

The purpose of this Standard Drawing is to provide typical standard details that shall be used within the limitations specified in the drawing and in accordance with the following:

1. The adaptability of the standard details shall be assessed by the project designer in respect of specific project geometric, appropriate foundation and scour conditions.
2. In reactive soils: this standard drawing is only applicable for reactive soils with linear shrinkage up to 8%. Specialist geotechnical design advice shall be sought otherwise.
3. If the insitu bearing capacity is inadequate, the following options may be explored subject to review and acceptance by E&T Structures and Geotechnical sections:
 - a. Insitu ground improvement, and/or
 - b. Redesign of the base slab.
 Any redesign works shall be RPEQ certified by appropriate engineering disciplines for compliance.
4. When there is uncertainty regarding the application of the standard details on this drawing for a specific project, advice shall be sought from E&T Structures.

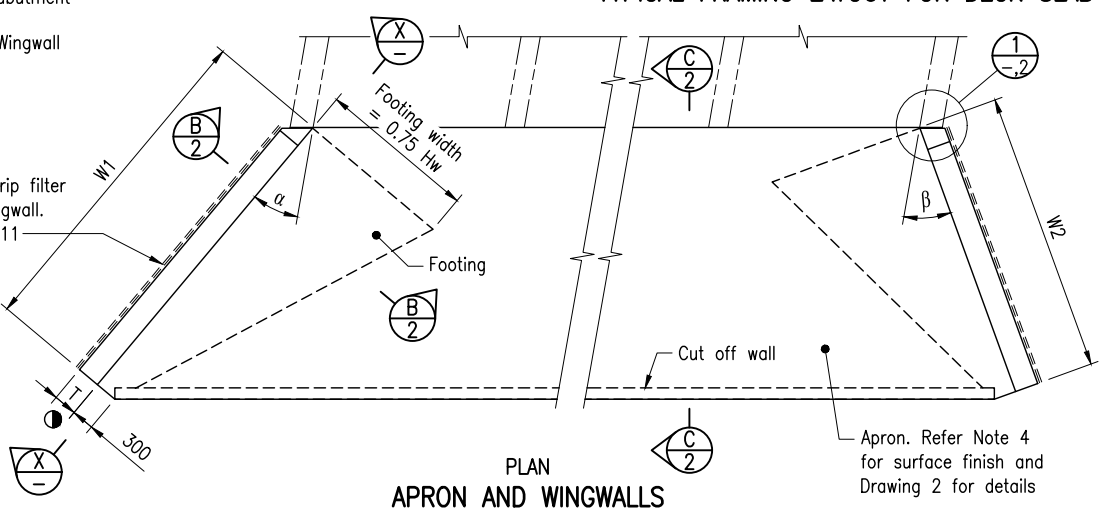
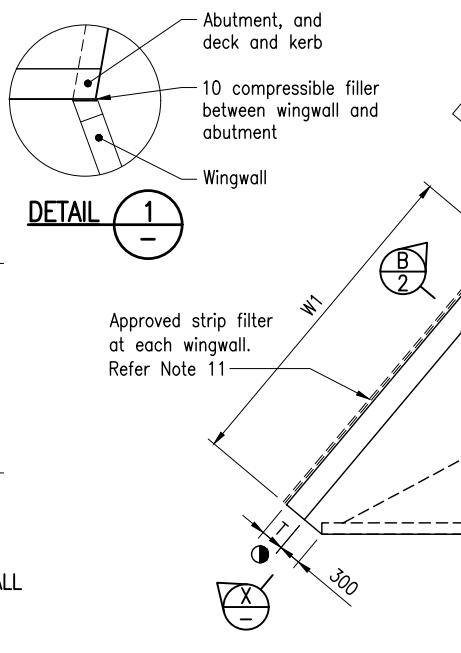
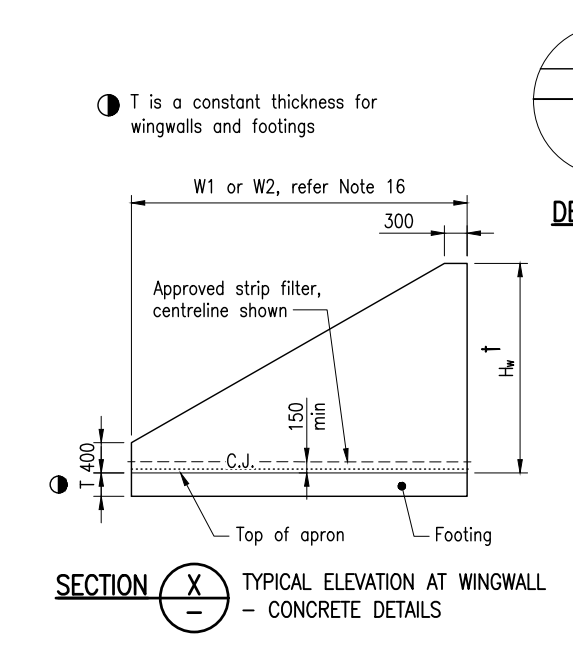
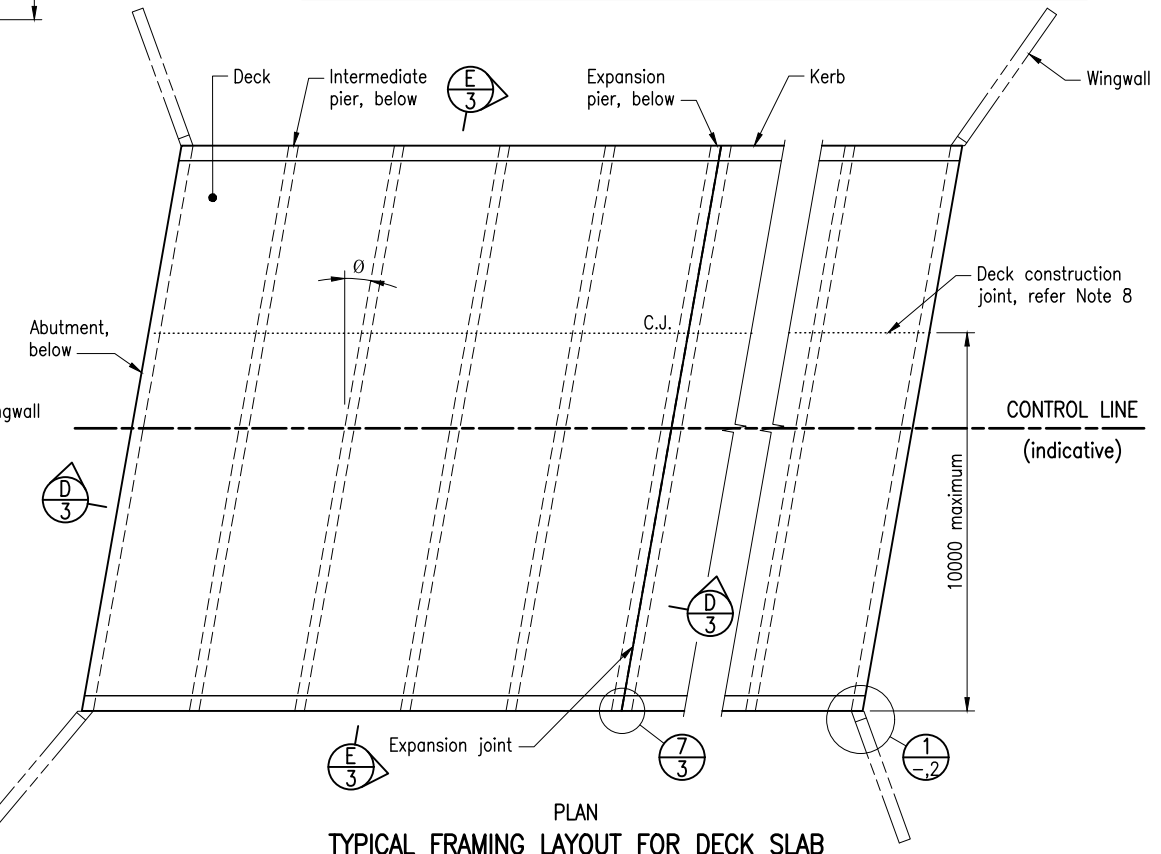
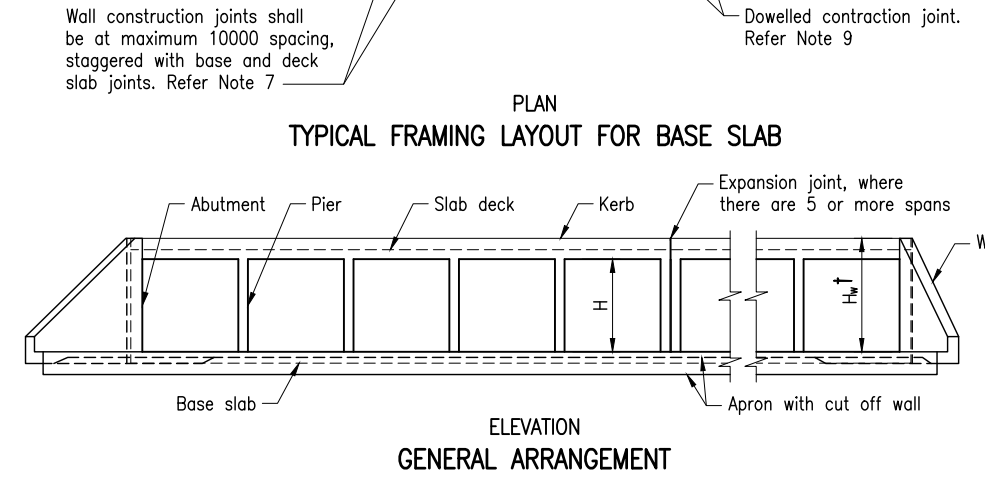
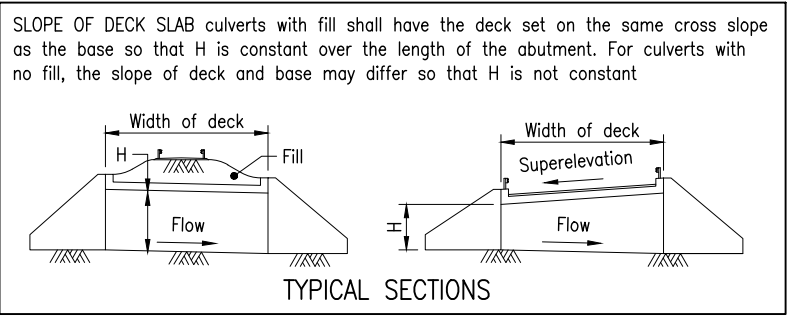


