REKABENTUK AWALAN

Data Fotometri
(Photometric Data)

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PROSES REKABENTUK AWALAN

1) Pemilihan *Lighting Class* utk *Traffic Route*

2) Pemilihan *Lighting Class* utk *Conflict Area* : Table B3 MS 825 Part 1

3) Penentuan - tinggi tiang, jenis lantera, jenis lampu, luminous flux, rating IP, jadual pembersihan lantera, kategori pencemaran, *maintenance factor*

(Table D1: MS 825 Part 1), lebar *carriageway*, lebar lane, susunan luminaire, jenis permukaan jalan (r-table)

Terms and Definition

1) Average road surface luminance (of a carriageway of a road) – (L)

- luminance of the road surface averaged over the carriageway

2) Longitudinal uniformity (of road surface luminance of a driving lane) – (U_{gl}) = Lmin/Lmax (each lane)

- ratio of the lowest to the highest road surface luminance found in a line in the centre along a driving lane

3) Longitudinal uniformity (of road surface luminance of a carriageway) – (U_l) = Lmin/Lmax

-lowest of the longitudinal uniformities of the driving lanes of the carriageway

4) Threshold increment *(TI)*

- measure of the loss of visibility caused by the disability glare of the luminaires of a road lighting installation

5) Surround ratio (of illumination of a carriageway of a road) *(SR)*

- average illuminance on strips just outside the edges of the carriageway in proportion to the average illuminance on strips just inside the edges

6) Overall uniformity (of road surface luminance,illuminance on a road area or hermispherical illuminance) - *(U_o) =* Lmin/Lave

-ratio of the lowest to the average value

Class	Luminance of the road surface of the carriageway for the dry road surface condition			Disability glare	Lighting of surroundings
	L in cd/m (minimum maintained)	Overall Uniformity Uo (minimum)	Longitudinal Uniformity Ul (minimum)	TI in % [a] (maximum)	SR (minimum) [b]
ME1	2,0	0,4	0,7	10	0,5
ME2	1,5	0,4	0,7	10	0,5
ME3a	1,0	0,4	0,7	15	0,5
ME3b	1,0	0,4	0,6	15	0,5
ME3c	1,0	0,4	0,5	15	0,5
ME4a	0,75	0,4	0,6	15	0,5
ME4b	0,75	0,4	0,5	15	0,5
ME5	0,5	0,35	0,4	15	0,5
ME6	0,3	0,35	0,4	15	No requirement

a- An increase of 5 percentage points in TI can be permitted where low luminance light sources are used (see note 6)

b- This criterion can be applied only where there are no traffic areas with their own requirements adjacent to the carriageway

ME - Series of lighting classes

Class	Horizontal Illuminance	
	E in lux (minimum maintained)	Uo (minimum)
CE0	50	0,4
CE1	30	0,4
CE2	20	0,4
CE3	15	0,4
CE4	10	0,4
CE5	7,5	0,4

CE - Series of lighting classes

- Arrangement :

  - Single-sided, twin central, staggered, opposite, combined twin central and opposite

