

## Appendix 2: Bridges and Culverts

For bridges and culverts there is much less standardisation as terrain and drainage flow requirements that drive the design vary greatly.

To provide a starting point, typical scope and associated cost estimates have been developed for example configurations based on most typical infrastructure provisions. This is for simple Super-T bridge construction and box units and crown units on cast in situ, reinforced slab base culverts. The basic assumptions underpinning the benchmark scopes and cost estimates are outlined in the Cardno report (3.4 Baseline assumptions).

In practice, it is likely that some additional design will be needed to more accurately scale the infrastructure required at a particular location. Once this is done, it will often be relatively straightforward to adjust the base cost sheets for the relevant quantities.

There is also more chance that the structures in question may be quite different in configuration from the benchmark scopes. For example, the bridge could be a road over rail overpass or require special foundation treatments because of unusually poor ground conditions. In these case bespoke designs and costs are likely to be required.

### Other Issues

Note that the benchmark treatments are for standard beam and slab construction. No allowance has been made for architectural treatments or for “statement” structures, as these are clearly beyond “basic and essential” in nature.

Note that the cost of land is not included as bridges and culverts are usually contained within waterway corridors or road reservations provided through other mechanisms such as the public land provisions in the ICP.

### Bridges and Culverts BIC

The detailed bridge and culvert benchmark scopes and cost sheets for the items listed below in Table 2.

Item	Category	Description	Standard	Cost Application	Estimate P50	Estimate P90
17	Bridge	Interim Primary Arterial Road Bridge 50 m span	Super-T – 15.80m wide (Interim)	Per Bridge	\$6,828,000	\$8,021,000
18	Bridge	Interim Primary Arterial Road Bridge 100 m length	Super-T – 15.80m wide (Interim)	Per Bridge	\$12,434,000	\$14,646,000
19	Bridge	Interim Secondary Arterial Road Bridge 50m length	Super-T – 14.90m wide (Interim)	Per bridge	\$6,270,000	\$7,368,000
20	Bridge	Interim Secondary Arterial Road Bridge 100m length	Super-T – 14.90m wide (Interim)	Per bridge	\$11,391,000	\$13,419,000
21	Bridge	Ultimate Connector Road Bridge 50m length	Super-T – 14.30m wide (Ultimate)	Per bridge	\$6,270,000	\$7,368,000
22	Bridge	Ultimate Connector Road	Super-T – 14.30m wide (Ultimate)	Per bridge	\$11,391,000	\$13,419,000
23	Bridge	Pedestrian Bridge 20m length	Super-T – 4m wide (Ultimate)	Per bridge	\$966,000	\$1,131,000
24	Bridge	Pedestrian Bridge 80m length	Super-T – 4m wide (Ultimate)	Per bridge	\$2,853,000	\$3,364,000
25	Major Culvert	Box culverts 1200 x 2100 (4 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$393,000	\$452,000
26	Major Culvert	Box culverts 1200 x 2100 (4 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$559,000	\$643,000
27	Major Culvert	Box culverts 1800 x 3000 (6 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$795,000	\$914,000

Item	Category	Description	Standard	Cost Application	Estimate P50	Estimate P90
28	Major Culvert	Box culverts 1800 x 3000 (6 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$1,202,000	\$1,382,000
29	Major Culvert	Box culverts 2100 x 2100 (16 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$1,413,000	\$1,625,000
30	Major Culvert	Box culverts 2100 x 2100 (16 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$2,142,000	\$2,463,000
31	Major Culvert	Circular Pipes (RCP) 1200 dia. (2 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$250,000	\$287,000
32	Major Culvert	Circular Pipes (RCP) 1200 dia. (2 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$352,000	\$405,000
33	Major Culvert	Circular Pipes (RCP) 1800 dia. (3 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$474,000	\$545,000
34	Major Culvert	Circular Pipes (RCP) 1800 dia. (3 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$752,000	\$865,000
35	Major Culvert	Circular Pipes (RCP) 2100 dia. (4 side by side)	Secondary Arterial Interim – 17.0 m	Per structure	\$709,000	\$816,000
36	Major Culvert	Circular Pipes (RCP) 2100 dia. (4 side by side)	Connector Boulevard Ultimate – 31.0 m	Per structure	\$1,145,000	\$1,316,000

Table 2: Bridge and Culvert Infrastructure Costings (Indexed to July 2018)