810	LHS
CH 950 – CH 1,100	LHS
CH 1,001 – CH 1,100	RHS

NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL-3)


SIGN 1
START OF PROJECT AT CH 0.00
BERHENTI
TYPE 5-CENTRE LINE
TYPE 6-EDGE LINE
GUARDRAIL
MATCH LINE AT CH 600.00
AWAS
TYPE 10-DOUBLE LINE
LEGEND:
DELINATOR
GUARDRAIL
ROAD STUD
GUARDRAIL LOCATION
CH 1,044 - CH 1,169 LHS
CH 1,048 - CH 1,169 RHS
NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL-3)
NOTES:
1)THE CHEVRON DELINEATOR SIGN SHALL BE ERECTED ON THE OUTSIDE OF A CURVE, LATERALLY [WD 39a&WD39b] 6m APART EACH OTHER.
2)BOLT AND NUTS AT GUARDRAIL PACKER SHALL BE SPOT WELDED.



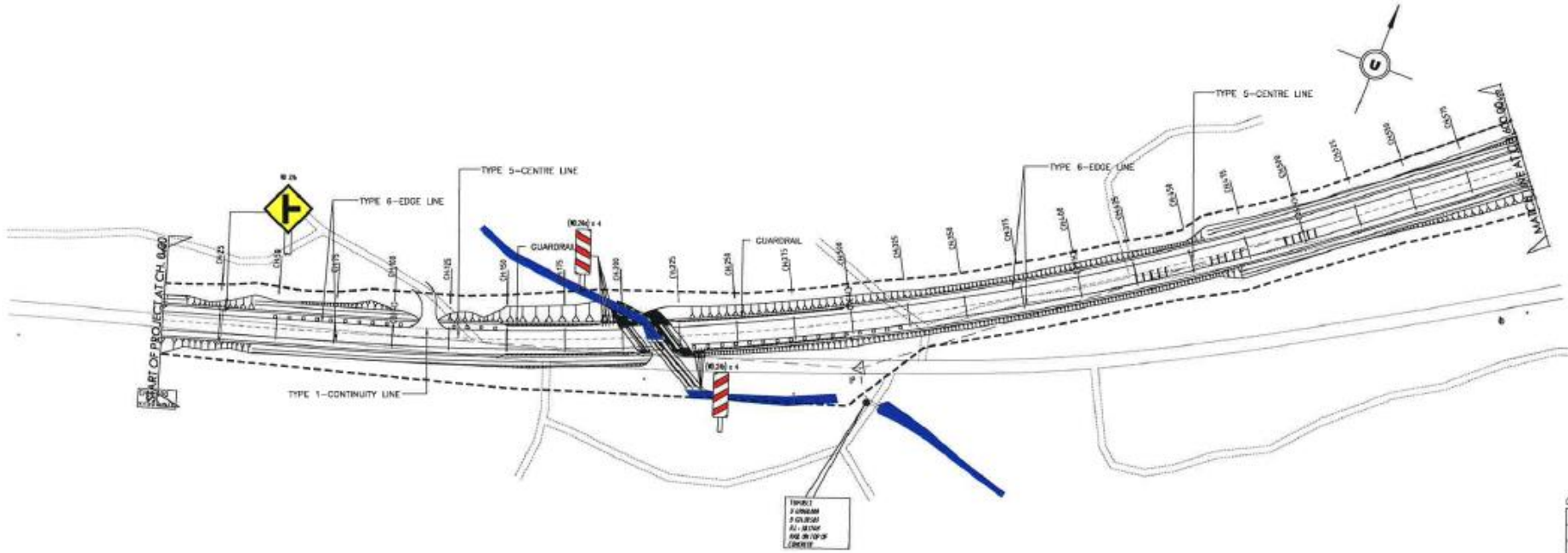
LEGEND:

DELINATOR
GUARDRAIL
ROAD STUD

GUARDRAIL LOCATION

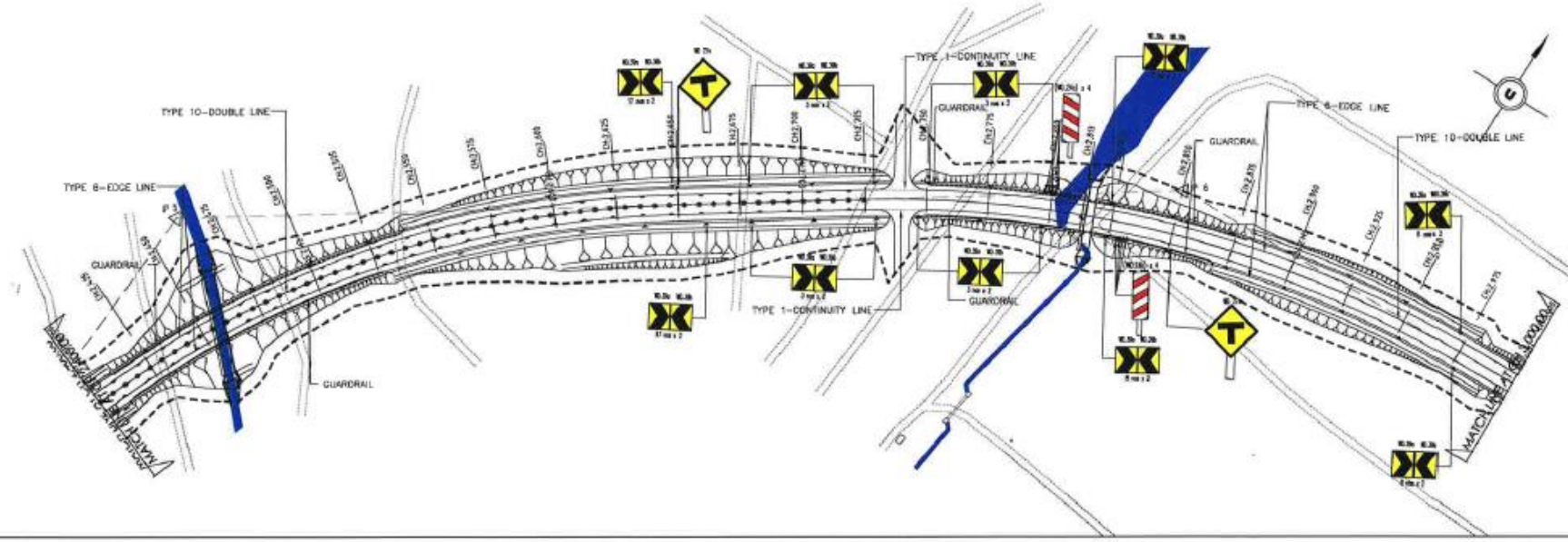
CH 1,280 – CH 1,710	LHS
CH 1,280 – CH 1,557	RHS

NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL-3)



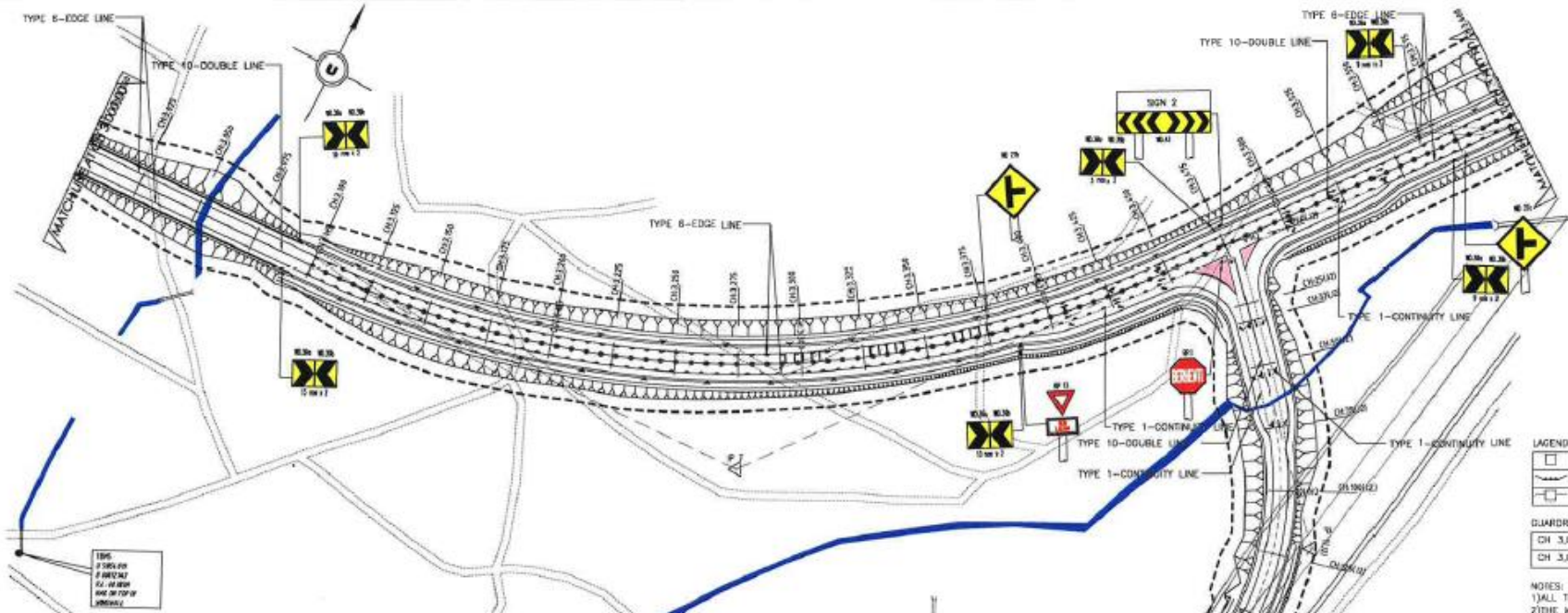
GUARDRAIL LOCATION

CH 150 – CH 190	LHS
CH 150 – CH 204	RHS
CH 225 – CH 300	LHS
CH 237 – CH 300	RHS



GUARDRAIL LOCATION

CH 2,408 – CH 2,542	LHS
CH 2,408 – CH 2,531	RHS
CH 2,750 – CH 2,882	LHS
CH 2,750 – CH 2,817	RHS



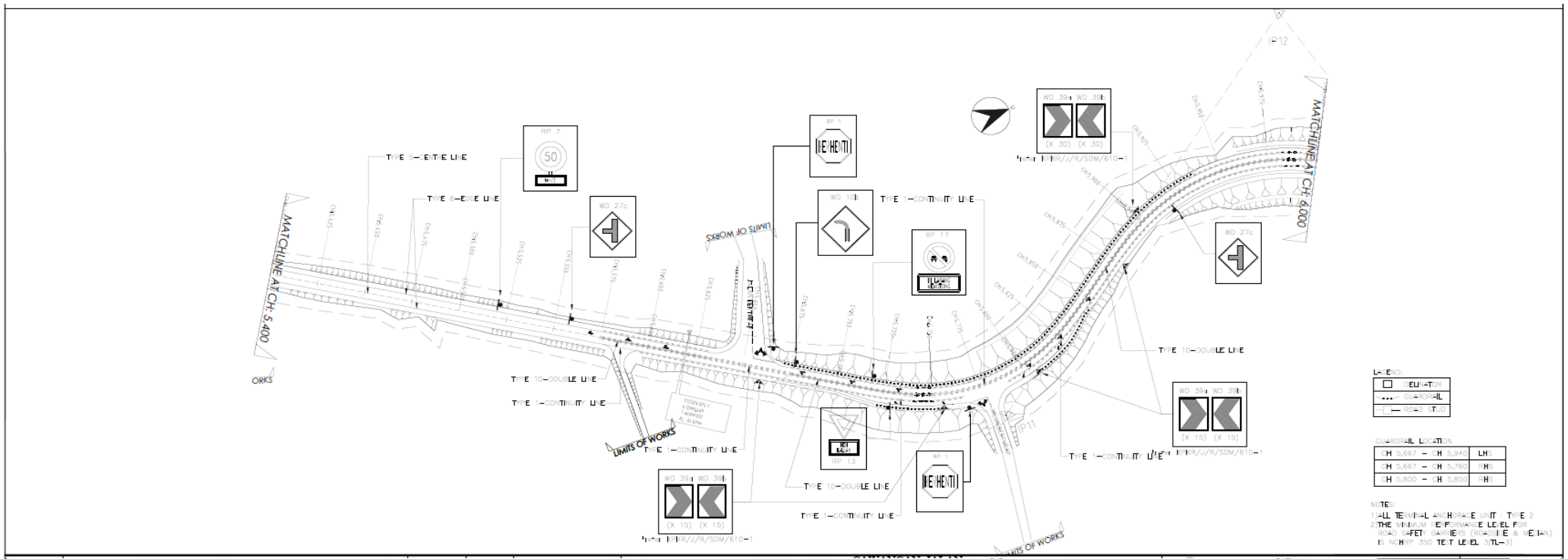
LAGEND:

