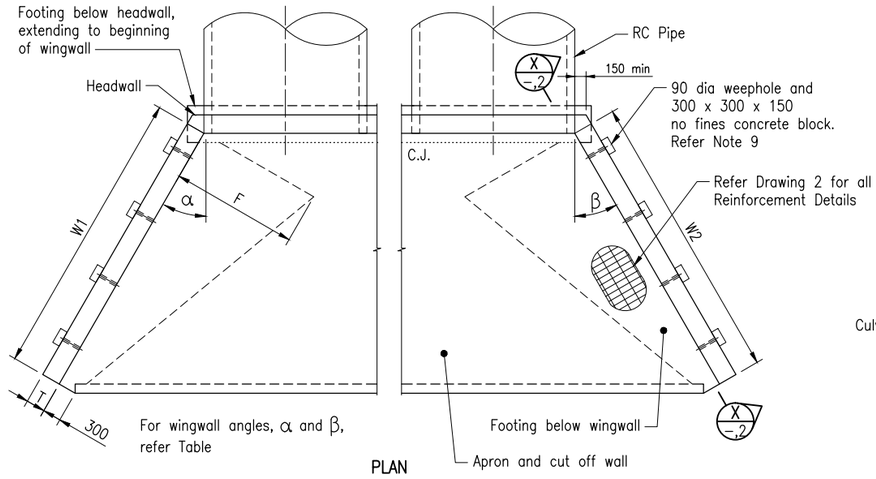
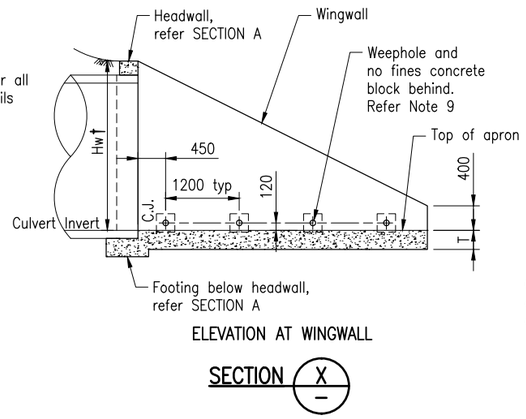
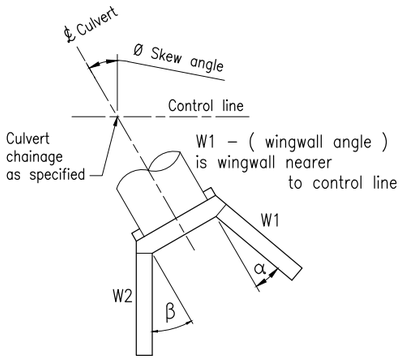


