APPENDIX 1 – ECOLOGICAL REPORT ON WAINGAWA WETLAND

Waingawa Structure Plan / Report

Ecological Notes on the Waingawa Wetland

1 Introduction

A site visit was undertaken on 5 February 2008 to assess the Waingawa Wetland's ecological values with a view to its incorporation into the Waingawa Structure Plan. This site visit also looked at the hydrological systems that are currently in place and options for the long-term management of these water systems to ensure the health of the wetlands.

Originally, the Waingawa Swamp wetlands are likely to have formed as part of the uplift of the Masterton Fault (Waingawa Fault). They are permanently fed by water coming out of the escarpment, supplemented by drains from land to the north.

Today, the interior of these wetlands are in relatively good condition, although the extent of the wetlands has been reduced by dumping of waste and sludge around the edge. Many areas within the Wetlands have high numbers of exotic weeds present and these weeds are expanding rapidly through the wetland interior in some parts.

2 Ecological Description

The Waingawa Wetlands are today made up of three distinct parts, as a result of roading, earthworks (both fill and excavation), dumping, and other historical activities associated with the former Waingawa Freezing Works (refer to attached Figure 1 and Photos 1 -12).

All the wetlands are dominated by raupo and harakeke (flax), with large areas of manuka and *Olearia virgata* scrub throughout the wetland. There are also areas of corkscrew willow and *Juncus greggiflorus* rushland with *Carex* species and pasture grasses. *Olearia virgata* is uncommon in the Wairarapa Plains Ecological District within which the wetlands are located.

The Eastern Wetland (photos 2 & 3)

The eastern wetland comprises to main components: an artificially made small lake (photo 1), and to the east a small area of unmodified wetland. The level of the small lake, which is fed by a stream flowing off the escarpment to the north, is raised above the rest of the wetland by about 2m. Water exits the lake in three different directions: a small amount flows into the adjoining wetland to the east; a small amount flows to the west to enter the central and then western wetlands; and the majority flows into a drain that circumvents the eastern wetland, and drains around the edge of the Kiwi Lumber site, towards Norman Avenue (Figure 1). The water is clear, likely as a result of this regular reflushing of the wetland system.

The eastern wetland is dominated by flax, raupo and exotic willows with Carex, some manuka and *Olearia virgata* with an isolated cabbage tree with areas of open water surrounding the interior vegetation. An elevated area in the middle had a number of fern species present and there are areas of pasture grasses. The wetland is not fully fenced off and regular stock access is contributing to its decline, with heavy grazing by cattle in the interior of the wetland observed during the site visit. The wetland interior is relatively free of weed species with the exception of the willows and some small areas of blackberry at its edge.

A number of bird species were observed, including pukeko, white swan, mallard and paradise shell ducks.

The Central Wetland (photos 5 – 7)

The central wetland is dominated by flax, raupo, manuka, *Carex secta* and *Olearia virgata* with koromiko, karamu and a number of ferns present.

The northeastern edge of the wetland has been historically filled in with sludge and other material (photo 7) and this has destroyed a large area of the original wetland. The ongoing sludge deposition is likely to be contributing to this wetland drying out and it was noticeably drier in the area surrounding the sludge deposition, with a dieback of some wetland plants in this area.

There are a number of weeds present within the wetlands, including *Convolvulus*, Himalayan honeysuckle, blackberry, and gorse and other pasture weeds and grasses. A climbing type of *Muehlenbeckia*, a native, is also present and is smothering a large area of the wetland species below the pines in the area close to the sludge deposit (photo 6).

Photo 8 illustrates the small stream that drains into the Central Wetland.

The Western Wetland (photos 9 – 12)

This part of the wetlands is the most ecologically valuable area part of the wetlands, and is also the largest part, comprising an area of 10.6ha.

This western component is largely protected by two adjoining QEII covenants (as this part of the wetland is split between two titles) that collectively cover 9.59ha; this covenant was approved by the QEII National Trust in 1999, and registered in 2003 (Figure 1).

This wetland is perhaps the least modified and the most expansive, with large areas of open water, areas of pure raupo and flax, as well as all the species of the other wetlands. The Protected Natural Area report for the Wairarapa Plains Ecological District notes that the vegetation of the wetlands may have been induced through the clearance of the original forest cover. The presence of a single kahikatea tree indicates that the wetland may have been kahikatea swamp forest (photo 11).

