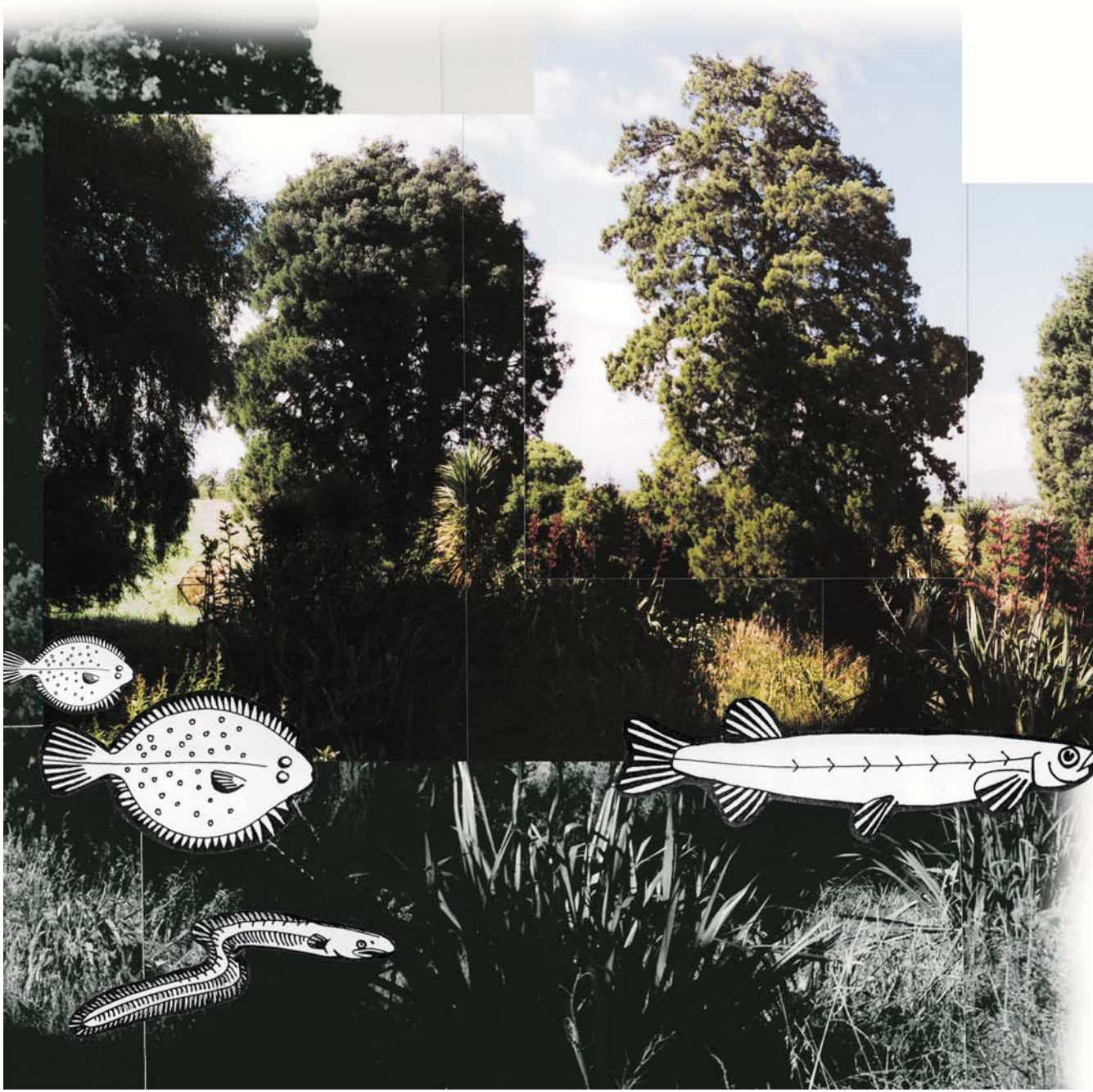


proposed

Spring Creek Kahikatea Park Landscape Concept Plan

A VISION FOR THE FUTURE

for Reserve 12, Spring Creek, Wairau Plain, Marlborough District

July 18, 2005 **DRAFT**

Brief:

It has been identified in the Wairau Plain Landscape Concept documents that little indigenous vegetation remains on the Wairau Plain. MDC would like to see the site restored and redeveloped in a way that reflects natural land patterns and processes, supporting a land cover and varied habitat type providing home to a wide range of indigenous fauna, both terrestrial and aquatic. The MDC is committed to protecting and enhancing the Wairau Plain landscape through good environmental stewardship, a role it takes seriously. The site has the potential to be developed as 'showcase' as part of this commitment. The site would be primarily focussed on restoring an environment fit for wildlife but there would be access for human visitors too, via a network of tracks, boardwalks, jetties, and viewing platforms, bird hides and an interpretation system that could be used by all age groups. The site has huge potential as an educational tool. Restoration should be carried out in such a way as would ultimately reflect its origins as a lowland kahikatea swamp forest. The successful achievement of this could be by way of re-wetting and introducing standing water bodies to parts of the site.

MDC see the current grazing regime continuing with a gradual phasing out over a suggested 10 year term with a concurrent, consistent reversion to an indigenous lowland forest cover, with kahikatea as the dominant climax species.

Details to be included in the proposal include:

- A natural re-aligning of Halls Stream through the property, creating ponds, and additional habitats so there can be a re-introduction of a range of 'lost' wetland and riparian species.
- Enhancement of the Spring Creek form and margins to create backwater habitat providing indigenous fish habitat and breeding areas.
- Provision for local and migratory birds with a food source and safe haven.
- Connecting the site with the broader context via a strong track and planted network with the potential to be routed below State Highway 1 and the adjacent rail corridor.
- Provision of an educational tool and a working example of successful restoration techniques for other l and owners and public visitors.

The proposal should be well resolved, designed in such a way as to provide maximum benefit for wildlife. A staging plan needs to be included outlining a gradual phasing out of the current landuse practices. Any proposals need to be robust, allow for on-site stormwater retention during peak-flow events, allow for flooding and to keep maintenance costs to a minimum, aiming for a final state of self-maintaining, self regenerating native plant cover.