TABLE OF WING ANGLES

Skew angle θ	Wingwall angle	
	α	β
0-10	30	30
11-20	25	30
21-30	20	30
31-45	15	30

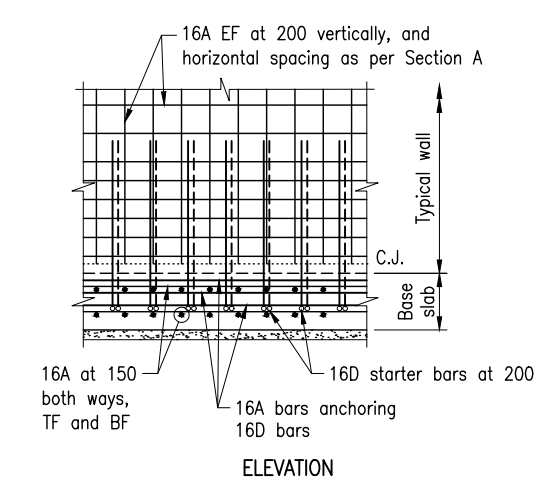
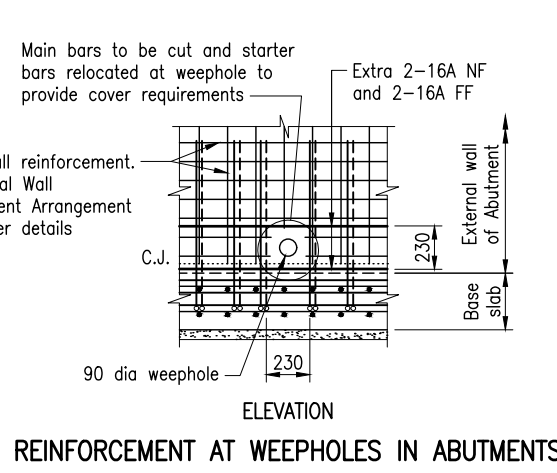
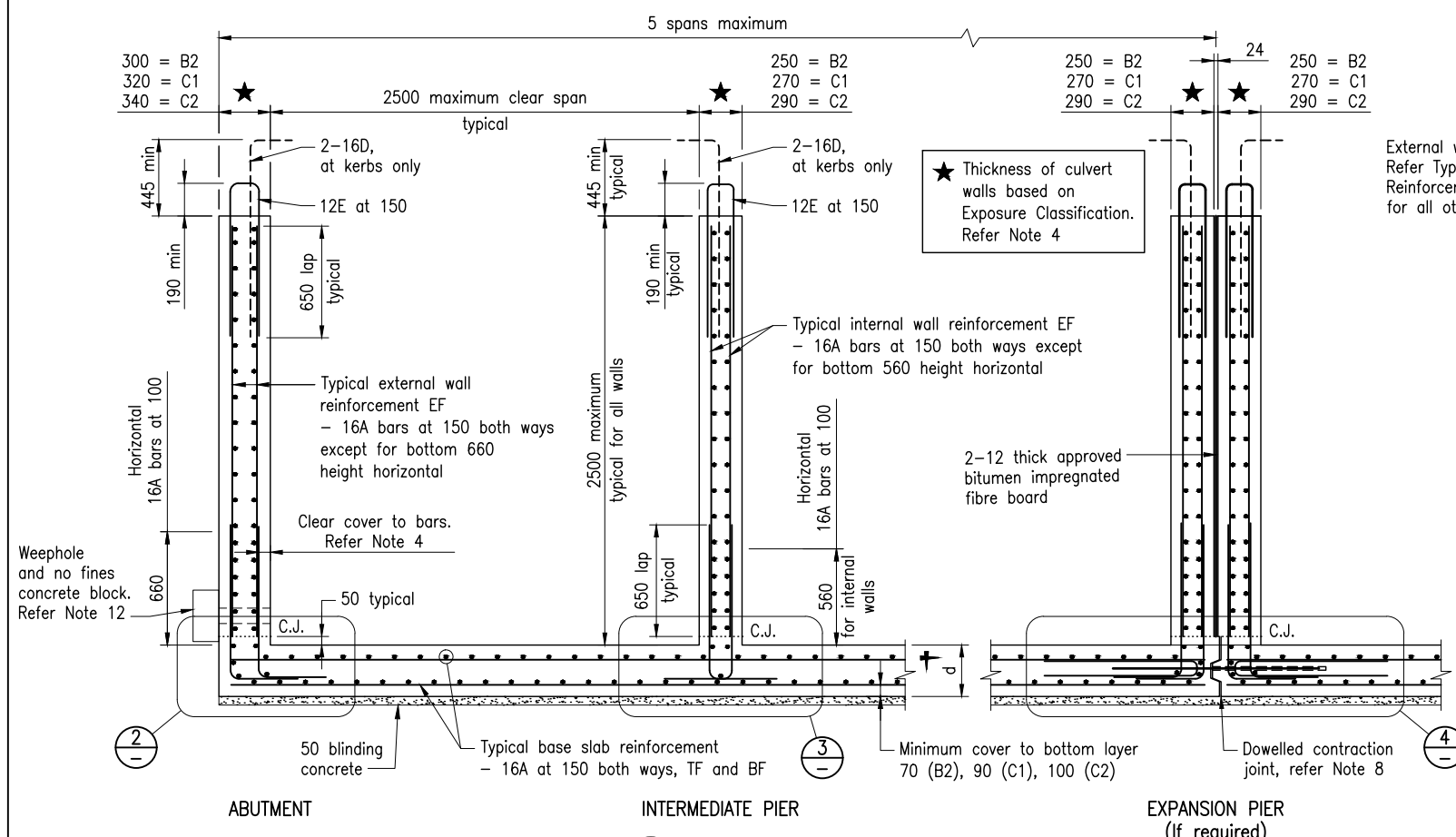
- NOTES:**
1. RC SLAB DECK CULVERT shown in this Standard Drawing shall be constructed in accordance with MRTS03. This drawing does not provide details of fish passage requirements. Where project specific environmental assessment determines that waterway barrier works are required, additional details shall be developed and included in the project drawings.
 2. DESIGN LOADS: Traffic loads and traffic load surcharge shall be in accordance with AS 5100. Heavy load platform is HLP400. Load factors and load combinations shall be in accordance with AS 5100.
 3. MAXIMUM DESIGN PRESSURE (E_d) under the culvert slab bases is provided in the Base Slab Details table on drawing 2.
 4. CONCRETE shall be in accordance with MRTS70. Design life 100 years. Exposure classification and cover to reinforcement shall be in accordance with AS 5100. Minimum concrete strength and cover to reinforcement shall be as shown in table below.

Exposure classification	minimum B2	C1	C2
Minimum concrete strength	S40/20	S50/20	S55/20
Minimum Cover UNO	60	70	80

- Triple-blend concrete in accordance with MRTS70 is required for Exposure classifications C1 and C2. Blinding concrete N20/20. Surface roughening of aprons, and traversable areas of slabs if required, shall be broom finish using a broom not less than 400 wide to achieve an average texture depth of 0.8. The direction of brushing shall be perpendicular to direction of flow.
- APRON AND BASE SLAB MINIMUM REINFORCEMENT for shrinkage and temperature effects are designed considering the full restraint condition to AS 5100. For the slab on ground condition, only the top half of the slab thickness is considered for calculation of this reinforcement.
- REINFORCING STEEL shall be read in conjunction with Standard Drawings 1043 and 1044, and shall be in accordance with MRTS71 and AS/NZS 4671. Deformed bars Grade D500N. Round bars Grade R250N. 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 controlled hydrogen type: G49X to AS/NZS ISO 14341-B or T49X to AS/NZS ISO 17632-B unless shown otherwise.
- CONSTRUCTION JOINTS (C.J.): A minimum of 24 hours shall be allowed prior to placement of adjacent concrete and the exposed face shall be treated as per MRTS70. The reinforcement shall be continued across the construction joint.
- DOWELLED CONTRACTION JOINTS at the expansion pier in the base slab: A minimum of 24 hours shall be allowed prior to placement of adjacent concrete and the exposed face shall be coated with bitumen, and the joint shall be continued across the aprons.
- EXPANSION PIERS shall be provided so that the maximum number of spans without an expansion pier is five and the minimum number of spans between abutment and expansion pier is three. No expansion pier is required up to 5 spans.
- WINGWALL DRAINAGE shall be provided behind wingwalls to prevent hydrostatic pressure being developed behind the wingwall. A strip filter shall be used at each wingwall to drain out at the low end of the wingwall as shown.
- WEEPHOLES shall be provided as follows:
 - Abutment walls, horizontally at 1200 crs,
 - Kerbs where there is fill on the deck, a minimum of 2 weepholes for each span, provided horizontally, and where the deck is superelevated at the lower kerb only,
 - Location of weepholes shall be determined such that reinforcement cover requirements are met,
 - A 300 x 300 x 150 no fines concrete block or approved equivalent shall be provided at each weephole as a drainage filter.
- SCUPPERS are applicable only when there is no fill on the deck and shall be provided at both kerbs of each span where
 - (a) the length of culvert exceeds 10m measured along the Control Line and the grade is 0.25% or less
 - (b) the length of culvert exceeds 20m measured along the Control Line and the grade is 0.35% or less
 Where the deck is superelevated, one scupper per span shall be provided at the lower kerb only. For culverts with fill, provide a 300 x 300 x 150 no fines concrete block or approved equivalent shall be provided on each scupper as a drainage filter. Spacing of reinforcement in kerbs may be altered slightly near scuppers such that minimum cover is maintained.
- HEIGHT OF FILL over deck shall be 2500 maximum.