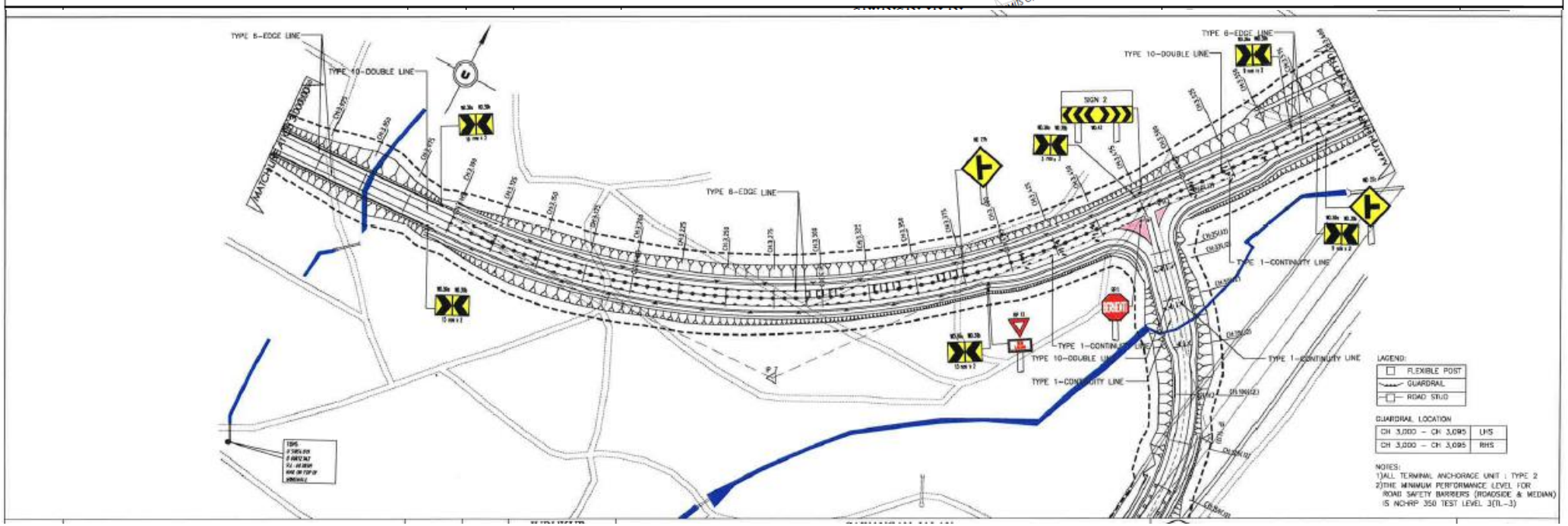
FLEXIBLE POST
GUARDRAIL
ROAD STUD

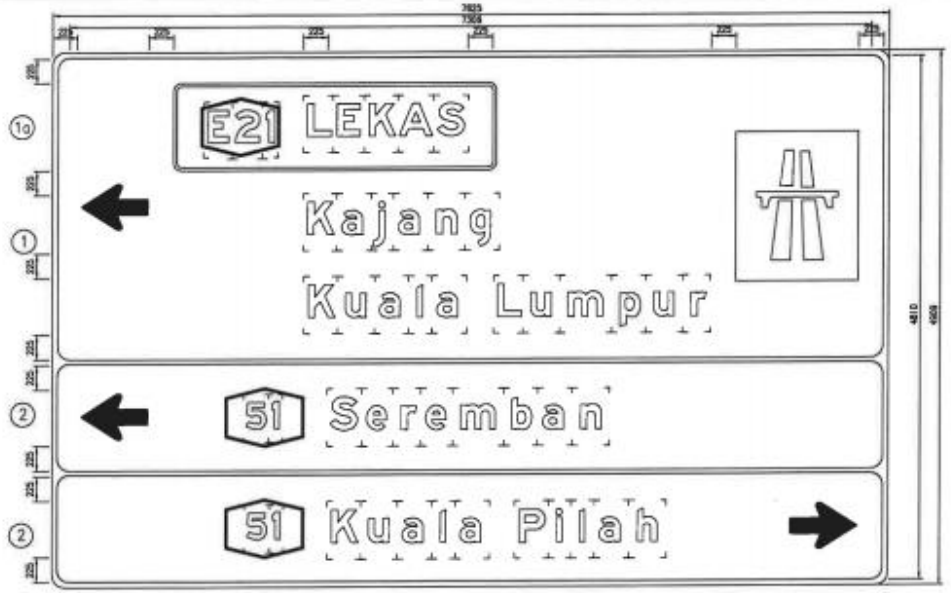
GUARDRAIL LOCATION

CH 3,000 – CH 3,095	LHS
CH 3,000 – CH 3,095	RHS

NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL-3)

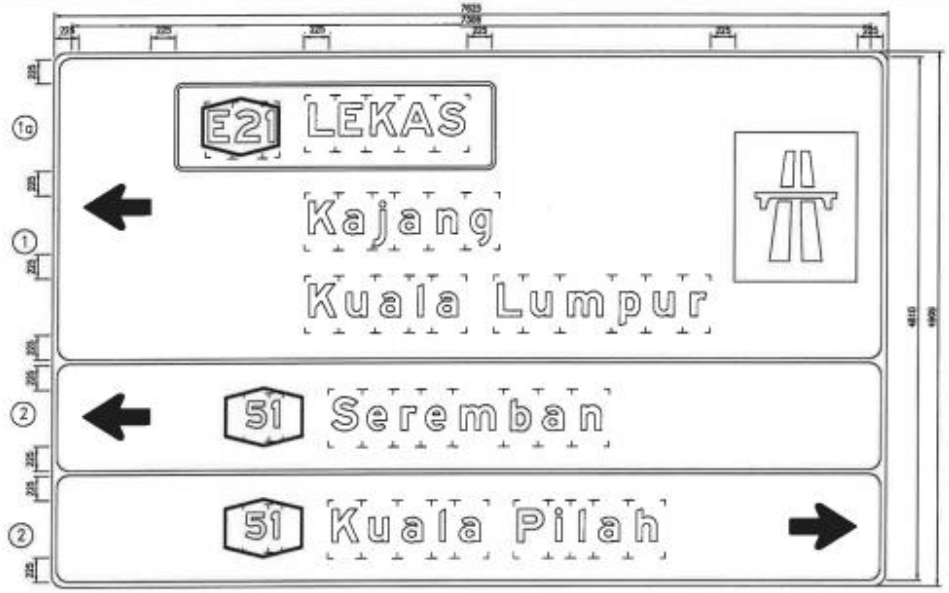

MATCHLINE AT CH: 5.400
MATCHLINE AT CH: 6.000
TYPE 6–EDGE LINE
TYPE 10–DOUBLE LINE
TYPE 1–CONTINUITY LINE
LIMITS OF WORKS
IP 12
IP 11
LEGEND:
DELINEATOR
GUARDRAIL
ROAD STUD
GUARDRAIL LOCATION
CH 5,667 – CH 5,940 LHS
CH 5,667 – CH 5,760 RHS
CH 5,800 – CH 5,850 RHS
NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL–3)


TYPE 6–EDGE LINE
TYPE 10–DOUBLE LINE
TYPE 1–CONTINUITY LINE
SIGN 2
LEGEND:
FLEXIBLE POST
GUARDRAIL
ROAD STUD