Site description:

The site (called "Reserve 12")* is located on north side of the lower reaches of Spring Creek just before the waterway discharges into the Wairau River. Reserve 12 is located on the eastern extreme of the "Spring Country" home to the houhere, manatu, mikimiki ecosystem and on the western extreme of the "Old Dune Country" home to the kahikatea, raupo, flaxlands ecosystem (see Wairau Plain Landscape Concept Guidelines). Areas such as this are utilised by the primarily for flood control purposes, but also for secondary uses such as farming and gravel extraction.

Reserve 12 is located in a high profile 'gateway' location for Blenheim when approaching the town from the north by highway (and by rail?) nestling in a low lying gently undulating grassy alluvial flat west of and below State Highway 1 between Spring Creek and a stopbank on its north boundary. Three maturing kahikatea trees remain in a small copse on the north boundary of the reserve. A power line corridor crosses the site, a utility that will remain in place. There has been some re-vegetation work carried out within a fenced-off plot below the remnant kahikatea trees and on the Spring Creek margins and at the eastern end of the reserve. However, in the wake of a long history of grand-scale clearing of the indigenous forest cover for pastoral farming the site overall could be described as a 'blank canvas'. Nearly all of the indigenous swamp forest that would once have covered much of the Wairau Plain including this site has been removed. Significant drainage works including channelisation and the straightening of watercourses and the construction of a stopbank system has dramatically altered the above and below ground water flows across the site and across the wider landscape. Tall climax kahikatea forest would once have graced this area, now reduced to a token but still significant three remnant trees.

Despite all this, Reserve 12 is a site that is ripe for restoration into a lowland forest environment and wetland habitat as it still has a relatively high water table. The site periodically floods, and has good water retention properties. The site is located in a position that in the future could be one of several establishing natural nodes along the strong, cool and clear flowing Spring Creek. Spring Creek will remain clear when the Wairau is discoloured. The remaining kahikatea here are the only semi-mature trees left standing on the lower Wairau Plain. There will be assumptions made that additional MDC land to the east accessed via Peninsula Road, and other areas further west and south currently privately owned will be able to be linked with and purchased for public use where necessary. There have been some previous proposals put forward for this land in the past along the lines of re-creating an indigenous wetland habitat.

* full legal description = "Pt Section 14 Wairau West District. Blk VIII Cloudy Bay SD".

view southwest across Reserve 12 from the junction of the stopbank and the eastern boundary on SH1

view of a typical 'drain' that crosses the site near the western end

Site ownership and management:

The site is currently owned by the Marlborough District Council, and comprises 9 hectares of pasture land leased to a neighbouring landowner (the Hall family) for dairy grazing purposes. A 3 year followed by a 9 year renewable lease arrangement has just been entered into between MDC Rivers and the Halls. However, this arrangement is reasonably flexible and will be subject to a year by year review. MDC has informed the Halls that there are proposals underway to revegetate the site over a 10 year term and that there will be a gradual reduction of available grazing area during this term.

There is a paper road / easement? crossing the site at its eastern end on a diagonal from the junction with SH1 and Spring Creek, and a utility corridor that also crosses the site that must be kept clear for access and safety purposes.

The site is predominantly managed as grazing and on the day of my site visit (January) appeared lush and green suggesting good ground water availability. There are a handful of mature willows dotted around the periphery of the site. The areas on the Spring Creek margins were fenced off from stock and had a typically taller grassed sward, amongst which was some revegetation planting which was being spray released at the time by a team employed by MDC. A broken informal line of willows lined the Spring Creek margins. The stopbank area to along the north boundary was also fenced and had long dry grass lining its banks, the top mown for access.

During the wetter months, standing water can be seen on the site due to its low lying nature.

The kahikatea copse approximately half way along the north boundary at the foot of the stopbank was fenced and had been underplanted with typical revegetation native species. Harakeke (flax) and cabbage trees were rapidly establishing within this fenced enclosure. Two further areas to the east and west of the kahikatea copse are being retired this year and will similarly be fenced off from stock (these areas are highlighted on the Preliminary Landscape Concept Plan).

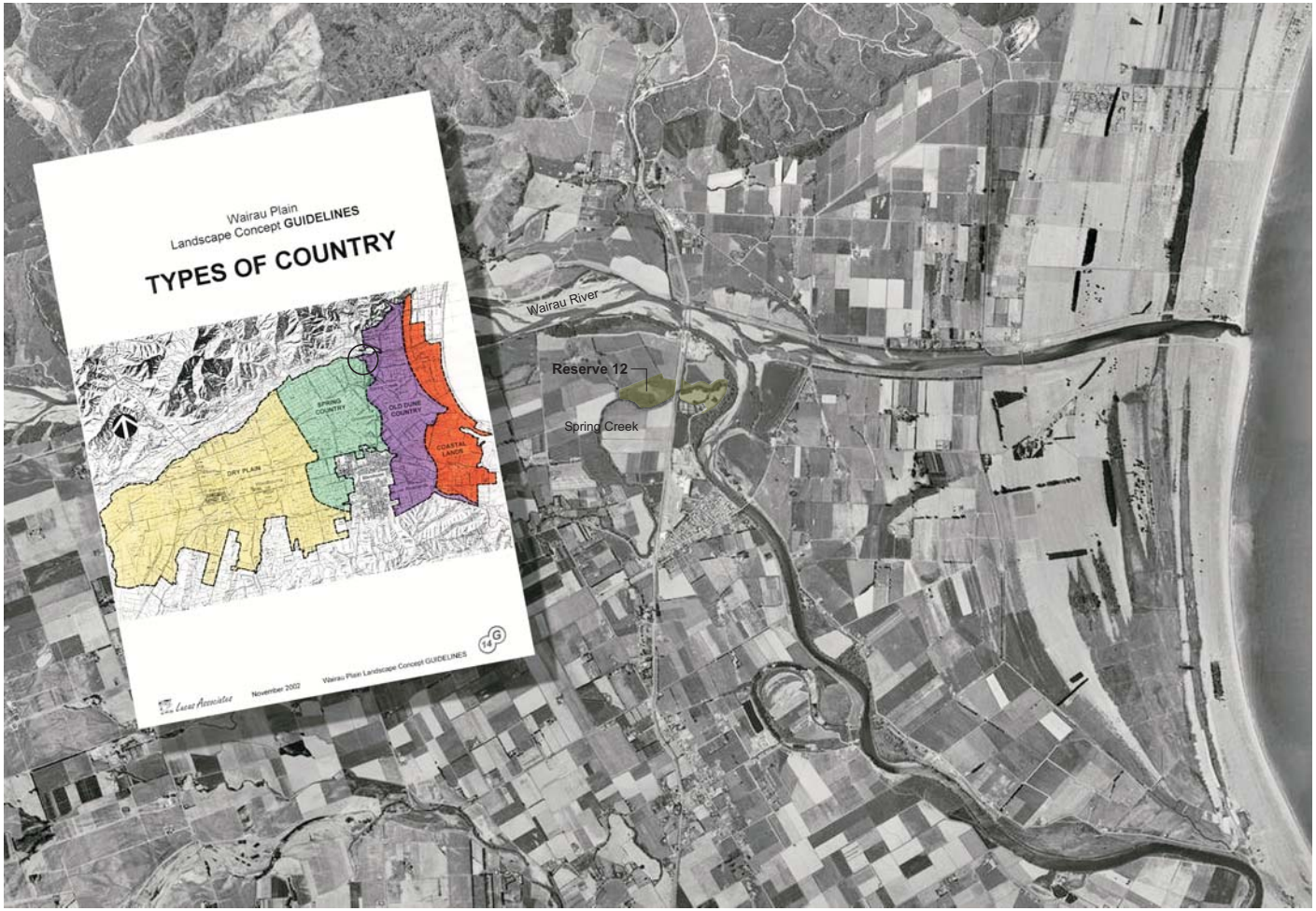
The site is gently undulating with a deep drain cut in parallel with the eastern boundary and another pair of drains at the western end of the site linking Halls Stream with Spring Creek on the other side of the stopbank.