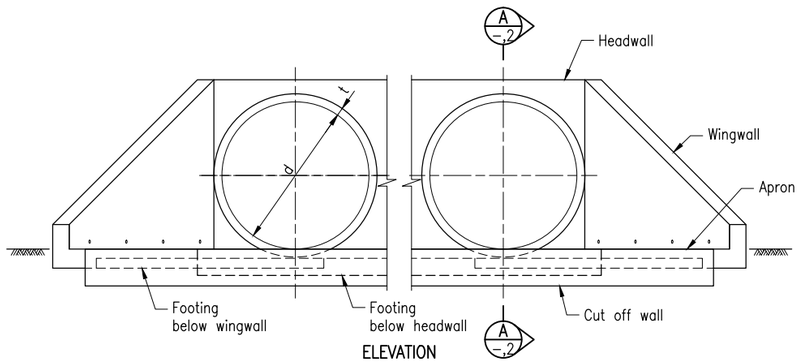


SECTION X/–

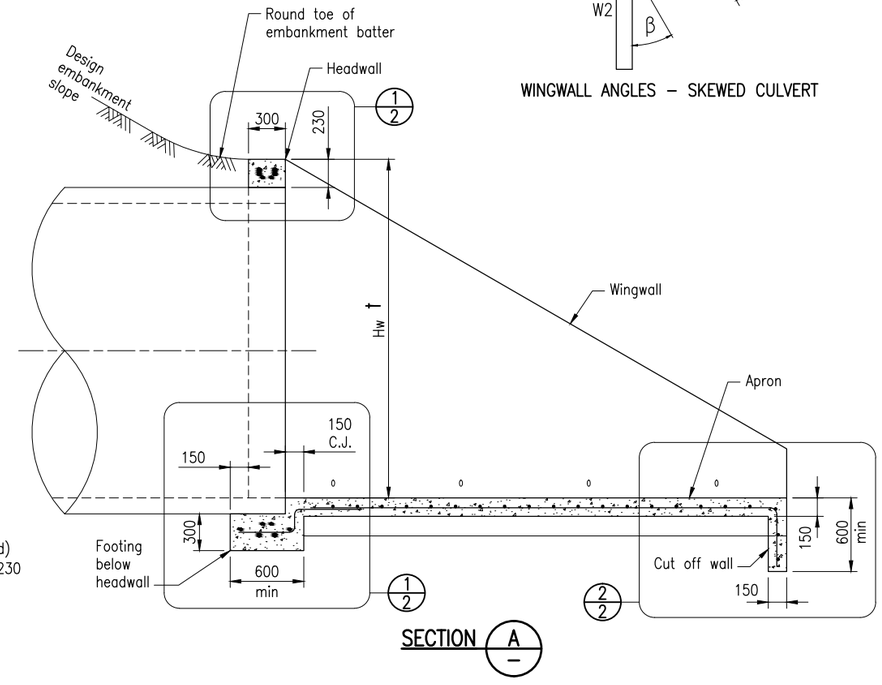
Skew angle Ø	Wingwall angle	
	α	β
0 – 10	30	30
11 – 20	25	30
21 – 30	20	30
31 – 45	15	30

