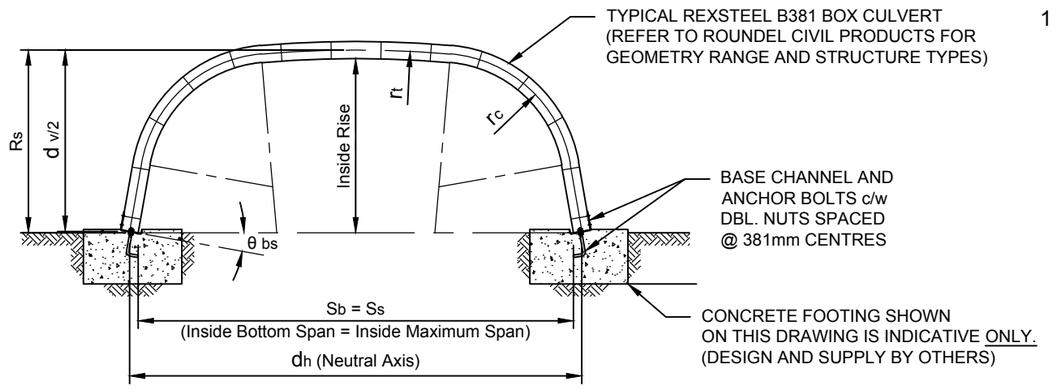


FOUNDATION AND FOOTINGS

1. FOUNDATION AND FOOTINGS: (Ref. AS/NZS 2041.2:2011 Section 2.6)

a) The Foundation for Box Culverts shall be assessed to determine that the actual bearing capacity of the underlying material exceeds the bearing capacity assumed in the design.
(Where considered necessary, appropriate geotechnical advice shall be obtained.).

b) Installation of Concrete works (designed and supplied by others) shall be in accordance with AS3600 and installed in accordance with the information supplied by the designer.
(Provision shall be made to ensure footings are not undermined by stream flows).

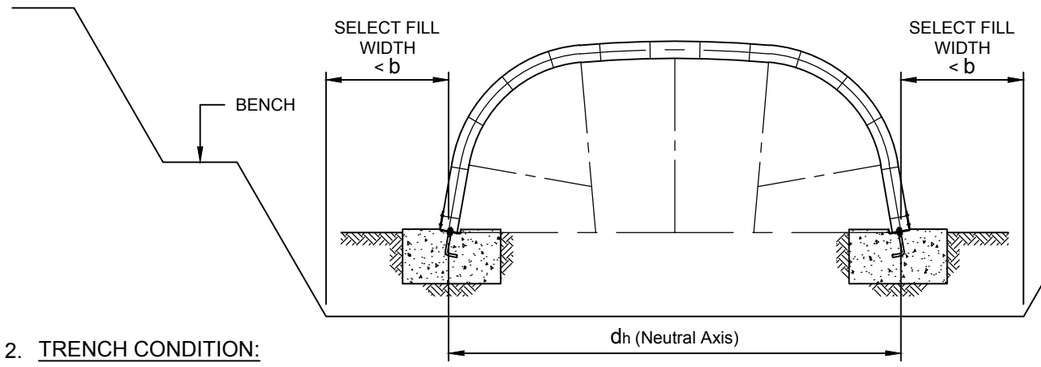
c) Base Channels (H.D.Galv.) supplied with B381 Box Culverts, to be cast in-situ with concrete footing.
Note: Anchor Bolts to be tied-in to concrete reinforcement.
(For installation and setout details, refer to "project specific"; Base Channel Setout drawings, supplied by Roundel Civil Products).

d) After concrete works, at least 48 hours shall lapsed before stripping any formwork and a further 5 days (7 days total) shall have lapsed before the backfilling operations.

