

Assessment of Ecological Effects

Wanaka Airport – Change in Designation

Wanaka

7 September, 2010

Contract Report: NS 95/09

Prepared for:
Mitchell Partnership Ltd
On behalf of Wanaka Airport and the Queenstown Airport Corporation

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1 Background

Queenstown Lakes District Council (QLDC), as a requiring authority for Wanaka Airport, seeks to extend the Wanaka Airport Aerodrome Designation to provide for an extension to the existing runway (from a 1,200m sealed runway to a maximum 1,750 m sealed runway) and a new parallel sealed runway to the north of the existing runway (maximum 1,700m long and 30 m wide). A plan showing the extended existing runway and the proposed new runway is provided and labelled **Attachment 1**.

The Aerodrome Designation extension will also provide for sufficient land area to provide for future passenger terminal facilities, taxiways, car parking and aviation related activities. These activities would form a future phase of development at the Airport therefore no detailed design has been undertaken at this stage. Future phases of development are therefore not considered within this assessment.

1.1 Introduction

Mitchell Partnerships is preparing a Notice of Requirement to alter the existing Wanaka Airport Aerodrome Designation. Natural Solutions for Nature Ltd has been engaged to prepare an assessment of ecological values to determine the effects of the extended and proposed new runway in terms of ecology. This report will inform the Assessment of Effects on the Environment for the Notice of Requirement.

Mitchell Partnerships have requested that the ecological assessment determine whether there are any habitats or species of significance that would be adversely affected by the proposal and, in the event that there are species of significance, propose methods to avoid, remedy or mitigate the potential effects.

1.2 Description of Proposal

The Notice of Requirement (NOR) seeks to extend the existing Aerodrome Designation to incorporate additional land to the north, northwest and southeast which will lead to a total land area of 132.94 hectares of land (more or less). The legal description for the site is as follows:

- Lots 10 and 11 DP24410
- Lot 8 DP 22637
- Lot 5 DP 23517
- Lot 7 DP 22637
- Lot 6 DP 22636
- Lots 1,2,3,4, and 5 DP 18824
- Lot 6 DP 24685
- Lots 2, 3 and 4 DP 23517
- Lots 1 and 2 DP 341605
- Sec 1 SO 24776
- Lots 1 and 2 DOP 26239

- Lots 4 and 5 DP 340031
- Lot 2 DP 368240
- Legal Road

All of the land is owned by QLDC with the exception of Lot 2 DP341605, which is owned by the New Zealand Fighter Pilots Museum Inc.

The existing runway would be extended, a second, parallel runway (of equal length to the existing and extended runway) would be provided for.

2 Methods

2.1 Assessment of the actual and potential effect on the environment of proposed activity

The assessment of ecological values was undertaken in three stages including field preparation, fieldwork and the assessment of data collected in the field.

2.1.1 Field Preparation

The preparation for the fieldwork included:

- Aerial photograph interpretation to assess the landforms and likely vegetation communities; and
- Review of existing ecological information and reports to identify vegetation and habitats likely to be found on the property. This included reference to threatened flora lists available for the Queenstown Lakes District, nearby reserves and a Protected Natural Area Programme (PNAP) Survey report for the Lindis, Pisa and Dunstan Ecological Regions which includes reference to a comparable site on the river terrace opposite the site.

2.1.2 Field Work

The ecological survey was undertaken by Dawn Palmer, principal ecologist for Natural Solutions for Nature Ltd on October 21, 2009. The survey undertaken is described below.

Wanaka Airport staff provided a familiarisation visit and an overview of the land affected by the proposal, the location of future developments on the site and some background to site management. A walk over survey followed.

2.1.2.1 Vegetation Survey

A vegetation survey targeted areas of the property that were most likely to contain ecological values and be affected by development associated with the changes in the Aerodrome designation.

During the vegetation survey a total of 9 locations were selected for the collection of detailed ecological information including the recording of GPS coordinates, vegetation community type, species lists and landform information.

Where plant species could not be positively identified in the field, specimens were collected and identified with the use of botanical reference books and websites (e.g. www.nzpcn.org.nz).

