Survey of Brecon Street Eucalyptus trees

On behalf of

Queenstown Lakes District Council

Date: 3/10/2021

Contract Report: NS 161/21/ Brecon Street Trees

Prepared by

Natural Solutions for Nature Ltd

Disclaimer

This report has been prepared by Natural Solutions for Nature Limited ("NSN") on the basis of information available to the author at the time of preparation. Where information has been obtained from other trusted external sources it has been assumed that it is accurate, without independent verification, unless otherwise indicated. No responsibility is accepted by NSN for any errors or omissions by external sources.

Prepared by:

Natural Solutions for Nature Ltd

Site Surveys	Dawn Palmer Bianca Amis – assistant Jack Guthrie - volunteer	26, 27, 28 and 29 September 2021
Report Prepared by	Dawn Palmer Bianca Amis - assistant	30/9/2021
Report Approved by	Dawn Palmer, Principal Ecologist	3/10/2021

1 Introduction

Natural Solutions for Nature Ltd ("NSN") has been engaged by the Queenstown Lakes District Council ("Council") to undertake a survey of five (5) mature *Eucalyptus* trees on the corner of Brecon Street and Cemetery Road to determine the use of these trees by native (absolutely protected) bird species.

Council proposes to remove the five mature *Eucalyptus* trees. The removal of the trees is required to implement the streetscaping upgrade of Brecon Street outlined in the Kā Huanui a Tāhuna Tree Strategy.

The Tree Strategy and Streetscape Plans provided to NSN are included in **Attachments 1 and 2.**

The trees which are the subject of this assessment are located on the corner of Cemetery Road and Brecon Street [**Figure 1**] near the Queenstown central business district.

This report will identify birds using these trees and will determine whether there are active nests in the trees. The report will also provide some brief context for the role and value of the Eucalypts.

2 Method

Surveys were undertaken by:

- Dawn Palmer - Principal Ecologist - Natural Solutions for Nature Ltd
- Bianca Amis - B. Environmental Science (Conservation & Wildlife) and marine/ freshwater scientist - *engaged and supervised by NSN to assist with the survey*
- Jack Guthrie - B. Environmental Science (Conservation & Wildlife) - *volunteer assistant supervised by NSN*

The survey method used a variation of the best practice methods for counting at bird feeders (ebird.org: bird counting best practices) and the Landcare Research backyard bird count. Both methods record the maximum number of each species seen and or heard during a set period from a specific location or area. The method was adapted to enable a traveling (*movement of more than 30 metres from an observation point*) survey of the area surrounding the Eucalypts. This was needed as some of the mature trees are very large requiring the cluster of trees to be viewed from further back and from different angles.

As the brief for the survey was to determine whether birds were nesting within five specific trees affected by the Streetscaping Plan, the survey effort centred on birds coming and going from those trees. A larger 6th tree to the north was only peripherally included.

Figure 1 illustrates the boundaries of the area where observations were made, and birds were followed. GPS tracks were recorded for surveys on the 27th and 28th of September. The survey on the 26th of September spent more time viewing the tallest 6th tree to the north and the tops of the other trees from the north and western areas of the Park.

The visual catchment surrounding the subject trees was bounded by the protected Sequoia on Isle Street, conifers, cedars, and spruce along both sides of Cemetery Road, the street side plantings of Bespoke Kitchen along Brecon Street, the I-FLY, and adjacent buildings under construction on Brecon Street, the minigolf trees and shrubs, the conifers and deciduous trees in the park between the Lakeview Holiday Park and the Minigolf and the Cemetery boundary trees and shrubs.

On Wednesday 29/9/2021, a specific search of a top pruned Sequoia located under powerlines between Cemetery Road and Isle Street was undertaken to determine whether birds, particularly tui were nesting in the dense cover provided by that tree.