Natural Values:

- Would once have supported significant lowland forest cover and wetland habitat due to its high water table and ability to be flooded at times.
- Proximity to Spring Creek – a major, cool, clear-flowing deep stream on the Wairau Plain, which has largely retained its natural form.
- Proximity to Halls Stream – a smaller meandering stream which once connected to Spring Creek across the site (has now been channelised).
- Low lying nature of the land very close to the water table.
- Relatively weed free (predominant weed is pasture grasses).
- Retains most of its original topographical character evident in the gentle swale patterning.
- Home to the last stand of ‘original’ lowland canopy forest species (three kahikatea).
- Several drains and watercourses cross the property.
- Close proximity to the State Highway allows clear views into the site.
- Bordering Spring Creek allows for creation and enhancement of wildlife corridors east and west of the site along the Spring Creek riparian corridor.

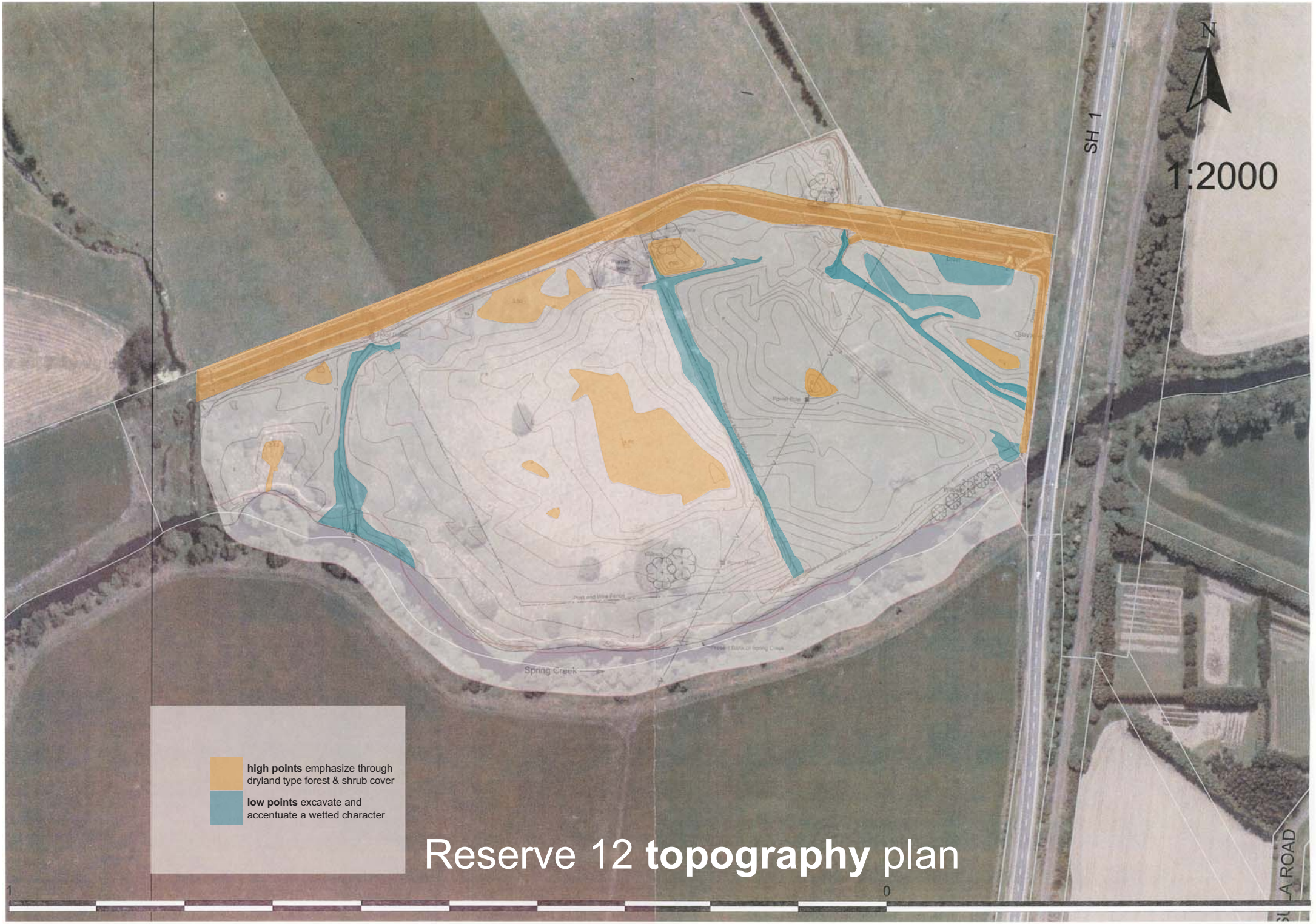
Issues:

