

2.4.1 SUBSTRUCTURES

2.4.1.1 BOX CULVERTS

GENERAL DESCRIPTION

Reinforced concrete box culverts are an economical design solution for many drainage and short-span bridging requirements.

In drainage structures, they can cope with large flows of water where headroom is limited. Hence they are ideal in road and rail structures where they are designed to take heavy wheel loads with no fill required above the structure.

This provides instant bridging with minimum traffic disruption. It will be appreciated that, if fill is placed over the culvert, the superimposed load lessens because the fill will distribute the load over a larger area.

The fact that traffic may use such an installation immediately after placing is noteworthy when compared with any insitu construction and most alternative materials which require compacted fill in place before the loading is applied.

Special culvert structures have been built in Australia for spans up to 7 m. Standard combinations of spans and leg-heights as specified in AS 1597 Parts 1 and 2 are available from most culvert manufacturers (see *Standard Box Culverts*).

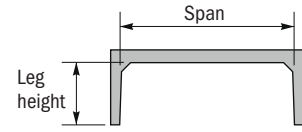
CULVERT DESIGN

While many Authorities have their own specific structural requirements and often their own designs, the minimum standards to which box culverts are designed are contained in AS 1597 Part 1, for culverts up to and including 1200-mm span, and AS 1597 Part 2 for culverts from 1500- to 4200-mm span.

Box culverts are normally designed for the standard highway vehicle and rail loads as described in the Austroads Bridge Design Code.

Construction considerations on-site may require that heavy equipment must travel over box culverts. This can result in loading conditions much more severe than those expected in service. In these circumstances, either the design must satisfy construction conditions or provision must be made to back-prop the units during construction.

STANDARD BOX CULVERTS



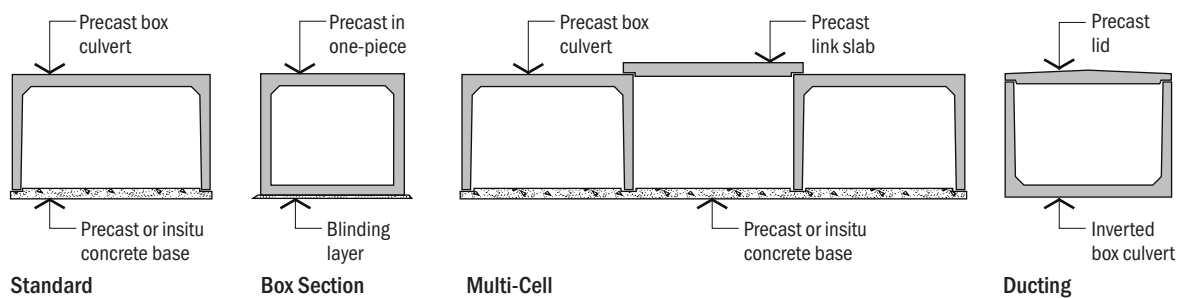
"SMALL-SIZES RANGE"

Leg height (mm)	Span (mm)						
	300	375	450	600	750	900	1200
150	■		■				
225		■	■	■			
300			■	■	■	■	■
450				■	■	■	■
600					■	■	■
750						■	
900							■
1200							■

"LARGE-SIZES RANGE"

Leg height (mm)	Span (mm)					
	1500	1800	2400	3000	3600	4200
900	■					
1200	■	■	■	■	■	
1500	■	■	■			
1800		■	■	■	■	■
2400			■	■	■	■
3000				■	■	■
3600					■	■
4200						■

TYPICAL ARRANGEMENTS

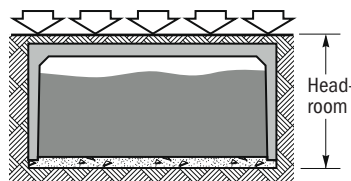


TYPICAL APPLICATIONS

(a) USED AS A CONDUIT

Features

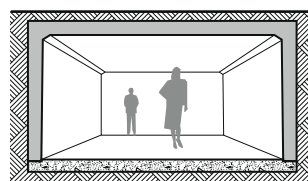
- Low headroom (compared to pipes)
- Heavy loads
- Full flows



(b) USED AS A TUNNEL

Applications

- Pedestrian subways
- Stock and wildlife crossings
- Conveyor tunnels under stockpiles



(c) USED AS DUCTING

Applications

- Electrical cable
- Steam, air and hot water
- Oil pipelines

