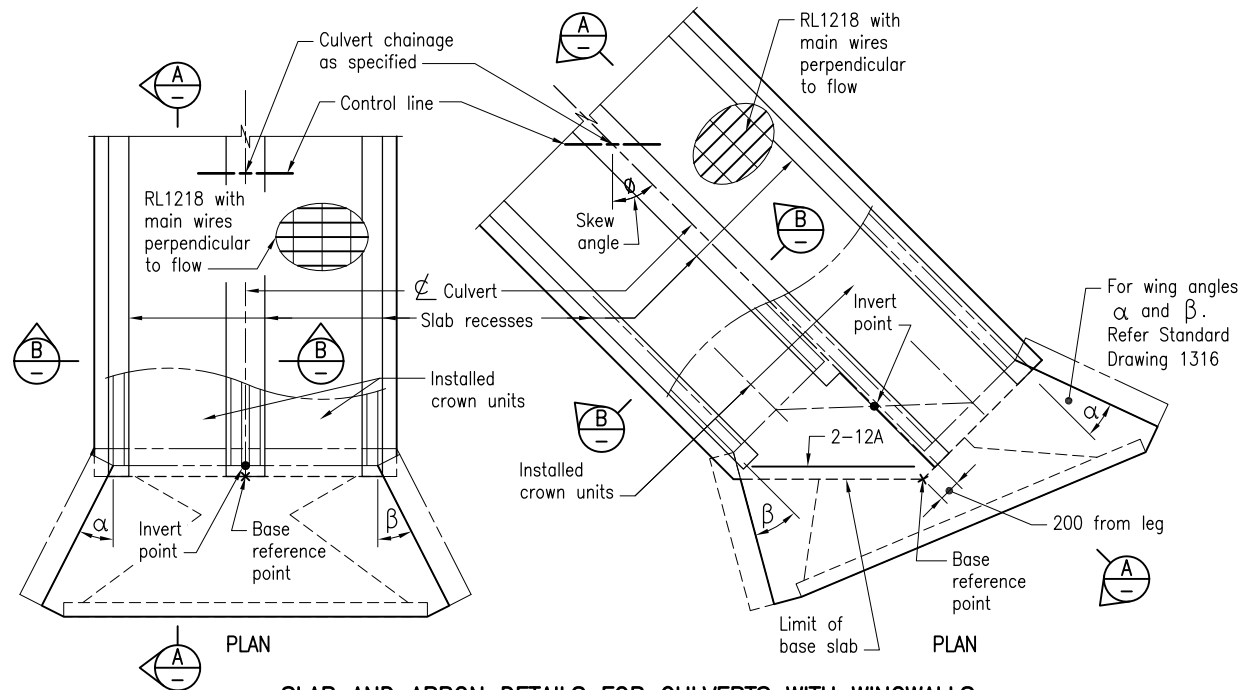


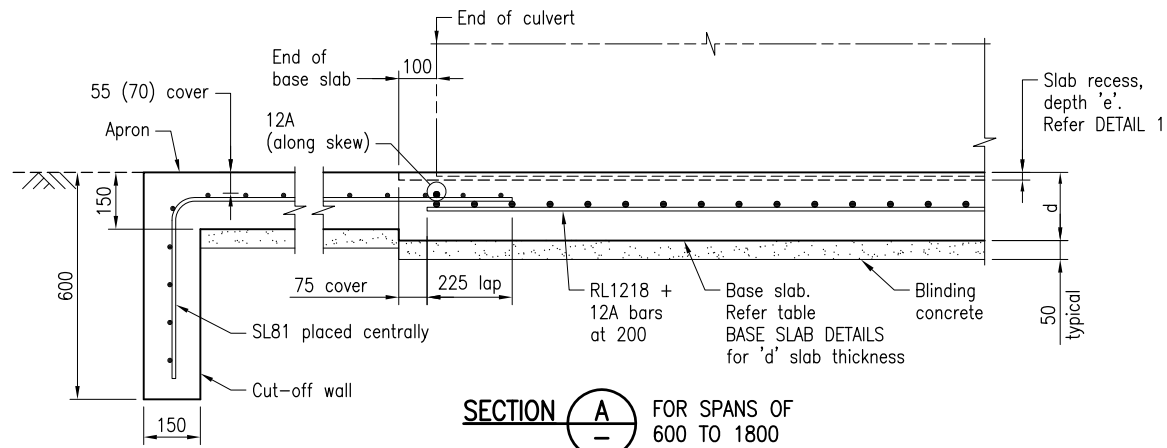
**SLAB AND APRON DETAILS FOR CULVERTS WITHOUT WINGWALLS**