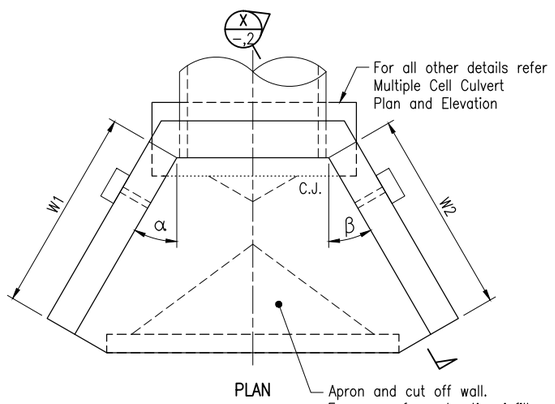


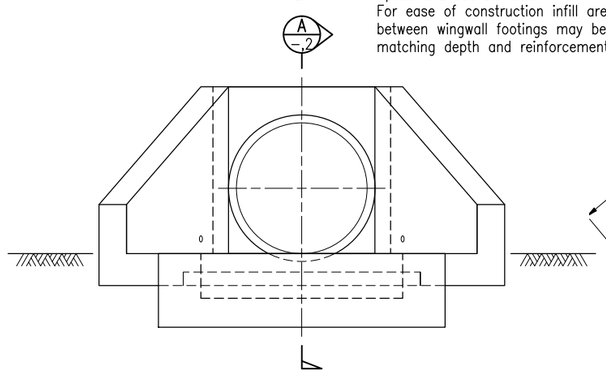
WINGWALL ANGLES – SKEWED CULVERT



MULTIPLE CELL CULVERT





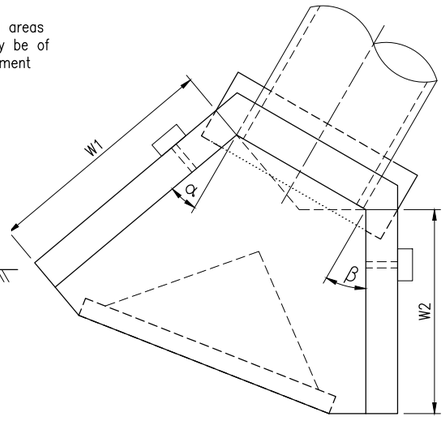


SINGLE CELL CULVERT

WINGWALL DIMENSIONS

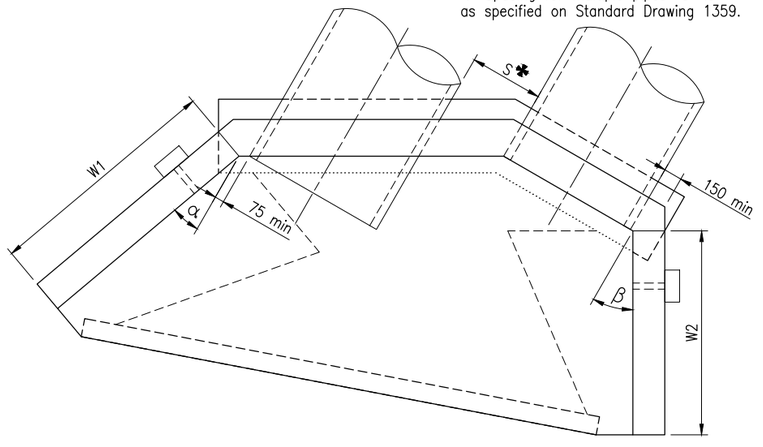
up to Hw †	F	T (Refer Note 4)
1000	0.75 Hw	210 (240)
1500		210 (240)
2000		260 (290)
2500		310 (340)
3000		310 (340)

† where Hw = Internal pipe diameter (d) + pipe thickness (t) + 230



PLAN – SKEWED SINGLE CULVERT

✽ Spacing for multiple pipes "S" is as specified on Standard Drawing 1359.



PLAN – SKEWED MULTIPLE CULVERT

NOTES:

1. PIPE CULVERT END STRUCTURES to be in accordance with MRTS03.
   The purpose of this drawing is to detail wingwalls, headwall and apron for culverts with pipe diameter 750 to 2400.
   Refer Standard Drawing 1305 for details of headwall and apron for culverts with pipe diameter 375 to 675.
   Refer Standard Drawing 1359 for details of culvert installation and earthworks.
2. PIPE DIAMETERS greater than 2400 require a special design.
3. HEADWALL HEIGHT may be increased to meet standard formwork when pipes other than reinforced concrete are used.
4. CONCRETE to be in accordance with MRTS70.
   Requirements for reinforced concrete are shown in table below.

	For pipes less than or equal to 800 diameter AND soil cover less than 2500 mm	For pipes greater than 800 diameter OR soil cover greater than 2500 mm for all pipes
Design life	50 years	100 years
Minimum exposure classification	B1 to AS 3600	B2 to AS 5100
Minimum concrete class	S32/20	S40/20
Cover to reinforcement	40 cover to AS 3600	55 cover to AS 5100
Minimum concrete class and cover for exposure classification C ✝	S50/20 with 65 cover to AS 3600	S50/20 with 70 cover to AS 5100