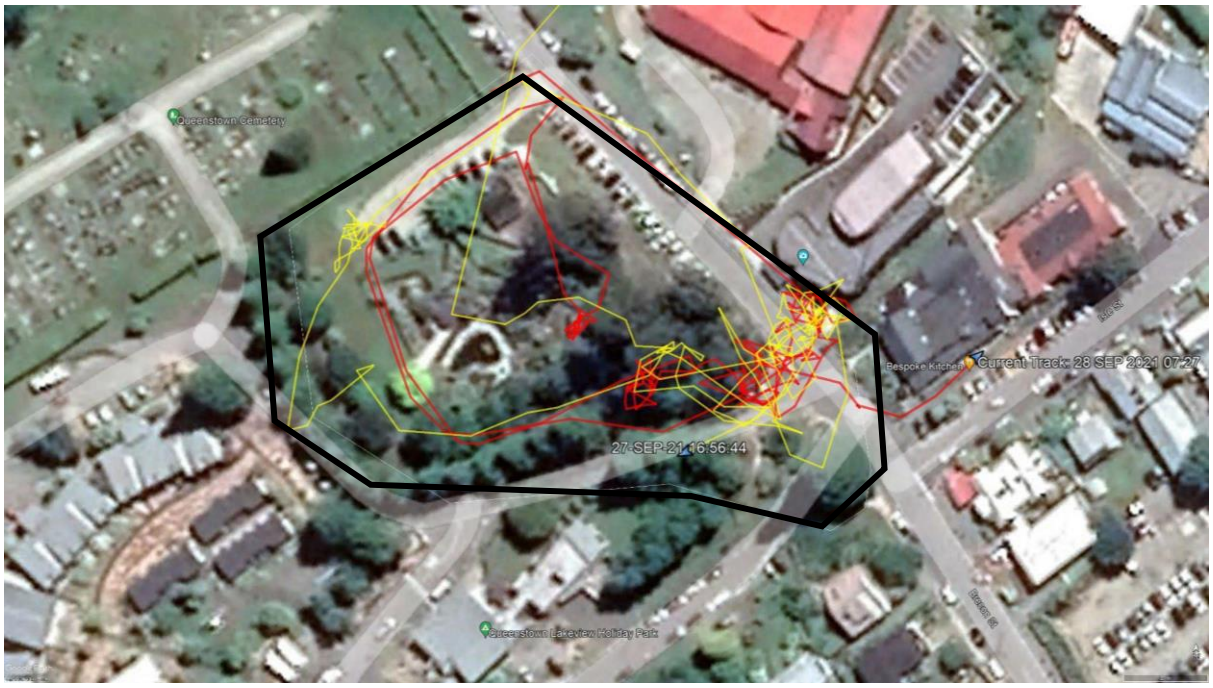

Figure 1 - Location of the survey area and survey tracks for two of the surveys.

The total visual catchment surveyed was about 7,310 m^2.

Three (3) surveys were undertaken for one (1) hour each; 45 minutes was spent searching the top pruned Sequoia and surrounding trees. They were undertaken on the following dates:

26/9/2021 Sunday 16:30 – 17:30 (1 person) - 1 hour of survey effort

27/9/2021 Monday 15:35 – 16:35 (2 observers) - 2 hours of survey effort

28/9/2021 Tuesday 07:30 – 08:30 (3 observers - including 1 volunteer) - 3 hours of survey effort

29/9/2021 Wednesday 14:00 - 14:45 (1 observer) - 45 minutes of search effort

The total combined survey and the search effort were 6 hours and 45 minutes.

Positions providing a good view of the trees were identified and two (2) observers using 10 x 50 and 10 x 42 binoculars systematically scanned the trees and branches for evidence of nests, behaviour that may indicate nesting, e.g., territorial displays or calling, defence, carrying of nesting material or courtship behaviour. Surveyors worked both independently and together where required to ascertain, confer or confirm behaviour, the number of birds, position of birds in the trees, and the direction of flight to or from the trees.

All birds seen and heard were recorded along with observed behaviour noted above to determine whether or not a nest was present and the value of the trees to the local bird population.