AS/NZS 2041.2:2011 TABLE 2.4.1 (B)
SELECT FILL SOIL PARAMETERS

	Span Range	$d_h \le 3000$	$3000 < d_h \le 8000$
Soil Type	Unified Soil Classification		
1-Coarse	GW, GP	Acceptable	Acceptable
	SW, SP	Acceptable	Acceptable
	GW-GM, GP-GM	Acceptable	Acceptable
	SW-SM, SP-SM	Acceptable	Acceptable
	GW-GC, GP-GC	Acceptable	Acceptable
2-Medium	GM	Acceptable	Acceptable
	SM	Acceptable	Acceptable
	GC	Acceptable	Acceptable
	SC	Acceptable	Acceptable
3-Fine	ML, CL, OL	Not Acceptable	Not Acceptable
	MH, CH, OH	Not Acceptable	Not Acceptable
	Pt	Not Acceptable	Not Acceptable
Maximum percentage fines (%) *		20	12
Coefficient of Gradation (C_c)		0.5-3.0	0.7-3.0
Minimum Coefficient of Uniformity (C_u)		2	3
Maximum Linear Shrinkage (%)		10	8
Maximum Plasticity Index (%) **		15	12

* The percentage of soil passing the 75 µm seive
** Plasticity index is waived if fines content is less than or equal to 5%



TRENCH CONDITION

2. TRENCH CONDITION:

a) *b* = Minimum transverse backfill distance.

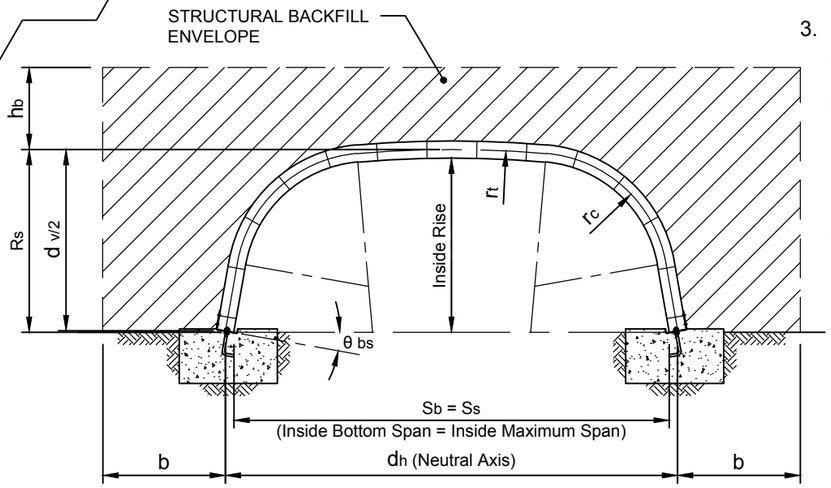
b) Where a structure is in a trench, the select fill shall extend to a minimum distance equal to the value given in AS/NZS 2041.2:2011 Table 2.4.3

AS/NZS 2041.2:2011 TABLE 2.4.3
MINIMIM TRANSVERSE DISTANCE OF BACKFILL
FOR SINGLE-CONDUIT BURIED CORRUGATED METAL STRUCTURES

Structural Backfill Location	Structural Backfill Type	Minimum Transverse Backfill Distance (b), mm	
		Structure Type (For metal box culverts)	
		$d_h \le 8000$	$d_h > 8000$
Trench in Rock	Compacted	1000	1200
Trench in Rock	Flowable	300	750
Trench in good insitu soil	Compacted	1000	1200
Trench in poor insitu soil	Compacted	1000	$d_h/2$ (see Note 1)
Embankment Construction	Compacted	1000	$d_h/5$ (see Note 1)

NOTE:
1. Minimum tranverse backfill distance for structures with $d_h > 12000$mm may be larger (but not smaller) that the above values if required by the designer.

PRELIMINARY ISSUE
ISSUED FOR COMMENT



BACKFILL ENVELOPE

3. BACKFILL ENVELOPE:

a) *b* = Minimum transverse backfill distance.

b) The structural backfill for a single-conduit structures under different fill conditions shall extend transversely at least the distance specified in AS/NZS 2041.2:2011 Table 2.4.3 and shown in the Backfill Envelope detail on each side (*b*) beyond the spring lines of the conduit, and vertically up to the minimum design height of cover required, (hb)

c) Select Engineered Backfill shall be compacted to greater than or equal to 95% of the Maximum Dry Density ratio for standard compaction as specified by the designer and in accordance with the relevant AS 1289 test method.
Moisture control during compaction shall be ±3% of optimum moisture content or ±2% if the material has more than 20% passing the 0.425mm sieve.