   ✝ Wingwall and wingwall footing thickness 'T' shown in brackets in Sections, Details and Wingwall Dimensions Table on this drawing shall be used for exposure classification C.
5. REINFORCING STEEL to be read in conjunction with Standard Drawings 1043 and 1044.
   Reinforcing steel to be in accordance with AS/NZS 4671 and MRTS71.
   Mesh and Type D1 and D2 bars may be varied for the appropriate value of 'hw' used in the lower parts of the wing.
   Deformed bars Grade D500N. Round bars Grade R250N. Reinforcing mesh Grade D500L. All reinforcing steel to be ACRS certified. Reinforcement to be hot dip galvanised to AS/NZS 4680 where shown.
6. TACK WELDING to reinforcement for location purposes to AS/NZS 1554.3. Welding consumables to be controlled hydrogen type: G49X to AS/NZS ISO 14341–B or T49X to AS/NZS ISO 17632–B unless shown otherwise.
7. WINGWALLS are to be built monolithically with headwall. However for culverts where d ⩾ 1500 or where wingwalls are used when the foundation bearing capacity < 150 kPa, the Engineer may direct that wingwalls be separated from headwalls by a bitumen coated joint.
   Wingwalls for skewed culverts with angle greater than 45 require a special design.
8. 'T' is a constant thickness for wingwalls and footings based on maximum height 'Hw'.
9. WEEPHOLES shall be provided horizontally in wingwalls, with a no fines concrete block or approved equivalent at each weephole as a drainage filter.
   Location of weepholes to be determined ensuring cover requirements are met.
10. PROJECT–SPECIFIC INFORMATION TO BE SHOWN ON THE DRAWINGS:
    – Skew angle
    – W1 and W2 dimensions
    – Steel schedule
11. DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DEPARTMENTAL DOCUMENTS:
- Design Criteria for Bridges and Other Structures
- NDRRA Design Guidelines

REFERENCED DOCUMENTS:

Departmental Standard Drawings:
- 1043 Reinforcing Steel – Standard Bar Shapes
- 1044 Reinforcing Steel – Standard Hook, Lap and Bend Details and General Steel Reinforcement Information
- 1305 Pipe Culverts – Headwall and Apron for Pipe Diameter 375 to 675
- 1359 Culverts – Installation, Bedding and Filling/Backfilling Against/Over Culverts

Departmental Specifications:
- MRTS03 Drainage, Retaining Structures and Protective Treatments
- MRTS70 Concrete
- MRTS71 Reinforcing Steel