No bird was knowingly omitted from the survey counts; counts are conservative and have not knowingly double-counted birds seen.

The *Eucalpytus* tree species was confirmed as *Eucalyptus gunnii* by Dr Dean Nicolle, an Australian botanist, arborist, and ecologist widely recognised as the leading authority on the genus *Eucalyptus*, (https://dn.com.au/dean-nicolle.html). Mr Guthrie obtained the identification by submitting a description, photo of a specimen and reaching out for identification through the Eucalypt Australia website to which Dr Nicolle responded.

Introduced to New Zealand, *Eucalyptus gunnii* (Cidar Gum) is endemic to Tasmania, Australia. It is listed as "endangered" under both the national Environment Protection and Biodiversity Conservation Act 1999 and Tasmania's Threatened Species Protection Act 1995. Known for its tolerance to cold climates up to -14 degrees Celsius, this evergreen tree flowers for most months of the year and reaches up to 35m in height. This prolonged flowering period provides nectar for extended periods of time, making it a reliable food source for nectar-feeding avian species. (iNaturalist, 2021; https://inaturalist.nz/taxa/323288-Eucalyptus-gunnii).

Knots in the trees where limbs have dropped don't appear to have form holes. The general structure of the trees is open, bark and litter have built up in some of the branch forks.

2.1 Limitations of the survey:

1. While best endeavours were used to identify and count all birds interacting with the trees, it is unlikely that the counts represent an absolute total count of all birds present. This is due to the mobility of the species observed, cryptic behaviour, and the amount of cover provided by the trees and shrubs surrounding the 5 Eucalypts of primary interest.

2. Surveys were undertaken from the ground, the higher portions of the trees were more difficult to see and will need to be searched by an arborist to ascertain whether there are nests, active or inactive present in the higher portions of the tree. Refer to the recommended Protocols described later in the report.

3. The timing of the surveys was constrained by the urgency of the work brief received from the Council. It therefore provides a snapshot of early spring bird activity rather than a comprehensive assessment. NSN has sought additional information regarding the seasonal variation in the use of the trees from Paul Kavanagh, General Manager of the Kiwi Birdlife Park. Where I have relied on Mr. Kavanagh's incidental observations and/ or knowledge I have cited him as the source of that information.

4. The NSN surveys were undertaken over 4 days at the beginning of the breeding season. **Table 1** below provides a summary of the survey results. As it is still early in the breeding season, a determination of whether native species *will* or *would* nest in the trees may be premature. The determination of whether birds *are currently* nesting in the trees while addressing the primary brief to NSN does not necessarily capture the overall value of the trees within the context of the urban ecology of the area.

5. Public concerns about the tree felling asserted that the trees were used by kereru for nesting. No kereru were observed during the survey. Discussion regarding the Eucalypts as a nesting habitat is provided below.

6. The site surrounding the Eucalypts is a busy and loud construction site. Noise affected the ability of observers to hear birds at times. Heavy vehicle traffic and more particularly, continuous construction noise may currently be influencing the use of the trees by birds. However, it is noted that the intersection is known by the author to have been a busy intersection for many years due to high levels of tourism activity and buses accessing the Skyline Gondola and surrounding businesses and accommodation. Birds tolerant of urban habitats usually acclimate to the presence of activity that does not directly threaten them.

7. Due to time constraints involved in reporting and undertaking a desktop research for this report, www.Birdsonline.org and the Heather and Robertson (1996 and 2005) Field Guide to New Zealand Birds were relied on along with the author's own knowledge and experience without further reference to other peer-reviewed journals or the further publications cited in the Field Guide and web-based resources.

Figure 2 - Panoramic view of the Queenstown Bay and lower Horn Creek catchment; the mature Brecon Street Eucalypts provide a major source of virtually year-round nectar. This food source has been observed to attract large flocks of Tui during the winter (pers. comm Paul Kavanagh, Wildlife Manager - Kiwi Birdlife Park). Photo taken from Kerry Drive. The Eucaplypts are the most or among the most mature trees in this portion of Queenstown. They are potentially the most prolific source of year-round nectar (albeit from a non-native source) in this portion of Queenstown.