A full species list is provided and labelled **Attachment 2**.

2.1.2.2 Fauna and Habitat Survey

Observations of fauna seen or heard were made during the site visit, although site specific bird counts, lizard and invertebrate trapping or sampling were not undertaken.

Faunal values other than those observed during the site visit have been inferred based on personal knowledge of the species known to be present in the area and habitats encountered.

2.2 Assessment of Field Data

The ecological significance of vegetation communities and fauna habitat values were assessed against the criteria provided in Appendix 5 of the District Plan:

- Representativeness
- Rarity (determined using the *New Zealand Threat Classification System lists, 2005*)
- Diversity and Pattern
- Distinctiveness/ Special Ecological Character and
- Ecological context

Subsequent to the notification of the District Plan, Landcare Research published the Land Environment of New Zealand (LENZ) classification system (Leathwick, et.al., 2003). LENZ and the subsequently published LENZ Level IV Threatened Environment Classification (TEC) database (Walker, et. al., 2007) can be used in the assessment of representativeness, distinctiveness and ecological context of vegetation communities. The TEC database was developed by reviewing the percentage of vegetation remaining within each LENZ unit and overlaying legally protected areas (DOC reserves and QEII covenants) to assess the existing level of protection for these remnants. Based on these criteria, six national scale threat categories have been established. These are:

- Acutely threatened - <10% indigenous vegetation cover remaining
- Chronically threatened – 10-20% indigenous vegetation cover remaining
- At risk – 20-30% indigenous vegetation cover remaining
- Critically under protected - >30% indigenous vegetation cover remaining and less than 10% protected
- Under protected >30% indigenous vegetation cover remaining and 10-20% protected
- No threat - >30% indigenous vegetation cover remaining and >20% protected

In addition, the values identified on the site were compared against the four national priorities for the protection of rare and threatened native biodiversity on private land (Table 2) as set out by a joint Ministry for the Environment (MfE) and Department of Conservation (DoC) statement published in April 2007.

Table 2: National Priorities for the protection of rare and threatened native biodiversity on private land

National Priority Goals	
1	To protect indigenous vegetation associated with land environments, (defined by Land Environments of New Zealand at Level IV), that have 20 percent or less remaining in indigenous cover.
2	To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.
3	To protect indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not already covered by priorities 1 and 2.
4	To protect habitats of acutely and chronically threatened indigenous species.

Source: Ministry for the Environment (2007)

In this report, existing vegetation communities and faunal habitats were considered significant if they satisfied any one of the above criteria.

Based on the ecological values identified, protection, mitigation, maintenance and enhancement measures were evaluated and where appropriate to the proposed NOR and its effects, recommendations made.

3 Identification of Values

3.1 Summary of Geology – Landform – Soils - Climate

The Designation Area is located on the true right of the Clutha River at about 340 metres above sea level. It sits upon the fluvioglacial outwash gravel and associated deposits found on the upper Clutha River terraces and Wanaka – Hawea plains (Turnbull, 2000). The Hawea deposits are noted by Turnbull as being unweathered or only slightly weathered are more than 15,100 +/- 200 years old.

Historically, the Cardrona River would have discharged (flowing east towards the Clutha River) over the plains braiding and cutting into the outwash terrace upon which the Aerodrome is located. Two old meander or braided river channels run generally west to east across the northern part of the site (refer to **Figure 1a** showing the soils associated with the landforms).

An un-named creek whose source can be traced using aerial photos to the eastern flanks of Criffel Peak on the Pisa Mountains south-west of the site (refer to **Figure 1b**), has been modified by culverts and chanelised by the excavation of drainage ditches. These modifications are repeated elsewhere within the small catchment of the creek. Both up and down stream of the site, ponds have been constructed.

Alluvial soils of the site are derived from high grade schist (Lucas Associates, 1995), and are predominantly classified as Luggate soils – well drained, shallow, sandy loam of moderate fertility over undulating slopes. The channel which formerly would have carried the un-named creek running from southwest to north east has lower fertility, moderately drained and relatively deep sandy loam – Gladbrook soils (refer Figure 1a from the GrowOtago website accessed 16/11/09).