The wetland is fenced along the northern boundary, but the fence is in poor condition and does not protect the large areas of open water from stock. As a result, cattle tend to congregate in this area and their presence is assumed to be affecting the long-term health of the wetland and water quality. Similarly to the central wetland, the stream that enters the wetland is also heavily grazed by stock with no fencing and no riparian vegetation.

From the aerial photographs, a large component of this western wetland has disappeared as a result of infilling and waste disposal (photos 10 & 12). It is uncertain as to what was included within this waste, but anecdotal evidence suggests it may contain contaminated material associated with the former Waingawa Freezing Works.

The wetland is home to large numbers of mallard duck, while tui, wax-eye and paradise shelduck were also observed during the site visit.

3 Wetland Fauna

Apart from the birds listed above, two nationally threatened bird species, the New Zealand dabchick and the white heron, have been recorded in the western wetland. The New Zealand dabchick is classified as 'Sparse' and the white heron is classified as 'Nationally Critical' (Hitchmough et al 2007). The wetland is also used by pied stilt for breeding and Australasian harrier, pied stilt and pukeko occur in the wetland.

Brown mudfish were also recorded in the vicinity of the wetland in 1996 and the wetland may provide habitat for other freshwater fish species such as short and long-finned eel.

4 Ecological Significance

The Protected Natural Areas report for the Wairarapa Plains suggests that freshwater wetlands would have covered approximately 18,143 hectares of the Plains in 1853. Today, the approximate extent of these wetlands is 2,447 ha, or 13% of the 1853 extent as a result of river diversion and drainage schemes (and possibly the effects of uplift from the 1855 earthquake). In addition, many of the other wetlands that are remaining have been highly modified by eutrophication and fill, and the spread of adventive plants such as willow and introduced grasses.

The Waingawa Swamp is ranked number 3 of the 19 Recommended Areas for Protection in the Protected Natural Areas report for the Wairarapa Plains. It is therefore considered one of the best quality or only remaining unprotected representative example of indigenous vegetation or wildlife habitat on this particular land type within the ecological district, and is one of the only few wetland systems included.

The fault uplift that created the wetland system is also noted as the second highest important geological site and landforms in the Wairarapa Plains Ecological District (Kenny & Hayward, 1996) for its national scientific, educational or aesthetic importance. The site is also noted as being moderately vulnerable to modification by humans.

5 Threats

The site visit highlighted a number of ongoing threats to the wetland associated with the timber working and the damage from the historical and recent dumping of a range of matter into the wetland. Two sites are of particular concern, the northeastern end of the central wetland where sludge and landfill is still being placed into the wetland (photo 7) and the more ecologically intact western edge where bark chip and gravel continue to be deposited into the wetland (photo 12).

Water levels in the wetlands were observed to be maintained by a water race and raised lake system (photos 1 & 4) and serious thought should be given to ensuring the long-term supply of water to the wetland systems. Any upstream modifications to water inflows, collapses of the raised lake, or other influences could drastically alter these relatively fragile and fresh-water dependent ecosystems.

Large parts of the three wetlands, particularly the northern edges, are not fenced and stock animals are intruding into the wetland edges and the open water surrounding them, particularly the eastern and western wetlands. This intrusion will be causing water quality issues and eutrophication and should be ceased through fencing. We would recommend fencing of the entire wetland margin with at least a 20 metre buffer area around the edge (Figure 1).

A number of invasive weed species are present in all three wetlands, including Himalayan honeysuckle, *Convolvulus*, blackberry, corkscrew willow, gorse, broom and the native climbing form of *Muelenbeckia*. These species are gradually increasing in all three wetlands and their control should be a priority.

6 Management Opportunities

Firstly, given the site's significance as a freshwater wetland system, we consider that all three wetland areas should be fenced and managed as a single ecological site.

Although the three wetland areas are relatively quite discrete, some minor intervention could readily link the western and central wetlands into a large unit at some stage in the future, which would improve their overall ecological functioning.

Ideally, all three wetlands should be incorporated into a Structure Plan that ensures they become a visual feature of the area, providing amenity to the area (and the wider Wairarapa).

There should be a buffer area around the edge of the wetlands, with perhaps a road verge or walkway around the southern edge of the wetlands incorporated into the design. The development of a formal grassed edge to the buffer area surrounding the wetlands would be easy to maintain via mowing. A raised edge would also help with the ongoing surveillance of the wetland for weed species etc. Overall, any intervention will benefit these wetlands as they are suffering from years of neglect, cattle grazing and the dumping of sludge and other material.

