Assessment of Ecological Values at Liffey Springs

Proposed Plan Change

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A report for:
Selwyn District Council

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SUMMARY

The proposed residential development at Liffey Springs requires a zone change from the present Rural to Living 1. An ecological assessment is required as part of the evaluation for a plan change. This report considers the ecological values at the site (in particular the vegetation cover) and also comments on the landscape plan.

The current vegetation cover is almost entirely exotic with cultivated paddocks and shelterbelts over most of the land. The few indigenous plants occur along the banks of the two streams (the LI and LII) which border the property. Thirteen naturally occurring indigenous species were recorded scattered along the banks of the two streams.

Of particular note is the presence of the indigenous swamp nettle (*Urtica linearifolia)*. This species has a threat ranking of 'at risk - declining' *(de Lange, 2009)*. The site is assessed as 'significant' according to the criteria in the Selwyn District Plan *(Appendix 12)*. Protection may be achieved by the establishment of the proposed esplanade reserve and the restoration of the site with locally sourced indigenous vegetation as proposed in the landscape plan.

Implementation of the proposed landscape plan can only enhance the natural features of the springs and two streams and will extend the nearby existing indigenous plantings in the upper reaches of the LI.

METHODS

The ecological values at the Liffey Springs site are assessed using the Ecosystems – Policies and Methods as described in the District Plan (Policy B1.3). These policies require that:

- Any wetland containing indigenous vegetation is assessed to establish its ecological values in accordance with the criteria set out in part E, Appendix 12.
- Ensure any sites assessed as significant under Appendix 12 criteria are legally and physically protected.
- Ensure the stream and margins are protected from any adverse effects on natural character or ecological values.
- Ensure maintenance and enhancement of public access

DESCRIPTION OF SITE AND PREVIOUS HISTORY

The site covers 28ha of mainly cultivated paddocks with shelterbelts. The slightly sloping land is bordered by two streams the LI (also known as Liffey Creek) and LII *(Fig.1)*. Both streams are spring fed with the LI flowing through Lincoln before joining the LII just below the southern boundary of the site. The LII originates on the site at a large pond *(Fig.2)* near the house and more springs swell the stream as it flows south towards the junction with the LI. Soils are Wakanui yellow grey earth and Taitapu recent soils which are heavy and slow draining. Since European settlement and agricultural development the streams draining the site would have been deepened and regularly cleared so that now the banks of the LI are quite steep in places.

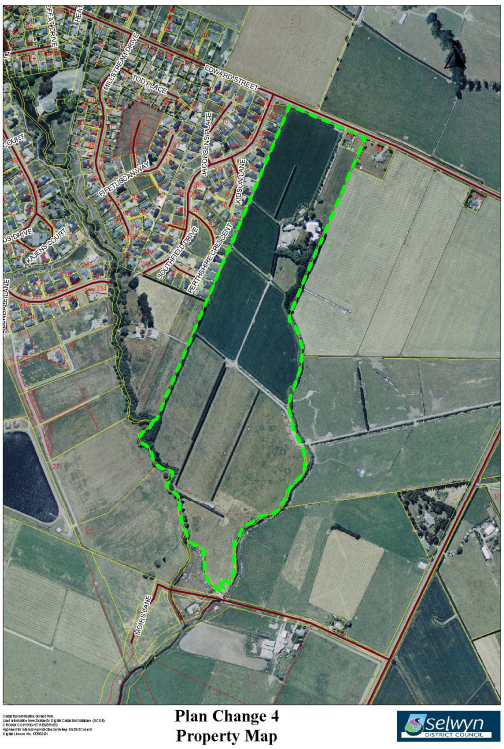

Fig.1 Aerial photo of site with property outlined with green dashed line. The site adjoins Lincoln village and is bounded by the LI River (on left) and the LII River (on right).

The main land uses on the site have been dairying (more than 20 years ago), an orchard (for 15 years) and for the last 5 years grazing and cropping. Some plum and walnut trees on the eastern side of the LII below the springs remain from the time when an orchard occupied the site. Presently most of the land is cultivated and is in grass or crops with some grazing.

Original vegetation
Before European settlement most of the site would have been wetland supporting a vegetation cover of flaxes, sedges, raupo, cabbage trees, manuka and pukio (*Ignatieva et al. 2008).*

Fig. 2 The springs at the head of the LII River.