Notes are continued on Drawing 2.

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RC SLAB DECK CULVERT		
GENERAL ARRANGEMENT		A3 Standard Drawing No
DRAWING 1 OF 4		1240
		Date 7/2021
A	B	C



NOTES, continued from Drawing 1:

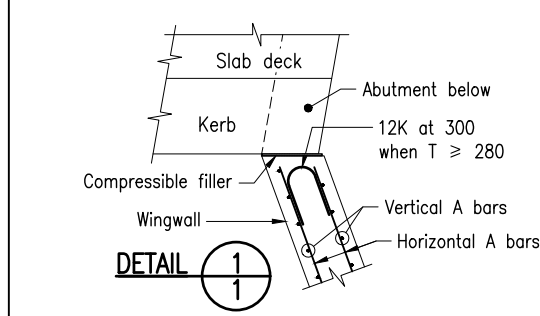
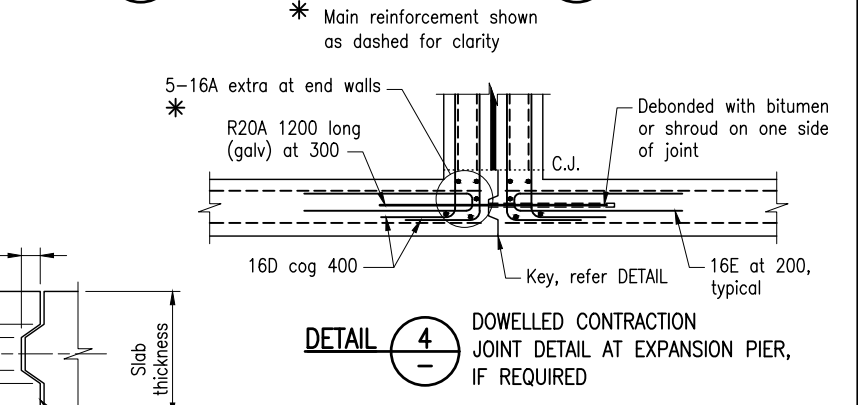
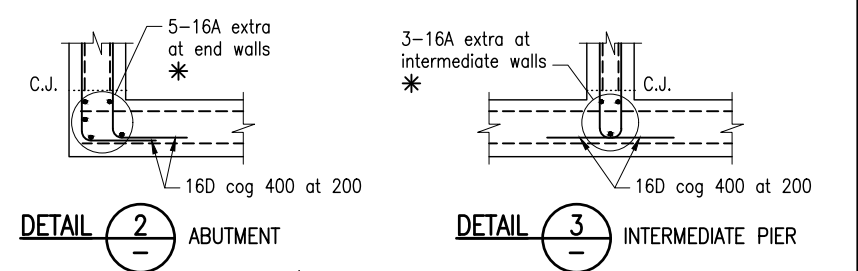
15. Refer Standard Drawing 1359 for details of culvert installation and earthworks.

16. PROJECT-SPECIFIC INFORMATION TO BE SHOWN ON THE DRAWINGS:
 Exposure classification; Culvert chamage; Skew angle; H, H_w, W1 and W2 dimensions; Surface roughening (if required); Safety barrier system setout; Requirements for fish passage.

17. DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DEPARTMENTAL DOCUMENTS:
 Design Criteria for Bridges and Other Structures;
 NDRRA Guidelines; Road Drainage Manual

REFERENCED Departmental Standard Drawings Specifications:
 1043 Reinforcing Steel – Standard Bar Shapes
 1044 Reinforcing Steel – Lap Lengths
 1359 Culverts – Installation, Bedding and Filling/Backfilling Against/Over Culverts
 1490 Steel Beam Guardrail – Installation and Setout Footing Details
 MRTS03 Drainage, Retaining Structures and Protective Treatments
 MRTS70 Concrete
 MRTS71 Reinforcing Steel

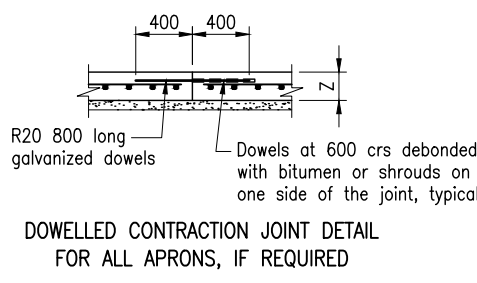
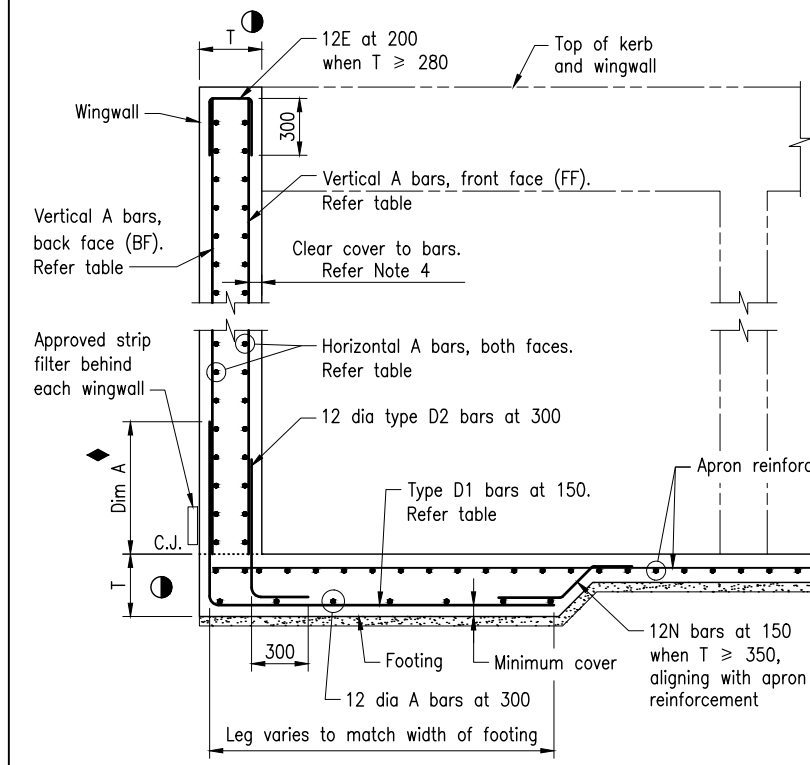


