BLOCKAGE ASSESMENT FORM

STRUCTURE : Culvert 1.2m x 0.6m

OPENING WIDTH:.....1.2.....**m**

DEBRIS TYPE/MATERIAL/L_{10}/SOURCE AREA - ***There may be more than one material type to consider!***

Debris Type/Material	L_{10}	Source Area	How Assessed
Logs, leaf and twigs	~0.75m	Woodland with few shrubs	Visual

No large limbs due to low velocity

DEBRIS AVAILABILITY (HML) – *for the selected debris type/size and its source area*

Availability	Typical Source Area Characteristics	Notes
High	• *Dense forest, thick vegetation, extensive canopy, difficult to walk through with considerable fallen limbs, leaves and high levels of floor litter.* • *Streams with boulder/cobble beds and steep bed slopes and banks showing signs of substantial past bed/bank movements.* • *Arid areas, where loose vegetation and exposed loose soils occur and vegetation is sparse.* • *Urban areas that are not well maintained and/or old paling fences, sheds, cars and/or stored loose material etc., are present on the floodplain close to the water course.*	
Medium	• *State forest areas with clear understory, grazing land with stands of trees* • *Source areas generally falling between the High and Low categories.*	
Low	• *Well maintained rural lands and paddocks, with minimal outbuildings* • *Streams with moderate to flat slopes and stable beds and banks.* • *Arid areas where vegetation is deep rooted and soils resistant to scour* • *Urban areas that are well maintained with limited debris present in the source area.*	

DEBRIS MOBILITY (HML) - *for the selected debris type/size and its source area*

Mobility	Typical Source Area Characteristics	Notes
High	• *Steep source area with fast response times and high annual rainfall and/or storm intensities and/or source areas subject to high rainfall intensities with sparse vegetation cover.* • *Receiving streams that frequently overtop their banks.* • *Main debris source areas close to streams*	
Medium	• *Source areas generally falling between the High and Low categories.*	
Low	• *Low rainfall intensities and large, flat source areas.* • *Receiving streams that Infrequently overtop their banks.* • *Main source areas well away from streams*	

DEBRIS TRANSPORTABILITY (HML) - *for the selected debris type/size and stream characteristics*

Transportability	Typical Transporting Stream Characteristics	Notes
High	• *Steep bed slopes (> 3%).and/or high stream velocity (V>2.5m/sec)* • *Deep stream relative to vertical debris dimension (D>0.5L_{10})* • *Wide streams relative to horizontal debris dimension. (W>L_{10})* • *Streams relatively straight and free of constrictions/snag points.* • *High temporal variability in maximum stream flows*	
Medium	• *Streams generally falling between High and Low categories*	Flat grades with no real channel
Low	• *Flat bed slopes (< 1%).and/or low stream velocity (V<1m/sec)* • *Shallow stream relative to vertical debris dimension (D<0.5L_{10})* • *Narrow streams relative to horizontal debris dimension.(W<L_{10})* • *Streams meander with frequent constrictions/snag points.* • *Low temporal variability in maximum stream flows*	

BLOCKAGE ASSESMENT FORM

Australian Rainfall & Runoff

SITE BASED DEBRIS POTENTIAL 1%AEP (HML) - *for the selected debris type/size arriving at the site*

Debris Potential	Combinations of the Above (any order)	Notes
DP_{High}	HHH or HHM	
DP_{Medium}	MMM or HML or HMM or HLL	Excludes effect of fence
DP_{Low}	LLL or MML or MLL	Eg. MML, therefore DP_{Low} selected

AEP ADJUSTED SITE DEBRIS POTENTIAL (HML) - *for the selected debris type/size*

Event AEP	At Site 1% AEP Debris Potential			AEP Adjusted At Site Debris potential
	DP_{High}	DP_{Medium}	DP_{Low}	
AEP > 5% *(frequent)*	**M**edium	**L**ow	**L**ow	Eg. Low
AEP 5% - AEP 0.5%	**H**igh	**M**edium	**L**ow	Eg. Low Medium for 1%
AEP < 0.5% *(rare)*	**H**igh	**H**igh	**M**edium	Eg. Medium High for PMF

Debris Blockage

MOST LIKELY DESIGN INLET BLOCKAGE LEVEL (B_{DES}%) *for the selected debris type/size*

Control Dimension Inlet Width W (m)	At-Site Debris Potential (Generally)		
	High	**M**edium	**L**ow
$W < L_{10}$	100%	50%	25%
$W \geq L_{10} \leq 3*L_{10}$	20%	10%	0%
$W > 3*L_{10}$	10%	0%	0%

Event AEP	Bdes %
AEP > 5% ***(frequent)***	Eg. Low – 0%
AEP 5% - AEP 0.5%	Eg. Low – 10% Medium – 10%
AEP < 0.5% ***(rare)***	Eg. Medium – 10% High – 20%

Refer Guideline if opening H<0.33W

BLOCKAGE ASSESMENT FORM

Barrel Blockage

The following tables are only relevant to sites subject to a significant debris load of sediment. Where inlet blockage and barrel blockage are both likely, the blockage producing the greatest impact on flood behaviour should be used in design.

LIKELIHOOD OF SEDIMENT BEING DEPOSITED IN THE BARREL OR WATERWAY (HML)

Peak Velocity Through Structure (m/sec)	Mean Sediment Size Present				
	Clay/Silt 0.001 to 0.04 mm	Sand 0.04 to 2 mm	Gravel 2 to 63 mm	Cobbles 63 to 200 mm	Boulders >200 mm
>= 3	L	L	L	L	M
1.0 to < 3.0	L	L	L	M	M
0.5 to < 1.0	L	L	L	M	H
0.1 to < 0.5	L	L	M	H	H
< 0.1	L	M	H	H	H

Likelihood of Sediment: Eg. Medium

MOST LIKELY DESIGN BARREL BLOCKAGE (Bdes%) ***for sediment of a particular mean size is then;***

Likelihood That Deposition Occurs	AEP Adjusted Sediment Potential		
	High	Medium	Low
High	100%	60%	25%
Medium	60%	40%	15%
Low	25%	15%	0%

Event AEP	Bdes %
AEP > 5% (frequent)	Eg. Low – 15%
AEP 5% - AEP 0.5%	Eg. Low – 15%
AEP < 0.5% *(rare)*	Eg. Medium – 40%

For modelling blockage mechanism (type, location and timing), refer to Guideline Table 8