Ecological restoration advice for biodiversity enhancement opportunities at Remuera Golf Club, 120 Abbotts Way, Remuera

To: Spencer Cooper – Course Superintendent, Remuera Golf Club

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Project description

Remuera Golf Club is seeking advice from the Council's Biodiversity team on opportunities to enhance biodiversity values at the golf course as part of their long term sustainability vision. This includes advice around revegetation and naturalisation of some areas of the course and opportunities for attracting native fauna.

The site is adjacent to Waiatarua Reserve which has been identified as a Significant Ecological Area under the Proposed Auckland Unitary Plan. There are opportunities to provide an enhanced buffer to this reserve and to help create linkage and stepping-stone opportunities with nearby reserves to assist native fauna in moving through an otherwise fragmented, highly urbanised landscape.

A number of planted native trees and amenity gardens exist already at the golf course. Additional areas have been identified for planting and naturalisation. There are operational constraints on the site around the maintenance of functional use of the course, maintenance requirements, visual amenity for course users and neighbours e.g. concerns rank grass will create rodent habitat, tidiness of planted areas (manicured feel versus naturalness), accessibility to retrieve balls etc. Some of these constraints were discussed on site and I have tried to incorporate them into the advice below where possible.

A *Tree Management Plan* written by Andrew Barrell (December 2014) has been prepared for proposed exotic tree removals (e.g. pines and gums) which will be progressively implemented over time. In conjunction with the exotic tree removals a replanting concept plan has been prepared by Brown NZ Ltd (August 2015). This plan provides a really great base and it is good to see that it focusses on the use of native tree species. Recommendations are made below in regards to the use of additional species, plant spacings, densities and maintenance.

Restoration and Enhancement Planting

For some of the larger areas that are to be revegetated or naturalised, it would be good to incorporate primary colonising species into the planting mix which are likely to do better than specimen or enrichment tree species in the first couple of years of establishment. Colonising species will create a micro-climate within these areas which will be more suitable for the enrichment species to establish later. Suitable coloniser species for the site include manuka, kanuka, karamu, mahoe, hangehange, flax, koromiko, mapou and five-finger. Enrichment species include the species listed on the planting concept plan – nikau, karaka, kowhai, kahikatea, taraire, totara, kawakawa, kohekohe, pigeonwood, rewarewa, rimu, puriri and pohutukawa.

For revegetation purposes when using most shrub and colonising species, generally estimate 1 plant per 1m² for the best balance of minimising overcrowding but maximising initial coverage to inhibit weed invasion. Enrichment tree species are generally slower growing but need much larger spacings within this mix considering there mature sizes. For areas where specimen trees only are required, it will be better to use larger sized specimens at the time of planting, and additional maintenance may be required to get the trees established (e.g. mulch, staking etc.). More information can be found at the following link:

http://www.aucklandcouncil.govt.nz/EN/environmentwaste/coastalmarine/Documents/nativeforestrestorationguide.pdf

Some recommended species for stream and pond edges are given below. Water quality will be impacted by the quality of water entering the site (I believe some of this was from the Stonefields development) and any rainwater runoff from the course itself. Minimising pesticide, herbicide and fertiliser use will help, but planting a buffer around waterways will also help improve water quality and improve habitat quality for species such as native eels. Even a single row of sedges is better than nothing, although the wider the buffer the better. Plants help to filter runoff and provide shade to reduce water temperatures. If the water temperature is too warm and the water is slow moving it may facilitate unwanted algae blooms, especially during the summer. Riparian vegetation may provide potential roosting and nesting opportunities for waterfowl.

It is recommended that all plants are eco-sourced from the Tamaki Ecological District where possible as these plants are more likely to do well having adapted to the specific environmental conditions of this area. It also helps to preserve biodiversity at the genetic level. When ordering plants the nursery should be informed that you want to eco-source plants locally for the project. More information on eco-sourcing at the following link: http://www.aucklandcouncil.govt.nz/EN/environmentwaste/coastalmarine/Documents/biodiversityecosourcing.pdf