GUARDRAIL LOCATION
CH 3,000 – CH 3,095 LHS
CH 3,000 – CH 3,095 RHS
NOTES:
1)ALL TERMINAL ANCHORAGE UNIT : TYPE 2
2)THE MINIMUM PERFORMANCE LEVEL FOR ROAD SAFETY BARRIERS (ROADSIDE & MEDIAN) IS NCHRP 350 TEST LEVEL 3(TL–3)



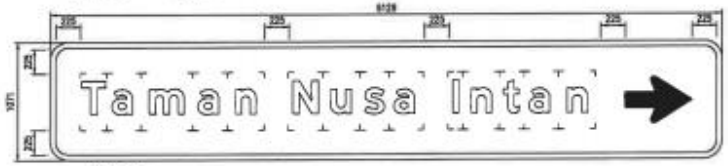
SIGN. 1

Background ①	Green
Letter	White
Background ①a	White
Letter	Black
Background ②	Blue
Letter	White
Letter Type	Transport Heavy Normal Letter
Letter Height	300mm
Sign Height	mm
Sign Width	mm
Sign Area	sq m



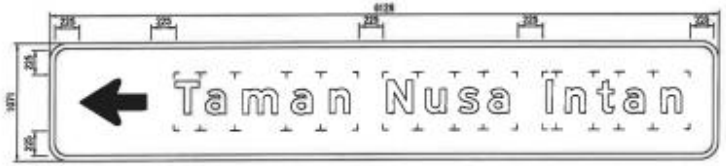
SIGN. 2

Background ①	Green
Letter	White
Background ①a	White
Letter	Black
Background ②	Blue
Letter	White
Letter Type	Transport Heavy Normal Letter
Letter Height	300mm
Sign Height	mm
Sign Width	mm
Sign Area	sq m