Fig. 3 Crack willow choking the LII River.

Current vegetation cover
As most of the site is cultivated paddocks with shelterbelts little remains of the indigenous vegetation which once covered the site. The few indigenous plants that have survived here are on the river banks that have not been cultivated. The springs, ponds and waterways are also mainly exotic. The area around the spring ponds is manicured grass cover down to the pond on northern and western sides *(Fig.2)*. Large exotic trees including weeping willows and wattles give some shade. On the eastern side of the springs are a jumble of tall crack willow and Eucalyptus with ivy climbing up trunks. An occasional cabbage tree and karamu survive amongst the tall trees. Below the pond on the eastern side of the LII crack willow, silver birch, pussy willow, hawthorn, elderberry and several rows of plum and walnut trees provide the main vegetation cover *(Fig.3)*.

Fig. 4 Pasture and willows line the LII River looking upstream.

Fig. 5 Gorse lines the LII River downstream

The western side of the LII is lined with Matsudama willows for almost a kilometre *(Fig.4)*. The southern part of the LII is lined with gorse on both sides of the stream *(Fig.5)*. The southern boundary is along a cut-through channel that diverts some of the LI water into the LII before the junction proper. Here grass goes right to the steep bank. The LI stream edge is lined with crack willow, elderberry and occasional gorse.

Fig. 6 Location of the occasional naturally occurring indigenous plants on the banks of the LI and LII rivers. Point 014 marks the site of the swamp nettle. See Appendix 2 for other species locations.

There are a few indigenous plants on the waterway margins *(Fig.6)*. Some have been planted and some are naturally occurring. Around the LII springs pond there are a few tall cabbage trees *(Cordyline australis)*, several karamu *(Coprosma robusta)* and the occasional flax *(Phormium tenax)(Fig. 6, Point 001)*. Near the waters edge several kahikatea *(Dacrycarpus dacrydioides)* have been planted and are doing well. Planted fuchsia *(Fuchsia excorticata)* has not done so well (possibly frosted). Also around the pond are some pukio *(Carex secta)*, and in the pond a small clump of raupo *(Typha orientalis)*. A cluster of pukio fills a depression near the house where there are more springs *(Figs.2,10, point 018)*. Downstream in the LII are a few native rushes *(Juncus edgariae)* amongst the gorse covered banks *(Point 009)*.

Fig. 7 Swamp kiokio at point 014 on the LI

Fig. 8 Swamp nettle at point 014 on the LI

On the east bank of the LI are some naturally occurring indigenous plants not found elsewhere on the site. Of note are two very small clumps of the nationally endangered swamp nettle (*Urtica linearifolia*). This plant has a threat status of 'At risk - declining' *(de Lange et al, 2009)*. The clumps of swamp nettle are near the waters edge and are under some blackberry that has been sprayed *(Fig.8)*. It is likely that the live blackberry leaves protected the swamp nettle from spray damage. Close to the swamp nettle are some pukio and a single

fern swamp kiokio *(Blechnum minus)(Fig.7).* This cluster of swamp plants is an indication of the plant communities that would have once been common in this area. Also nearby is the climbing indigenous vine pohuehue *(Muehlenbeckia australis)* here climbing over a large crack willow.

There are historic records of the swamp nettle in the LI River near Lincoln. These records were confirmed as still present in 1998 *(Pember, 1999).* Although the plants are small (generally under willows) it is likely there are scattered swamp nettle plants along the L2 riverbanks down to Lake Ellesmere.

Fig. 9 Ivy growing up a cabbage tree.

Fig. 10 Pukio in a depression around a spring (Point 018)

Crack willow *(Fig.3)*, poplar, ivy *(Fig.9)*, elderberry, pampas grass, cotoneaster, prunus, pines, blackberry, silver birch, hawthorn, silver poplar, gorse, walnut, are all considered to be conservation weeds *(Howell, 2008).* These plants have the potential to spread and compete with native plantings. They should be removed from the site before planting takes place.