For Headwall details where H = 300 to 600 refer Standard Drawing 1174

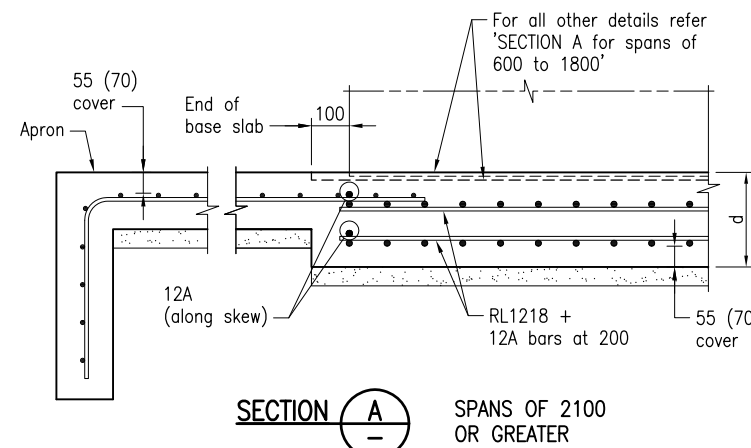


**SLAB AND APRON DETAILS FOR CULVERTS WITH WINGWALLS**

For Headwall and Wingwall details refer Standard Drawing 1303



**SECTION A FOR SPANS OF 600 TO 1800**

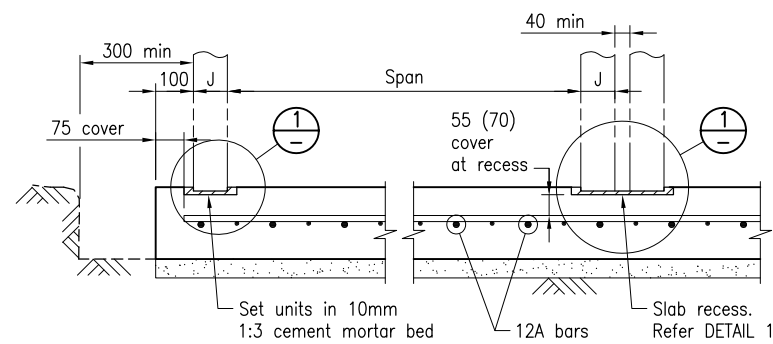


**SECTION A SPANS OF 2100 OR GREATER**

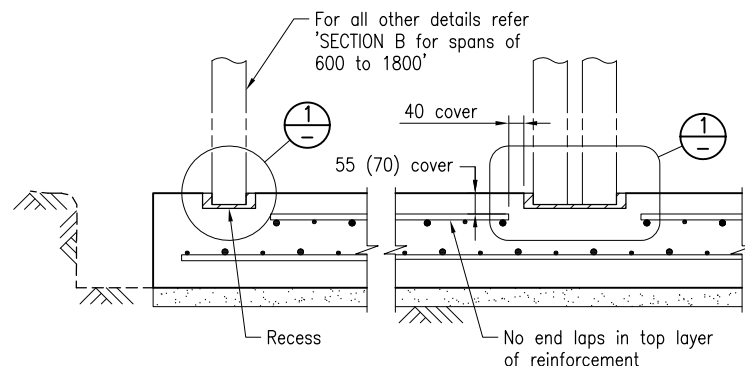
Span, refer Note 4	Slab thickness 'd'
600	180 (210)
750	180 (210)
900	180 (210)
1200	180 (210)
1500	190 (210)
1800	190 (210)
2100	210 (240)
2400	220 (240)
2700	240 (280)
3000	240 (280)
3300	250 (290)
3600	260 (300)

