

## APPROPRIATE NATIVE PLANT SPECIES FOR MARGIN ZONE

Plant Species	Common Name	Broad leaf	Reed	Height	Growth	Water depth	Comments
<i>Baumea articulata</i>	Sedge tussock		✓	1.5m+	Med	0-1m	
<i>Baumea juncea</i>	Sedge tussock		✓	800mm	Slow	0-300mm	Coastal
<i>Baumea rubiginosa</i>	Sedge tussock		✓	1.5m	Slow	0-100mm	
<i>Baumea teretifolia</i>	Sedge tussock		✓	1.5m	Slow	0-100mm	
<i>Bolboschoenus fluviatillis</i>	Purua grass	✓		1.5m	Fast	0-600mm	Dies back in winter. Aggressive growth, suited to larger ponds.
<i>Carex lessoniana</i>	Rautahl	✓		800mm	Med	0-100mm	Plant in groups. Aggressive growth, suited to larger ponds.
<i>Carex secta</i>	Niggerhead	✓		1.5m	Med	0-100mm	Plant in groups.
<i>Carex virgata</i>	Small swamp sedge	✓		1.5m	Med	0-100mm	Plant in groups.
<i>Eleocharis acuta</i>	Spike rush	✓		300mm	Fast	0-600mm	Aggressive growth, suited to larger ponds.
<i>Eleocharis sphacelata</i>	Spike rush	✓		1.5m+	Slow	0-1000mm	Aggressive growth, suited to larger ponds.
<i>Juncus maritimus</i>	Wiri	✓		1.5m+	Slow	0-100mm	Coastal
<i>Juncus pallidus</i>	Giant rush	✓		1.5m	Slow	0-300mm	Coastal Dies back in winter.
<i>Leptocarpu s similis</i>	Coastal jointed rush	✓		1.5m	Slow	0-1500mm	Dies back in winter.
<i>Schoenoplectus pungens</i>	Club rush	✓		800mm	Slow	0-300mm	Dies back in winter.
<i>Schoenoplectus validus</i>	Club rush	✓		1.5m	Slow	0-600mm	Dies back in winter. Aggressive growth, suited to larger ponds.
<i>Typha orientalis</i>	Bulrush / raupo	✓		1.5m+	Fast	0-1.0m	Dies back in winter. Aggressive growth, suited to larger ponds.

## APPROPRIATE NATIVE PLANT SPECIES FOR LOWER BANK ZONE

Plant species	Common name	Growth	Spacing	Comments
<i>Carex secta</i>	Niggerhead	Med	1m	Plant in groups
<i>Carex virgata</i>	Small Swamp Sedge	Med	1m	Plant in groups
<i>Carex testacea</i>	Slender Sedge	Med	0.5m	Plant n groups
<i>Cortaderia fulvida</i>	Toetoe	Med	2m	
<i>Cyperus ustulatus</i>	Umbrella Sedge	Med	1m	
<i>Juncus gregiflorus</i>	Rush	Slow	2m	
<i>Phormium cookianum</i>	Mountain Flax	Fast	1m	Plant in groups of five or more.
<i>Phormium tenax</i>	Flax	Fast	1.5m	Plant in groups of five or more.
<i>Cordyline australis</i>	Cabbage Tree	Fast	1 m	Plant in groups of 3-7
<i>Coprosma propinqua</i>	Mingimingi	Med	1m	
<i>Coprosma robusta</i>	Karamu	Fast	1m	
<i>Coprosma tenuicaulis</i>	Swamp Coprosma	Med	1m	
<i>Leptospermum</i>	Manuka	Fast	1m	Mass plant in clumps
<i>Dicksonia squarrosa</i>	Wheki	Slow	2-6m	Plant in groups of 3-7
<i>Blechnum novae-zelandiae</i>	Kiokio	Fast	0.5m	Good coloniser
<i>Doodia media</i>	Rasp Fern	Med	0.5m	Good clay bank groundcover

## APPROPRIATE NATIVE PLANT SPECIES FOR UPPER BANK ZONE

Plant species	Common name	Growth	Spacing	Comments
<i>Anthropodium cirratum</i>	Rengarenga	Fast	0.5m	Mass planted as understorey. Frost tender, susceptible to insect/slug/snail damage.
<i>Aristotelia serrata</i>	Wineberry/Makomako	Med	2m	Good coloniser
<i>Astelia trinervia</i>	Kauri Grass	Fast	0.5m	Of limited availability
<i>Coprosma robusta</i>	Karamu	Fast		
<i>Cordyline australis</i>	Cabbage Tree	Fast		Plant in groups of 3-7
<i>Cyathea dealbata</i>	Ponga	Slow		Plant in groups of 3-7
<i>Cyathea medullaris</i>	Mamaku	Slow		Plant in groups of 3-7
<i>Dianella nigra</i>	Turutu	Fast	0.5m	Mass plant in groups as understorey.
<i>Dicksonia squarrosa</i>	Wheki	Slow	1m	Plant in groups of 3-7
<i>Hebe stricta</i>	Koromiko	Fast	1m	
<i>Kunzea ericoides</i>	Kanuka	Fast	1m	Plant in groups of 5-7
<i>Macropiper excelsum</i>	Kawakawa / Pepper Tree	Med	1m	Frost tender
<i>Melicytus ramiflorus</i>	Mahoe	Fast	1.5-2m	
<i>Myrsine australis</i>	Mapou	Fast	1.5-2m	
<i>Pseudopanax arboreus</i>	Puahou / Five Finger	Fast	1m	Upper bank