Birds
Birds seen and heard at the site include fantails, pukeko, waxeyes, hawk, mallard ducks. Bellbirds feed on flowering gums in winter (David Hobbs *pers.comm.)*

SIGNIFICANCE

Context
The history of the Canterbury Plains reveals an almost complete loss of the original vegetation cover due to land development. Extensive cultivation and drainage have severely depleted wetlands on the Low Plains. There are no remaining major indigenous plant communitities left on arable soils and no examples of the habitats that once covered most of the land surface. Wetlands have survived only in streams and hollows *(Steven & Meurk, 1996).* Because so little remains of these once extensive wetlands any tiny remnants now have immense value.

Evaluation
The ecological characteristics and quality of a site determine its significance. The ecological significance of the site is assessed using the following criteria (*Selwyn District Plan, Appendix 12).* A site that has 1 or more high rankings is ecologically significant.

a) representativeness*: does the site represent a good example of one of the original types of native vegetation in the district?*
The original vegetation type in this area is likely to have been flax and sedgeland with raupo, cabbage trees, manuka, and mikimiki. Although the site still has the smallest remnants of some of these species they are low in numbers and widely scattered.

b) diversity and pattern: *is there a notable range of species and habitats?*
Although there are a number of species present the actual numbers of plants is low.

c) rarity and special features: *are there rare species or communities?*
The swamp nettle *(Urtica linearifolia)* is one of New Zealands threatened plants (de Lange et al, 2009). It is listed as 'At risk - declining'.
Wetland ecosystems are now rare on the plains. The springs from which the LII arises is a special feature as is the clear spring-fed water of both streams.

d) naturalness: *what is the extent to which the site has been modified by human activities?*
The site is highly modified over most of its area due to drainage, cultivation and displacement of the original indigenous vegetation cover by exotic species.

f) ecological context: *is the site connected to or close to other natural areas?*
The banks of the LI upstream of the site have been revegetated with indigenous species natural to the area. Although the numbers of indigenous plants on site are not yet high enough to provide suitable habitat for native birds there is great potential to continue the revegetation on the river banks and higher areas in the long term.

e) size and shape: *is the site large and/or compact?*
Low numbers of indigenous trees and shrubs are scattered along long narrow streams.

f) fragility, threat and buffering: *are there any threats to the site and what is its overall susceptibility and resilience to the effects of such threats?*
Plant pests are a threat to the few remaining indigenous plants. The few pukio are being shaded out by willows and ivy is threatening to smother cabbage trees *(Fig. 9)*. Because there are so few native plants their resilience to plant pests is low.

Criterion	Ranking
a) representativeness	L
b) diversity and pattern	L
c) rarity and special features	H
d) naturalness	L
e) size and shape	L
f) fragility, threat and buffering	L

The site is regarded as significant because of the presence of swamp nettle which is on the New Zealand threatened plant list *(de Lange, 2009)*. The creation of an esplanade reserve along both the LI and LII rivers will provide legal protection for the swamp nettle and its associated cluster of plants. Physical protection can be achieved by identifying and marking the swamp nettle and restoration of the site during landscaping *(Fig.8)*. Restoration would involve removing the blackberry vines by careful cutting and pasting the stems with herbicide, taking care to not damage the existing swamp nettle, pukio and the swamp kiokio. Planting along the stream edge with more of the swamp nettle, pukio and swamp kiokio would restore the site to a viable plant community.

COMMENTS ON THE LANDSCAPE PLAN

The landscape plan in the application for zone change outlines an extensive planting programme for the esplanade and recreation reserves. Indigenous trees, flaxes and sedges will be the main focus with the retention of some of the large exotic trees around the pond for shade and shelter in the short term until the native plantings become established. Overall this plan will definitely enhance the area and provide a natural environment that will attract native birds, lizards etc. Public access is provided for with walkways and a rail trail. The continuation of the existing indigenous plantings in the LI will increase the native habitat.

Suggestions to further enhance the plan

1. Protect the swamp nettle as above.
2. Ensure that all species planted are locally sourced.
3. The trees and shrubs in the landscape plan are a good selection for establishment planting. Once established swamp kiokio and swamp nettle can be planted amongst the flaxes and sedges.
4. Add pokaka as a companion plant to kahikatea. Like kahikatea it can stand wet feet and therefore is a good tree to plant in wet areas. It also provides berries for birds.
5. Add more divaricating shrub species in drier areas eg *Coprosma virescens* for berries to encourage birds and lizards
6. Remove as many of the weedy species as possible. Remove most exotic trees as the native plants become established.
7. Don't plant willows as they will shade out the sedges and clog streams.