The GrowOtago website maps the median rainfall of the site as 601 – 650 mm per annum.

The Land Environment classification summary is provided for completeness.

3.1.1 Land Environments of New Zealand

Land Environments of New Zealand (LENZ) is a national environment-based classification of ecosystems mapped across the New Zealand landscape. LENZ units are mapped on the basis of 15 climate, landform and soil parameters that were selected for their roles in driving geographic variation in biological diversity (Leathwick *et. al.*, 2003).

The site is classified as N.1.5.c. Table 1 below presents a summary of the environmental variables characteristic of this unit.

Because LENZ units are derived from parameters that “drive geographic variation in biological diversity” the LENZ units can be used as a surrogate for the potential full range of terrestrial ecosystems and their associated biodiversity (Walker *et. al.*, 2006). LENZ is utilised in Section 4 to discuss the significance of vegetation recorded during the vegetation survey.

Table 1: LENZ Unit Environmental Parameters

	LENZ Units
Parameter	N5.1c
Elevation	425m
Location	Found around Ranfurly and Wanaka, also occurs around the Shotover River and around Queenstown' surrounds
Climate	warm temperatures, moderate solar radiation, high vapour pressure deficits, high annual water deficits
Landform	Very gently undulating plains
Soils	Imperfectly drained soils of moderate fertility from a mixture of colluvium and loess from greywacke and schist

Source: Leathwick *et al.* (2002) Land Environments of New Zealand – Technical Guide page 162

3.2 Presence of Indigenous Vegetation

Species noted during the site visit are listed in **Attachment 2** at the back of this report.

The vegetation is predominantly exotic pasture grasses and weeds. Twenty-six (26) of the plant species recorded were introduced, and three (10 percent) were endemic. These were isolated specimens of *Discaria toumatou* (Matagouri), *Melicytus alpinus* (porcupine shrub) and *Muellenbeckia axillaris* (Creeping pohuehue). These specimens were noted along the edge of the historic channels and dip in the terrace (**Figure 1b** and **Figure 2**). The *Muellenbeckia* was found where the un-named creek emerged from a culvert. It was scrambling through boulders in fill on the east side of the existing runway.

One paddock was under a crop of lucerne, another had been recently sprayed with herbicide and disc sown for summer / autumn crop.

Two rows of shelter belt plantings comprising *Pinus radiata* (Radiata pine) and *Pseudotsuga menziesii* (Douglas fir) were present at the northern end of the site.

No threatened species were seen or are known to occur within the area of the proposed expansion of the Airport designation.



Figure 2: View south-east from waypoint 13 over showing exotic pasture and weeds with the isolated specimens of *Melicytus alpinus* (porcupine shrub) identified. Source: D Palmer, 21/10/09

3.3 Indigenous Fauna

3.3.1 Avifauna

The eight species noted during the site visit are listed in **Attachment 2** at the back of this report. Of these, six were introduced by humans (exotic) - finches, skylarks, starlings, blackbirds and two were self introduced natives; spur winged plover and Australasian harrier.

The open pastures on the Clutha River terrace, presence of ponds and the drainage channel which crosses the terrace upon which the Airport is located, provides habitat commonly supporting the species seen during the site visit and noted above. Black-back gulls and migratory waders such as South Island Pied Oystercatchers may also be expected to occur on the site, the later between about August and December.

None of the species identified as present or potentially so are threatened (Hitchmough, et. al., 2007).

A waste water treatment plant with 3 open tanks and a subterranean disposal field (Project Pure) is located about 200 metres north of the north western RESA.

A peer review of the 'bird mitigation report' prepared for Project Pure dated 4 February, 2008 was prepared by Dr Murray Williams. In his report, Dr Williams noted gulls and waterfowl as the birds most likely to be attracted to the wastewater facility. However, he concluded that the design and operation of the waste water facility "was most unlikely to be attractive as feeding or roosting habitat to gulls and waterfowl, or to the range of small birds present in the airport's grassland environs".