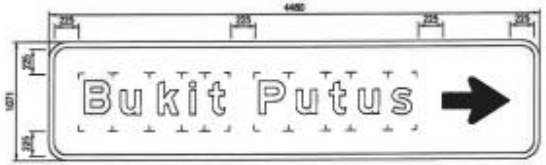
SIGN. 3

Background	White
Letter	Blue
Letter Height	300mm
Sign Height	1,071mm
Sign Width	6,126mm
Sign Area	6.60sq m



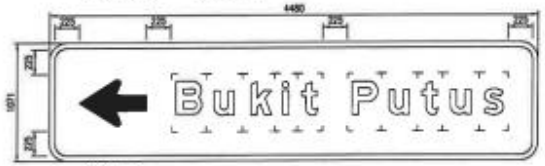
SIGN. 4

Background	White
Letter	Blue
Letter Height	300mm
Sign Height	1,071mm
Sign Width	6,126mm
Sign Area	6.60sq m



SIGN. 5

Background	White
Letter	Black
Letter Height	300mm
Sign Height	1,071mm
Sign Width	4,480mm



SIGN. 6

Background	White
Letter	Black
Letter Height	300mm
Sign Height	1,071mm
Sign Width	4,480mm

LUKISAN TENDER

KAJIAN KES

(10th Malaysian Road Conference & Exhibition 2018)

IOP Conf. Series: Materials Science and Engineering **512** (2019) 012023 doi:10.1088/1757-899X/512/1/012023

Road safety audit – what we have learnt?

