

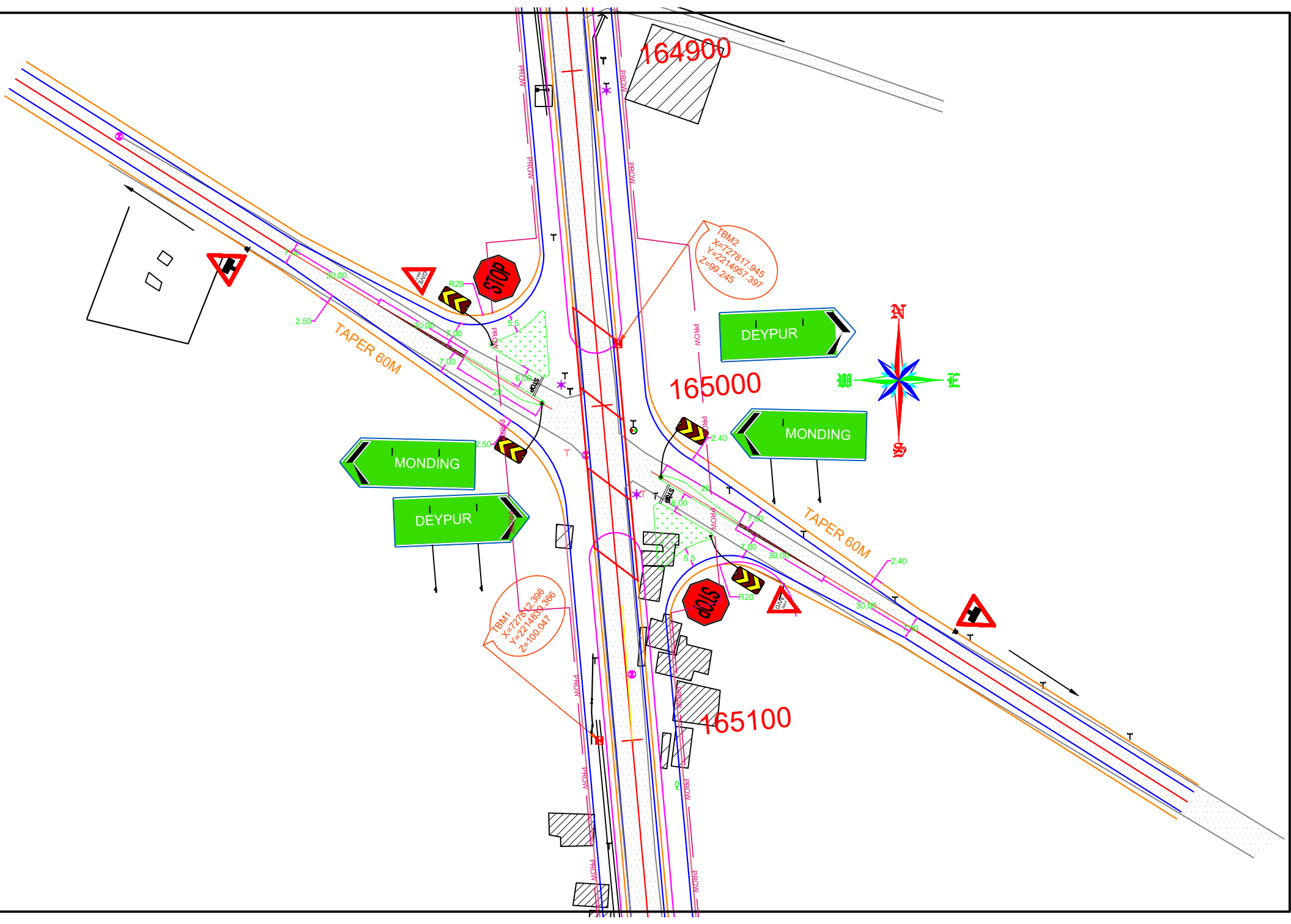
TCS - VUP APPROCHES WITH RE WALL WITH SLIP ROAD

Sl. No	From(km)	To(km)	Length with structure (km)	Length without structure (km)
1	164/140	165/480	1/340	1/260

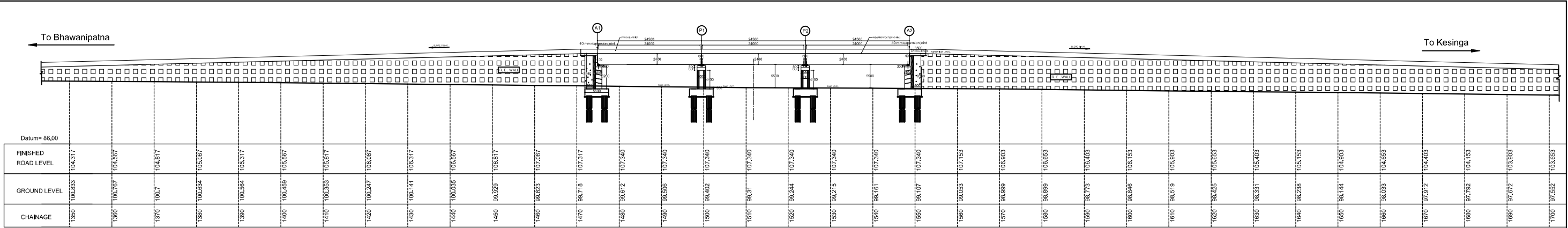
164900

165000

165100



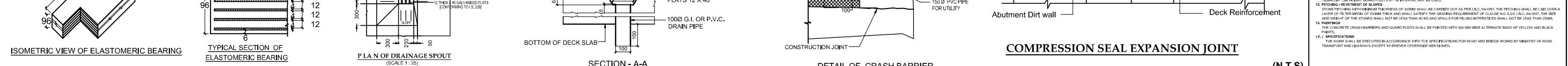
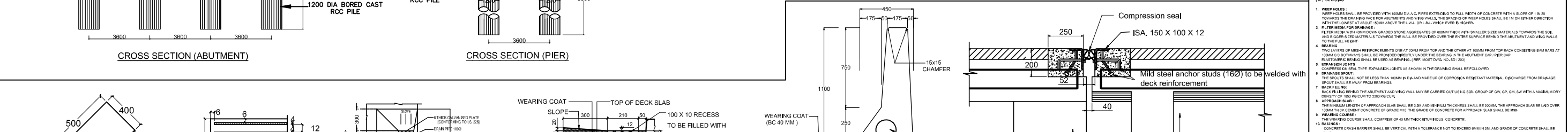
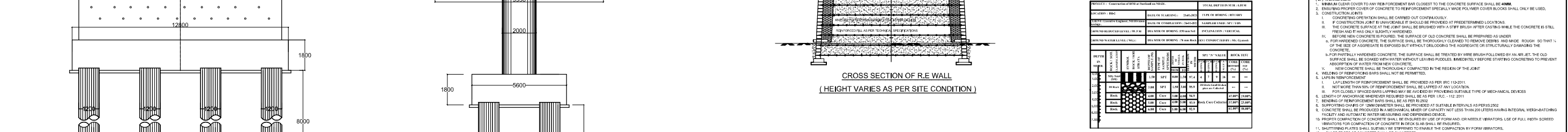
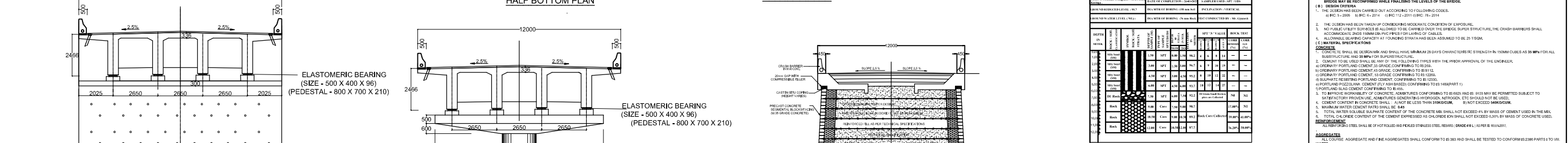
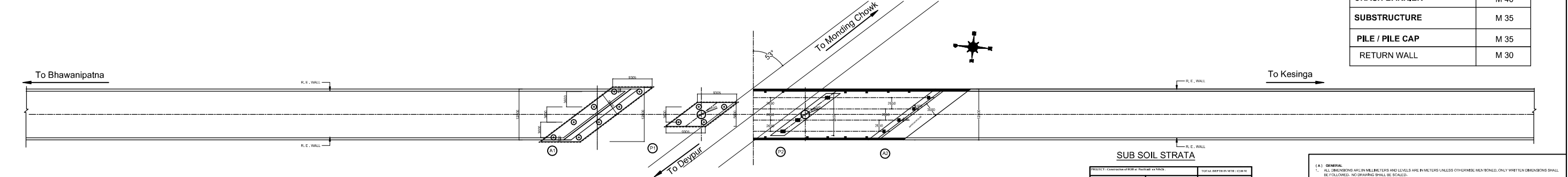
3 X 24.0 M - UNDERPASS