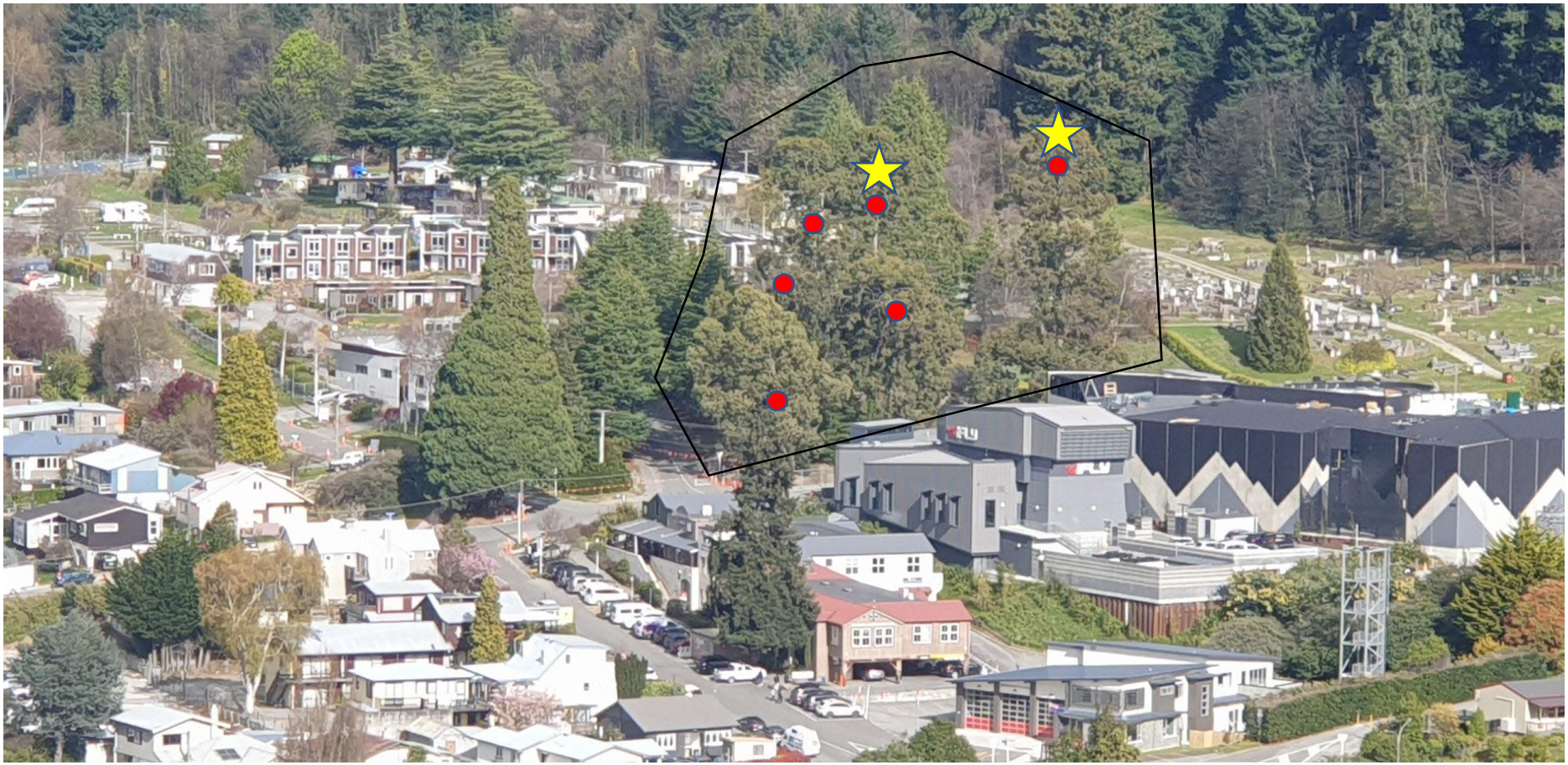

Figure 3 - The Brecon Street Eucalypts - seen here surrounded by conifers; a mature Sequoia south (left in this view) is listed by the District Plan as a protected tree. A very mature 6th Eucalypt is seen to the north (right) of the cluster of 5. Zoom view from Kerry Drive. Trees recommended to be retained marked with a yellow star.