BASE SLAB DETAILS

Up to Span	Maximum design pressure (E _d) kPa		Base slab thickness d † for Exposure classification		
	H < 1500	H ≥ 1500	B2	C1	C2
1800	190	180	300	330	350
2500	180	170			

WINGWALL DIMENSIONS AND MINIMUM REINFORCEMENT REQUIREMENTS

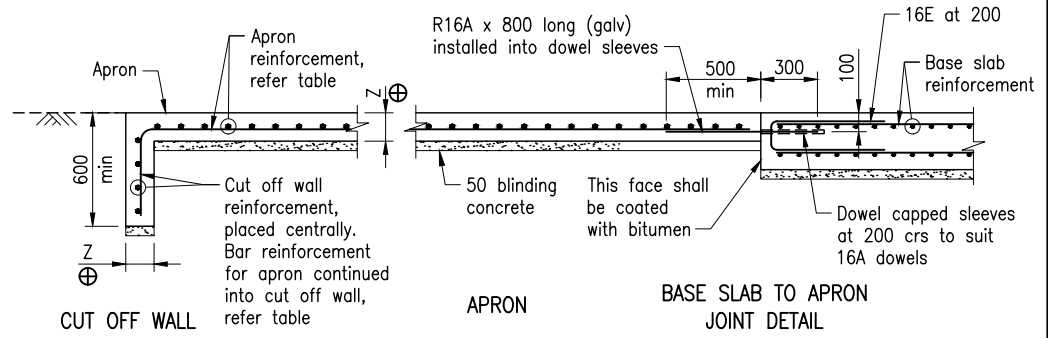
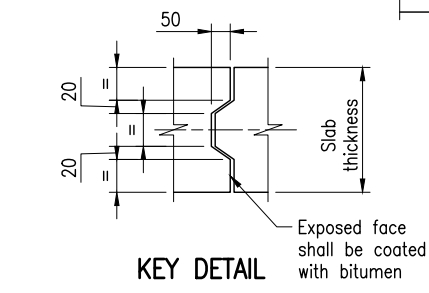
up to H _w †	T for Exposure classification			Vertical A bars BF		Vertical A bars FF		Horizontal A bars FF and BF						D1 bars			
	B2	C1	C2	Dia	Spacing	Dia	Spacing	B2		C1		C2		Dia	Dim A		
								Dia	Spacing	Dia	Spacing	Dia	Spacing			Dia	Spacing
1000	220	240	260	12	150	12	300	150	125	12	100	12	500	12	500		
1500	220	240	260					150	125	12	100	12	500				
2000	260	270	280					125	100	16	125	16	125			16	700
2500	330	340	350					100	150	16	125	16	125			16	700
3000	380	390	400	16				16	150	20	175	20	175	16	700		
3260	410	420	430					16	150	20	175	20	175	16	700		



APRON AND CUT OFF WALL DIMENSIONS AND MINIMUM REINFORCEMENT REQUIREMENTS

Exposure classification	Apron and Cut off wall #	
	Thickness Z ⊕	Reinforcement
B2	150	N12 at 150 both ways
C1	175	N12 at 150 both ways
C2	190	N12 at 125 both ways

⊕ where Z is a constant thickness for aprons and cut off walls.
 # Refer Note 5 of Drawing 1