CONCLUSIONS

Although most of the survey area is farmed and dominated by exotic plants some naturally occurring indigenous plants still remain. A nationally rare plant, the swamp nettle, is present and has survived despite the highly modified environment.

Very few wetlands remain on the plains and opportunities to restore the indigenous vegetation on natural landforms are rare (*Steven and Meurk 1996*). The exclusion of stock from the waterway will improve the water quality and create good habitats for fish, birds, frogs and invertebrates. Naturalising the waterways by removing most of the exotic trees and grading off the steeper banks, then planting with locally sourced natives, will greatly enhance the natural values of the area. The planting of all the riparian areas in appropriate indigenous species as described in the landscape plan would not only provide food corridors for birds but a educational and recreational opportunity for Lincoln and beyond.

References

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Ignatieva, Maria; Meurk, Colin; van Roon, Majorie; Simcock, Robyn; Stewart, Glenn. 2008. *How to put Nature back into Our Neighbourhoods. Landcare Research Science Series No.35.* Manaaki Whenua Press.

Howell, Clayson. 2008. *Consolidated list of environmental weeds in New Zealand. DoC Research and Development series 292.* Department of Conservation.

Pember, Richard. 1999. *Three locally threatened plants.* Peter Skellerup Plant Conservation Scholarship.

Steven, J.C.; Meurk, C.D. 1996. *Low and High Plains Ecological Districts, Plains Ecological Region, Canterbury. Protected Natural Areas Programme Survey Report (Draft).* Department of Conservation.

Selwyn District Council. *Proposed Selwyn District Plan (Appendix 12,14)*

Christchurch City Council (2003) *Streamside Planting Guide.* www.ccc.govt.nz/parks/TheEnvironment/streamside.asp

Appendix 1
Indigenous plants recorded at Liffey Springs 9 Sept 2009

Common name	Botanical name
Trees and shrubs	
Cabbage tree	*Cordyline australis*
Karamu	*Coprosma robusta*
Poro poro	*Solanum laciniatum*
Kahikatea (planted)	*Dacrycarpus dacrydioides*
Fuchsia (planted)	*Fuchsia excorticata*
Herbs	
Swamp nettle	*Urtica linearifolia*
Flax	*Phormium tenax*
Azolla, retoreto	*Azolla filiculoides*
Duckweed	*Lemna minor*
Raupo	*Typha orientalis*
	Myriophyllum propinquum
Rushes and sedges	
Pukio	*Carex secta*
Wi, native rush	*Juncus edgariae*
Ferns	
Swamp kiokio	*Blechnum minus*
Climbers	
Pohuehue	*Muehlenbeckia australis*