- Road Surface Classifications – Table C3 & C4 MS 825

  i) R3 : Q_o = 0.07 Asphalt road surface with dark aggregate

  ii) R1 : Q_o = 0.1 Cement concrete road surface

To be filled by designer and attached in tender document

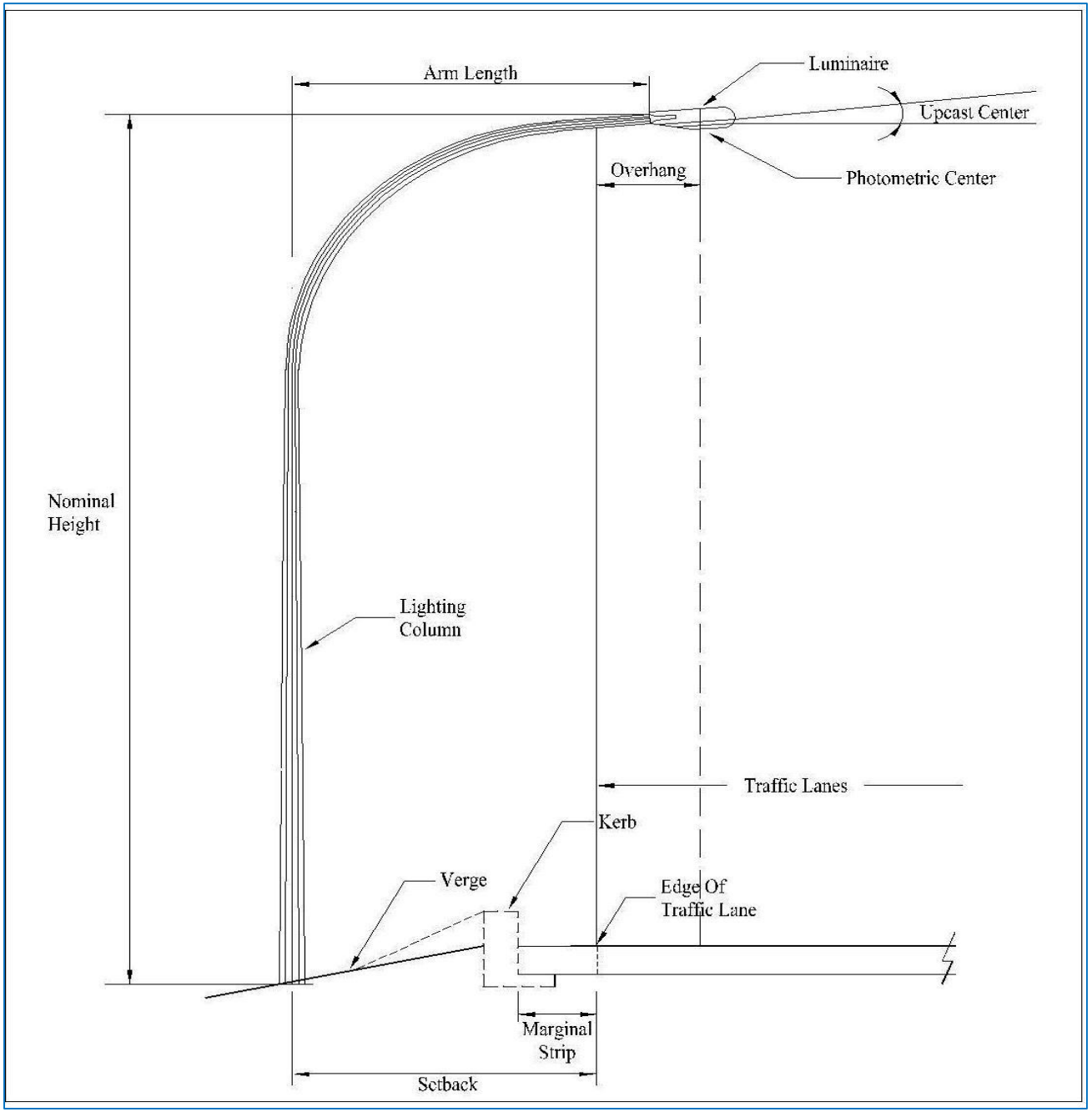
APPENDIX D1 – 1.1A
DESIGN CRITERIA

*Road Lighting Class	: ME_____/ CE_____		
*Road Surface Type	: Asphalt / Concrete		
Luminance Coefficient, Q_o	=	_	
Average Luminance, L_{ave}	≥	_____	
Overall Uniformity, U_o	≥	_____	
Longitudinal Uniformity, U_l	≥	_____	
Threshold Increment, TI	≤	_____	
Surround Ratio, SR	≥	_____	
*Maintenance Factor , MF	:	_	
*Column Height , H	:	_	m
* Column spacing (m)	:	_	m
*Lamp Type	:	_	
*Lamp Wattage	:	_	W
Flux (klm)	:	_	klm
Lamp Tilting Angle	:	_	
*Arm Length	:	_	
*Overhang	:	_	
*Setback	:	_	

Note :

* Data to be filled by Designer

Maintenance Factor , MF = Luminaire MF X Lamp Lumen MF


Arm Length
Luminaire
Upcast Center
Overhang
Photometric Center
Nominal Height
Lighting Column
Traffic Lanes
Kerb
Verge
Edge Of Traffic Lane
Marginal Strip
Setback

DESIGN CRITERIA OF ROAD LIGHTING & TRAFFIC SIGNAL LIGHT

DESIGN STANDARDS

THE FOLLOWING DESIGN STANDARDS ARE USED IN DESIGNING ROAD LIGHTING.