Plants suitable for naturalised 'bush' areas following the removal of large exotic trees – including colonising and enrichment species species			
Scientific name	**Common name**	**Plant form & height**	**Planting notes**
Leptospermum scoparium	Manuka	Tree (~8m)	Wide ecological tolerance, hardy species. Important coloniser. Use plentifully. 1-1.5m spacing. Flowers spring-autumn. Great food source for bees.
Kunzea ericoides	Kanuka	Tree (~12m)	Important coloniser species, fast growing. Prefers drier conditions than manuka. 1-1.5m spacing. Flowers spring-summer. Good food source for bees.
Coprosma robusta	Karamu	Shrub (~4m)	Fast growing coloniser, hardy, wide tolerance. Abundant autumn fruit for birds. 1-1.5m spacings.
Melicytus ramiflorus	Mahoe	Tree (~10m)	Early successional species, good in light gaps and on edges. Shade tolerant. Abundant summer fruit for birds. 1.5m spacings.
Geniostoma ligustrifolium var. ligustrifolium	Hangehange	Shrub (~4m)	Shade tolerant, fast growing. 1.5m spacings.
Phormium tenax	Flax	Clump form (~2m)	Very hardy coloniser, wide tolerance. Flowers are a good nectar source for birds e.g. Tui. 1-1.5m spacing.
Hebe stricta	Koromiko	Shrub (~3m)	Hardy and fast growing coloniser. Flowers summer-autumn. Good food source for bees. 1-1.5m spacings. Also good amenity area species.
Myrsine australis	Mapou	Tree (~6m)	Good coloniser. 1.5m spacings.
Pseudopanax arboreus	Five-finger	Tree (~8m)	Good colonising species. Prolific fruit producer. 1.5m spacings.
Coprosma arborea	Mamangi	Small tree (~10m)	Fruit attracts birds. 1.5m+ spacings.

Rhopalostylis sapida	Nikau	Palm (~10m)	Under planting main canopy, Shade tolerant, attracts birds. Plant 2+m spacings.
Corynocarpus laevigatus	Karaka	Tree (~18m)	Under planting main canopy. Large orange fruit eaten by kereru. 5+m spacings.
Sophora microphylla	Kowhai	Tree (~20m)	Nectar of flowers attracts birds. Prolific bright yellow flowers in spring. 5+m spacings.
Dacrycarpus dacrydioides	Kahikatea	Tree (up to 60m)	Favours moist sites, very slow growing. Produces fruit. 5+m spacings.
Beilschmiedia taraire	Taraire	Tree (~20m)	Slow growing, produces large purple fruit eaten by kereru. 5+m spacings.
Podocarpus totara	Totara	Tree (~30m)	Slow growing, hardy. Produces fruit. 5+m spacings.
Macropiper excelsum subsp. excelsum	Kawakawa	Shrub (~7m)	Under planting main canopy, Shade tolerant. Fruit attracts birds. May need shelter to establish. 3+m spacings.
Dysoxylum spectabile	Kohekohe	Tree (~20m)	Under planting main canopy, prefers shady sites. Flowers and fruit attracts birds. 5+m spacings.
Hedycarya arborea	Pigeonwood	Tree (~15m)	Bright orange fruit attracts birds 5+m spacings.
Knightia excelsa	Rewarewa	Tree (~30m)	Slender tree. Attractive red flowers attract Tui. 5+m spacings.
Dacrydium cupressinum	Rimu	Tree (~35m)	Slow growing. Long drooping leaves. Fruit attracts birds. 5+m spacings.
Vitex lucens	Puriri	Tree (~20m)	Under planting main canopy. Slow growing. Pink flowers and fruit attracts birds including kereru. 8+m spacings.
Metrosideros excelsa	Pohutukawa	Tree (~25m)	Tolerates wide range of conditions. Slow growing. Bright red flowers in summer (NZ xmas tree) which attract nectar feeders. 5+m spacings.
Alectryon excelsus subsp. excelsus	Titoki	Small tree (~10m)	Under planting main canopy. Bright red fruit attracts birds. Often used in urban landscaping, easily managed. 5+ m spacings.

Plants suitable for stream and pond edges and seepage areas - (sedge species also suitable for planting around damp drain areas on the course. Even a single row of plants will help filter out runoff and excess nutrients, but the wider the buffers the better).

Scientific name	Common name	Plant form	Planting notes
Carex geminata	Rautahi	Sedge	Stream edges, seepages and pond margins. 0.5-1m spacings.
Carex virgata	Swamp sedge	Sedge	Swampy conditions and damp seepages, will tolerate shade. 0.5-1m spacings.
Carex secta	Purei	Sedge	Stream edges, including shallow open water and swampy areas. 0.5-1m spacings.
Cordyline australis	Cabbage tree	Tree (~10m)	Tolerates wet and dry conditions. Spring-summer fruit producer, good food source for birds. 1.5m spacings.
Phormium tenax	Flax	Clump form (~2m)	Very hardy, wide tolerance. Flowers in summer. Good nectar source for birds e.g. Tui. 1-1.5m