Monitoring of birds has been undertaken under contract to QLDC subsequent to the commissioning of the waste water facility. While some swallows have frequented the facility, monitoring has not revealed an increase in bird activity from an initial base count. The design of the treatment tanks allows netting to be placed over the open water to deter avifauna should this be necessary (personal communication, Martin O'Malley, 16/11/09).

Based on my own observations and knowledge of the avifauna of the area, I conclude that it is highly unlikely that there are avifauna species of conservation significance likely to be affected by the proposed change in the Designation Area.

3.3.2 Lizards

The site visit was undertaken during the early afternoon in partly overcast conditions. While the timing of and weather conditions during the site visit were not optimal for detecting lizards, no lizards were observed during the site visit.

The site is within the range of a number of skinks and geckos. However, given the absence of rocks and the level of cultivation the site has experienced, it is in my view that the species most likely to be present (if any) would be the McCanns skink (not threatened).

The cultivation of the land does not improve this probability given their small home ranges and the potential for direct destruction of animals and their habitat during the process of cultivation combined with the absence of rocks for shelter/ refuge from this activity and predators.

The abundance of rabbits suggests that mammalian predators (e.g. cats and mustelids) are also likely to be present and therefore also likely to be affecting (suppressing) any lizards present.

3.3.3 Invertebrates

No specific survey for invertebrates was undertaken. The lack of indigenous vegetation and ongoing cultivation of the land is likely to have reduced the potential diversity of the site's indigenous invertebrate community compared to nearby sites and reserves which support a mixture of indigenous and exotic vegetation communities.

3.3.4 Freshwater Fish

No specific survey for freshwater fish was undertaken. The only potential for habitat or freshwater fish to be present within the designation area exists within the water race. The water race flows through an artificial pond west of and immediately adjacent to the existing runway into a culvert under the existing runway and away to the east eventually to the Clutha River.

It is the view of the writer that the potential for indigenous freshwater fish to be present (such as (*Galaxias brevipinnis* (Koaro) or non-migratory Galaxiids) is very low, particularly as a result of the excavation of the drain.

4 Significance

4.1 Comparison with Historical Vegetation and Significance Criteria

4.1.1 Significance Criteria – District Plan

Walker, et. al. (2003), Leathwick et.al., (2003) and Lucas Associates (1995), combine to suggest the vegetation historically present on the site was likely to have been a mosaic of *Sophora microphylla* (kowhai), matagouri, *Olearia* woodlands with *Myrsine divaricata* (weeping mapou), *Kunzea ericoides* (kanuka), *Corokia cotoneaster*, *Carmichaelia*, *Melicytus*, *Coprosma* and *Cyathodes* along with Fescue short tussock grasslands.

A report for the Protected Natural Area Programme (PNAP) survey of the Lindis, Pisa and Dunstan Ecological Districts recommended an area for protection located on the terrace true left of the Clutha River directly opposite the Wanaka Airport designation area (RAP 12 – South Hawea Flat). Refer to **Attachment 3** which shows the location of waypoints and this RAP.

The RAP is environmentally comparable to the Airport Designation Area and while it also contains pasture species and modifications associated with the use of fire and grazing by stock and rabbits, the PANP report identifies a substantially native community of fescue tussockland and *Raoulia* cushionfields as well as a range of dry land sub shrubs on the RAP (Ward, et.al., 1994). No such diversity was present within the Airport Designation Area with the exception of a few (and not more) porcupine shrubs and matagouri.

The Airport Designation Area has also been subjected to a long history of disturbance (fire, pastoral activities, cultivation, plant and animal pest infestation) which has resulted in the extensive loss of the pre-settlement vegetation communities.

As previously reported there were but a scant few specimens of matagouri and porcupine shrub, common associates of dry shrublands.

The presence of these specimens does not however in the view of the writer, satisfy any of the Criteria set out in Appendix 5 as they do not form or support a representative community, do not contribute to the diversity and pattern of the Upper Clutha indigenous biodiversity, nor are they distinctive components of the local indigenous flora. The specimens present provide no viable connectivity to dry land shrublands present on the terraces of the Upper Clutha.