- Stopbank on north boundary will impede water crossflows from the Wairau River to the north to Spring Creek on the south boundary to the site.
- Concern that water levels become raised on adjacent farmland through altering the sites drainage potential - need to liaise with MDC engineers.
- Stopbank to the north is a dominant artificial feature and will be harder to plant up due to its steep sided substrate construction (high water shedding ability).
- The current grazed regime may be problematic in ‘dovetailing’ existing uses with future planned revegetation practices.
- Existing dairy grazing may be having adverse effects on the Spring Creek water quality through effluent runoff. At present, the water quality reduces from its source to its confluence with the Wairau.
- Spring Creek could be a conduit for weed spread to the site from infested areas upstream.
- Willows along the Spring Creek margins will be difficult to phase out/remove.
- Proximity to State Highway 1 (and the rail corridor) may increase the weed invasion into the site from weedy road boundaries and discarded rubbish from passing motorists.
- Exposed nature of the site (drying winds in summer and cold winter winds) will mean revegetation practices need to be robustly designed.
- Low lying nature of the site may create a frost hollow situation, slowing plant establishment.
- Periodic flooding nature of the site will need to be planned for before any excavation takes place.
- Pylon corridor having to remain may compromise proposed natural patterning.
- Access to the site from 100kmh stretch of SH1 could be difficult during construction phases and non-viable for later visitor access who will have to enter the site via the more distant Peninsula Road area to the east.
- General concern of ecological degradation through adjacent horticultural, residential and agricultural land uses.
- Need to maintain access for mechanical clearing of stream preferably on the south side of the stream, leaving the north side for taller denser plantings to create shade.
- Creation of esplanade strip on south side of stream important.
- Weed threat - especially crack willow, old mans beard, gorse, ragwort, broom and barbery.
- Lack of cultural knowledge, and traditional consultation with local knowledge holders at present…
- No consultation with those with histories of the Wairau as yet…



A possible vision for the site...

A vision for this patch of grazed pasture is to restore and re-establish the lost lowland forest cover and wetlands to the site. To restore a character as close as possible to what its original nature would have been like. The image above shows the site within its wider context on the alluvial plain formed by the Wairau River. Spring Creek, bounding the south of the reserve and 1.5km north of Spring Creek settlement is a reminder of the once abundant streams and natural watercourses that meandered across the flat Wairau Plain. This stream is mainly supplied by groundwater resurfacing at the base of the Wairau alluvial fan. Spring Creek is considered regionally significant. There is a need to re-establish a generally 'wetted' character to the land within the area simply known as 'Reserve 12' (Marlborough District Council). Areas of relatively lower lying land could be excavated deeper and the several drains that cross the property could be opened up and naturalised forming strong links across the site to Spring Creek. Habitat could be created that would support eel, koura, inanga, pukeko, grey teal, shoveller, grey warbler, silvereye, fantail, shining cuckoo, bellbird, kereru, tui, kingfisher, little cormorant and black cormorants, white-faced herons, grey duck, mallard, cattle-egret (migrant from Australia with main flocking sites around Spring Creek) and potentially rifleman, tomtit, brown creeper and robin. Australian bittern, marsh and spotless crakes could colonise from the wetlands along the Tuamarina River (Para Swamp). The 'grain' of the land runs generally from the northwest to the southeast formed by ancient meanderings of the Wairau River. This grain can be accentuated through a range of planting communities which would reflect the subtle variations in moisture from a combination of dry grey shrubland and totara forest clumps through to wide expanses of harakeke and *Carex* spp wetlands. In places, Spring Creek could have its margins opened up increasing the water carrying capacity of the area and also creating areas of deep, still calmed waters, important for creating safe habitat for juvenile eel and inanga away from predation by trout and adult eels. Diverting water from Spring Creek into the area provides an opportuntiy for cleansing the water from sediments and chemicals through filtration using appropriate native plant species before the waters re-enter Spring Creek. Provision could be made to allow for water ingress via shallow swales into a large relatively open central area during peak flow events which would also allow a measure of stormwater retention. Public access can be made available to the site from a carpark at the notheastern end of Peninsula Road via tracks and boardwalks (routed under SH1 and the railway corridor), jetties, viewing platforms, bird hides and interpretation facilities.