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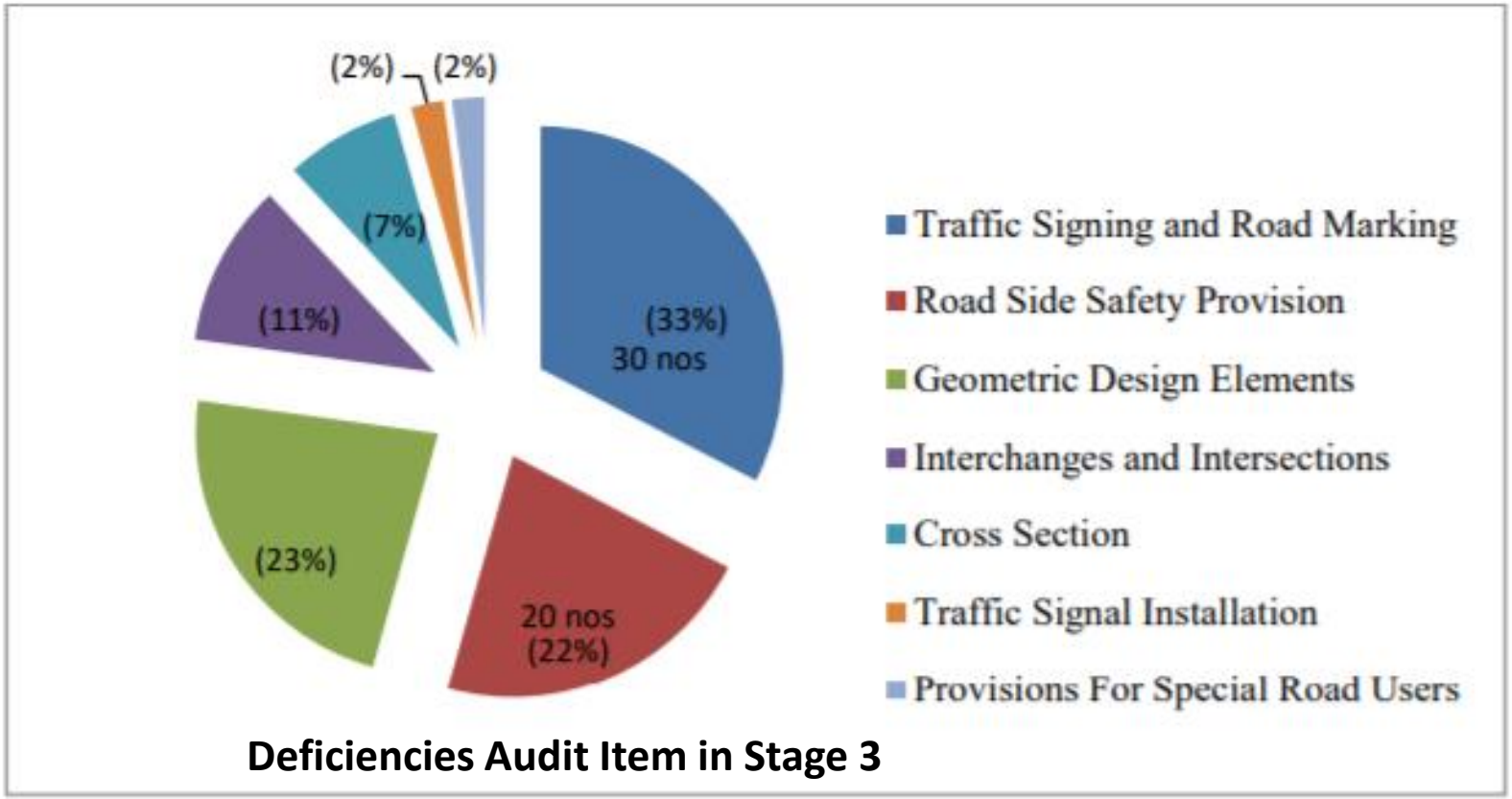
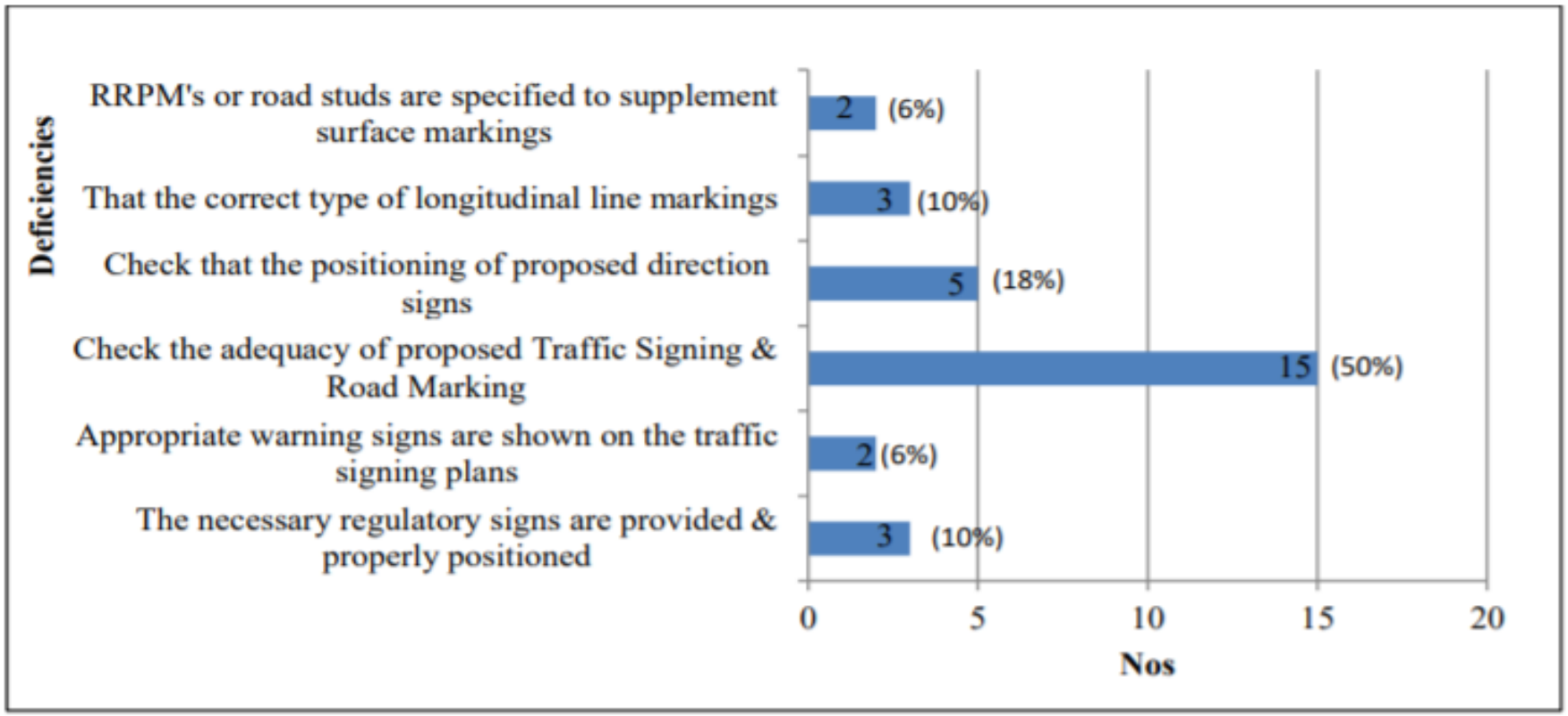
Abstract. The traffic accident problem in Malaysia is one of the most serious problem facing the nation. In the effort to reduce traffic accidents, 'Re-Active' initiatives, such as the 'Accident Blackspot' Program, 'Pro-Active' measures such as Road Safety Auditing and improved road design practices is implemented. In early 1997, Road Safety Audit (RSA) was started in JKR and a manual was produced as the primary guide for Road Safety Auditing by JKR and its Consultants engaged in this work. Since then, the implementation of RSA has revealed issues on poor RSA management, common repetitive mistakes by designers and the absence of warrant application. This paper discusses these issues and relates them to the study carried out. This study attempts to compare local RSA practices with other countries in finding the solutions to the above problems. It has been shown that having a policy, clear roles & responsibility and proper RSA management is vital in ensuring road safety is adequately catered for. Furthermore, frequent updating of design guidelines and building up of competency of road designers can substantially reduce the issue on quality of road design.

…… The study has also indicated that 92 number of safety deficiencies were found in Road Safety Audit Report Stage 3 involving various issues. It was found that issues **involving traffic signing and road marking** are 30 nos. (33%) and road side safety provision 20 nos. (22%) contributed to 50 nos. (55%) of the total deficiencies as shown in figure as below.