No threatened species of flora or fauna have been found or are known to occur on the site.

4.1.2 Threatened Environment Classification and National Priorities

The site falls within a Land Environment classified as N5.1.c, and as identified in section 3 above, the site sits upon 'inland outwash gravels', which support naturally rare ecosystems.

Table 3 below lists the LENZ environment together with historical vegetation communities, the percentage indigenous vegetation cover remaining (estimated at the national scale) and threat category for N5.1.c environments. N5.1c environments are acutely threatened.

Table 3: LENZ Level IV Environments and Threat Status

LENZ Unit	% Indigenous Veg. Cover Remaining	% Protected	Threat Category	LENZ Historical Vegetation Description
N5.1c	2.7	0.8	Acutely Threatened	Supported continuous areas of grassland with some areas of kanuka.

Source: Leathwick, et.al. (2003) and <http://www.landcareresearch.co.nz/databases/LENZ/downloads/ThreatCategoriesVer3.xls>; accessed 16/11/09

The remnant indigenous vegetation present on this portion of the Upper Clutha inland outwash gravels and within this area of the N.5.1.c environment has however been so extensively cleared that it must be relegated it to the 97.3 percent of the N.5.1.c land area whose indigenous cover is considered to have been *lost*.

4.2 Summary of Significance

In assessing the ecological values identified within the site against the criteria for determining significance, it can clearly be concluded that the values of the site do not satisfy any of the criteria set out in Appendix 5 or the National Priorities as they might be applied to private land.

It is acknowledged that the land is Council owned. However, the later test has been applied to the site as though it were private land.

The findings of the site visit and assessment were discussed with Department of Conservation Programme Manager for Biodiversity at the local Wanaka Area Office who concurred that his understanding of the site was that there were “no values of interest to the Department on the upper terrace of the Clutha River within the proposed Designation area” (personal communication, Mr Stuart Thorne, 11/11/09).

5 Assessment of effects on the environment

5.1 Actual or potential adverse effects on the environment

5.1.1 Vegetation

There is no ecologically significant indigenous vegetation present on the site and only a few isolated specimens of indigenous shrubs. Therefore there will be no actual or potential adverse effects on the vegetation of the site arising from proposed extension of the Airport Designation area.

The construction of an extension to the existing runway or the construction of an additional runway within the proposed expansion of the Airport Designation area will result in effects that will be no more than minor; namely the removal of arable land, exotic conifer shelter belts and potential a few of the remaining indigenous shrubs.

5.1.2 Avifauna

There are no species of ecological significance present on the site. The species present at this site or potentially so are commonly found throughout New Zealand and indeed Australia. Most are also native to Europe and or North America.

During my site visit, small mixed flocks of finch species, blackbirds and starlings were observed feeding on the ground north of the existing runway, on a recently sown paddock and near willows west of the existing runway. A harrier was noted to be soaring over areas well populated by rabbit burrows.

Small birds such as sparrows and finches could potentially be involved in bird strike on aircraft. Sparrows have been identified as frequently involved in bird strike incidents (Department of Conservation 2006). Chilvers, et al (1997) suggests that smaller birds are individually less likely to cause damage or pose a serious threat to safety. However, species such as sparrows, finches, starlings and gulls that have flocking behaviour pose the greatest threat to aircraft (Chilvers, et al 1997, Ministry of Transport – Canada, 2004). Planes with higher speeds and quieter noise levels ahead of their flight path are at greater risk of bird strike (CAA, 2003).

Most birds, other than raptors and territorial species such as thrushes, will flock together at some point during the cycle of the year.

Waterfowl on nearby dams, spur-winged plovers, harriers, starlings, blackbirds, swallows, finches and the occasional black-back gull or migratory wader (e.g. South Island oyster catchers) which are or may be present on or around the site may from time to time be vulnerable to air strike.