The northern extent of the western and central wetlands abuts the Waingawa Fault escarpment and provides a natural edge to the wetland. Pine and macrocarpa removal combined with fencing at the top of this escarpment would be relatively simple and cost effective to undertake, and would provide a suitable buffer, given the steep sided escarpment.

More detail on the recommended management priorities for each of the wetlands is outlined below.

Eastern Wetland

All the willow trees should be removed from the edge of the wetland and its interior. The perimeter of the wetland should be fenced, with a 20m buffer area incorporated between the edge of the water and the fenceline. This would allow the wetland species in this area and that are currently grazed by cattle to regenerate as a natural wetland buffer area, needing minimal intervention. Ideally, the buffer fencing would also include the area of stream that travels into the wetland to prevent stock using it to gain access to the wetland. Some riparian replanting in this zone would also be preferable.

This wetland is particularly sensitive to any hydrological changes, as only a small amount of the water from the artificial lake actually enters it.

This eastern wetland is a rather small discrete wetland when compared to the others, and it is probably impracticable to consider reconnecting it to the other wetlands, because of the amount of fill that separates it, and the buildings and plant on that fill. However, it could be connected by walkway and a contiguous buffer to the central and western wetlands.

Central Wetland

The scale of the fill that has been dumped in the central wetland makes it impracticable to consider excavating it to restore it to its natural extent. However, it is recommended that further dumping of earth or waste cease, and the current edges of the fill be rehabilitated either with plantings or by being grassed over. Dumping of bark chip into the western wetland should also cease and a large proportion of the dumped material should be removed and placed elsewhere or used as mulch in replanting around the wetlands.

Much of the wetland is already fenced by security fencing, but this should be removed and replaced with a new fence that incorporates a 20 metre buffer around all but the northern side of the wetland (as the northern side abuts the old fault escarpment) to assist with its long-term health. Ideally, a portion of the stream that enters the wetland in the north should be fenced and some riparian planting undertaken to connect the wetland with the stream. This buffer could be a mix of grass, walkways and some minimal landscape planting consistent with the industrial park nature of the site.

This wetland would probably require the biggest expenditure on weed control of invasive weeds, including blackberry, broom and gorse, to prevent their spread. In the long-term, it would be good to remove the surrounding pines and macrocarpa trees in the north as this is affecting the microclimate and natural regeneration under the tree canopy. The area of wetland below the canopy of these trees is also densely affected with weeds, including large smothering populations of the native climber, *Muehlenbeckia*.

Depending on long-term options, restoration could involve the removal of the existing road between the central and western wetlands and some widening of the wetland in this zone so

that they connect as a single wetland unit. However, this is likely to be costly and would require more detailed hydrological assessment.

Western Wetland

Of the three wetlands, this area is the best defined in terms of its natural depression, is the least modified, and is considered to be the most visually pleasing.

The first priority for this wetland is to cease all dumping of waste bark chips and earth along its edges, and undertake some action to remove the more recent material. The edge could then be contoured and grassed to act as a buffer area. The ground level around this wetland is relatively raised, and the development of a walkway or some form of public access along the southern boundary would create good outlooks over the wetland.

The formation of continuous and well maintained perimeter fencing should be the second priority, including along the areas of open water in the north and west of the wetland. This area is relatively weed-free, and fencing off this wetland combined with a buffer area would yield huge benefits. There are many wetland species in the grazed area already, and these would regenerate rapidly to fill any buffer area. Long-term, only limited weed surveillance and control would be required.

As with the other wetlands, the entire wetland should be fenced to prevent stock access and a 20 metre buffer zone incorporated around the fenceline (with the exception of the wetland adjoining the steep northern fault escarpment).

Some Invasive weed control, particularly at the eastern edge, would be beneficial and would improve the ecological integrity of the wetlands and the visual aesthetics of the wetlands. Priority weeds for control include broom, blackberry, gorse and lupin.

The Raised Lake

As part of the site development, serious thought needs to be given to the long-term water supply, and the large raised lake in the eastern part of the wetlands. Currently, this lake is approximately 4 metres above the wetlands to the west and 2m to the east, and is formed by a raised bank around its perimeter. The stream from the north has been diverted into this lake (photo 4), the water from which is then diverted by a series of channels to the wetlands to the west and the east. The lake has some indigenous values, with raupo present along its edges and some flax and other broadleaved species surrounding it.