N
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SH 1
Spring Creek
high points emphasize through dryland type forest & shrub cover
low points excavate and accentuate a wetted character
Reserve 12 topography plan
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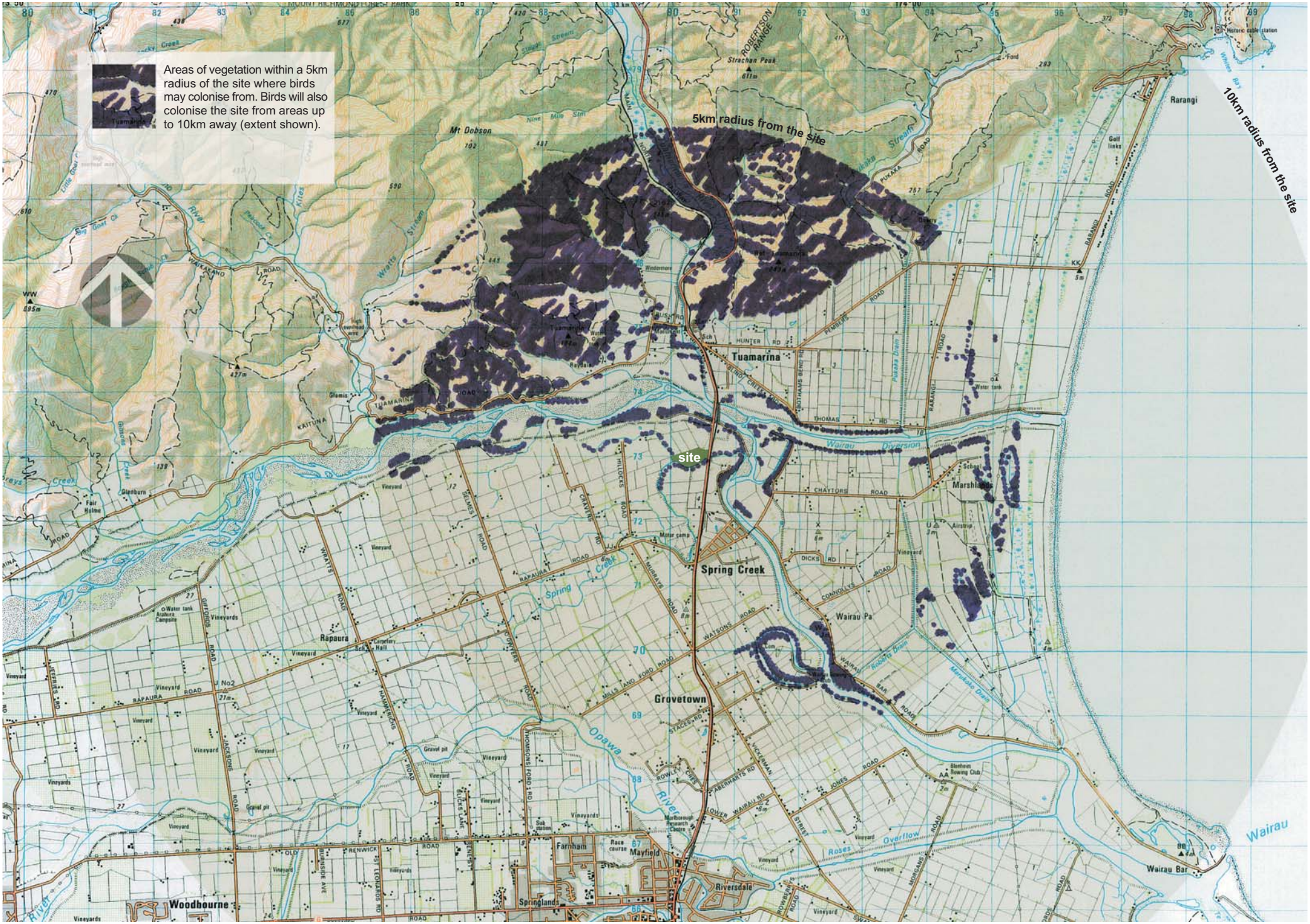


nearby bird habitat

Plant list for Spring Creek Kahikatea Park

KEY **Food:** for native birds shown as: F = Fruit/seed; N = Nectar; B = Bud/foliage; I = Insects. L = Fruit for Lizards.
Plant tolerances: for *sunny, shady, moist, dry* & *windy* conditions shown as: ■ = tolerates or needs; ❑ = intolerant; ½ = tolerant of some.
Staging: 1st = plant initially; 2nd = plant when shelter established; R = rare; * = plant that may colonize naturally; ** = can be invasive.