LONGITUDINAL SECTION

GRADE OF CONCRETE FOR RCC 'T' GIRDER

SUPERSTRUCTURE - RCC	M 35
CRASH BARRIER	M 40
SUBSTRUCTURE	M 35
PILE / PILE CAP	M 35
RETURN WALL	M 30



SUB SOIL STRATA

DEPTH IN METRE	SOIL TYPE	WATER CONTENT (%)	LIQUIDITY INDEX	PLASTICITY INDEX	UNSATURATED WATER CONTENT (%)	SHRINKAGE (%)	PERCENTAGE PASSING 75 MICRON SIEVE (%)	PERCENTAGE PASSING 425 MICRON SIEVE (%)	PERCENTAGE PASSING 20 MICRON SIEVE (%)
0-150	CLAY	45	1.0	15	40	10	100	100	100
150-300	CLAY	45	1.0	15	40	10	100	100	100
300-450	CLAY	45	1.0	15	40	10	100	100	100
450-600	CLAY	45	1.0	15	40	10	100	100	100
600-750	CLAY	45	1.0	15	40	10	100	100	100
750-900	CLAY	45	1.0	15	40	10	100	100	100
900-1050	CLAY	45	1.0	15	40	10	100	100	100
1050-1200	CLAY	45	1.0	15	40	10	100	100	100
1200-1350	CLAY	45	1.0	15	40	10	100	100	100
1350-1500	CLAY	45	1.0	15	40	10	100	100	100

DEPTH IN METRE	SOIL TYPE	WATER CONTENT (%)	LIQUIDITY INDEX	PLASTICITY INDEX	UNSATURATED WATER CONTENT (%)	SHRINKAGE (%)	PERCENTAGE PASSING 75 MICRON SIEVE (%)	PERCENTAGE PASSING 425 MICRON SIEVE (%)	PERCENTAGE PASSING 20 MICRON SIEVE (%)
0-150	CLAY	45	1.0	15	40	10	100	100	100
150-300	CLAY	45	1.0	15	40	10	100	100	100
300-450	CLAY	45	1.0	15	40	10	100	100	100
450-600	CLAY	45	1.0	15	40	10	100	100	100
600-750	CLAY	45	1.0	15	40	10	100	100	100
750-900	CLAY	45	1.0	15	40	10	100	100	100
900-1050	CLAY	45	1.0	15	40	10	100	100	100
1050-1200	CLAY	45	1.0	15	40	10	100	100	100
1200-1350	CLAY	45	1.0	15	40	10	100	100	100
1350-1500	CLAY	45	1.0	15	40	10	100	100	100

