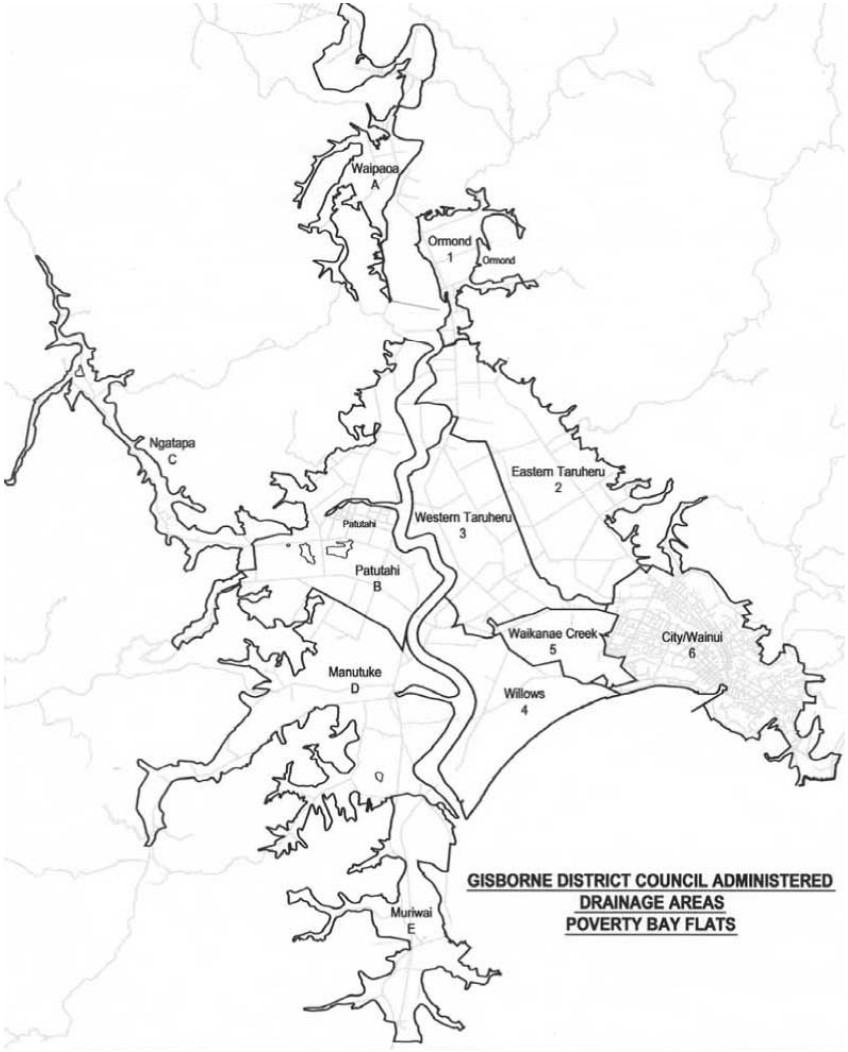
H19 Appendix: The Gisborne District Council (2004) Culvert Construction Guidelines for Council Administered Drainage Areas



The Gisborne District Council Rivers and Land Drainage Division administers and maintains a network of 295km of drains and 206km of minor rivers and streams within the Gisborne region. Most of these drains are located within the 11 Drainage Areas located within the Poverty Bay Flats as identified in the Map to the left.

All culvert crossings located on these drains are designed, constructed and maintained to fulfill the performance standard required, being:

- Drainage Area drains provide unconstrained collection and disposal outlets for subsurface field drains (or, where installed, the field drain pump system), within 12 hours after significant rainfall events of up to 5 year frequency.

Note: *that these culvert installation guidelines apply to all culverts except for those associated with the construction of any river (or modified river) crossing for the purpose of operating State Highways under the Transit New Zealand Act 1989.*

Note: *that where culverts are to be installed in drains within state highway road reserve approval must be obtained from the State Highway operator. Construction will be subject to the State Highway operator's standards and requirements.*

Culvert Capacity

Any culvert shall convey a 5 year average recurrence interval (ARI) flood without heading up more than 0.5 metres or causing any increase in upstream water levels on neighbouring properties. ***Note***: The minimum practical culvert size is 375mm diameter.

Culvert Materials

Culverts shall be spun concrete pipes from a concrete pipe manufacturer accredited to the Concrete Pipe Association of Australia.

Culvert Invert Levels

The culvert invert shall be placed to suit the invert and grade of the drain/streambed when maintained in a free flowing condition (i.e. accounting for any build up of material in the drain/streambed that should be removed during normal maintenance of the drain/streambed).

Note*: The change in colour of the base soil is a good indicator you are at the original drain invert.*

For drainage area maintained drains and streams, Gisborne District Council Rivers and Land Drainage will provide the correct invert level on line with the drain/stream design inverts.

Fish Passage Requirements

There is a requirement for provision of fish passage in the drain/stream. Fish passage can be achieved by burying the culvert invert slightly on the correct grade:

- Culverts up to 600mm are buried to provide an invert 50mm into the drain/streambed.
- Culverts up to 100mm are buried to provide an invert 90mm into the drain/streambed.
- Culverts over 100mm are buried to provide an invert 120mm into the drain/streambed.

Culvert Construction

- Culvert pipe bedding shall be firm and shall support the pipe barrel.
- Culvert pipes shall be pulled together and firmly held in place during breastwork and backfill construction.

Note: *For larger pipes, a winch system is used through the centre of the pipes.*

Breastwork of the culvert ends (refer GDC Plan EW270), is constructed from 200mm by 50mm rough sawn H4 tanalised timber, cut to fit snugly around the pipe and dug back into the drain bank a minimum of 300mm. A minimum of two 150mm H4 half round posts for each culvert end are driven on either side of the pipe approximately 150mm inside the ends of the pipe. The posts are driven to just below the level of where the top board of the breastwork will be, which will generally be 150mm lower than the surrounding ground level. These posts are tied back together using at least a double No. 8 galvanised wire formation that can be twitched tight before buried under the backfill. Backfill shall be clean and free from vegetation.

Compaction of the backfill shall be progressively completed in even layers. Where required, basecourse is used on the top layers of the backfill.

Note: *For culverts larger than 900mm or in situations where the total drain depth is greater than 1.2 metres, full round posts or rail iron with wire rope tiebacks will be required.*