Appendix 2

Locations of all plants recorded at Liffey Springs 9 September 2009

These waypoints relate to those in Fig.3

waypoint	Species	Common Name(s)	easting	northing
1	Acacia sp.		2469442	5728937
1	Agrostis stolonifera	creeping bent	2469442	5728937
1	Azolla filiculoides	retoreto	2469442	5728937
1	Betula pendula	silver birch	2469442	5728937
1	Callitriche stagnalis	starwort	2469442	5728937
1	Carex secta	pukio	2469442	5728937
1	Coprosma robusta	karamu	2469442	5728937
1	Cordyline australis	ti kouka, cabbage tree	2469442	5728937
1	Cortaderia selloana	pampas grass	2469442	5728937
1	Crataegus monogyna	hawthorn	2469442	5728937
1	Dacrycarpus dacrydioides	kahikatea, white pine	2469442	5728937
1	Eucalyptus sp.	gum tree, silver-dollar	2469442	5728937
1	Fuchsia excorticata	tree fuchsia, kotukutuku	2469442	5728937
1	Hedera helix	ivy	2469442	5728937
1	Juncus articulatus	jointed rush	2469442	5728937
1	Lemna minor	duck weed	2469442	5728937
1	Mimulus guttatus	monkey musk	2469442	5728937
1	Phormium tenax	harakeke, NZ flax	2469442	5728937
1	Pinus sp.		2469442	5728937
1	Populus alba	silver poplar	2469442	5728937
1	Populus nigra	Lombardy poplar	2469442	5728937
1	Prunus x domestica	plum	2469442	5728937
1	Rorippa nasturtium-aquaticum	watercress	2469442	5728937
1	Rubus fruticosus agg.	blackberry	2469442	5728937
1	Salix babylonica	weeping willow	2469442	5728937
1	Salix fragilis	crack willow	2469442	5728937
1	Salix matsudana		2469442	5728937
1	Salix x reichardtii	pussy willow	2469442	5728937
1	Sambucus nigra	elder	2469442	5728937
1	Sequioadendron giganteum	redwood	2469442	5728937
1	Solanum laciniatum	poroporo	2469442	5728937
1	Typha orientalis	raupo	2469442	5728937
1	Vinca major	periwinkle	2469442	5728937
2	Conium maculatum	hemlock	2469368	5728723
2	Cotoneaster glaucophyllus	cotoneaster	2469368	5728723
2	Crataegus monogyna	hawthorn	2469368	5728723
2	Dactylis glomerata	cocksfoot	2469368	5728723
2	Galium aparine	cleavers	2469368	5728723
2	Juglans regia	walnut	2469368	5728723
2	Populus nigra	Lombardy poplar	2469368	5728723
2	Prunus x domestica	plum	2469368	5728723
2	Rubus fruticosus agg.	blackberry	2469368	5728723
2	Ulex europaeus	gorse	2469368	5728723

Appendix 2 (continued)
Locations of all plants recorded at Liffey Springs 9 September 2009

waypoint	Species	Common Name(s)	easting	northing
5	Azolla filiculoides	retoreto	2469397	5728852
5	Populus alba	silver poplar	2469397	5728852
5	Populus nigra	Lombardy poplar	2469397	5728852
5	Rorippa nasturtium-aquaticum	watercress	2469397	5728852
5	Salix matsudana		2469397	5728852
5	Sequioadendron giganteum	redwood	2469397	5728852
6	Salix fragilis	crack willow	2469370	5728688
6	Sambucus nigra	elder	2469370	5728688
6	Polystichum vestitum	prickly shield fern	2469398	5728619
8	general data		2469423	5728337
9	Azolla filiculoides	retoreto	2469255	5728164
9	Elodea canadensis	Canadian pondweed	2469255	5728164
9	Juncus edgariae	wi	2469255	5728164
9	Lemna minor	duck weed	2469255	5728164
9	Mimulus guttatus	monkey musk	2469255	5728164
9	Rorippa nasturtium-aquaticum	watercress	2469255	5728164
9	Salix matsudana		2469255	5728164
9	Ulex europaeus	gorse	2469255	5728164
10	Myriophyllum propinquum	water milfoil	2469213	5728003
11	Salix matsudana		2469120	5728125
11	Ulex europaeus	gorse	2469120	5728125
12	Muehlenbeckia australis	pohuehue	2469117	5728158
13	Salix babylonica	weeping willow	2469103	5728226
13	Salix fragilis	crack willow	2469103	5728226
13	Sambucus nigra	elder	2469103	5728226
14	Agrostis stolonifera	creeping bent	2469072	5728313
14	Blechnum minus	swamp kiokio	2469072	5728313
14	Carex secta	pukio	2469072	5728313
14	Crataegus monogyna	hawthorn	2469072	5728313
14	Galium aparine	cleavers	2469072	5728313
14	Rubus fruticosus agg.	blackberry	2469072	5728313
14	Salix fragilis	crack willow	2469072	5728313
14	Sambucus nigra	elder	2469072	5728313
14	Urtica linearifolia	swamp nettle	2469072	5728313
15	Crataegus monogyna	hawthorn	2469020	5728392
15	Pinus sp.		2469020	5728392
15	Salix fragilis	crack willow	2469020	5728392
15	Sambucus nigra	elder	2469020	5728392
16	Muehlenbeckia australis	pohuehue	2469029	5728430
16	Salix fragilis	crack willow	2469029	5728430
17	general data		2469241	5728586
18	Carex secta	pukio	2469349	5728861
18	Coprosma robusta	karamu	2469349	5728861
18	Rubus fruticosus agg.	blackberry	2469349	5728861
18	Salix matsudana		2469349	5728861
18	Ulex europaeus	gorse	2469349	5728861