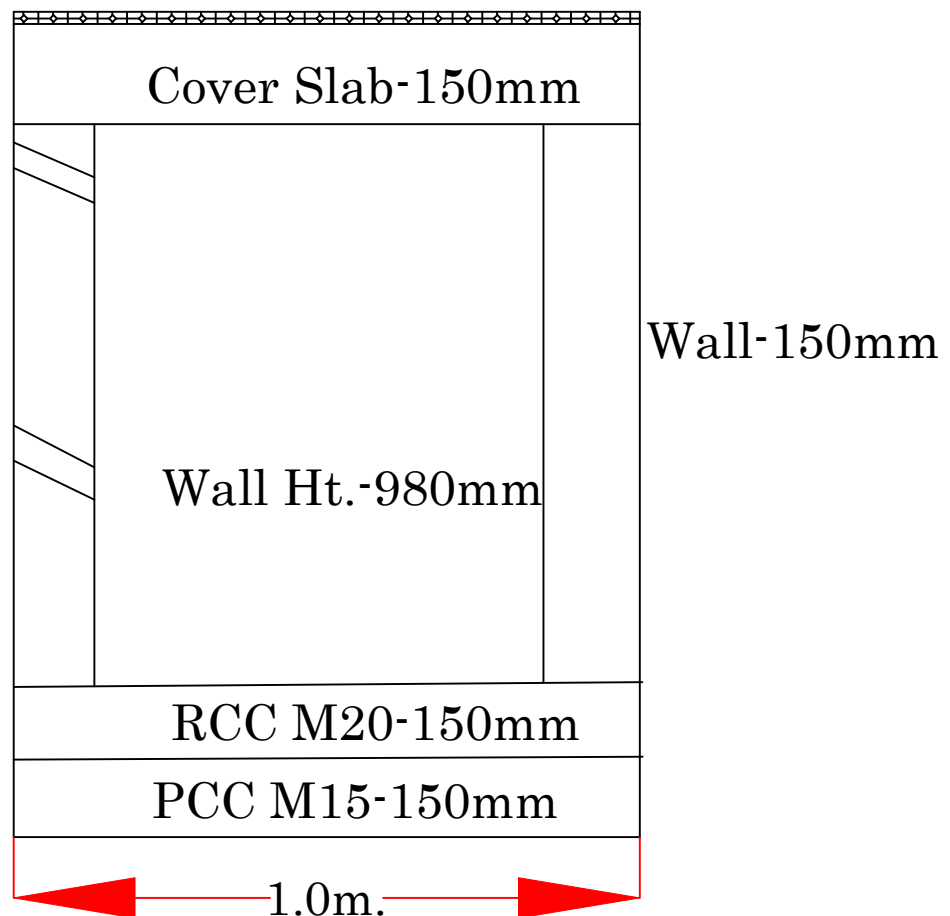
- (A) GENERAL
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED. NO DIMENSIONS SHALL BE SCALE.
 2. SITE SPECIFICATION NOTES ARE MENTIONED IN THE RESPECTIVE DAD.
 3. THE LEVELS MAY BE CORRECTED PRIOR TO EXECUTION. THE ROAD GEOMETRIES AS SHOWN IN THE PROJECT ADJACENT TO THE BRIDGE MAY BE RECONFORMED WHILE FINALISING THE LEVELS OF THE BRIDGE.
- (B) DESIGN CRITERIA
1. THE DESIGN HAS BEEN CARRIED OUT ACCORDING TO FOLLOWING CODES:
a) IRC 5-2009 b) IRC 4-2014 c) IRC 112-2011 d) IRC 15-2011
 2. THE DESIGN HAS BEEN TAKEN UP CONSIDERING MODERATE CONDITION OF LAPPING.
 3. NO FUTURE UTILITY EXPOSURE IS ALLOWED TO BE CARRIED OVER THE BRIDGE. SUPERSTRUCTURE, THE CRASH BARRIERS SHALL ACCOMMODATE 200S 150MM DIA PVC PIPES FOR LAYING OF CABLES.
 4. ALLOWABLE BEARING CAPACITY AT JOINTING STRATA HAS BEEN ASSUMED TO BE 25 T/SQM.
- (C) MATERIAL SPECIFICATIONS
- CONCRETE
1. CONCRETE SHALL BE DESIGN M35 AND SHALL HAVE MINIMUM 28 DAYS CHARACTERISTICS STRENGTH IN 150MM CUBES AS 35 MPa FOR ALL SUBSTRUCTURE AND 30 MPa FOR SUPERSTRUCTURE.
 2. CEMENT TO BE USED SHALL BE ANY OF THE FOLLOWING TYPES WITH THE PRIOR APPROVAL OF THE ENGINEER.
a) ORDINARY PORTLAND CEMENT AS GRADE CONFORMING TO IS 8041.
b) ORDINARY PORTLAND CEMENT AS GRADE CONFORMING TO IS 8112.
c) ORDINARY PORTLAND CEMENT AS GRADE CONFORMING TO IS 12254.
d) SULPHATE RESISTING PORTLAND CEMENT CONFORMING TO IS 12255.
e) PORTLAND CEMENT AS GRADE CONFORMING TO IS 12254.
 3. PORTLAND CEMENT SHALL BE KEPT IN BAGGAGE CONFORMING TO IS 12254.
 4. PORTLAND CEMENT SHALL BE KEPT IN BAGGAGE CONFORMING TO IS 12254.
 5. SATISFACTORY PROVEN USE, ADULTURES GENERATING HYDROGEN, NITROGEN, ETC SHOULD NOT BE USED.
 6. CEMENT CONTENT IN CONCRETE SHALL NOT BE LESS THAN 140 KG/M³ AND NOT EXCEED 180 KG/M³.
 7. MAXIMUM WATER CEMENT RATIO SHALL BE 0.45.
 8. TOTAL WATER SOLUBLE SULPHATE CONTENT OF THE CONCRETE MIX SHALL NOT EXCEED 4% BY MASS OF CEMENT USED IN THE MIX.
 9. TOTAL CHLORIDE CONTENT OF THE CEMENT EXPRESSED AS CHLORIDE ION SHALL NOT EXCEED 0.06% BY MASS OF CONCRETE USED.
- AGGREGATES
- WATER
1. COURSE AGGREGATE AND FINE AGGREGATES SHALL CONFORM TO IS 383 AND SHALL BE TESTED TO CONFORM TO IS 2286 PARTS 1 TO VII.
 2. WATER TO BE USED IN CONCRETING AND CURING SHALL CONFORM TO IS 3043.
- (D) WORKMANSHIP
1. MINIMUM CLEAR COVER TO ANY REINFORCEMENT BAR CLOSEST TO THE CONCRETE SURFACE SHALL BE 40MM.
 2. DRIPPING PROPER COVER OF CONCRETE TO REINFORCEMENT SPECIALLY MADE POLYMER COVER BLOCAS SHALL ONLY BE USED.
 3. CONSTRUCTION JOINTS
a) CONCRETING OPERATION SHALL BE CARRIED OUT CONTINUOUSLY.
b) IF CONSTRUCTION JOINT IS UNAVOIDABLE IT SHOULD BE PROVIDED AT PREDETERMINED LOCATIONS.
c) THE CONCRETE SURFACE AT THE JOINT SHALL BE BRUSHED WITH A STIFF BRUSH AFTER CASTING WHILE THE CONCRETE IS STILL FRESH AND IT HAS ONLY SLIGHTLY HARDENED.
 4. BEFORE NEW CONCRETE IS POURED, THE SURFACE OF OLD CONCRETE SHALL BE PREPARED AS UNDER:
a) FOR UNWEDED CONCRETE, THE SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVE DUST, AND MADE ROUGH SO THAT 1% OF THE SIZE OF AGGREGATE IS EXPOSED BUT WITHOUT DELOOSING THE AGGREGATE OR STRUCTURALLY DAMAGING THE CONCRETE.
 5. FOR PARTIALLY HARDENED CONCRETE, THE SURFACE SHALL BE TREATED BY WIRE BRUSH FOLLOWED BY AN AIR BLOW. THE OLD SURFACE SHALL BE SOAKED WITH WATER WITHOUT LEAVING PORES. IMMEDIATELY BEFORE STARTING CONCRETING TO PREVENT ABSORPTION OF WATER FROM NEW CONCRETE.
 6. NEW CONCRETE SHALL BE THOROUGHLY COMPACTED IN THE REGION OF THE JOINT.
 7. WELDING OF REINFORCING BARS SHALL NOT BE PERMITTED.
 8. LAP LENGTH OF REINFORCEMENT SHALL BE PROVIDED AS PER IRC 112-2011.
a) NOT MORE THAN 50% OF REINFORCEMENT SHALL BE LAPPED AT ANY LOCATION.
b) FOR CLOSELY SPACED BARS LAPPING MAY BE AVOIDED BY PROVIDING SUITABLE TYPE OF MECHANICAL DEVICES.
c) LENGTH OF ANCHORAGE WHERE REQUIRED SHALL BE AS PER IRC 112-2011.
 9. BENDING OF REINFORCEMENT BARS SHALL BE AS PER IRC 2502.
 10. SUPPORTING CHAIRS OF 10MM DIAMETER SHALL BE PROVIDED AT SUITABLE INTERVALS AS PER IRC 2502.
 11. CONCRETE SHALL BE PRODUCED IN A MECHANICAL MIXER OF CAPACITY NOT LESS THAN 250 LITERS HAVING INTERNAL VIBRO-HATCHING FACILITY AND AUTOMATIC WATER MEASURING AND DISPENSING DEVICE.
 12. PROPER COMPACTION OF CONCRETE SHALL BE ENSURED BY USE OF FORM AND/OR NEEDLE VIBRATORS. USE OF FULL WIDTH SCORED VIBRATORS FOR COMPACTION OF CONCRETE IN DECK SLAB SHALL BE ENSURED.
 13. SHUTTING PLATES SHALL SUITABLY BE EXPENDED TO ENABLE THE COMPACTION BY FORM VIBRATORS.
 14. SHARP EDGES OF CONCRETE SHALL BE CHAMFERED.
- (E) DETAILING
1. WEAP HOLES SHALL BE PROVIDED WITH 100MM DIA PVC PIPES EXTENDING TO FULL WIDTH OF CONCRETE WITH A SLOPE OF 1 IN 50 TOWARDS THE DRAINING FACE FOR ABUTMENTS AND PIER WALLS. THE SPACING OF WEAP HOLES SHALL BE 1M ON EITHER SIDE WITH THE LOWEST AT ABOUT 10MM ABOVE THE LEVEL OF SLAB WHICH EVER IS LOWER.
 2. FILTER MEDIA FOR DRAINAGE
a) AT TOP WITHIN WITH 100MM DIA GROUPED STONE AGGREGATE OF 20MM THICK WITH SMALLER SIZED MATERIAL TOWARDS THE SOLE AND LARGER SIZED MATERIAL TOWARDS THE WALL BE PROVIDED OVER THE ENTIRE SURFACE BEHIND THE ABUTMENT AND PIER WALLS TO THE FULL HEIGHT.
 3. BEARING
a) TWO LAYERS OF MESH REINFORCEMENT ONE AT 20MM FROM TOP AND THE OTHER AT 10MM FROM TOP EACH CONSISTING 8MM BARS AT 100MM C/C BOTHWAYS SHALL BE PROVIDED EXCEPT UNDER THE BEARING OF THE ABUTMENT CAP, PIER CAP.
b) ELASTOMERIC BEARING SHALL BE USED AS BEARING. (REF. MOST DWG NO. SD/200)
 4. EXPANSION JOINTS
a) COMPRESSION SEAL TYPE EXPANSION JOINTS AS SHOWN IN THE DRAWING SHALL BE FOLLOWED.
 5. DRAINAGE GROUT
a) THE GROUT SHALL NOT BE LESS THAN 100MM IN DIA AND MADE UP OF CORROSION RESISTANT MATERIAL, (FRESH) FROM DRAINAGE GROUT SHALL BE AWAY FROM BEARINGS.
 6. BACK FILLING
a) BACK FILL BEHIND THE ABUTMENT AND PIER WALL MAY BE CARRIED OUT USING SOIL GROUP OF GW, GP, GL OR GW WITH A MAXIMUM DRY DENSITY OF 150 KGS/M³ TO 220 KGS/M³.
 7. APPROACH SLAB
a) THE MINIMUM LENGTH OF APPROACH SLAB SHALL BE 5.0M AND MINIMUM THICKNESS SHALL BE 300MM. THE APPROACH SLAB BE Laid OVER 100MM THICK CEMENT CONCRETE OF GRADE M30. THE GRADE OF CONCRETE FOR APPROACH SLAB SHALL BE M30.
 8. WEARING COURSE
a) THE WEARING COURSE SHALL COMPRISE OF 40 MM THICK BITUMINOUS CONCRETE.
 9. RAILINGS
a) CONCRETE CRASH BARRIER SHALL BE VERTICAL WITH A TOLERANCE NOT TO EXCEED 3MM IN PL AND GRADE OF CONCRETE SHALL BE M40.
 10. GUARD POSTS
a) GUARD DIA 100MM HEIGHT GUARD POSTS AT 1M INTERVAL MAY BE USED.
 11. PITCHING (REINFORCEMENT OF SLOPES)
a) STONE FITTING WITH MINIMUM THICKNESS OF 300MM SHALL BE CARRIED OUT AS PER IRC 50-1987. THE PITCHING SHALL BE Laid OVER A LAYER OF 100MM MESH OF 20MM THICK AND SHALL SATISFY THE GRADING REQUIREMENT OF CLAUSE NO. 5.3.5 (IRC 86-1967). THE SIZE AND WEIGHT OF THE STONES SHALL NOT BE LESS THAN 40 KGS AND SHALL BE FOR FILLING INTERSTICES SHALL NOT BE LESS THAN 20MM.
 12. PAINTING
a) THE CONCRETE CRASH BARRIERS AND GUARD POSTS SHALL BE PAINTED WITH 300 MM WIDE ALTERNATE BANDS OF YELLOW AND BLACK PAINT.
- (F) SPECIFICATIONS
- THE WORK SHALL BE EXECUTED ACCORDANCE WITH THE SPECIFICATIONS FOR ROAD AND BRIDGE WORKS BY MINISTRY OF ROAD TRANSPORT AND HIGHWAYS EXCEPT WHEREVER OTHERWISE MENTIONED.

COMPRESSION SEAL EXPANSION JOINT

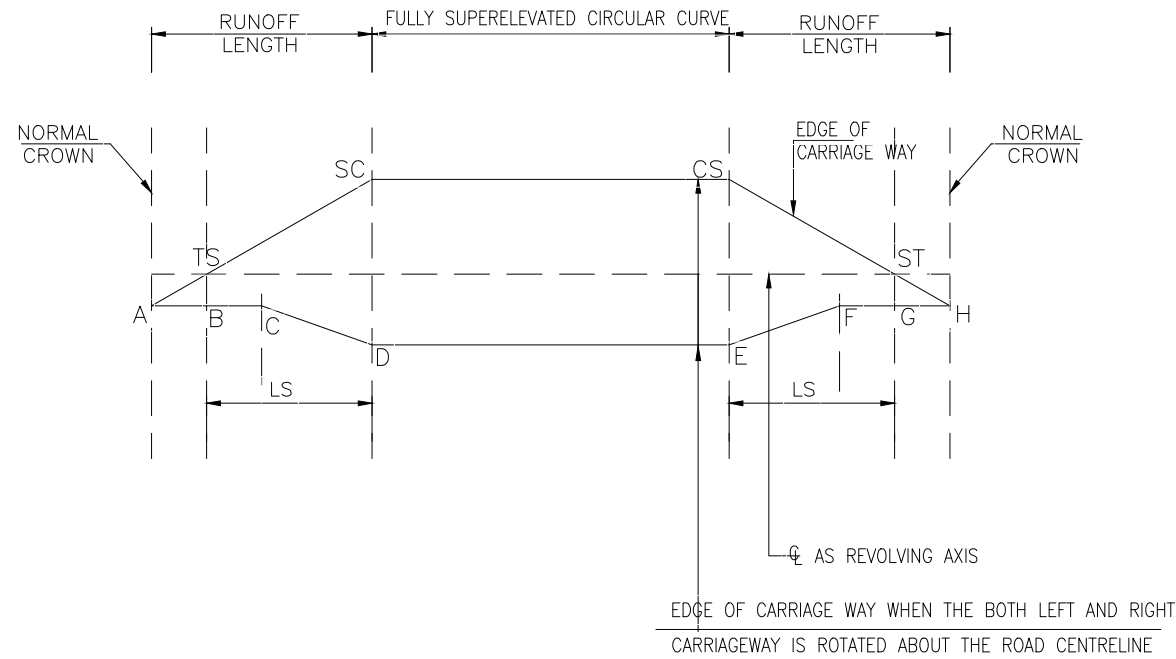
DETAIL OF CRASH BARRIER

(N.T.S)