3 Results

3.1 Species Present

Bird species recorded during the three (3) surveys undertaken are summarised in **Table 1** below.

At least 12 species were recorded in the vicinity of the five (5) Eucalypts. Incidental observations of activity in the 6th Eucalypt to the north were also noted.

Four (4) bird species were endemic and while not threatened, they are absolutely protected under the Wildlife Act, 1953. They were tui, korimako/ bellbird, piwakawaka/ fantail, and riroriro/ grey warbler.

Two (2) of these species were observed in the Eucalypts; they were the nectar-feeding species tui and korimako/ bellbird.

Piwakawaka/ fantail, and riroriro/ grey warbler are insectivorous species seen and heard (respectively) in the deciduous trees, red beech hedge, conifers, and gardens to the west and south of the Eucalypts. They were not seen in the Eucalypts during the surveys.

One (1) species - Silvereyes - are native birds, they were seen once, flying from east to northwest past the Eucalypts. While one may have anticipated silvereyes would also feed in these trees, they did not do so during the surveys.

The balance of birds seen were introduced, naturalised and secure overseas, they included blackbird, song thrush, starling, chaffinch, greenfinch, house sparrows, hedge sparrows, and small passerine (perching/ song birds) "finch" species that flew through the site too quickly to be identified. Chaffinch and sparrows briefly perched in the trees.

Species known to be present in the area but not detected during the surveys

New Zealand falcon (eastern) - At-Risk: recovering, are known by the author to hold territories on Queenstown Hill and Bowen Peak/ Bobs Peak area. The Queenstown Bay and its parks and gardens all fall within the territory of these two pairs. They have been regularly seen and heard by the author hunting over Queenstown including the area of the Brecon Street trees and its nearby surroundings over more than two decades. Mature, tall trees are used as perching posts to scout for prey. In the absence of tall trees, they perch on light posts and electrical installations where they risk electrocution (https://www.doc.govt.nz/news/media-releases/2015/doc-and-delta-partner-to-help-keep-new-zealand-falcon-safe-near-power-lines/). NSN notes that an electrical substation is located just 100 metres away between the Brecon Street trees and the Kiwi Birdlife Park.

Kereru have a variable breeding season that is dependent on the availability of ripe fruit; they nest most commonly between September and February and can support overlapping clutches such that they can be simultaneously incubating and chick-rearing in another nest, (Heather and Robertson, 2005). Pairs usually occupy the same nest each breeding season. The nest is constructed as a platform of sticks on a horizontal fork or tangle of vines 2 - 15 metres above the ground (Heather and Robertson, 2005).

Kereru breeding behaviour includes a conspicuous display dive; this is performed by both sexes but mostly by males close to the time of egg-laying near the nest location. Other displays include neck bobbing, close chases, a bobbing movement by the male, posturing and calling. Incubating or brooding birds defend their nests with grunts and wing flicking, (Heather and Robertson, 2005).

NSN has observed some of these behaviours over the Queenstown Gardens and Sunshine Bay areas.

Mr Kavanagh (Kiwi Birdlife Park General Manager) described seeing Kereru fly between the Kiwi Birdlife Park and the Queenstown Gardens where they feed on new kowhai shoots from August through until mid-September. Ironically their numbers seem to reduce just prior to the annual Great Kereru Bird Count held each year between about 17 and 26th September. Mr Kavanagh reported that he has never seen a nest in or around the Brecon Street trees or the Park but could not confirm whether they had *ever* nested in the trees.