Botanical name	common name	food	tolerances	stage
TALL TREES				
Dacrycarpus dacrydioides	kahikatea, white pine	F,I	■ ½ ■ ❑ ■	2nd
Dacrydium cupressinum	rimu	F,I	■ ½ ■ ❑ ■	2nd
Elaeocarpus dentatus	hinau	F,I	■ ½ ■ ❑ ❑	2nd
Laurelia novaezelandiae	pukatea	F	■ ■ ■ ❑ ❑	2nd
Nothofagus fusca	red beech	F,I	½ ½ ■ ❑ ❑	2nd
Nothofagus solandri var solandri	black beech	F,I	½ ½ ❑ ■ ❑	2nd
Nothofagus truncata	hard beech	F,I	■ ❑ ❑ ❑ ❑	2nd
Podocarpus hallii	mountain totara	F,N,B,I	■ ■ ■ ■ ■	2nd
Podocarpus totara	totara	F,N,B,I	■ ■ ■ ■ ■	2nd
Prumnopitys taxifolia	matai, black pine	F,B,I	■ ½ ■ ½ ■	2nd
TREES & TALL SHRUBS				
Alectryon excelsus	titoki	F,I	❑ ■ ❑ ½ ❑	2nd
Aristotelia serrata	makomako, wineberry	F,B,I	½ ½ ■ ½ ❑	2nd
Carpodetus serratus	putaputaweta, marbleleaf	F,B,I	❑ ½ ■ ■ ❑	2nd
Coprosma linariifolia	narrow-leaved coprosma,	F,I,L	½ ■ ■ ½ ½	1st
Coprosma lucida, C.robusta	shining karamu	F	■ ■ ■ ■ ■	1st
Coprosma rotundifolia	round-leaved coprosma	F,I	½ ■ ■ ½ ½	1st
Cordyline australis	ti kouka, cabbage tree	F,N,I	■ ½ ■ ■ ■	1st
Dodonaea viscosa	akeake		■ ❑ ❑ ■ ■	2nd
Fuchsia excorticata	kotukutuku, tree fuchsia	F,N,B,I	½ ■ ■ ❑ ❑	2nd
Griselinia littoralis	kapuka, broadleaf	F,B,N,I	■ ■ ■ ■ ■	2nd
Hoheria angustifolia	houhere, narrow-leaved lacebark	F,I	■ ½ ■ ■ ■	1st
Leptospermum scoparium	manuka, tea tree	N,I	■ ❑ ■ ■ ■	1st
Lophomyrtus obcordata	rohutu, NZ myrtle	F,I	■ ■ ■ ■ ■	2nd
Melicytus ramiflorus	mahoe, whiteywood	N,B,I	½ ■ ½ ❑ ½	2nd
Myrsine australis	mapou, red mapou	F,I	■ ■ ½ ½ ½	2nd
Olearia paniculata	akiraho	I	■ ❑ ■ ½ ■	1st, 2nd
Pennantia corymbosa	kaikomako	F	½ ½ ■ ½ ❑	2nd
Pittosporum eugenioides	tarata, lemonwood	F,I	■ ■ ½ ■ ❑	1st, 2nd
Pittosporum tenuifolium spp tenuifolium	kohuhu, black matipo	F,I	■ ■ ■ ■ ■	1st
Plagianthus regius	manatu, lowland ribbonwood	F,I	■ ½ ■ ½ ■	1st
Pseudopanax arboreus	whauwhaupaku, fivefinger	F	❑ ■ ■ ❑ ❑	2nd
Pseudopanax crassifolius	lancewood, horoeka	F,B,N,I	■ ½ ■ ■ ■	2nd
Solanum aviculare	poroporo	F	■ ■ ½ ■ ½	2nd *
Solanum laciniatum	poroporo	F	■ ■ ½ ■ ½	2nd *
Streblus heterophyllus	turepo, small-leaved milk tree	F	½ ■ ■ ❑ ❑	2nd
Syzigium maire	swamp maire	F	½ ■ ■ ❑ ❑	2nd
SHRUBS				
Brachyglottis repanda	Rangiora		■ ❑ ❑ ■ ■	1st
Carmichaelia australis var "ovata"	NZ broom, makaka	F,I	■ ❑ ❑ ■ ■	2nd
Carmichaelia carmichaeliae	NZ broom, makaka	F,I	■ ❑ ❑ ■ ■	2nd
Coprosma crassifolia	thin-leaved coprosma	F,L	■ ■ ■ ½ ❑	1st
Coprosma foetidissima	stinking coprosma	F,I,L	■ ■ ■ ■ ■	2nd
Coprosma grandifolia	large-leaved coprosma	F,I,L	■ ■ ■ ■ ■	2nd
Coprosma linariifolia	narrow leaved cop', yellow-wood	F,I,L	■ ■ ■ ■ ■	1st
Coprosma lucida	shining karamu	F,I,L	■ ■ ■ ■ ■	2nd
Coprosma propinqua	mikimiki, mingimingi	F,I,L	■ ■ ■ ■ ■	1st
Coprosma rigida		F,I,L	■ ■ ■ ■ ■	2nd
Coprosma rotundifolia	round leaved coprosma	F,I,L	■ ■ ■ ■ ■	2nd
Coprosma rubra	red-stemmed coprosma	F,I,L	■ ½ ■ ½ ■	2nd (nr)
Coprosma taylorae		F,I,L	■ ■ ■ ■ ■	2nd
Coriaria arborea	tutu *(toxic)*	F	■ ½ ■ ■ ■	2nd *
Corokia cotoneaster	korokio	N	■ ❑ ½ ■ ■	1st
Cyathodes juniperina	mingimingi	F	❑ ½ ■ ■ ❑	1st, 2nd
Discaria toumatou	matagouri		■ ❑ ½ ■ ■	1st
Hebe gracillima		I	■ ½ ½ ½ ■	1st
Hebe parviflora	hebe	I	■ ❑ ❑ ■ ■	2nd
Hebe salicifolia	koromiko	I	■ ½ ½ ½ ■	1st
Hebe stenophylla	koromiko	I	■ ½ ½ ½ ■	1st
Hebe stricta var atkinsonii	koromiko	I	■ ½ ½ ½ ■	1st
Hebe traversii	hebe	I	■ ❑ ❑ ■ ■	2nd
Helichrysum lanceolatum			■ ❑ ❑ ■ ❑	2nd
Leucopogon fasciculatus	mingimingi		½ ½ ❑ ■ ❑	2nd
Macropiper excelsum	kawakawa	F	½ ½ ■ ■ ½	2nd
Melicope simplex	poataniwha	F,I	½ ■ ■ ❑ ■	2nd
Muehlenbeckia astonii R	shrubby tororaro/bush pohuehue	F,N,L	■ ❑ ½ ■ ■	1st
Myoporum laetum	ngaio		■ ❑ ■ ■ ■	2nd
Myrsine divaricata	weeping mapou	F,I	■ ■ ■ ½ ❑	2nd
Neomyrtus pedunculata	rohutu	F	❑ ■ ■ ❑ ❑	2nd
Raukawa anomalus	shrub pseudopanax	F,N	½ ½ ■ ½ ½	2nd
Sophora prostrata	prostrate kowhai	N	■ ❑ ❑ ■ ■	1st
Urtica ferox	tree nettle *(toxic)*		❑ ■ ■ ❑ ❑	2nd *
GROUNDCOVERS				
Anemanthele lessoniana	bamboo grass, windgrass		½ ■ ■ ½ ½	1st **
Astelia fragans	bush flax, kakaha	F,I	½ ■ ■ ❑ ❑	2nd
Carex comans		F	■ ½ ❑ ■ ■	1st
Carex dipsacea			■ ❑ ■ ❑ ■	1st
Carex dissita; C. flagellifera; C. forsteri	sedges		■ ■ ■ ❑ ■	1st
Carex lambertiana; C.solandri	sedges		■ ½ ■ ❑ ❑	1st
Carex secta	pukio, tussock sedge	F	■ ½ ■ ❑ ❑	1st
Carex testacea			■ ❑ ❑ ■ ■	1st
Coprosma acerosa var "brunnea"			■ ❑ ❑ ■ ■	1st
Coriaria sarmentosa	tutu *(toxic)*		■ ❑ ■ ■ ■	2nd *
Cortaderia richardii	toetoe,		■ ❑ ■ ■ ■	1st
Dianella nigra	turutu, blue berry	F	½ ■ ■ ❑ ❑	2nd
Fuchsia perscandens		F	❑ ■ ■ ❑ ❑	2nd
Hebe parviflora; Hebe traversii	hebes	I	■ ❑ ❑ ■ ■	2nd
Heliohebe hulkeana ssp hulkeana	hebe, NZ lilac	I	½ ½ ■ ❑ ❑	2nd
Libertia ixioides	NZ iris, mikoikoi	F	½ ■ ■ ■ ■	1st
Melicytus "waipapa bay"	porcupine shrub	F	■ ❑ ❑ ■ ❑	2nd
Microlaena polynoda	bamboo rice grass	I	❑ ■ ■ ❑ ❑	1st
Muehlenbeckia complexa			■ ❑ ❑ ■ ❑	1st
Olearia arborescens			■ ❑ ½ ■ ❑	2nd
Olearia rani	heketara		■ ❑ ½ ■ ❑	2nd
Olearia solandri	coastal tree daisy		■ ❑ ❑ ■ ❑	2nd
Ozothamnus leptophyllus (Cassinia)	tauhinu, cottonwood	I	■ ❑ ■ ■ ■	1st
Phormium tenax	harakeke, NZ flax	N,L	■ ❑ ■ ■ ■	1st
Poa cita	silver tussock, wiwi	F	■ ❑ ■ ■ ■	1st
Typha orientalis	raupo, bullrush		■ ❑ ■ ❑ ■	1st
Uncinia ferruginea; U. laxiflora	hook grasses		❑ ■ ■ ❑ ❑	1st
Uncinia leptostachya; U. scabra	hook grasses		❑ ■ ■ ❑ ❑	1st
Uncinia uncinata	watau, hook sedge		❑ ■ ■ ❑ ❑	1st
FERNS				
Blechnum minus	swamp kiokio		■ ■ ❑ ❑ ❑	2nd
Blechnum novae zelandiae	kiokio, small hardfern		■ ½ ■ ❑ ❑	2nd
Cyathea dealbata	ponga, silver fern, a tree fern		❑ ■ ■ ❑ ❑	2nd
Cyathea medullaris	mamaku, a tree fern		❑ ■ ■ ❑ ❑	2nd
Cyathea smithii	katote, soft tree fern	I	❑ ■ ■ ❑ ❑	2nd
Dicksonia squarrosa	wheki, rough tree fern	I	½ ■ ■ ❑ ❑	2nd
Polystichum richardii; P. vestitum	shield ferns; pikopiko; puniu		½ ■ ■ ❑ ❑	2nd
VINES				
Parsonsia spp.	NZ jasmine	B	½ ■ ½ ❑ ❑	2nd
Passiflora tetrandra	kohia, native passionvine		❑ ■ ½ ❑ ❑	2nd