RCC DRAIN

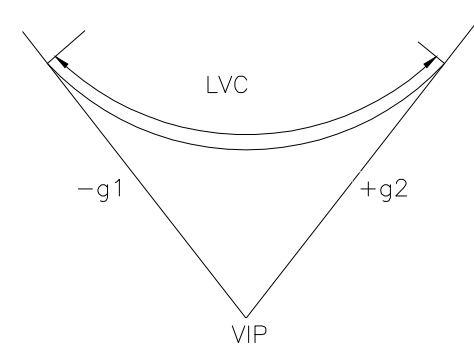


DETAILS OF SUPERELEVATION

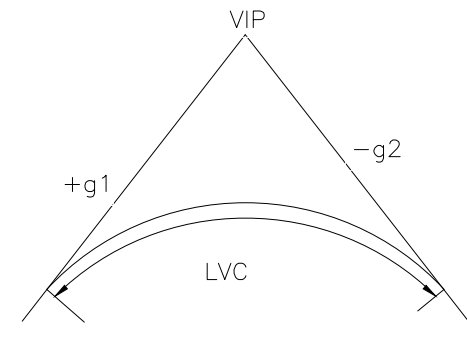


FOR CURVILINEAR SECTION WITH TRANSITION CURVE

DETAILS OF VERTICAL CURVE

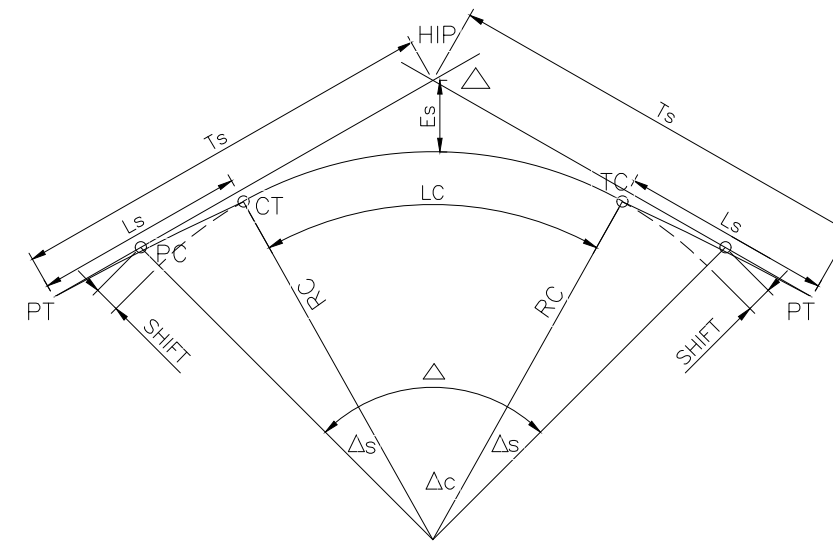


FOR VALLEY CURVE

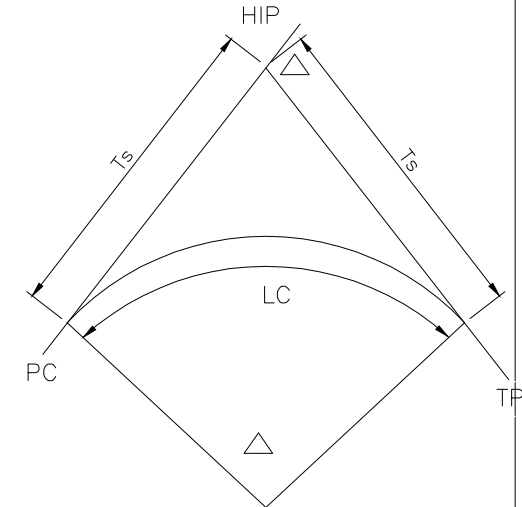


FOR SUMMIT CURVE

DETAILS OF HORIZONTAL CURVE



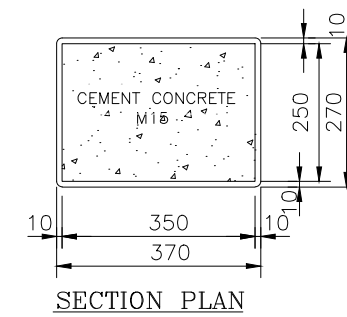
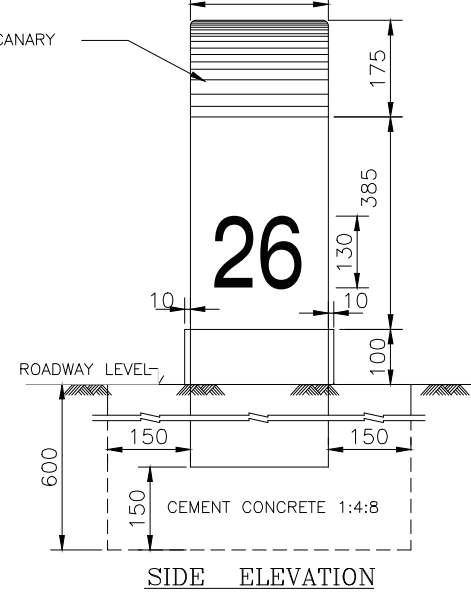
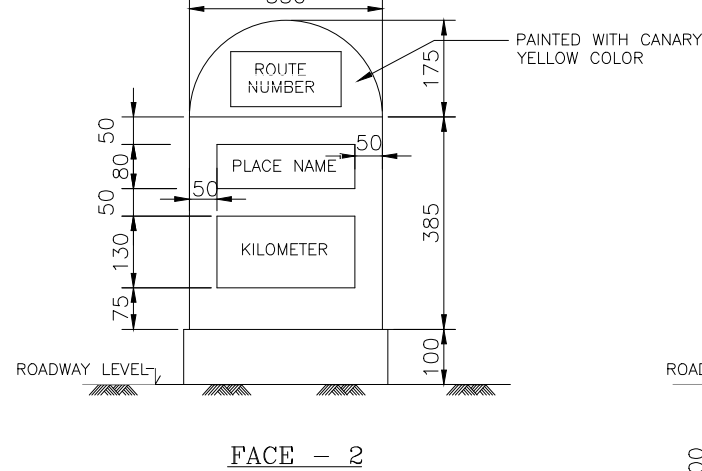
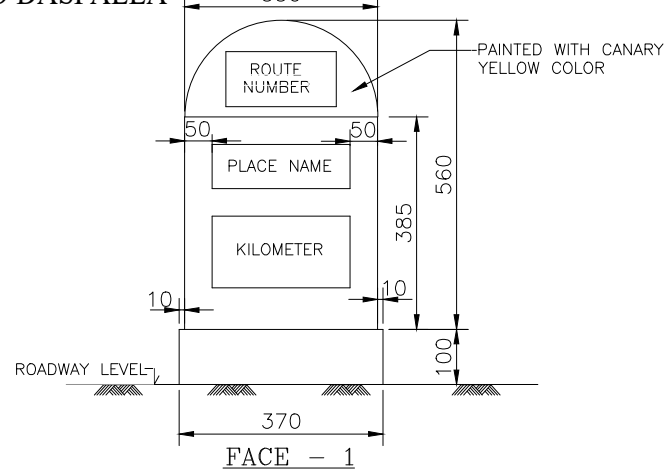
FOR CIRCULAR CURVE IN TRANSITION