- MS 825 : - CODE OF PRACTICE FOR THE DESIGN OF ROAD LIGHTING
- CIE 115 : RECOMMENDATIONS FOR THE LIGHTING OF ROADS FOR MOTOR AND PEDESTRIAN TRAFFIC
- L-S20 : SPECIFICATION FOR ROAD LIGHTING INSTALLATION
- JKR/SPJ/2008-S8 : STANDARD SPECIFICATION FOR ROAD WORKS (SECTION 8 : TRAFFIC SIGNAL SYSTEM)

DESIGN CRITERIA

CLASS OF ROAD : R5
ROAD PROFILE : 4 LANE DUAL CARRIAGEWAY
SPEED LIMIT : 90km/hr

ITEM	TYPICAL CONFLICT AREA (JUNCTION)	MAIN LINE
LIGHTING CLASS	CE0	ME1
MINIMUM MAINTAINED AVERAGE ILLUMINANCE (LUX) / LUMINANCE (cd/m^2)	50 LUX	2.00 cd/m^2
ILLUMINANCE / LUMINANCE (INITIAL) REQUIRED	57.47 LUX	2.30 cd/m^2
OVERALL UNIFORMITY (E Min/ E Ave)	≥0.4	≥0.4
LONGITUDINAL UNIFORMITY (Emin / Emax)	-	≥0.7
DISABILITY GLARE (TI)	-	10
MAINTENANCE FACTOR	0.87 (ASSUMPTION : CLEANING INTERVAL = 36 MONTH, MEDIUM POLUTION, IP 6X MIN)	0.87 (ASSUMPTION : CLEANING INTERVAL = 36 MONTH, MEDIUM POLUTION, IP 6X MIN)
LIGHTING ARRANGEMENT	MEDIAN & ROAD SIDE	MEDIAN & ROAD SIDE
AVERAGE SPAN	AT GRADE 25m AT BRIDGE (PARAPET) 25m	AT GRADE 35m
ROAD SURFACE TYPE	ASPHALT, Q_o = 0.07	ASPHALT, Q_o = 0.07

ROAD LIGHTING COLUMNS

> ALL COLUMNS USED ARE OCTAGONAL HOT-DIPPED GALVANISED IRON (2 SECTIONS)

> LIGHTING COLUMNS ARE DESIGNED TO WITHSTAND A WIND SPEED OF 35m/s

TYPE OF LUMINAIRES :-

> TYPE OF LUMINAIRES USED SHALL BE AS FOLLOWS :

AREA	TYPE OF FITTING	LAMP LUMEN	ARM LENGTH	TILTING ANGLE
MEDIAN	2 X 250W HPSV LUMINAIRE MOUNTED ON 10m POLE	28000 lm	(WITH ARM)	5°
ROAD SIDE	1 X 250W HPSV LUMINAIRE MOUNTED ON 10m POLE AT BRIDGE PARAPET	28000 lm	(WITH ARM)	5°
CORBEL @ PARAPET	1 X 250W HPSV LUMINAIRE MOUNTED ON 9m POLE AT BRIDGE PARAPET	28000 lm	(WITH ARM)	5°

> ALL LIGHT LUMINAIRES WILL MEET THE MINIMUM REQUIREMENT OF IP66 FOR OPTICAL COMPARTMENT AND MINIMUM IP43 FOR CONTROL GEAR COMPARTMENT.

> ACCESS TO THE INTERIOR OF THE LUMINAIRE SHALL BE FROM THE TOP. BOTTOM ACCESS IS NOT ACCEPTABLE

TRAFFIC SIGNAL LIGHTING

> SIGNAL HEAD SHALL BE OF 300mm HIGH-POWER LED LAMP
> TRAFFIC SIGNAL CONTROL SYSTEM SHALL BE SIMILAR TO EXISTING CONTROL MONITORING SYSTEM (CMS)