**BASE SLAB DETAILS**

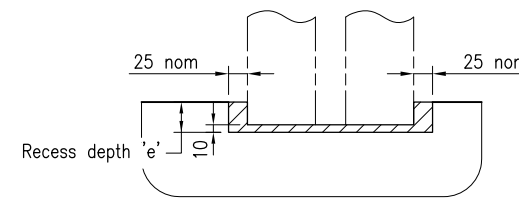
Recess depths 'e' for H are as follows :  
 where H = 600, 'e' = 0, no recesses  
 H > 600 to 750, 'e' = 20  
 H > 750 to 1200, 'e' = 30  
 H > 1200, 'e' = 40



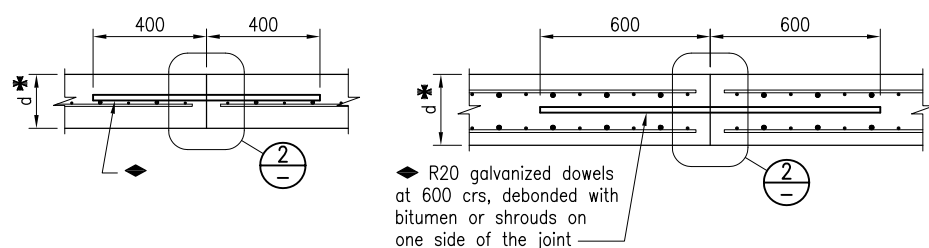
**SECTION B FOR SPANS OF 600 TO 1800**



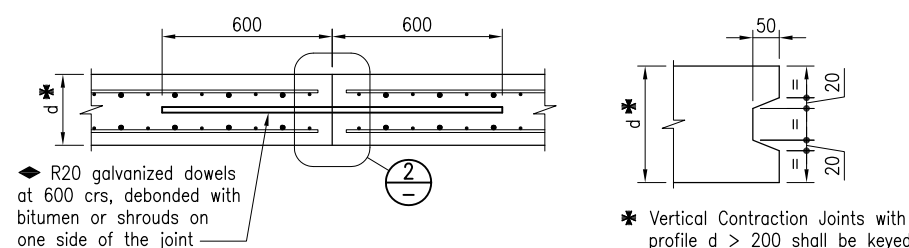
**SECTION B SPANS OF 2100 OR GREATER**



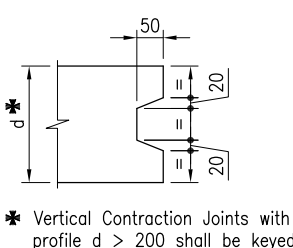
**DETAIL 1 SLAB RECESS DETAILS**



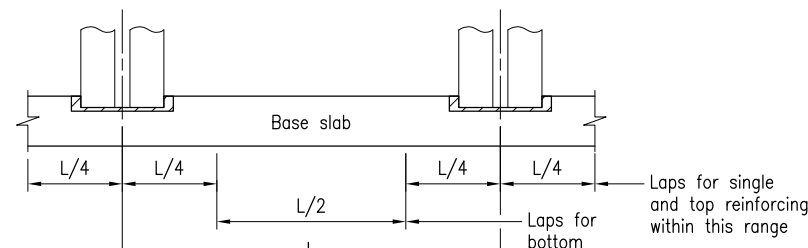
**DOWELLED CONTRACTION JOINT FOR SPANS OF 600 TO 1800 AND FOR ALL APRONS**



**DOWELLED CONTRACTION JOINT FOR SPANS OF 2100 OR GREATER**



**DETAIL 2**



**REINFORCING BAR LAP LOCATIONS**

**DESIGN EXCLUSIONS:**  
 For culverts with a base > 10 metres along road centreline, this design should not be used in:  
 a) Highly reactive or expansive clay soils (linear shrinkage > 8%).  
 b) Where large differential settlements are expected to occur.  
 Specialist design advice shall be obtained in these circumstances