FOR CIRCULAR CURVE

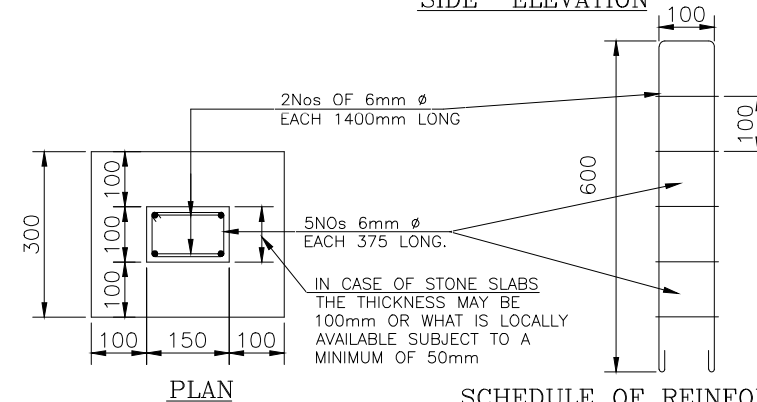
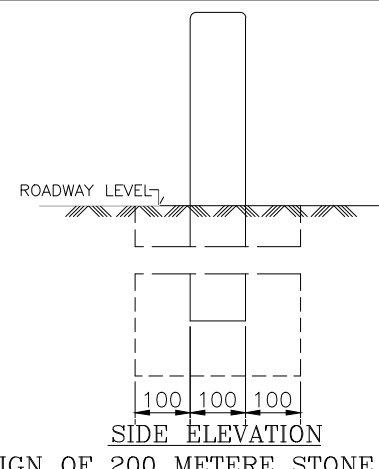
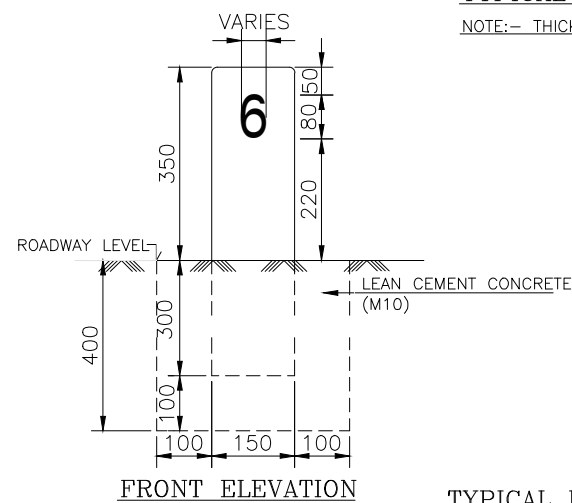
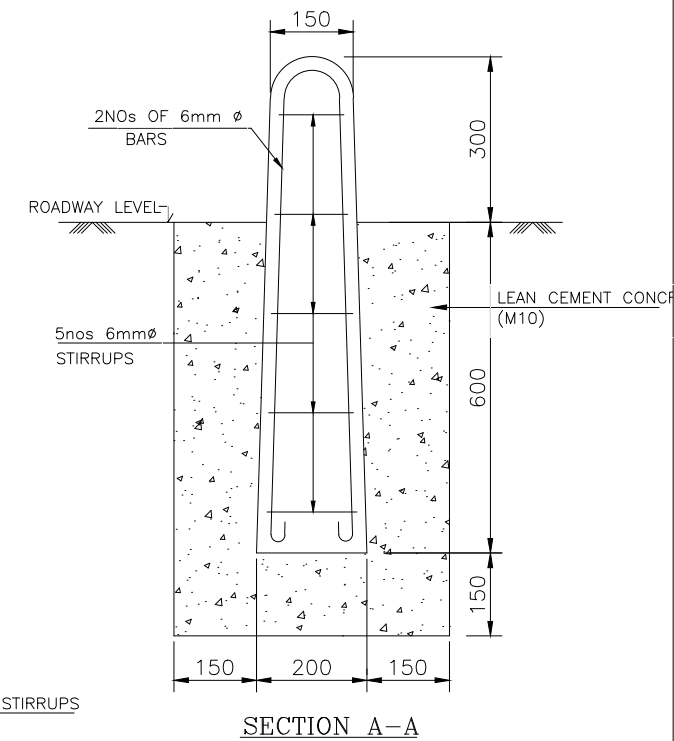
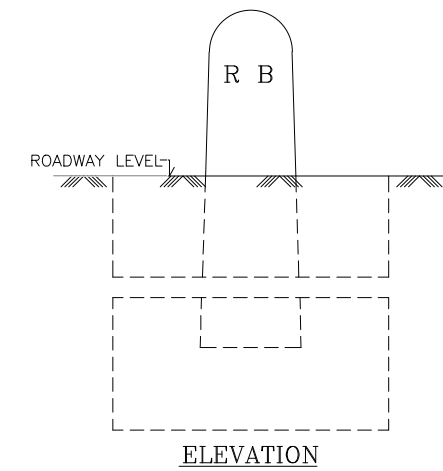
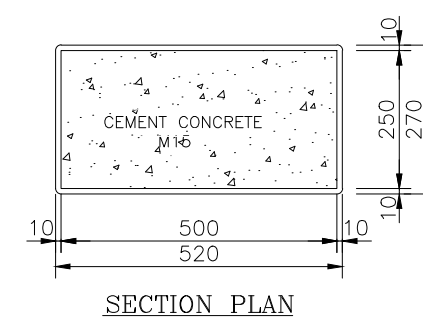
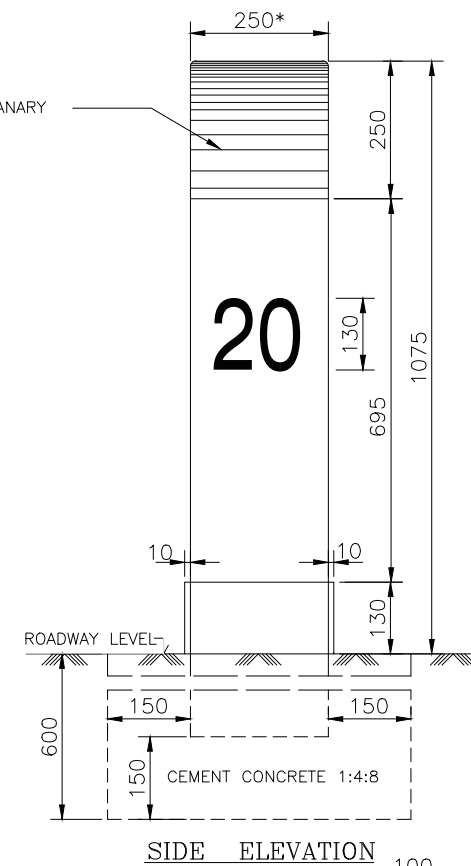
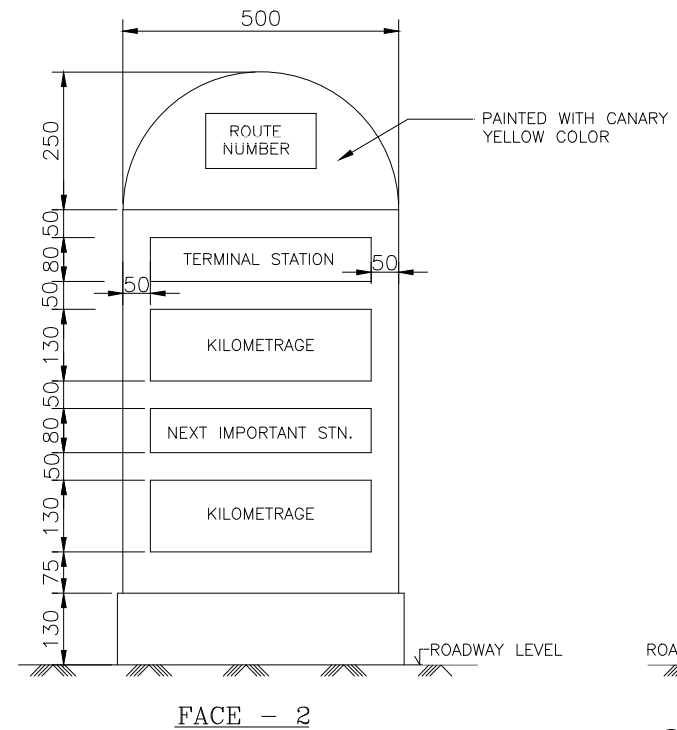
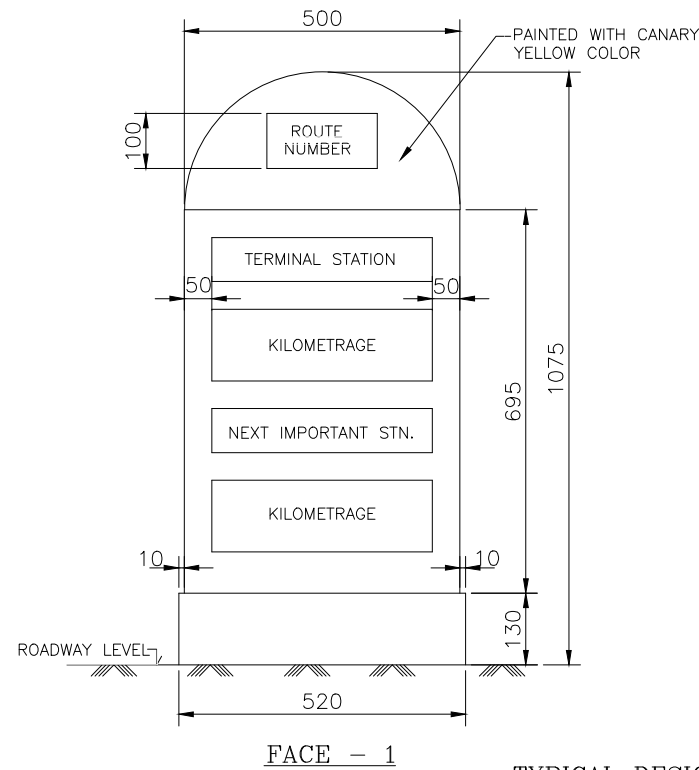
LEGEND :

