- **Location 7 – Type J**

- **Location 7 – Type M**

- **Location 7 – Type M**

- **Location 7 – Type M**

- **Location 7 – Type M**

SKM

- **Location 7 – Type M**

- **Location 7 – Type M**

- **Location 7 – Type J**

- **Location 8 – Chain Wire Fence Debris**

- **Location 8 – Old Bridge Piers**

- **Location 8 – Type M**

SKM

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Old Bridge Piers**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 8 – Type M**

- **Location 9 – Type A**

- **Location 9 – Type N**

- **Location 9 – Type N**

- **Location 9 – Type N**

- **Location 9 – Type N**

- **Location 9 – Type N**

- **Location 9 – Type N**

- **Location 10 – Type O**

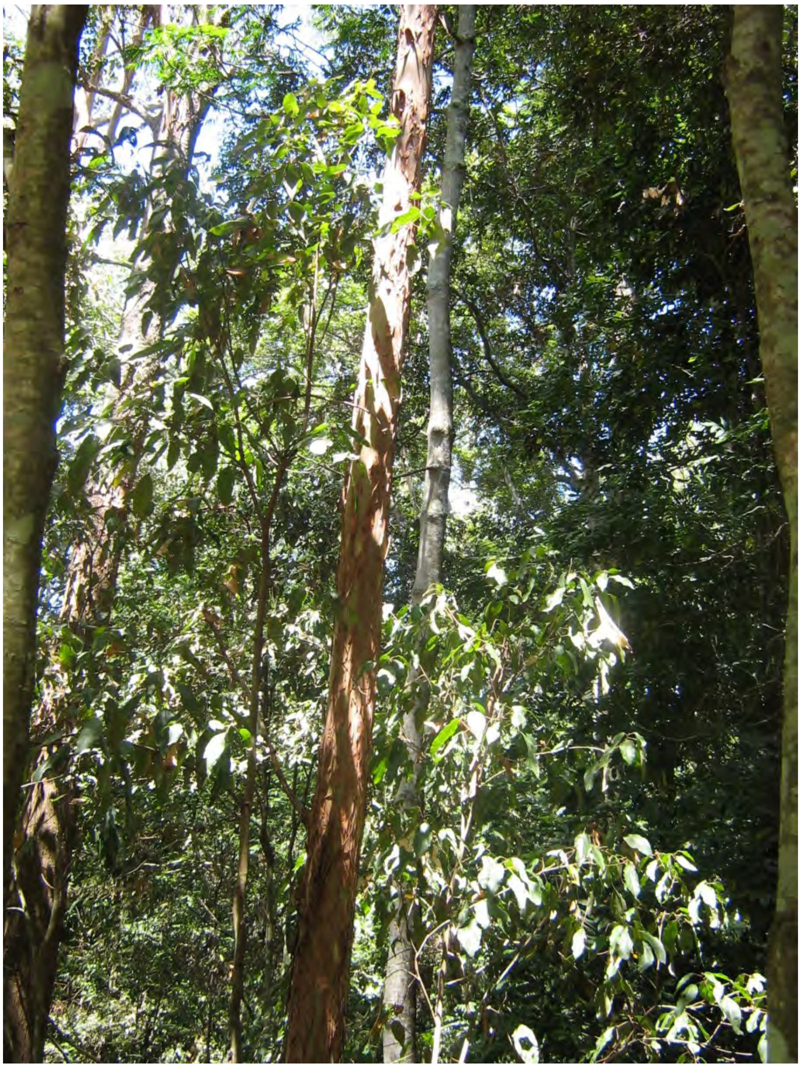
- **Location 10 – Type O**

- **Location 10 – Type O**

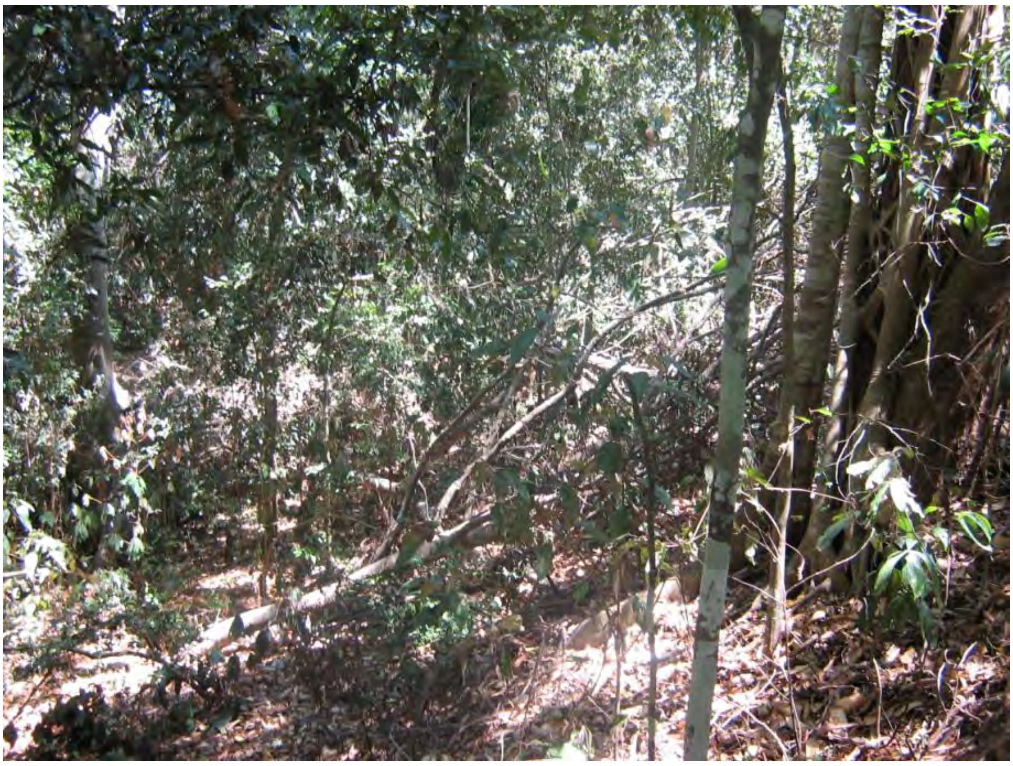
- **Location 10 – Type O**

- **Location 10 – Type O**

- **Location 10 – Type O**



- **Location 10 – Type O**



- **Location 10 – Type O**

- **Location 10 – Type O**

- **Location 10 – Type O**

- **Location 10 – Type O**

SKM

- **Location 10 – Type O**

- **Location 10 – Type O**

SKM

- **Location 11 – Type N**

- **Location 11 – Type N**

- **Location 11 – Type N**

- **Location 11 – Type N**

- **Location 12 – Type P**

- **Location 12 – Type P**

- **Location 12 – Type P**

- **Location 13 – Type N**

- **Location 13 – Type N**

- **Location 13 – Type N**

- **Location 13 – Type A**