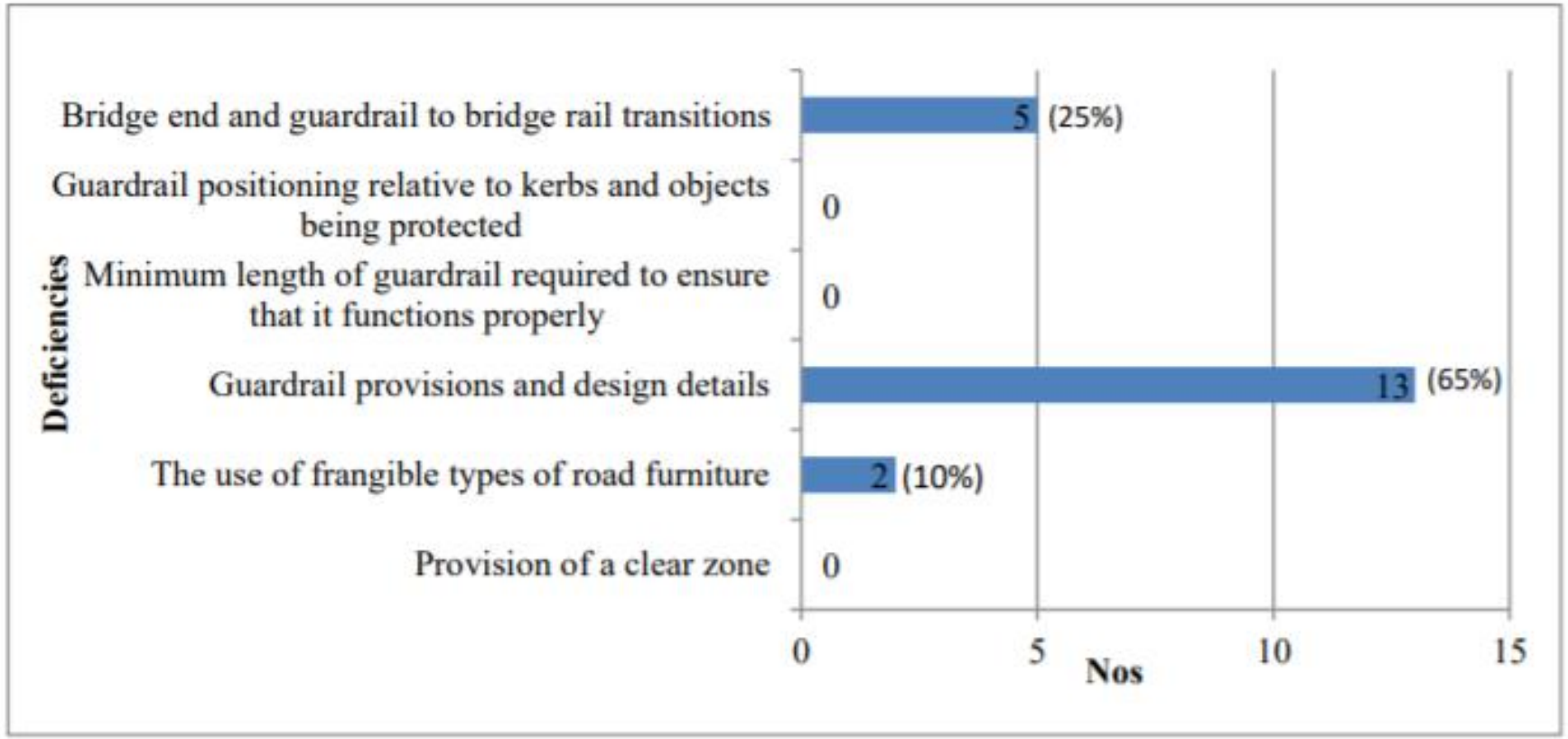
Deficiencies Audit Item in Stage 3

The figure shows that issues **involving inadequate numbers of signage and inappropriate usage of road markings** 15 nos. (50%) were the main concerns highlighted in auditing of signage and road markings. This is followed by inadequate detailing of barriers in auditing of road side safety provisions 13 nos. (65%)