Or conversely, they could pose a risk to safe aviation in the event that they were to be struck by an aircraft during takeoff or landing. Most bird strikes occur between 50 and 800 feet (16 to 266 m above ground level)¹. Nationally, spur wing plover account for 37% of bird strike at airports in New Zealand and 17% of bird strikes at Queenstown airport (Department of Conservation, 2006).

Given that there is an Airport Designation in effect at this site, the species present and the circumstances giving rise to effects, the need to control avifauna within the Airport Designation area already exists.

¹ Civil Aviation Authority of NZ (2003): Bird Hazards. Gaps Published April 2003

In New Zealand most species of native and indigenous wildlife are absolutely protected under Section 3, Part 1 of the Wildlife Act 1953, unless the species is listed in Schedules 1 – 6 of the Wildlife Act (Department of Conservation, 2006).

All species observed at the site with the exception of the spur-winged plover and South Island Pied oystercatcher (which are absolutely protected), are listed in Schedules 1, 3 or 5 of the Wildlife Act, 1953. Mallards are listed under Schedule 1 as game species and Schedule 3 as species that may be hunted subject to the Minister of Conservation's notification.

All other birds are listed in Schedule 5 as "Wildlife not protected".

It is common for airports to obtain authorisation from the Minister of Conservation to harass or kill absolutely protected wildlife for the purposes of minimising risk of air strike. Section 53 (1) of the Wildlife Act, 1953 makes provision for this.

Control of species listed on Schedule 3 outside of the hunting season, or any species not listed in Schedules 1 to 6 would require a permit from the Department of Conservation to dispose of birds under section 54 of the Wildlife Act. Conditions of any permit are likely to include Health and Safety requirements, use of humane dispatch methods and the appropriate disposal of the carcasses.

The writer understands that Wanaka Airport has commenced the process of obtaining such a permit under the Wildlife Act that would authorise them to undertake control in the form of harassment or killing avifauna which may pose a threat to maintenance of safe aviation conditions.

It is understood that this permit would be sought regardless of the outcome of the NOR in order to manage potential hazards associated with avifauna in the existing Airport Designation area.

5.1.3 Other fauna

The potential effects of the expanded Airport Designation area on invertebrates and lizards are likely to be no more than minor. There are no species of ecological significance known to be present at the site.

It is highly unlikely that the drainage ditch contains freshwater fish populations of ecological significance. Therefore the effects on freshwater fish habitat that may arise from filling the old river channel and extending the length of the existing culvert under the second runway are likely to be no more than minor.

5.2 Actual or potential benefits effects for the environment

There are no actual or potential ecologically beneficial effects on the environment that would arise from the proposed change in the Designation area according to the brief received and assessed.

6 Recommendations for mitigation measures to prevent or reduce potential or actual adverse effects

There are no significant ecological values known to be present within the area proposed for inclusion in the expanded Airport Designation Area.

An increase in aircraft use of the area may result in a commensurate increased risk of air strike (by virtue of the fact that more aircraft movements increase the opportunity or potential for an event to occur) however this can be reduced through the following management techniques:

- the removal of shelter belts used by birds for roosting and nesting, or ensure that they are cut back at least 150 metres from the runway or taxiway centre line²
- managing the land in a way that does not attract flocks of birds – e.g. not cultivating the soil or broadcasting seed over the ground surface,
- take measures which reduce or avoid the treatment tanks of Project Pure becoming more attractive to birds

The control of rabbits may reduce the local food supply of harriers which feed on rabbits thereby potentially posing a risk to safe aviation.

7 Opportunities for enhancement

The control of rabbits, *Hieracium*, reinstatement of short tussock grassland communities, *Raoulia* cushionfields and low shrubland as well as riparian planting along the portion of the drainage ditch to remain open would improve the ecological values of the site.

To the extent that any land management efforts to reinstate a level of indigenous diversity would not be at odds with the purpose of the existing and proposed expansion of the Airport Designation Area (i.e. would not create habitat attractive to birds), it is recommended that they be incorporated into any landscape rehabilitation following the site's development or associated with the ongoing management of the site.