			spacing.
Carex dissita	Forest sedge	Sedge	Stream edges, seepages, will tolerate shade under forest canopy. 0.5-1m spacings.
Cyperus ustulatus	Giant umbrella sedge	Sedge	Open damp places, may grow in shallow standing water. 0.5-1m spacings.
Typha orientalis	Raupo	Sedge	Grows in up to 1m depth of water, edges of lakes and streams, swampy area.
Examples of native species suitable for using as hedging or amenity garden planting			
Scientific name	**Common name**	**Plant form**	**Planting notes**
Myrsine australis	Mapou	Shrub/tree	Shade tolerant, can be hedged if managed
Corokia cotoneaster	Korokio	Shrub	Shade tolerant, can be hedged if managed
Lophomyrtus bullata	Ramarama	Shrub	Shade tolerant, can be hedged if managed
Griselinia littoralis	Broadleaf	Shrub	Can be hedged if managed. Produces fruit.
Hebe stricta	Koromiko	Shrub	Very hardy, fast growing coloniser. Many *Hebe* varieties available – differing sizes and coloured flowers etc.
Libertia grandiflora	NZ Iris	Low-growing shrub	Attractive white flowers and seed pods. Grows best in shaded/semi-shaded areas but will grow in full sun.
Phormium cookianum	Dwarf mountain flax	Small flax	Flowers are a good nectar source for birds.
Dianella nigra	Turutu, (NZ blueberry)	Low-growing shrub	Tiny white flowers and bright blue fruit.
Pratia angulata	Creeping pratia		Fast growing creeping ground cover. Attractive white flowers and purple-red fruit. Does well in most places, useful groundcover for shady sites.
Muehlenbeckia complexa	Pohuehue (wire vine)	Creeping vine	Can be grown along fences/buildings. Can be hedged if managed.

Fauna Attraction

Planting will play a significant role in attracting native fauna to the site, e.g. planting nectar and fruit producing trees and naturalising areas for invertebrate habitat which in turn will provide food for insectivorous birds. Below are some recommendations for specific species you may wish to include as indicator species as their presence foraging or breeding at the site will indicate that habitat availability and quality is improving.

Birds

Fantail, Grey Warbler, and Silvereye are some of the more common native insectivorous birds that are likely to become more abundant with improving food availability and animal pest control. Fantail in particular are a charismatic species as they will readily follow behind people as they walk catching insects that have been disturbed.

A number of the plants listed above are prolific flowerers which as well as providing amenity values, also provide valuable nectar sources for bird species such as Tui, Silvereye and Kereru. Tui are a charismatic species, particularly when trees such as kowhai are in flower, where they'll sit and sing persistently to defend their food source.

Following flowering many of these species provide a valuable fruit food source for native birds. Species such as taraire, puriri and karaka produce large fruit that can only be swallowed and

dispersed by kereru. Kereru are a good indicator species as their presence shows improved habitat quality and availability. Although large in size, they are vulnerable to animal pests when nesting. Kereru would also benefit from animal pest control.

Ruru or morepork are a small native owl which feed on insects, small rodents and small birds. They usually roost in dark forested areas during the day. Nests are located within tree cavities, broken logs or in forks of braches, or sometimes on the ground, which makes them vulnerable to pest animals. Morepork tend to feed from high perches that give them good visibility of prey food below. If there are downward facing lights that are left on during the night at the golf course, it may be possible to create perching opportunities for morepork around or on them as they will feed on moths and insects attracted to the light (you may find morepork are doing this already given that they are present at Waiatarua Reserve). They may use nest boxes occasionally, although so will many other bird species such as starlings and myna. The hole would need to be at least 100mm in diameter. There are a number of nest box designs out there, and it may be worth trialling some different styles. It could be an interesting experiment to see what other species you get nesting too!

Many other bird species are likely to be present at or will visit the site, particularly with the habitat available in the adjacent reserve. Species such as white-faced heron, paradise ducks and pukeko often feed out during the day in grass and wetland environments. Species of waterfowl such as mallard ducks and NZ scuap will be attracted to the pond and stream environments present. These species will be encouraged to stay by providing safe and sheltered roosting and nesting opportunities with riparian planting and pest animal control.

Pollinators, invertebrates and native butterflies

It was discussed that honeybees could be kept on site. This would assist with the pollination of plants. The use of flowering plants has already been discussed above, but it is recommended that a reasonable variety of plant species are used that provide foraging availability for bees across the year (particularly winter, when there is a naturally less food availability so winter to early spring flowerers should be considered). There are a number of native pollinators that may return if food is available including native butterflies and moths, native bees, birds and lizards.