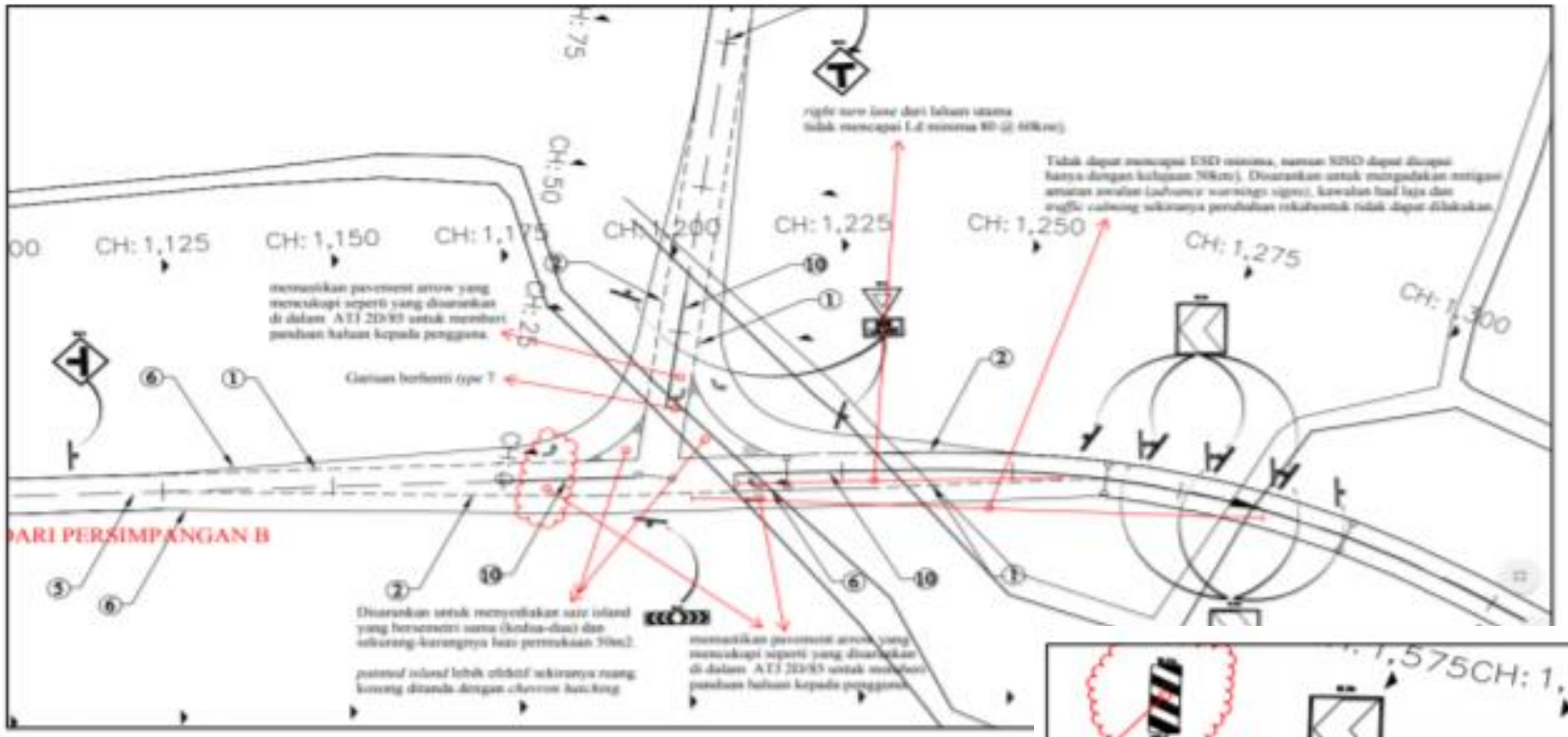


Deficiencies Found in Traffic Signing & Road Marking

This is followed by inadequate detailing of barriers in auditing of road side safety provisions 13 nos. (65%)

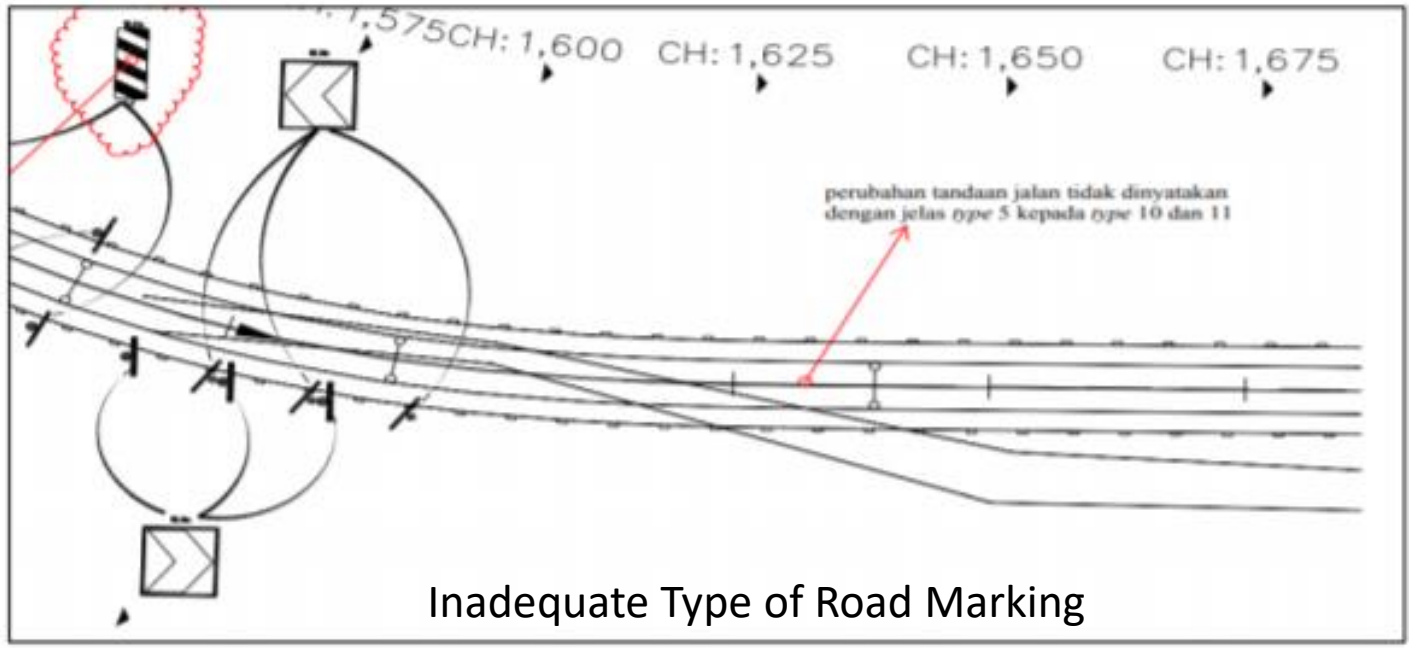


Deficiencies Found in Roadside Safety Provision



Inadequate Type and Traffic Signing Location

Commonly involve issues of traffic signing and road marking and road side safety provision



Inadequate Type of Road Marking

SEKIAN TERIMA KASIH

Q & A