On balance, NSN considers it highly unlikely that a kereru is currently nesting in the Eucalypt trees.

3.2 Determination of nesting

No active nesting was observed in any of the five *Eucalyptus gunnii* trees at the time of the survey.

The search for nests in the top pruned Sequoia between Cemetery Road and Isle Street was undertaken as a follow up site visit on Wednesday 29th September because tui had been observed flying into this tree during the other surveys. However, the search resulted in the conclusion that there was likely to be a blackbird nest in the tree's dense foliage.

A female blackbird was also seen carrying nesting material on the north side of the minigolf property on Tuesday 28th September.

3.2.1 Summary of bellbird activity and nesting behaviour

- Bellbird (at least 3) were frequently seen and heard in the flowering Eucalypts during all three of the surveys. They were additionally heard near the toe of the conifer-clad slope northwest of the surveyed site, from the direction of the Kiwi Birdlife Park and to the

south and southeast. They were frequently seen flying between the Brecon Street Eucalypts and the Bespoke Kitchen nectar feeder (cup mounted on the wall).

- While in the Eucalypts they gleened, perched, sang, and fed on nectar. They were seen to move rapidly up and down the trees while foraging and returning to the trees (particularly the southeasternmost trees which have a higher density of open flower) after short periods away. They appeared to move most frequently between the Eucalypts, the Bespoke Kitchen feeders, and an attractant southeast of the Eucalypts.
- The behaviour of the bellbirds indicates that the Eucalypts are important sources of nectar but that no nesting was occurring in the trees.
- Bellbirds maintain the same territory year to year. The female makes a cup nest of twigs and fibres, lining it with feathers and fine grasses. Most nests are constructed in dense cover in a fork (Heather and Robertson, 2005). While territorial, they may leave a territory to feed at a valuable nectar source.

Conclusion - bellbirds:

- Bellbirds are not currently nesting in the Eucalypts nor are they likely to be nesting in the immediately surrounding trees.
- The Eucalyptus trees provide a valuable source of year-round nectar for bellbirds and are within the territory of at least 2 pairs.

3.2.2 Summary of tui activity and nesting behaviour

- At least two (2) tui – a pair – were observed in the Eucalypts.
- They were most frequently seen perching and calling from the top of the trees and occasionally within the flowering portion of the southeastern most trees where there was a higher proportion of open flowers. They did not spend as much time as the bellbirds in the trees. Tuis usually displace bellbirds at defended foraging sites.
- During the surveys they were primarily observed:
    - calling from the top of the tallest, 5th tree from the Cemetery Road corner for 45 minutes on 26/9/2021,
    - calling from the top of the large, protected Sequoia to the south for 20 minutes on the 29/9/2021.
    - calling from the top of the 2nd and 3rd trees north from the Cemetery Road intersection,
    - feeding from the Bespoke Kitchen nectar (cup feeder) and
    - aerial feeding on insects between Cemetery Road and Isle Street,
    - flying to the dense cover of the nearby cedars and conifers along Cemetery Road and to the top pruned cedar that was checked for nests on 29/9/2021.

    - repeatedly flying southeast in the direction of the Man Street roundabout, and towards the Kiwi Birdlife Park.
    - They were also heard calling from the direction of the Cemetery

- Territories are established in September – October by singing from high perches, especially in the early morning and late afternoon, (Heather and Robertson, 2005). Females build bulky nests with twigs and sticks lining them with fine grasses, usually in a fork of a shrub, top of a sapling, in or under the canopy of a tree, sometimes under vines; usually sheltered, those sometimes in the open or even in the fork of an outer branch in the canopy/ subcanopy in large trees (Higgins, et al. (2001). The Brecon Street Eucalypts have a reasonably open structure and are relatively exposed given their height and relative isolation as a mature copse within an urban setting.
- Tui willl aggressively defend territory and food sources, however they were not observed to defend the Eucalypts during the surveys. No aerial chases or defensive flying behaviour were observed between tui and other species.