SECTION C: APRON AND CUT OFF WALL

Department of Transport and Main Roads

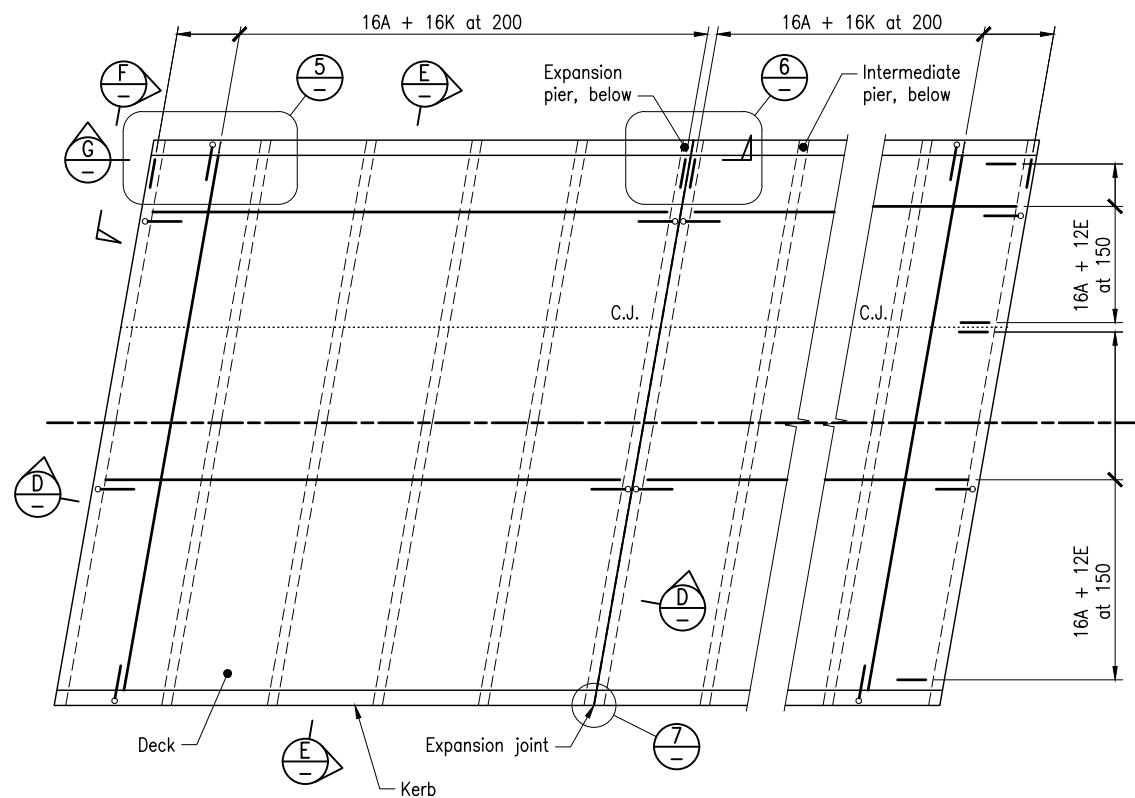
RC SLAB DECK CULVERT

REINFORCEMENT DETAILS – BASE, APRONS, WALLS AND WINGS

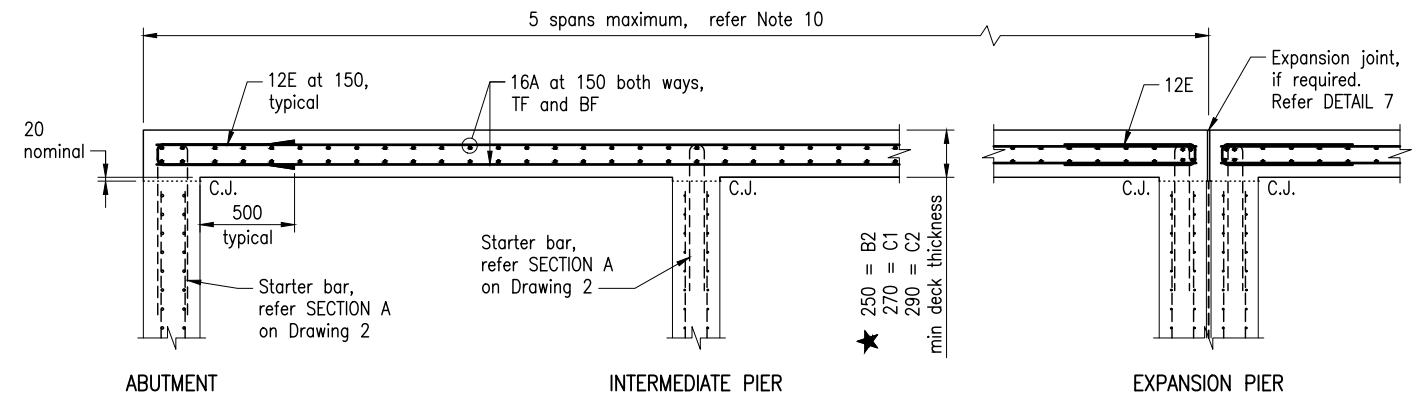
DRAWING 2 OF 4

Standard Drawing No 1240
 Date 7/2021

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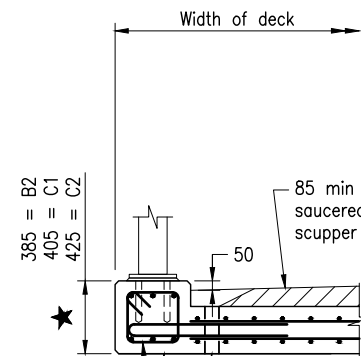