(TS)	TANGENT TO SPIRAL	(Ls)	LENGTH OF TRANSITION	(HIP)	HORIZONTAL INTERSECTION POINT
(SC)	SPIRAL TO CURVE	(Ts)	TANGENT DISTANCE	(L)	RUNOFF LENGTH
(CS)	CURVE TO SPIRAL	(Δ_s)	DEVIATION ANGLE OF TRANSITION CURVE	(Δ)	TOTAL DEVIATION ANGLE
(ST)	SPIRAL TO TANGENT	(Δ_c)	DEVIATION ANGLE OF CIRCULAR CURVE	(LC)	LENGTH OF HORIZONTAL CURVE
(PC)	POINT OF CURVATURE	(LVC)	LENGTH OF VERTICAL CURVE	(Es)	APEX DISTANCE
(PT)	POINT OF TANGENT	(g)	VERTICAL GRADIENT		

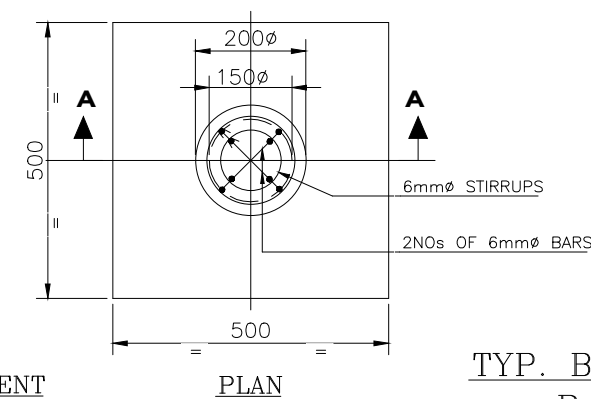


BAR BENDING SCHEDULE					
Sr.No.	Type of MS Bar	No.of Bars	Shape of Bars	Dia. in mm	Length of MS bar including hooks
1	Main Bars	2		6mm	1.84m
2	Topmost stirrup	1		6mm	370mm
3	Stirrup (First from top)	1		6mm	405mm
4	Stirrup (Second from top)	1		6mm	440mm
5	Stirrup (Third from top)	1		6mm	475mm
6	Bottom most stirrup	1		6mm	810mm

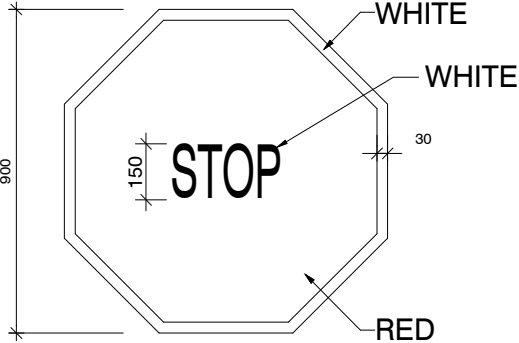
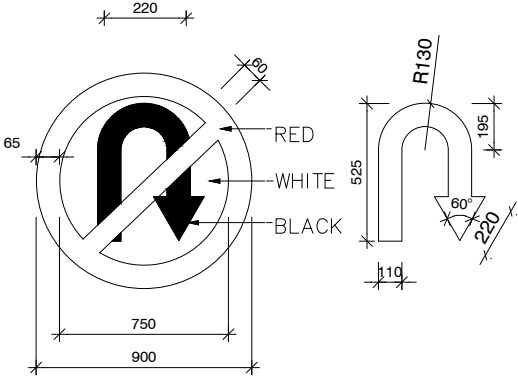
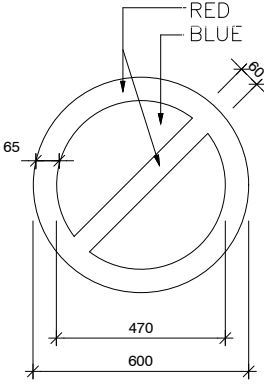
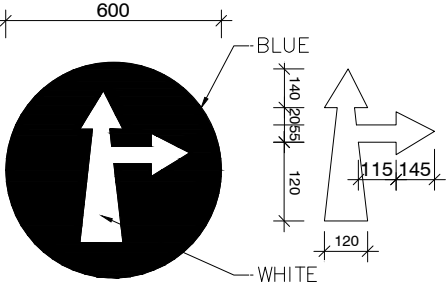
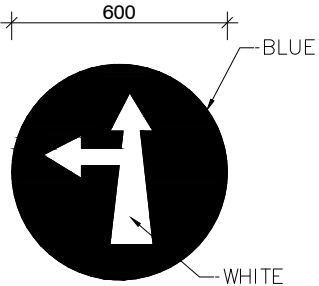
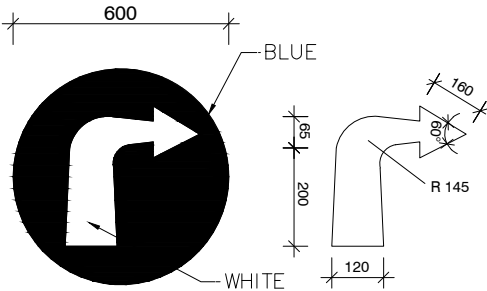
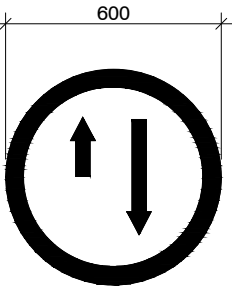
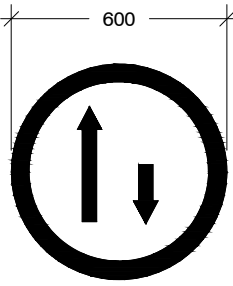
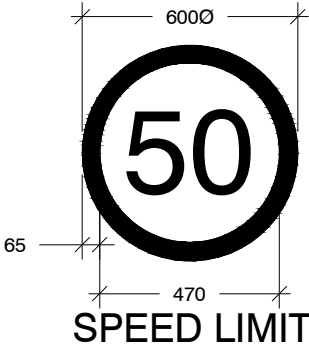
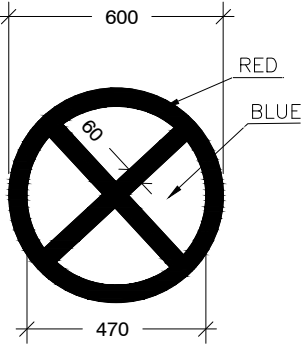
- NOTES:
- All Dimensions are in mm unless otherwise indicated.
 - Background colour shall be white with black letters & numerals for numbers of stations & distances.
 - Standards for letter & number sizes for all km shall be as per IRC: 8-1980
 - Size of numbers for 200m stones shall be as per IRC: 26-1967
 - Details of Boundary stones shall be as per IRC: 25-1967
 - The stones shall be provided on left side of road as shown independently for each direction of traffic flow.



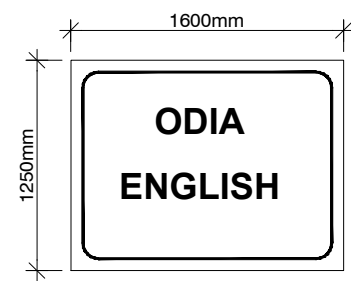
SCHEDULE OF REINFORCEMENT WHEN R.C.C IS USED



TYP. BOUNDARY STONE DESIGN WITH R.C.C AS MATERIAL

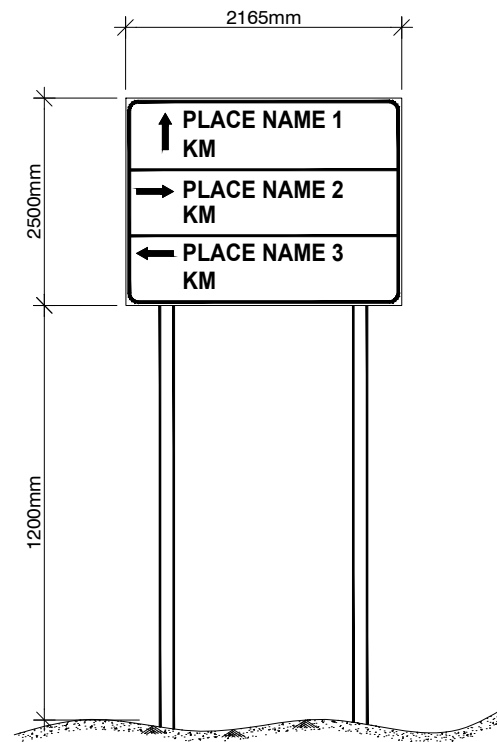
			 COMPULSORY AHEAD OR TURN RIGHT
MS-1 STOP SIGN	MS-2 U-TURN PROHIBITED	MS-3 NO PARKING SIGN	MS-4
 COMPULSORY AHEAD OR TURN LEFT	 COMPULSORY TURN RIGHT	 PRIORITY TO VEHICLES IN OTHER DIRECTION	 PRIORITY TO VEHICLES IN THIS DIRECTION
MS-5	MS-6	MS-7	MS-8
	 SPEED LIMIT	 NO STOPPING OR STANDING	
	MS-9	MS-10	

WS-1 RIGHT HAND CURVE	WS-2 LEFT HAND CURVE	WS-3 CROSS ROAD	WS-4 SIDE ROAD ON LEFT
WS-5 SIDE ROAD ON RIGHT	WS-8		WS-6 T-INTERSECTION
INTERSECTIONS			
WS-11		WS-13	
WS-7 STAGGERED INTERSECTION		WS-9 RESTRICTION END	
MAJOR ROAD AHEAD		MINOR ROAD AHEAD	