Lowering the lake, or its removal, could have some serious consequences for the health of the wetlands, and no changes should be made to it without a hydrological assessment.

The Waingawa Stream

The western wetland is drained by a permanent stream, the Waingawa Stream, which meanders through a natural flow channel across much of the Waingawa Structure Plan site to the State Highway. This stream has been entirely cleared of any indigenous vegetation and is regularly grazed by cattle. However, fencing the stream and providing some riparian planting will have major benefits, both ecologically in terms of habitat and stream protection, and visually in terms of aesthetic appeal. Ideally, this stream can be incorporated into a greenway that connects up with the wetlands in the north, which might also include a walkway linking with a potential walkway along the edge of the wetlands.

7 Conclusions

The Waingawa Wetlands are considered to be highly significant ecologically in the Wairarapa and as a result they should be formally protected and incorporated into the Waingawa Structure Plan in a manner that ensures their long-term survival.

The wetlands have all be neglected, and have been modified through stock grazing, waste disposal, weed infestation and drainage works. They have also been subject to considerable amount of fill, often containing waste and contaminants, which has divided the wetlands into three discrete units – they are all currently a fraction of their original extent.

To ensure their long-term survival and to increase their ecological integrity, the removal of waste in some areas, the cessation of dumping, proper fencing, weed control and the establishment and ongoing maintenance of a buffer area around the wetlands are all necessary actions.

The site is currently not open to the public and the provision of public access through a perimeter walkway or possibly roading or car parking near the wetlands, would have a range of benefits in terms of surveillance and community interest in the state and wellbeing of the wetlands. A walkway could be incorporated into the development of any buffer area, and could also link with a potential future walkway along the Waingawa Stream.

In summary, a number of key actions are recommended:

- Perimeter fencing of all wetlands to exclude stock access
- The establishment of a 20 metre buffer surrounding the western and central wetlands to prevent any further encroachment and to define the wetland edge from surrounding development (because of the elevated fault scarp in the north of the wetlands, such a buffer is not necessary, and elsewhere the buffer width may need not be as wide as 20m in many places)
- A narrower buffer surrounding the eastern wetland
- Development of an access track within the buffer area surrounding the southern portion of the western and central wetlands and linking with the eastern wetland
- The buffer area to be a cost-effective and low-maintenance mix of mowed grass, riparian planting and shade trees that can allow the area to have a dual use as park land and ecological buffer
- The development of a staged wetland management plan to remove the pest species present and to cost-effectively rehabilitate those areas of wetland where material has been dumped into the wetland interior, and
- Development of a long-term approach to water management and the man-made lake to ensure the wetland hydrology is maintained.

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Western Wetland

Central Wetland

Raised Lake

Eastern Wetland

Historic Dumping Grounds

0 100 200 300 400 500 m

June 12, 2008 W07151_Wetlands_A3.mxd

Boffa Miskell

Direction of water flow (indicative)

Buffer (20m)

Buffer (10m)

QEII Covenant

FIGURE 1

WAINGAWA WETLANDS & HYDROLOGY

Photo 1. Photo of the raised lake between the Eastern Wetland and the Central Wetland. Raupo surrounding open water.

Photo 2. Eastern Wetland illustrating wetland vegetation adjacent to the stream that flows from the raised lake.

Photo 3. Open water and mixed wetland vegetation of the Eastern Wetland.

Photo 4. Smaller storage lake located in farmland just above the raised lake.

Photo 5. Looking south into the Central Wetland. The Western Wetland can be seen in the distance of this photo.

Photo 6. Convolvulus and Muehlenbeckia within the Central Wetland adjacent to the pine shelterbelt.

Photo 7. Photograph illustrating the scale of the sludgel being dumped into the Central Wetland below the raised lake.

Photo 8. A small stream to the north of the property that exits into the Central Wetland.

Photo 9. The wetland interior of the Western Wetland illustrating mixed native wetland vegetation and exotic plants.

Photo 10. Photograph looking south-west across the Western Wetland. Older dumped material in the foreground.

Photo 11. Open water, wetland vegetation and the sole kahikatea in the south-western portion of the Western Wetland.

Photo 12. Bark-chip encroachment into the edge of the Western Wetland. Wetland vegetation to the right and rear of photo.