Department of Transport and Main Roads

PIPE CULVERTS

WINGWALLS, HEADWALL AND APRON FOR PIPE DIAMETER 750 TO 2400
DRAWING 1 OF 2

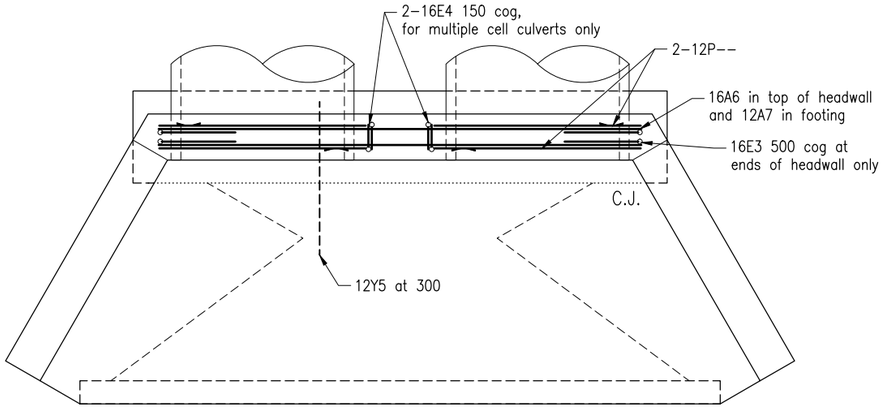
Queensland Government

A3 | Not to Scale

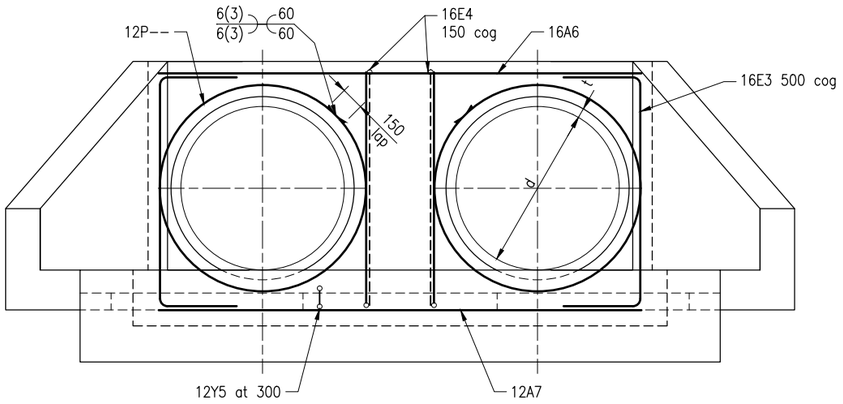
Standard Drawing No 1304

Date 1/16

D | E | F | G | H

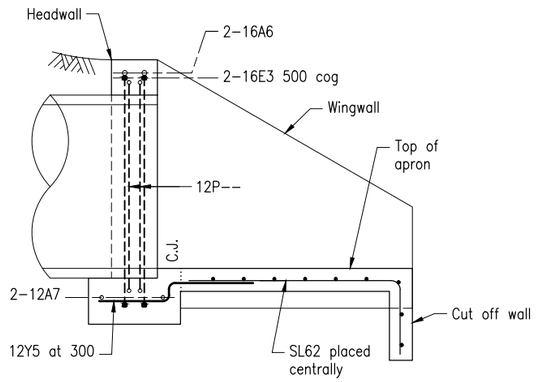


PLAN



ELEVATION

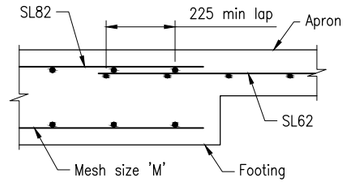
HEADWALL REINFORCEMENT



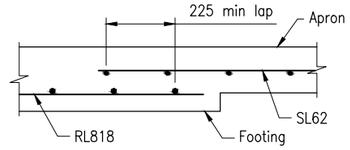
DETAIL 1/1 HEADWALL

DETAIL 2/1 APRON

HEADWALL AND APRON REINFORCEMENT DETAILS



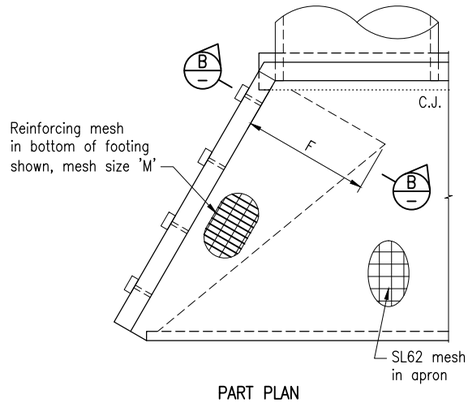
T > 210 (240)



T = 210 (240)

WINGWALL FOOTING TO APRON REINFORCEMENT DETAILS

DETAIL 3/–



PART PLAN

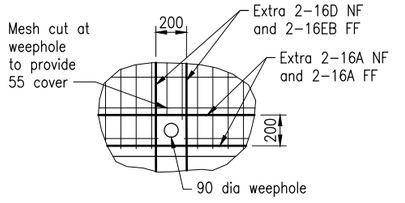
OVERLAP DETAIL

MINIMUM REINFORCEMENT REQUIREMENTS

(Refer Note 5)