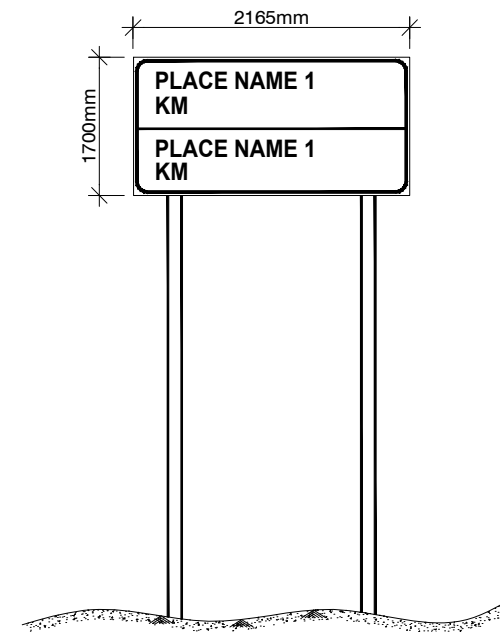
PLACE IDENTIFICATION

IS-1



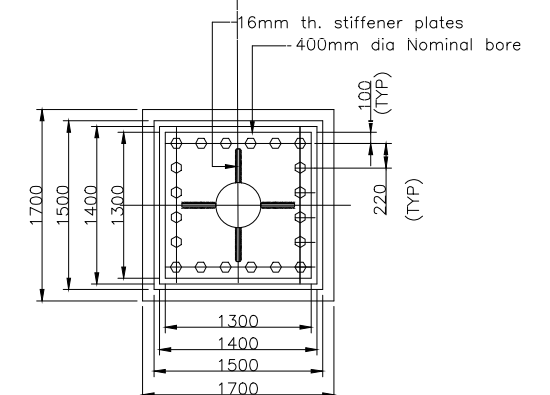
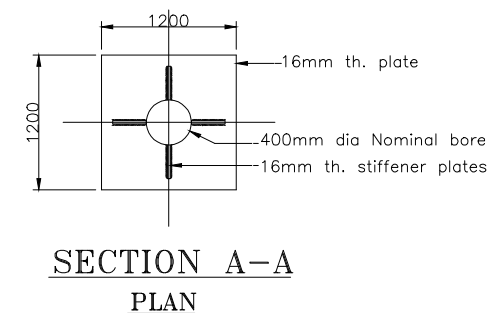
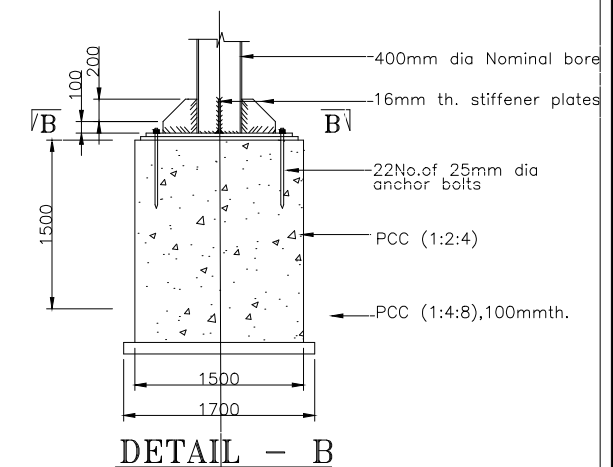
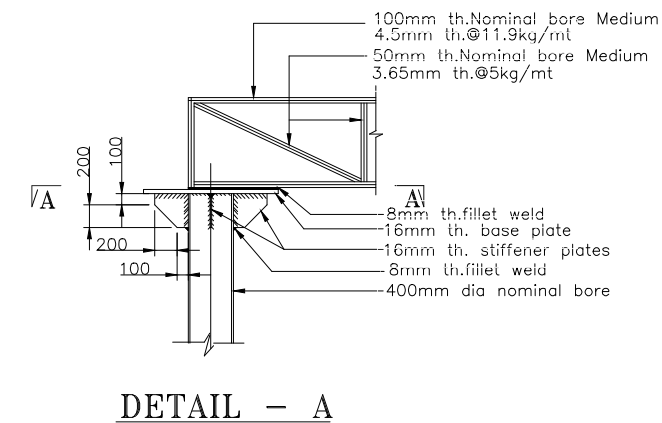
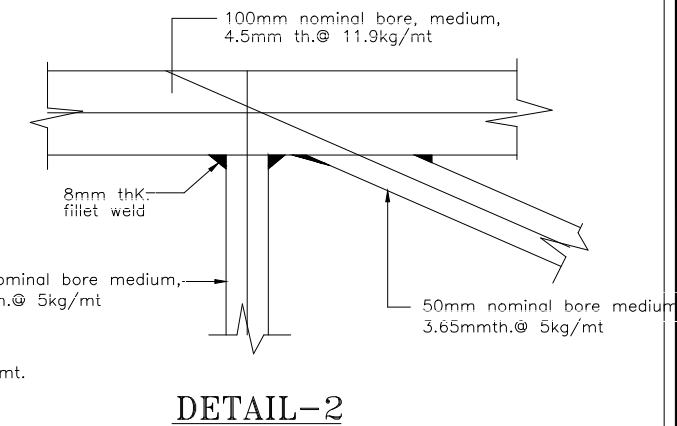
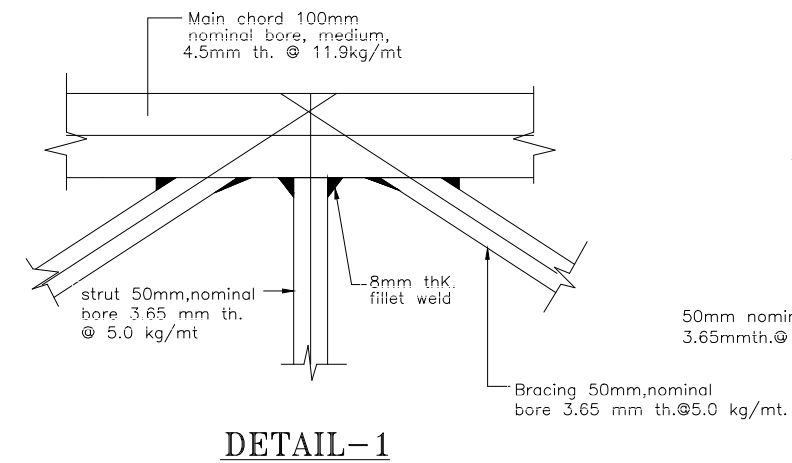
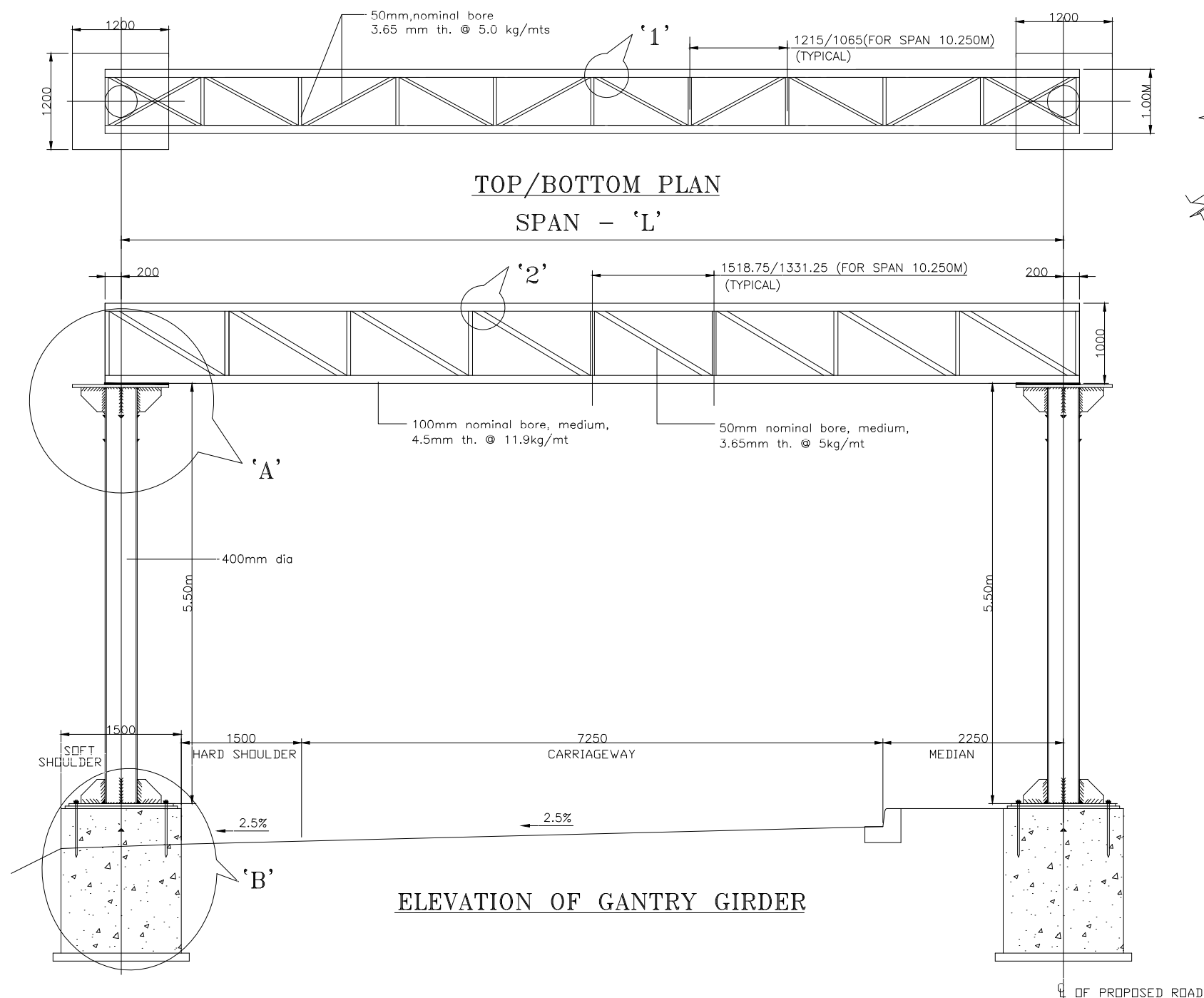
DESTINATION SIGN