## APPROPRIATE NATIVE SPECIMEN TREES

Plant Species	Common name	Growth	Spacing	Comments
<i>Alectryon excelsus</i>	Titoki	Med	5m	
<i>Beilshmedia tarairi</i>	Taraire	Med	10m	
<i>Beilshmedia tawa</i>	Tawa	Med	8m	
<i>Corynocarpus laevigatus</i>	Karaka	Slow	5m	Poisonous berry kernels
<i>Dacrycarpus dacrydioides</i>	Kahikatea	Slow	5m	Can be planted on lower bank as likes damp ground
<i>Dysoxylum spectabile</i>	Kohekohe	Fast	8m	
<i>Fuchsia excorticata</i>	Kotukutuku	Fast	5m	
<i>Hedycarya arborea</i>	Pigeonwood	Med	8m	
<i>Hoheria populnea</i>	Lacebark	Fast	5m	Best planted in groups
<i>Knightia excelsa</i>	Rewarewa	Fast	8m	
<i>Laurelia novae-zelandiae</i>	Pukatea	Slow	8m	Can be planted on lower bank as likes damp ground
<i>Podocarpus totara</i>	Totara	Med	5m	Hardy & tolerant of most conditions
<i>Sophora microphylla</i>	Kowhai	Fast	5m	Best planted in groups. Poisonous alkaloids.
<i>Syzygium maire</i>	Swamp maire	Slow	5m	Can be planted on lower bank as likes damp ground
<i>Vitex lucens</i>	Puriri	Fast	5m	

- These specimen trees provide a food source for native birds and insects.
- Many of these trees require shelter and good soils to thrive and should be planted during later stages of the planting plan.

SUMMARY OF POND DESIGN	
<i>Pond Name</i>	
<i>Pond Location</i>	
CALCULATION DESCRIPTION	ANSWER (Including units)
<b>General</b>	
Pond Type (Quality or Detention)	
Contributing Catchment Area	
Contributing Pervious Area	
Contributing Impervious Area	
<b>Pond Size Calculations</b>	
Average Pond Depth $d_A$ at normal water level	
Stormwater Quality Design Storm $S_D$	
Run-off Volume from impervious areas, $V_{imp}$	
Run-off Volume from pervious areas, $V_{perv}$	
Water Quality Volume, $V_d$	
Actual Total Pond Volume	
Pond Efficiency (Quality only)	
Forebay Depth $d_A$	
Stormwater Quality Design Storm $S_D$ (Forebay)	
Water Quality Volume, $V_d$ (for Forebay)	
5% $V_d$ for Forebay	
Actual Forebay Volume	
Velocity through Forebay for 20% AEP	
Outlet Type:	
<b>Weir Outlets</b>	
Service outlet weir dimensions	
Emergency outlet weir dimensions	
<b>Manhole Outlets</b>	
Primary outlet diameter	
Extended detention device diameter	
Emergency outlet weir dimensions	
Emptying time for water quality volume	
<b>Maintenance</b>	
Estimated Catchment sediment yield	
Forebay clean-out frequency	
Main Pond clean-out frequency	
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Notes:

1. Symbols as given in TP10

Signed: .....

Position: .....

(This table is for layout guidance only and should be site specific for each pond).

MAINTENANCE FREQUENCY SCHEDULE:				
<i>Pond Name and Type</i>				
<i>Pond Location</i>				
Item	Monthly	3 – Monthly	Annually	Following storm
Litter				
Structural Inspection				
Inlets				
Outlets				
Planting				
Pest Control				
Sediment Accumulation – Forebay (Inspection and estimated cleaning frequency)				
Sediment Accumulation – Main Pond (Inspection and estimated cleaning frequency)				
Fencing				
Mowing				
Weed Control				
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Tick relevant boxes detailing frequency of maintenance checks.

Schedule to be accompanied by details of proposed maintenance methods.

Separate tables to be completed for during and after construction maintenance period.

Signed: .....

Position: .....

(This table is for layout guidance only and should be site specific for each pond).

**MAINTENANCE LOG FOR:**

*Pond Name and Type*

*Pond Location*

Date of Inspection:

Inspection type (*eg routine 3-monthly*)

ITEM	COMMENT	WORKS UNDERTAKEN
Structural		
Planting		
Pest Control (including methods used)		
Inlets		
Outlets		
Litter		
Sediment Accumulation – Forebay		
Sediment Accumulation – Main Pond		
Pipework		
Mowing		
Weed Control (including details of chemical sprays used)		
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.....		

Tick all items that are satisfactory. Otherwise, comment as required.

Sub-Contractors used: .....

Signed: .....

Position: .....