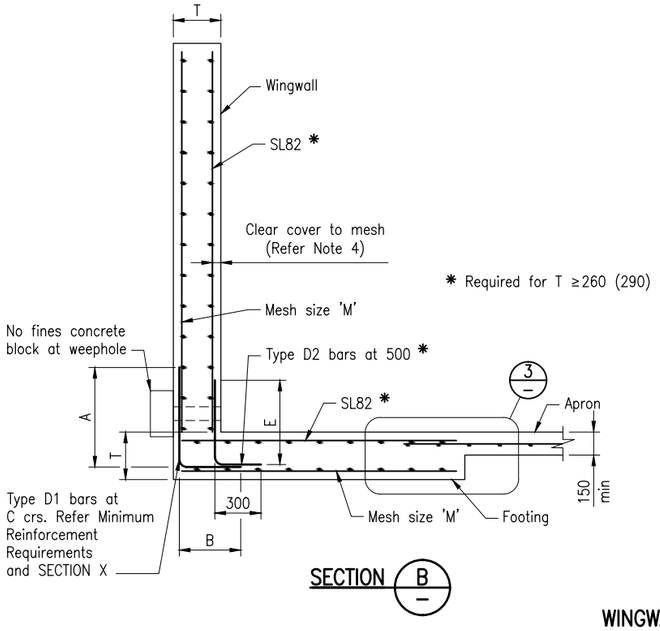
hw ◒	M	Type D1 Bars				12 dia Type D2 Bars
		dia	A	B	C	E
400 – 1000	RL818	12	550	400	200	450
1000 – 1500	RL818	12	550	400	200	550
1500 – 2000	RL1018	12	600	400	100	600
2000 – 2500	RL1018	12	650	400	100	650
2500 – 3000	RL1218	20	750	500	100	650

◒ hw = height of wingwall here hw varies from Hw at headwall to 400 at wingwall end

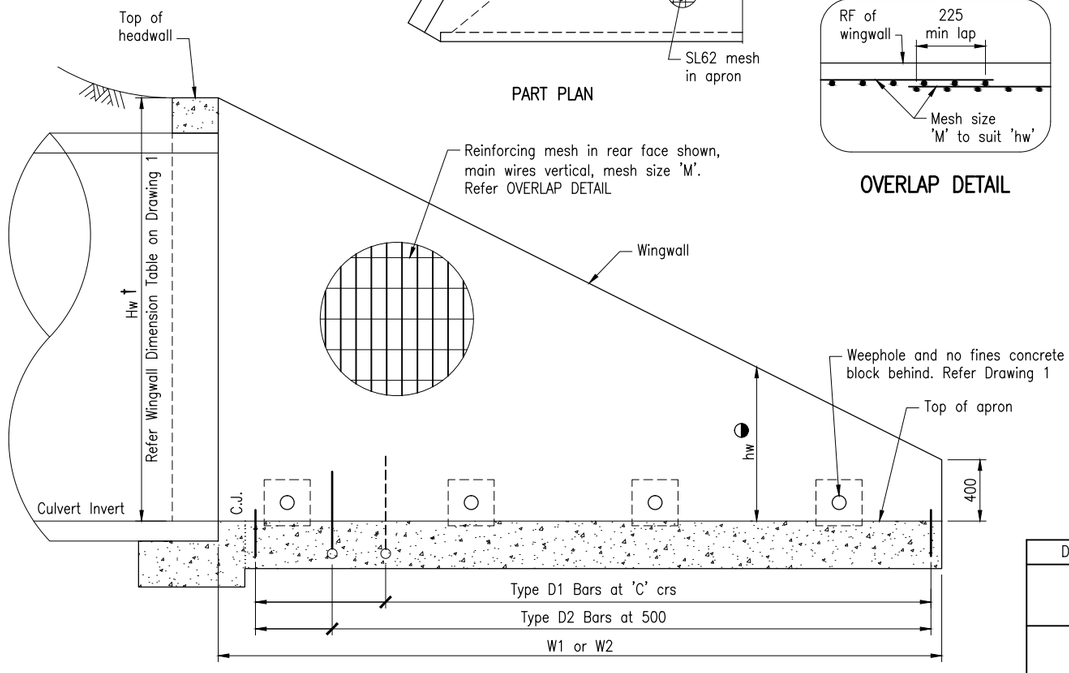


ELEVATION

TYPICAL REINFORCEMENT AT WEEPHOLE



SECTION B/–



WINGWALL REINFORCEMENT

SECTION X/1 ELEVATION AT WINGWALL

Department of Transport and Main Roads

PIPE CULVERTS

WINGWALLS, HEADWALL
AND APRON FOR
PIPE DIAMETER 750 TO 2400
DRAWING 2 OF 2

A3

Not to Scale

Standard Drawing No 1304

Date 1/16

D E F G H