design **Jeremy Head** Registered NZILA Landscape Architect
Lucas Associates for the Marlborough District Council, June 14, 2005

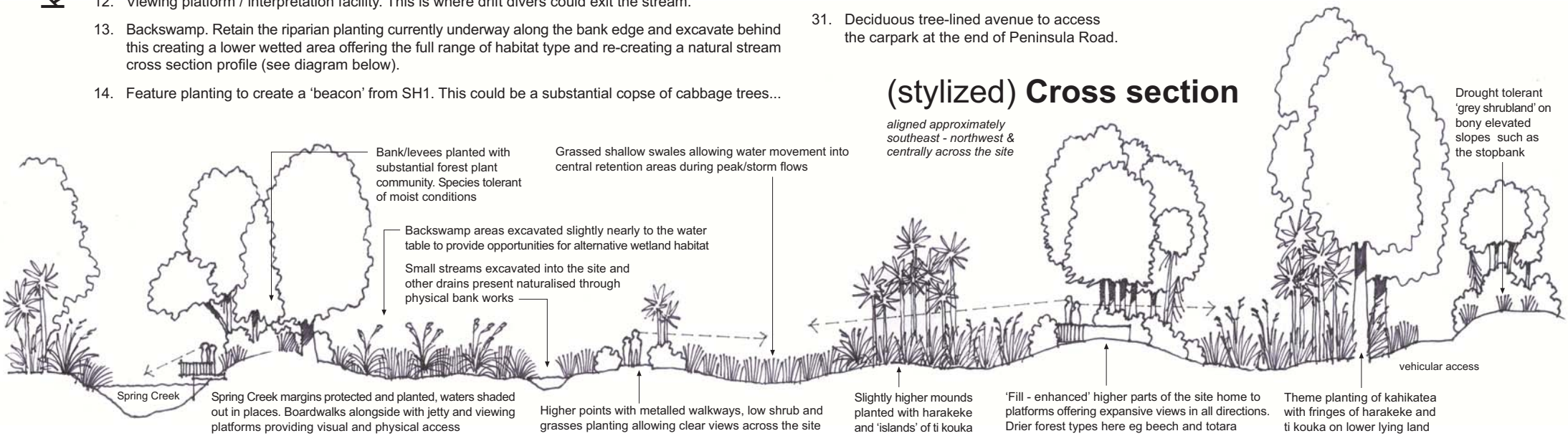
preliminary **Landscape Concept** plan

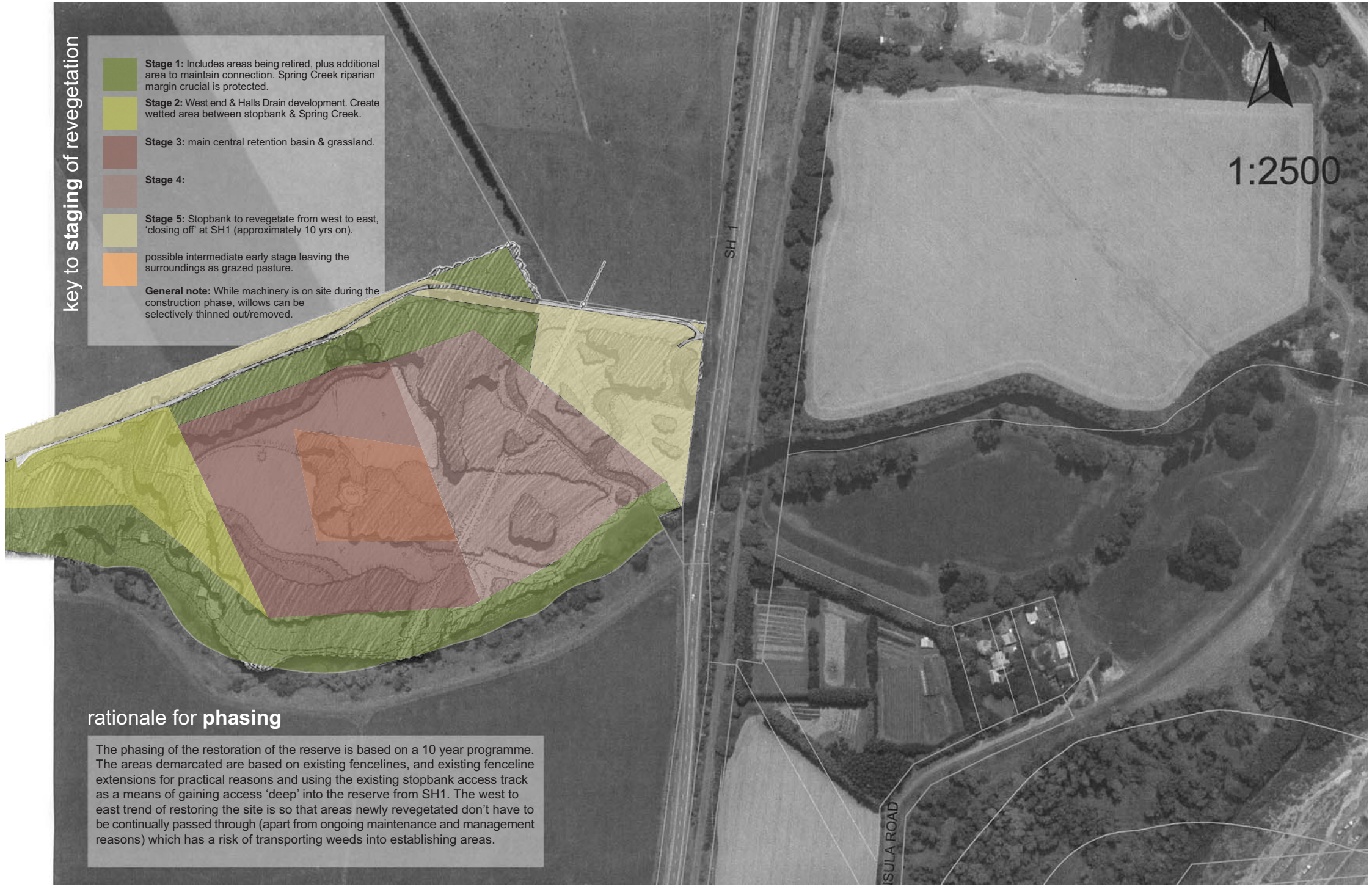
key to preliminary **Site in local Context** plan