- **Location 13 – Type A**

Appendix D Ready Reference: Recommended Floodplain Parameters

WBMN Parameters – Section 3.6

- **Recommended Parameters WBNM Model**

Description	Value
Lag Parameter	1.6
Impervious Lag Factor	0.1
m value	0.77
Stream Lag Factor	
e) Natural channel	1.0
f) Gravel bed with rip-rap	0.67
g) Excavated earth	0.50
h) Concrete lined	0.33

Manning's n Parameters – Section 5.6

- **Short-List of Manning's n Parameters – Floodplain and Urban**

Description	Manning's n
Dense vegetation	0.090
Swamp	0.080
Medium-dense vegetation	0.075
Crops	0.040
Low Grass/Grazing *	0.035
Waterbodies	0.030
Roads/Footpaths	0.015
Buildings	1.000
Urban block	0.300

*Refer Section 5.4 for permissible depth varying roughness in grassed areas

SKM

Outlet Control Hydraulic Losses in Culverts – Section 6.1.1

Inlet losses are documented in Figure 7.17 of Waterway Design (AustRoads, 1994). For box culverts, the relevant values for culverts in MBRC are summarised as follows:

- square edges with wingwalls at 90^o to 75^o to barrel (i.e. headwall only) = 0.5
- square edges with wingwalls at 30^o to 75^o to barrel = 0.4
- square edges with wingwalls at 10^o to 25^o to barrel = 0.5
- square edges with wingwalls at 0^o to barrel (i.e. extension of sides) = 0.7
- any wingwall with tapered edges = 0.2

The relevant outlet control values for simulating circular culverts in MBRC are summarised as follows:

- square edges with wingwalls = 0.5
- rounded edges with wingwalls = 0.2

For pipe-arch or corrugated steel arch structures, the relevant values for culverts in MBRC are summarised as follows:

- projecting from fill = 0.9
- any headwall with square edges = 0.5
- mitred to conform to fill slope = 0.7
- end-section conforming to fill slope = 0.5

Outlet Control Hydraulic Losses in Culverts – Section 6.1.2

Height Contraction Coefficient:

- 0.6 for square edged entrances
- 0.8 for rounded edged entrances

Width Contraction Coefficient:

- 0.9 for sharp edged entrances
- 1.0 for rounded edged entrances

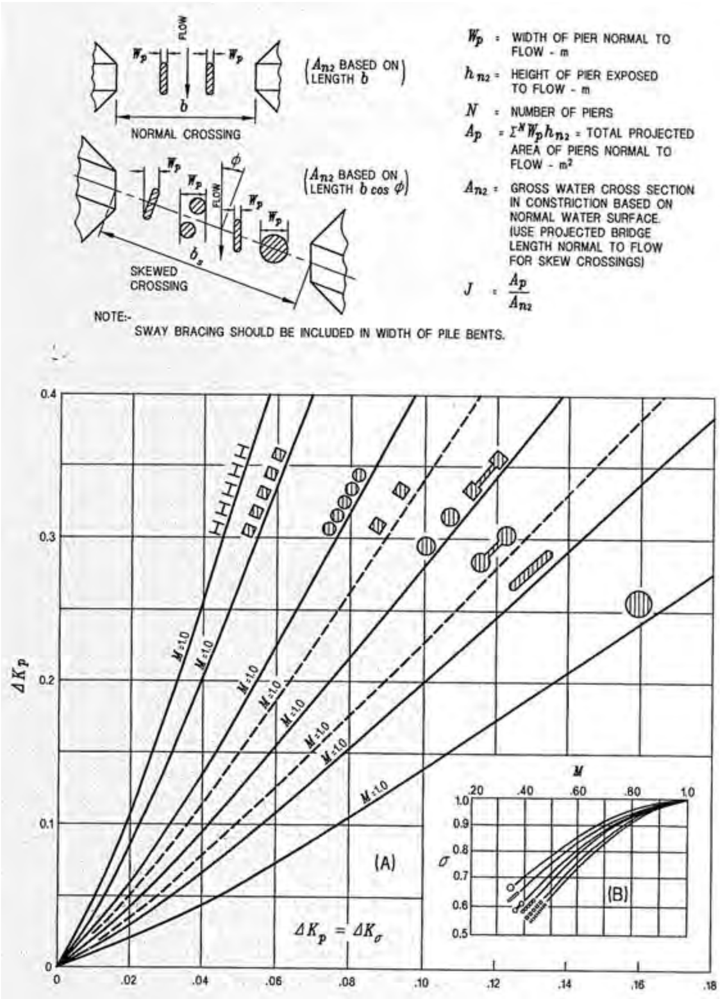
SKM

Bridges – Proposed Modelling Approaches for Contraction and Expansion – Section 6.2.1

- bridges simulated as either 1D structures or sets of 2D FC cells (or FC shape file); and
- minor additional loss coefficients in the order of 0.1 to 0.3 will be required to fully represent the losses associated with contraction and expansion of the flow into and out of the bridge structure in the 2D domain.

Bridges – Pier Losses – Section 6.2.2

A proposed approach is to represent the pier losses using the techniques presented in Waterway Design (AustRoads 1994). Figure 5.7 from this document is reproduced below.



- **Pier Loss Coefficients (from Waterway Design, AustRoads, 1994)**

Bridges – Pipe Crossings of Waterways – Section 6.3

Section 4.7.2.3 of the TUFLOW Manual (BMT WBM 2008) provides adequate guidance on how to apply layer flow constrictions to account for height varying losses. The losses for pipe crossings can be estimated by assuming that the pipe acts similar to a vertical pier and using the head loss vs J factor curves reproduced in from the figure above from AustRoads (1994).

Culvert Blockage – Section 8.2.1

- **Culvert Blockage Factors – Natural and Urban Debris**

Upstream Catchment Conditions	Culvert Blockage Conditions	
Debris Potential	**Full Blockage**	**Partial Blockage**
Moderate	If <2.4 m diagonal	If > 2.4 m diagonal, then apply 15 %