Native invertebrate species will naturally return if areas are left to naturalise, including letting leaf litter build up under vegetation where possible. Native invertebrates will benefit from the reduced use of toxic pesticides and herbicides.

Native butterflies such as Copper butterflies require food availability for their different life stages - that is nectar for adults and food to support the larval stage such as the native wire vine *Muehlenbeckia*. This is a scrambling vine species, however it can be managed as a hedge, ground cover or climber along fences or walls. Good nectar species for native butterflies include koromiko, rangiora, pohutukawa*. Olerias*, and native jasmine.

Lizards

Native lizards such as the copper skink (*Oligosoma aeneum*) may be present. Native lizards are significantly threatened by animal pests and habitat removal. Habitat opportunities can be enhanced by providing places for them to hide from predators e.g. ground cover plantings, rock or wood piles, leaf litter, rotting logs, and rock walls with lots of small crevices. These things also provide habitat for invertebrates which lizards feed on. Areas of rank grass also provide excellent habitat opportunities for native lizards. As discussed on site, some complaints had been received about areas where grass had stopped being mowed and the risk that this may provide habitat for pest animals. By implementing an animal pest control programme this should not be an issue. These areas could be further enhanced by planting a selection of native shrubs and grasses such as flax, turutu, toetoe and pohuehue or with specimen trees interspersed.

Bats

The native long-tailed bat is present in certain forested areas in Auckland including the Waitakere Ranges and the Hunua Ranges and has more recently been found in smaller forested areas around Rodney and in Clevedon. These bats generally roost in cavities, in bark crevices or in

epiphytes on old growth trees, and also often roost in mature pine trees. They often feed along streams and waterways where they prey on insects. Although it is highly unlikely that long-tailed bats are present at the golf course, there are bat detectors available to borrow from the Weed Free Trust if you would like to have a go anyway - (info@weedfree.org.nz). You can find out more information about bats and bat detectors on our website:
http://www.aucklandcouncil.govt.nz/EN/environmentwaste/biodiversity/Pages/bats.aspx

Additional information on attracting native fauna can be found here:
http://www.aucklandcouncil.govt.nz/EN/environmentwaste/coastalmarine/Documents/Biodiversity-Wildlife-Backyard-Brochure.pdf

Pest plants

The site is intensively managed, but there is moderate weed issues associated with the 'bush' and edge areas. Weed species that were incidentally noted on site included *Tradescantia*, ivy, agapanthus, woolly nightshade and arum lily. Current weed management primarily focusses on grass species with impacts associated with course quality. Additional weed control in the bush areas would be achievable given the restricted nature of current infestations. Pest plant species can inhibit the natural growth and regeneration of native bush. It is recommended that invasive weed species are controlled as part of any ecological restoration project. As there is a desire to reduce herbicide use it may be worth talking with a Biosecurity Officer about alternative methods of control if needed. Advice on control methods can be found on Council's website http://www.aucklandcouncil.govt.nz/EN/environmentwaste/biosecurity/Pages/pestplants.aspx or you can contact a Biosecurity Advisor to discuss specific pest plant issues on (09) 301 0101 or email biosecurity@aucklandcouncil.govt.nz.

Pest animals

A significant part of successfully attracting native species is the ability to provide a safe environment for them to live in. New Zealand's native species evolved in the absence of mammalian predators and simply have not evolved the mechanisms and behaviours necessary to defend themselves against introduced pests such as rats, possums, mustelids (stoats, ferrets and weasels), hedgehogs and cats. Pest control at the golf course is focussed on species that impact on the quality of the course e.g. rabbit and insect species that affect the playing turf. It is strongly recommended that animal pest control is broadened to include rodents, mustelids and possums. It is acknowledged that constraints include the desire to minimise toxic products e.g. poison baits, and to avoid the risk of harming wandering domestic pet dogs and cats. There are a number of trap models and bait station models that have been designed to minimise or eliminate this risk. Pest control is being carried out at the adjacent Waiatarua Reserve and any pest control at the golf course will benefit the work being carried out there. The Biosecurity team can provide advice on pest control methods biosecurity@aucklandcouncil.govt.nz

This is an exciting project and the Biodiversity team would like to offer continued support as the project develops. While the above advice is pretty general in terms of the type of things that could be included to enhance biodiversity, if you would like some more detailed advice about something, please feel free to contact me. For example as the revegetation and naturalisation works are going to occur over a number of years, I'd be happy to provide planting advice on specific areas as they are worked on year to year if this would be useful. I think you're off to a great start with your replanting concept plan and you've got a fantastic vision of the potential for the site! I hope this advice has been useful and as I said, please keep in touch as the project progresses.

Kind regards,
Jacinda

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