1. Remnant group of 3 kahikatea. Continue with the underplanting programme and managing for regeneration. Make kahikatea the theme species for the areas presently being retired...
2. Stopbank. Plant up with drought tolerant 'grey' shrubland species and ground cover plants. Keep the accessway open for maintenance and staging practicalities (see diagram below), (restore from the west eastwards - see staging diagram).
3. Outlet from Hall's Drain. Excavate the general area as shown, merging with the drain area further to the west. Create wetted margins with raupo, harakeke, pukio, and rushes to create wider habitat range.
4. Viewing window into calmed deeper waters, mounted on timber platform over the water with interpretation facility. Deeper waters will discourage wild cat and mustelids access to wildlife areas.
5. Viewing platform / interpretation facility. This is an area where people could enter the stream for drift-diving. Location for fish feeding / fish-food dispensers.
6. Continue with revegetation planting. Establish taller tree species e.g. kahikatea. Aim to shade out the stream. Run the walking track amongst future forest giants in the dappled shade. Maintain a healthy riparian edge along here (see diagram below.
7. Lower point excavated where water can enter the central open areas for short- term retention during storm events (see diagram below).
8. Central 'wetted land' which would have a grassland/sedgeland/rushland quality with fringes of bands of harakeke, raupo and offering a mixed habitat type.
9. Slightly higher point, that could have excavations added to create a low hummock which could provide a base for bird hides, viewing platforms nestled amongst dryland forest species such as totara, grey shrubland species, cabbage trees. There would be dramatic views from here in both directions across broad expanses of grasslands to distant fringes of harakeke, groves of cabbage trees backed by tall kahikatea (see diagram below).
10. Lower point excavated where water can enter the central open areas for short- term retention during storm events (see diagram below) .
11. Existing pylon corridor. Keep open below as per regulations to maintain clear access along the entire length. This area could be planted up with lower growing sedges in the wetter hollows and tussocks on the higher, drier areas.
12. Viewing platform / interpretation facility. This is where drift divers could exit the stream.
13. Backswamp. Retain the riparian planting currently underway along the bank edge and excavate behind this creating a lower wetted area offering the full range of habitat type and re-creating a natural stream cross section profile (see diagram below).
14. Feature planting to create a 'beacon' from SH1. This could be a substantial copse of cabbage trees...
15. Open the drain from here out into a naturalised swale system taking advantage of the local low points. Link this to the drain further west, creating a wetted land of harakeke and 'islands' of cabbage trees.
16. 4WD access link to the pylon corridor from the stopbank and link to SH1, based on the existing track.
17. Bird hide set down well into the native grasslands.
18. Walkway (and cycleway?) link under SH1 and the railway line to the track to the east of SH1 and connecting back to the carparking area at the end of Peninsula Road.
19. Strengthen the kahikatea 'link' across SH1 with a substantial copse adding visual and ecological substance to the paddock and planted borders.
20. Phase out the existing willows and unwanted exotics and start to reintroduce a native sequence of riparian planting featuring kahikatea strongly as the ultimate canopy species.
21. Lower point excavated where water can enter the central grazed area for short- term retention during storm events.
22. Grazed land for the foreseeable future. Fence off the native planting and include a fenced 'run' to the adjacent grazed area (29).
23. Native planting to emphasize the old stream channel using species that would be expected to be present in a naturally moisture-altered environment.
24. Metalled carpark using slightly permeable materials. Use substantial timber bollards to define and protect the edges. Include signage and (robust) interpretation.
25. Timber footbridge at the start of the track crosses Spring Creek leaving the non-natural (i.e. cars etc.) behind.
26. Continue with and increase the full range of riparian planting species. Control weed growth.
27. Maintain views across a wetted sedgeland area to Spring Creek.
28. Walkway - metalled and timber boardwalk (depending on local ground conditions, steepness of bank etc.).
29. Grazed pasture (sheep preferably). This area could be used as a temporary camping ground.
30. Copses of tall deciduous trees will provide an aesthetic point of difference and create a positive contrast and appreciation with the natural riparian restoration planting...
31. Deciduous tree-lined avenue to access the carpark at the end of Peninsula Road.

(stylized) **Cross section**

aligned approximately southeast - northwest & centrally across the site





suggested **Staging** plan for Reserve 12

report prepared by

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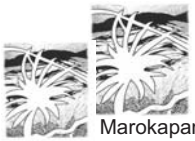
June 2005



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