IS-2

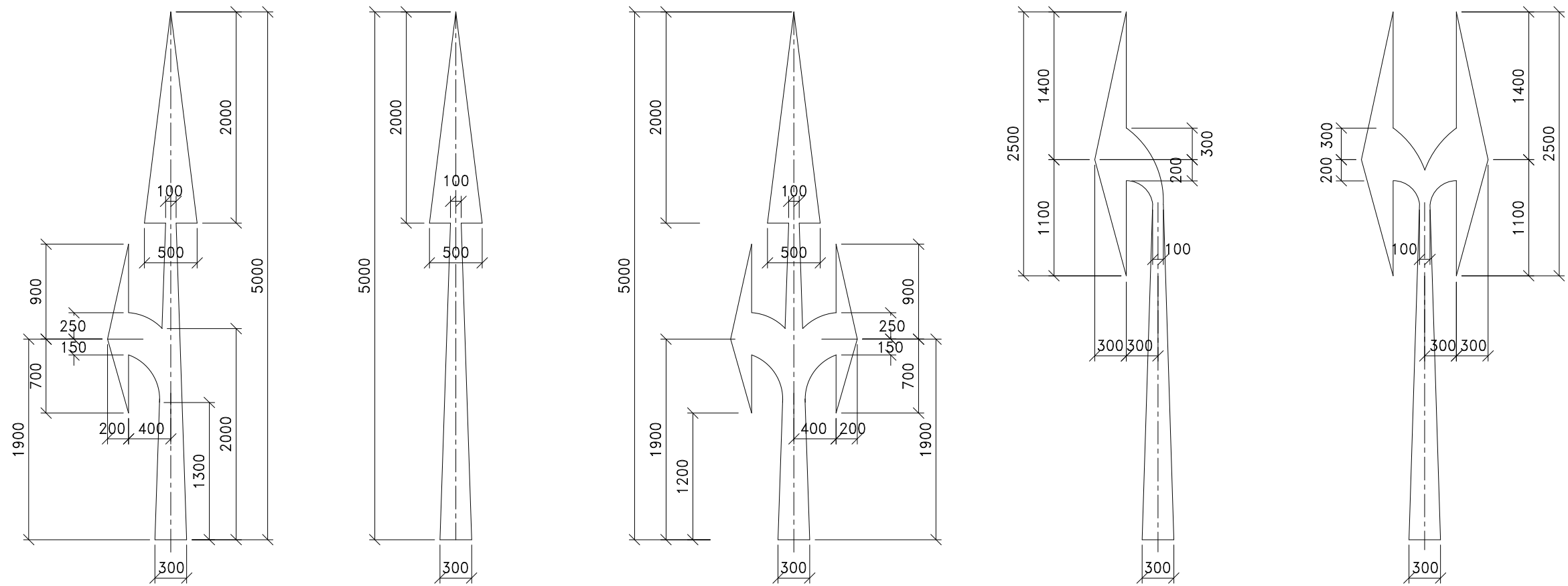


RE-ASSURANCE SIGN

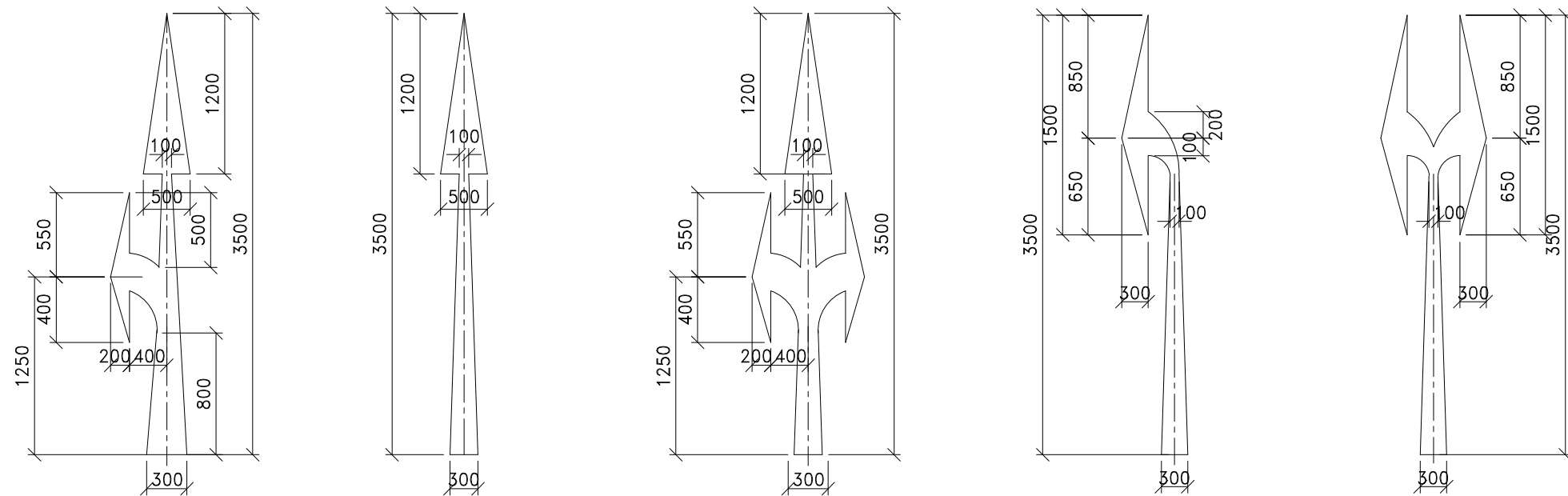
IS-3



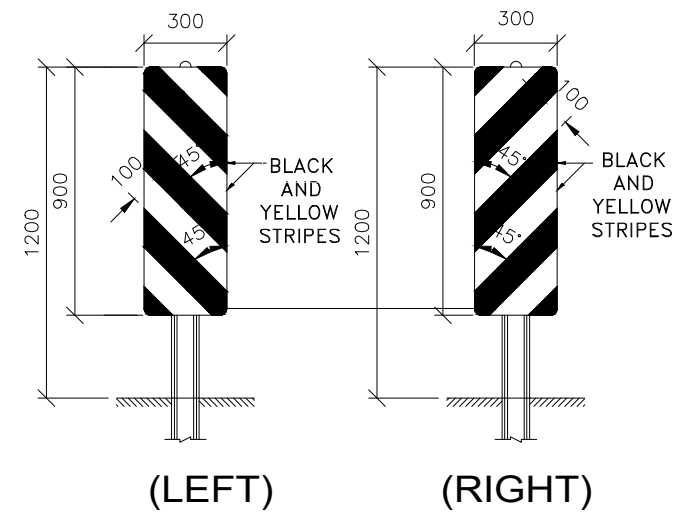
SECTION B-B
COLUMN BASE DETAILS



ARROW MARKING FOR ROUTE DIRECTION FOR DESIGN SPEED MORE THAN 50km/hr.



ARROW MARKING FOR ROUTE DIRECTION FOR DESIGN SPEED OF 50km/hr. OR LESS



HAZARD MARKERS

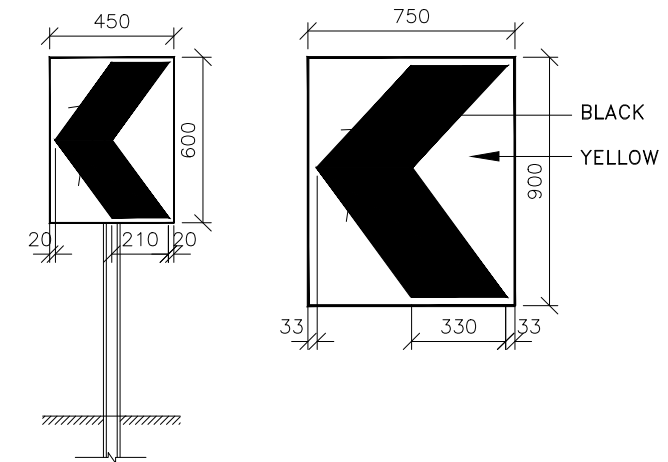


Table 15.3 Spacing of Single Chevron Signs

Curve Radius(m)	Distance Between Single Chevron (m)	
	On Curve	Before Curve
50	15	30
100	20	40
200	30	60
300	45	90
400	60	120
500	70	140
>500	80	150