² Ministry of Transport – Canada – Sharing the Skies; page 141

8 Summary

Queenstown Lakes District Council (QLDC), as a requiring authority for Wanaka Airport, seeks to extend the Wanaka Airport Aerodrome Designation to provide for an extension to the existing runway (from a 1,200m sealed runway to a maximum 1,750 m sealed runway) and a new sealed parallel runway to the north of the existing runway (maximum 1,700m by 30 m wide).

Notice of Requirement to alter the existing Wanaka Airport Aerodrome Designation is being prepared to facilitate this.

The Council owned land within the proposed expansion of the Designation is being used and is identified for potential future additional use by the Project Pure waste water treatment facility and disposal fields. The land therefore already supports an element of essential community infrastructure the proposed extension will in the view of the author result in additional adverse ecological effects.

An assessment of the ecological values of the affected area has determined that there are no species, communities or habitats of significance that would be adversely affected by the proposal.

Recommendations to enhance the existing ecological values are limited to efforts that would not attract avifauna thus increasing the potential for air strike.

This could include the control of rabbits and *Hieracium*, as well as the reinstatement of short tussock grassland communities, *Raoulia* cushionfields.

9 References

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ATTACHMENT 1

Proposed Domestic Runway Layout – February 2010

ATTACHMENT 2

A full species list

Wanaka Airport Aerodrome Designation Species List

e = endemic

n = native to NZ and elsewhere

* = introduced

Scientific name	Common name	Scientific name	Common name
Plants		Birds	
<i>Achillea millefolium</i> *	Yarrow	<i>Alauda arvensis</i> *	Skylark
<i>Agrostis capillaris</i> *	Browntop	<i>Anas platyrhynchos</i> *	Mallard ducklings
<i>Anthoxanthum odoratum</i> *	Sweet vernal	<i>Carduelis carduelis</i> *	Goldfinch
<i>Capsella bursa-pastoris</i> *	Shepherd's purse	<i>Circus approximans</i> ⁿ	Australasian harrier
<i>Cerastium fontanum</i> *	Mouse-ear chickweed	<i>Emberizia citrinella</i> *	Yellowhammer
<i>Chenopodium album</i> *	Fathen	<i>Sturnus vulgaris</i> *	Starling
<i>Cirsium arvense</i> *	California thistle	<i>Turdus merula</i> *	Blackbirds
<i>Crepis capillaris</i> *	Hawksbeard	<i>Vanellus miles</i> ⁿ	Spur-winged plover
<i>Cytisus scoparius</i> *	Broom – <i>recently sprayed with herbicide</i>	Mammals	
<i>Discaria toumatou</i> ^e	matagouri	Scientific name	Common name
<i>Echium vulgare</i> *	Vipers bugloss	<i>Oryctolagus cuniculus cuniculus</i> *	rabbit
<i>Erodium cicutarium</i> *	Storksbill		
<i>Hieracium aurantiacum</i> *	Orange hawkweed		
<i>Hieracium pilosella</i> *	Mouse-ear hawkweed		
<i>Holcus lanatus</i> *	Yorkshire fog		
<i>Hypochoeris radicata</i> *	Cats ear		
<i>Lupinus arboreus</i> *	Tree lupin		
<i>Malva parviflora</i> *	Small-flowered mallow		
<i>Marrubium vulgare</i> *	Horehoun		
<i>Medicago sativa</i> *	lucerne		
<i>Meliccytus alpinus</i> ^e	Porcupine shrub		
<i>Muellenbeckia axillaris</i> ^e	Creeping pohuehue		
<i>Pinus radiata</i> *	Radiata pine		
<i>Pseudotsuga menziesii</i> *	Douglas fir		
<i>Rumex acetosella</i> *	Sheep's sorrel		
<i>Taraxacum officinale</i> *	Dandelion		
<i>Trifolium arvense</i> *	Haresfoot trefoil		
<i>Trifolium repens</i> *	White clover		
<i>Verbascum thapsus</i> *	Woolly mullein		