PLAN DECK REINFORCEMENT

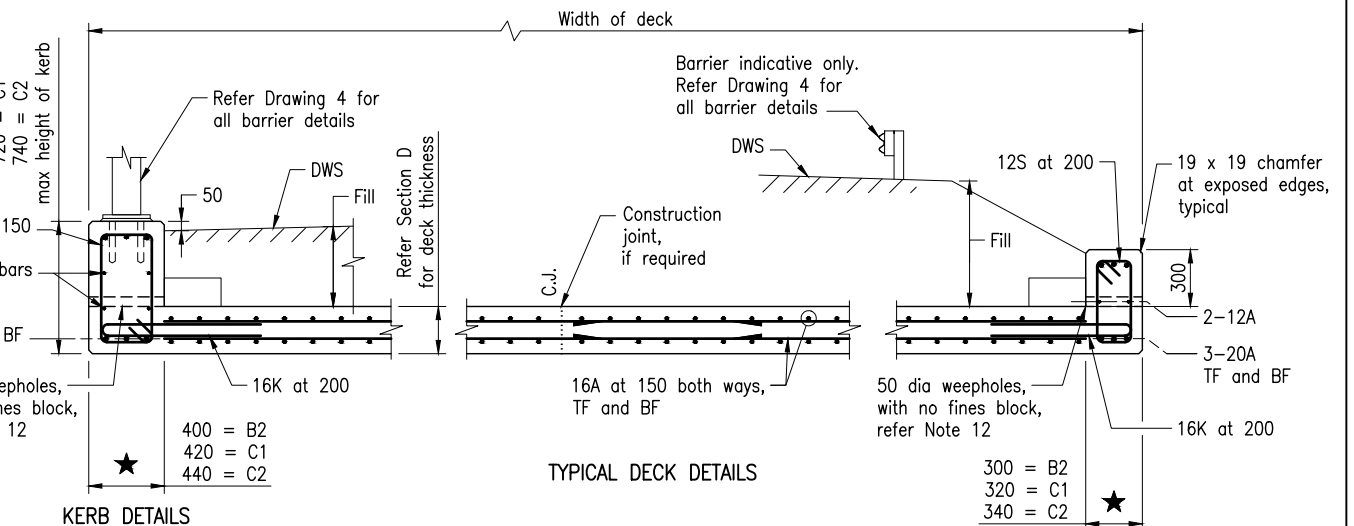


SECTION D

★ Thickness of deck or kerb based on Exposure Classification. Refer Note 4



KERB DETAILS FOR NO FILL

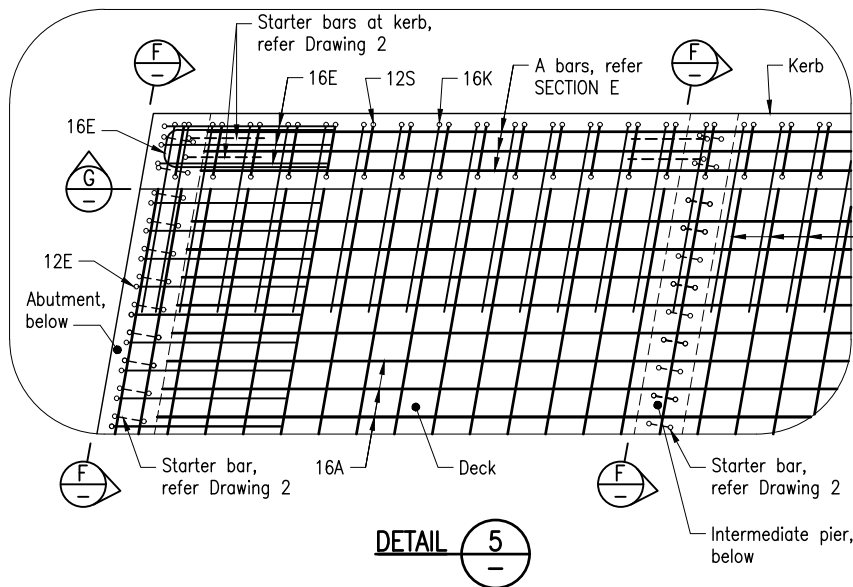


TYPICAL DECK DETAILS

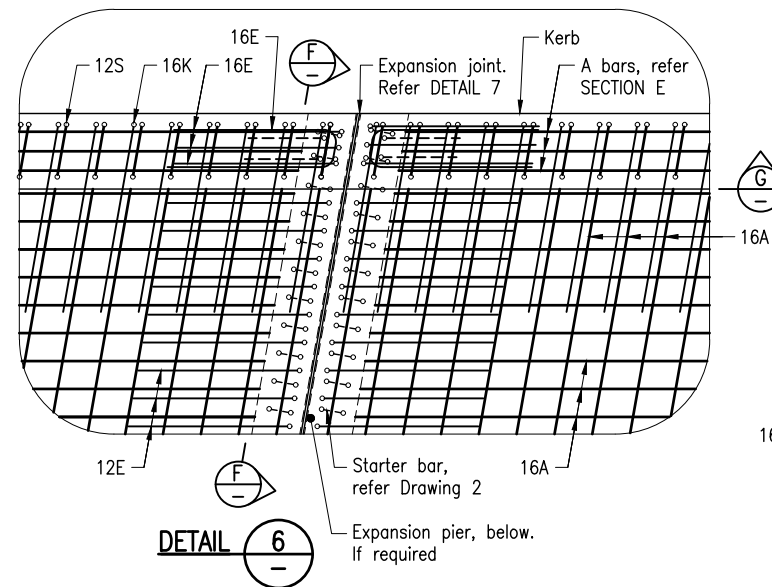
KERB DETAILS UP TO 400 DEEP FILL

KERB DETAILS FOR GREATER THAN 400 DEEP FILL

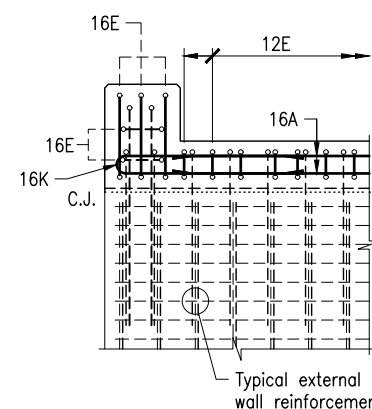
SECTION E



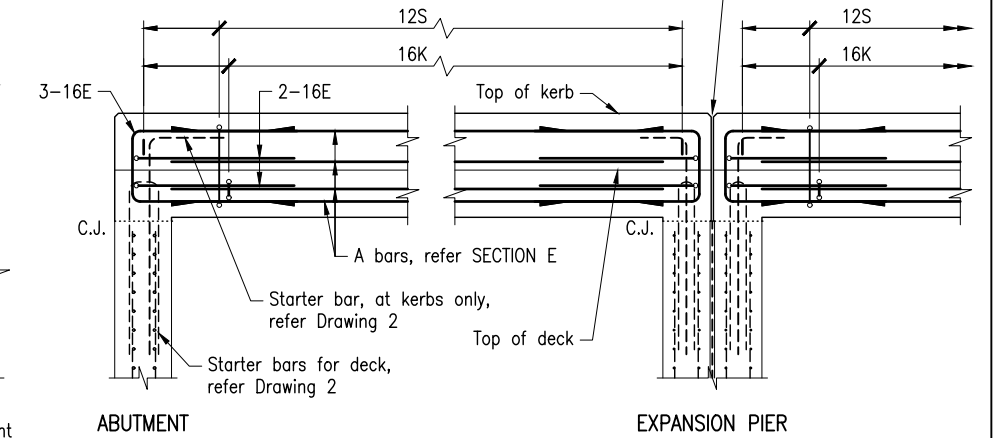
DETAIL 5



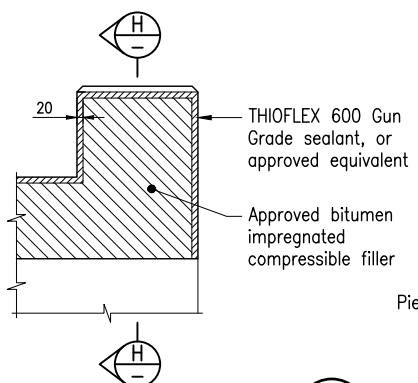
DETAIL 6



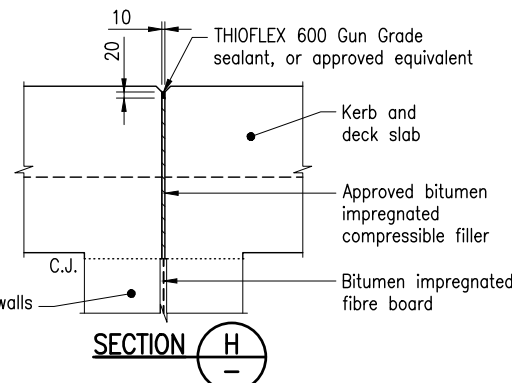
VIEW F TYPICAL PART ELEVATION AT WALLS



SECTION G TYPICAL PART ELEVATION AT KERBS



DETAIL 7 EXPANSION JOINT DETAIL

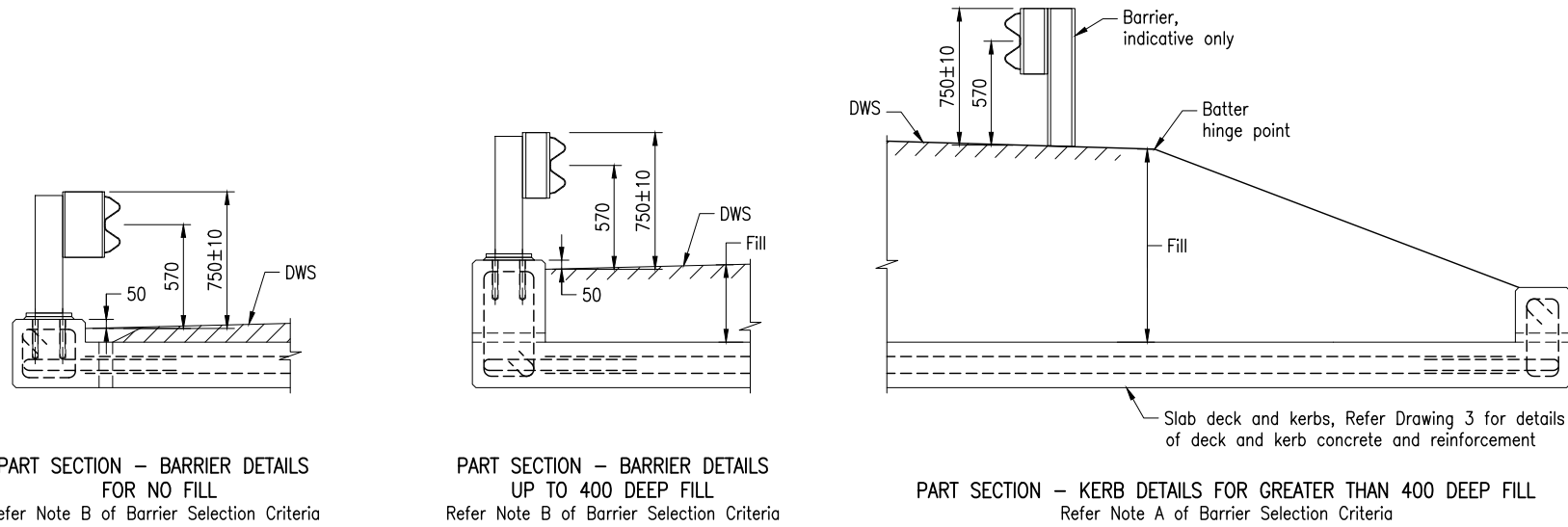


SECTION H

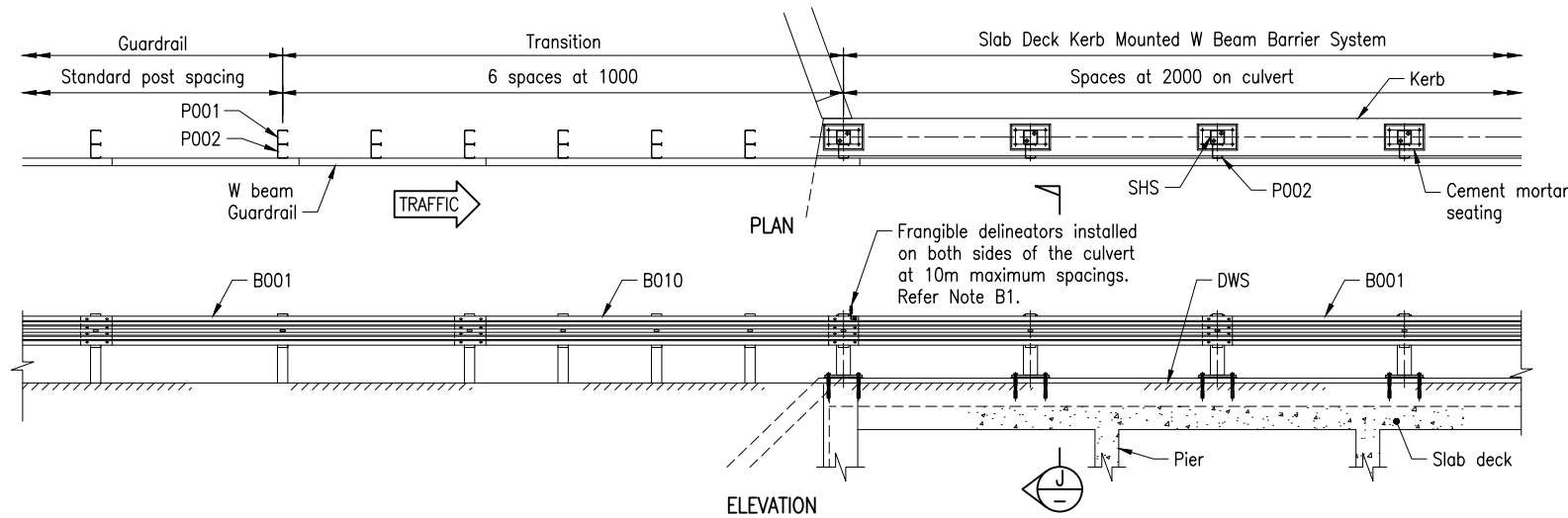
Department of Transport and Main Roads			
RC SLAB DECK CULVERT			
REINFORCEMENT DETAILS - SLAB DECK AND KERBS		A3	Standard Drawing No
DRAWING 3 OF 4		Not to Scale	1240
			Date 7/2021
A	B	C	

BARRIER SELECTION CRITERIA

- A. For W-beam rail barrier, an approved road safety barrier design solution in accordance with "Accepted Road Safety Barrier Systems and Devices" shall be adopted. A suitable barrier system shall be assessed in accordance with the Road Planning and Design Manual. The design decisions leading to adoption of this solution shall be fully documented.