- NOTES:**
- BASE SLAB for RC Box Culvert shall be in accordance with MRTS03.
  - Reinforced concrete base, aprons and footings shall be cast monolithically.
  - BASE DIMENSIONS given are applicable to a maximum fill height over the culvert crown of 2000. An on site check of the units dimensions should be made before setting out the base slab as there are variations between manufacturers.
  - UNIT DIMENSIONS : H = Height of opening, J = Thickness of leg, Span = Internal width
  - CONCRETE shall be in accordance with MRTS70. Requirements for reinforced concrete are shown in table below.

Design life	100 years
Minimum exposure classification	B2 to AS 5100
Minimum concrete class	S40/20
Minimum cover to reinforcement UNO	55 cover to AS 5100
Minimum concrete class and cover for exposure classification C †	S50/20 with 70 cover to AS 5100

† Slab thickness 'd' in brackets ( ) shall be used for exposure classification C. All exposed edges shall have 19 x 19 chamfers. Blinding concrete N20/20.

- REINFORCING STEEL shall be read in conjunction with Standard Drawings 1043 and 1044 and in accordance with MRTS71 and AS/NZS 4671. Reinforcement bar in the secondary direction shall be offset from the secondary (cross) wires of the mesh by 100. Deformed bars Grade D500N, round bars grade R250N and reinforcing mesh Grade D500L. Reinforcement shall be hot dip galvanised to AS/NZS 4680 where shown.
- TACK WELDING to reinforcement for location purposes to AS/NZS 1554.3. Welding consumables shall be G49X to AS/NZS ISO 14341-B or T49X to AS/NZS ISO 17632-B.
- DOWELLED CONTRACTION JOINTS shall be provided where (a) the length and/or (b) the width of the base slab exceed 20 metres. When contraction joints are required across the width, they shall be located at 1/4 span points of crown units and are to be continued across the aprons. 24 hours minimum shall be allowed between pours.
- DESIGN LOADING: HLP400, M1600, A160 and W80 in accordance with AS 5100.2. EMBANKMENT - Maximum height of fill shall be 2000. BASE SLAB - Maximum pressure shall be 150 kPa.
- Refer Standard Drawing 1359 for details of earthworks for culverts.
- PROJECT-SPECIFIC INFORMATION to be shown on the drawings: Exposure classification; Culvert chainage; Skew angle; Base and apron setout and extents; Headwall and/or wingwall extents; Steel schedule
- DIMENSIONS are in millimetres unless shown otherwise.

**ASSOCIATED DEPARTMENTAL DOCUMENTS:**  
 Design Criteria for Bridges and Other Structures  
 NDRRA Guidelines  
 Road Drainage Manual (RDM)

- REFERENCED DOCUMENTS:**
- Departmental Standard Drawings:
- 1043 Reinforcing Steel - Standard Bar Shapes
  - 1044 Reinforcing Steel - Lap Lengths
  - 1174 RC Box Culverts - Installation of Precast Units and Construction of Headwalls Height = 375 to 600
  - 1303 RC Box Culverts and Slab Link Culverts - Construction of Headwalls and Wingwalls Height > 600
  - 1316 RC Box Culverts and Slab Link Culverts - General Arrangement and Installation of Precast Units Height > 600
  - 1359 Culverts - Installation, Bedding and Filling/Backfilling Against/Over Culverts
- Departmental Specifications:
- MRTS03 Drainage, Retaining Structures and Protective Treatments
  - MRTS70 Concrete
  - MRTS71 Reinforcing Steel

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R C BOX CULVERTS AND SLAB LINK BOX CULVERTS		
CONSTRUCTION OF BASES WITH RECESSES AND APRONS ( ALL SIZES )		A3 Not to Scale Standard Drawing No <b>1318</b> Date 11/16