ATTACHMENT 3

Location of waypoints and features considered during the assessment

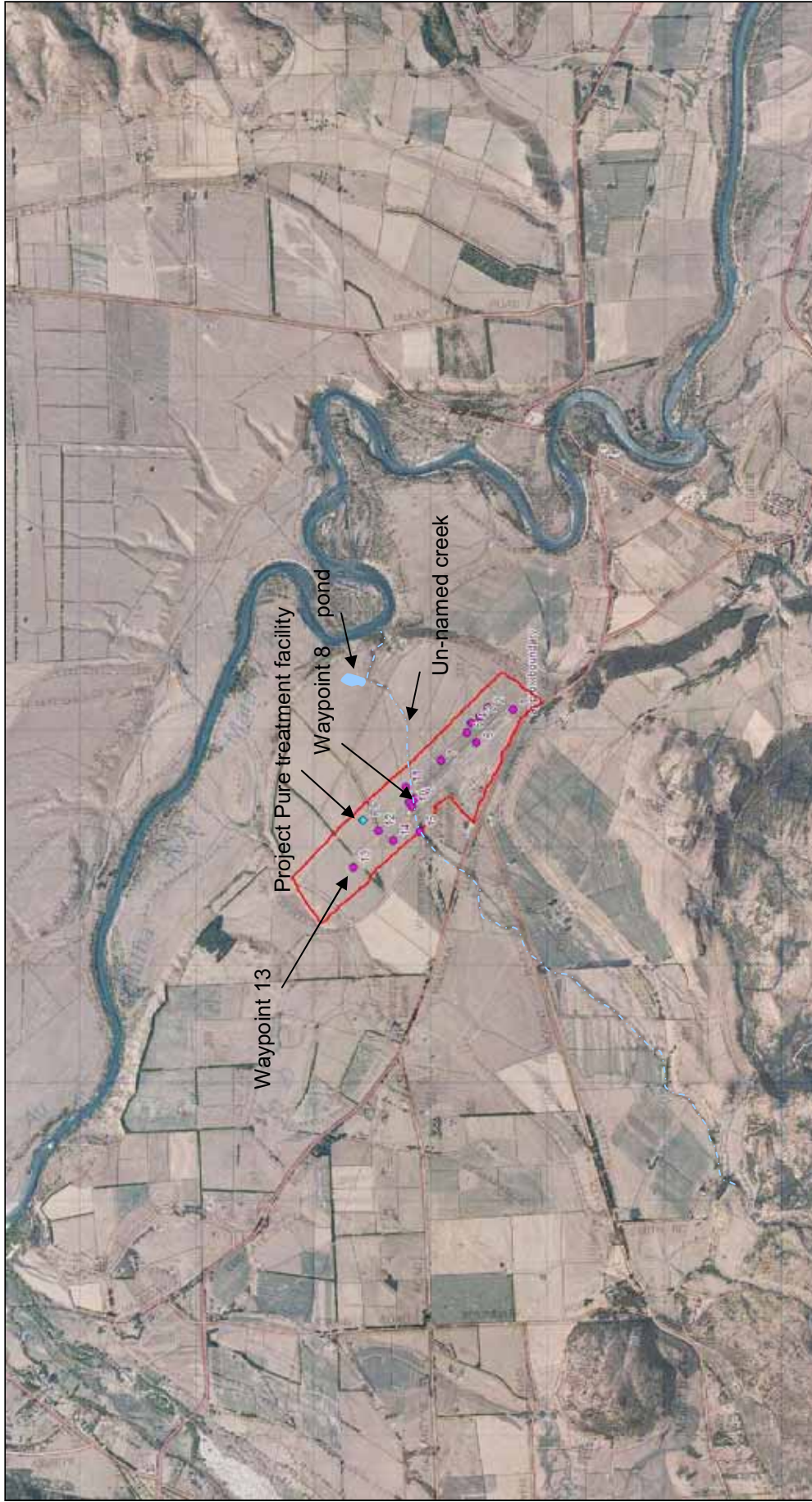


Figure 3. Location of waypoints and features considered during the assessment. The proposed boundary of the extended Designation area is shown in red.

Source of Aerial photograph: MapToaster