- B. Road safety barrier solution shown in this drawing is indicative only, and shall only be considered where options as per Note A above have been considered and assessed. The details of the plate mounted barrier shall be in accordance with the manufacturers' technical data sheets and specifications.



TYPICAL GENERAL ARRANGEMENT FOR BARRIER SYSTEMS ON SLAB DECK CULVERT



BARRIER TRANSITION DETAILS WHERE KERB MOUNTED SYSTEM IS USED
Approach Shown - Departure Opposite Hand

BARRIER NOTES:

- B1. THE BARRIER SYSTEM shown in this Standard Drawing shall be constructed in accordance with MRTS14.
- B2. DELINEATION on the barrier system shall be installed in the location and to the spacing shown on the drawing. Delineators shall be consistent with the requirements specified in MRTS14.
- B3. DIMENSIONS are in millimetres.
- B4. Refer to Drawing 1 for all other notes.

ASSOCIATED DOCUMENTS:

- Accepted Road Safety Barrier Systems and Devices
- Road Planning and Design Manual

REFERENCED DOCUMENTS:

- Departmental Standard Drawings
 - 1477 Steel Beam Guardrail - Posts and Blockouts, Soil and Bearing Plates, Slip Base Plate
 - 1490 Steel Beam Guardrail - Installation and Setout Footing Details
- Departmental Specifications:
 - MRTS14 Road Furniture

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RC SLAB DECK CULVERT				A3	Standard Drawing No
BARRIER DETAILS		Not to Scale	1240		
DRAWING 4 OF 4			Date 7/2021		
A	B	C			