4. MINIMUM SPACINGS FOR MULTIPLE STRUCTURES:

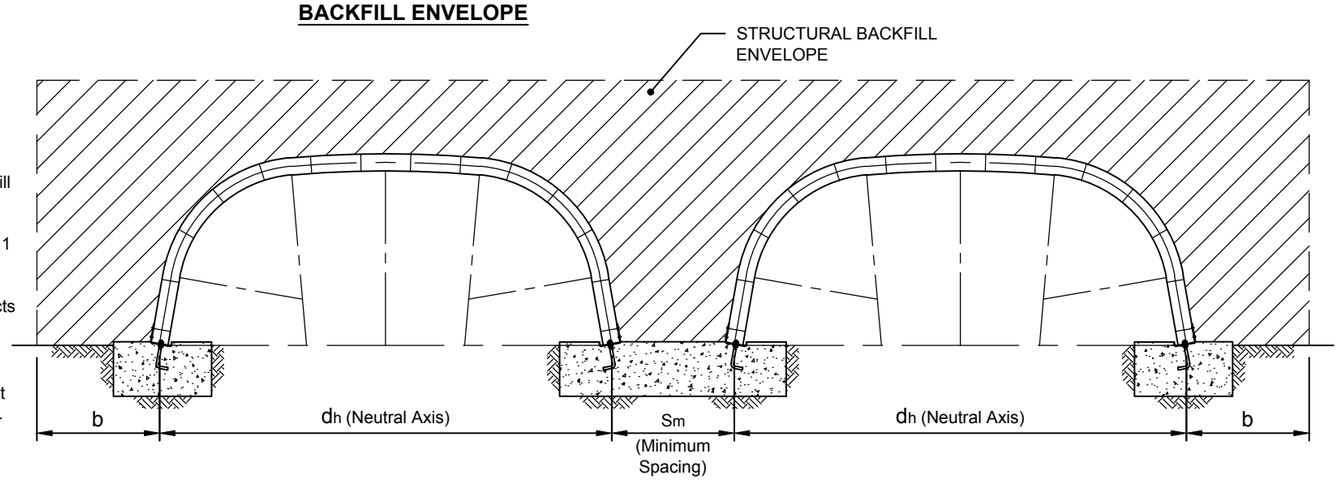
a) The minimum spacing between adjacent multiple structures shall be sufficient to ensure adequate select fill support is provided to the structures and the fill above. Spacings shall be as specified in the design but not less that the minimum spacings given in AS/NZS 2041.2:2011 Table 2.5.

b) These limits may be inadequate where earthquake effects are important and may need to be increased when significant earthquake effects are expected.

c) The limit state design method takes account of the effect of spacing on buckling of the corrugated metal structure.

AS/NZS 2041.2:2011 TABLE 2.5
MINIMIM SPACINGS FOR MULTIPLE STRUCTURES

Structural Backfill Location	Structural Backfill Type	Transverse Distance between Structures (S_m), mm	
		Structure Type Metal Box Culverts	
		$d_h \le 8000$	$d_h > 8000$
Between Adjacent Structures	Compacted	1000	To be determined by numerical modelling
Between Adjacent Structures	Flowable	300	



MINIMUM SPACINGS FOR MULTIPLE STRUCTURES

Rev	Date	Revision Description	Drawn	Draft Chk	Des Eng	Lead Eng
5						
4						
3						
2						
1						
0	11 SEP 17	INITIAL ISSUE	BF	BF		

A3 Scale: N.T.S.

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B381 CORRUGATION - 381mm x 140mm
FOUNDATION, TRENCH, BACKFILL AND MULTIPLE STRUCTURE DETAILS

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