Conclusion – tui

- On balance, given the prolonged singing by the male tui from the tops of the trees in the late afternoon, and the presence of a smaller female, the Eucalypts are assessed as being within the territory of at least 1 pair of tui.
- NSN saw no physical evidence of tui be nesting in the Eucalypts nor are they likely to be nesting in the immediately surrounding trees.
- They were not observed to defend the nectar source by chasing bellbirds away from it.

Additional Notes

- Tui may form communal roosts in winter when attracted to an important food source, (Heather and Robertson, 2005). Mr Kavanagh reports that he and or staff of the Kiwi Birdlife Park have observed tui flocking to the winter flowers of the gum trees; their numbers had recently reduced, (pers. comm. Paul Kavanagh).
- Tui are known to travel 20km + to gain regular access to winter flowering gums (Eucalypts), (Heather and Robertson, 2005).

Table 1 Species recorded during the survey and their behaviour

Species	**Conservation Status**	**Maximum seen/ heard**			**Behaviour**	**Interaction with *Eucalyptus gunnii***
		1	**2**	**3**		
tui *Prosthemadera novaeseelandiae*	Endemic, NT, increasing	2	2	1	Perching, territorial singing, nectar-feeding	Tree not defended; territorial perching/ singing tree; year-round source of nectar
korimako/ Bellbird *Anthornis melanura*	Endemic, NT	3	3	3	Perching, territorial singing, nectar-feeding	frequent use of tree; year-round source of nectar
piwakawaka/ Fantails *Rhipidura fuliginosa*	Native, NT, extreme fluctuations	3	1	-	foraging through red beech hedge, and deciduous exotics feeding while in flight	no interaction
riroriro/ Grey warbler *Gerygone igata*	Endemic, NT	2	1	-	heard to the south of the area	no interaction
tauhou/ Silvereye *Zosterops lateralis*	Native, NT, SO	-	-	2	flew E to NW past the trees	no interaction; anticipated that some feeding may occur
blackbird *Turdus merula*	Introduced, NAT, SO	4	4	2	nest building, ground feeding	no interaction
chaffinch *Fringilla coelebs*	Introduced, NAT, SO	3	2	2	calling, foraging perching in surrounding trees	no or fleeting interaction, perch & fly
greenfinch *Carduelis chloris*	Introduced, NAT, SO	2		5	calling, foraging perching in surrounding trees	no interaction
Song thrush *Turdus philomelos*	Introduced, NAT, SO	1		1	ground-feeding; singing from the surrounding habitat	no interaction
sparrow *Passer domesticus*	Introduced, NAT, SO	11	3	2	ground feeding	no or fleeting interaction, perch & fly
dunnok *Prunella modularis*	Introduced, NAT, SO			2	ground-feeding; courtship displays	no or fleeting interaction, perch & fly
starling *Sturnus vulgaris*	Introduced, NAT, SO			1	Heard in conifers	no interaction
finch spp.	Introduced			4	flying through site, too fast to identify	no interaction

Survey numbers: **1** - 26/9/2021 Sunday 16:30 – 17:30; **2** - 27/9/2021 Monday 15:35 – 16:35; 3 - 28/9/2021 Tuesday 07:30 – 08:30
Table Abbreviations: NT - not threatened; NAT – Naturalised; SO - secure overseas

4 Legal Framework

4.1 Wildlife Act 1953

The provision of legal advice in not within the author's area of expertise, however the Wildlife Act 1953 specifies that it is an offence to knowingly disturb the nest of an absolutely protected species (see above) – Tui, bellbird, fantail and grey warblers, falcon and kereru all fall into this category.

In relation to whether or not the trees are used for *nesting* at the time of felling, NSN provides the following recommendations and the adoption of the protocol set out below should Council proceed with the removal of the trees.

NSN's understanding of the Wildlife Act 1953 suggest that if Council (or their contractors) were to knowingly fell a tree that is currently occupied by the nest of an absolutely protected, this would constitute a prosecutable offence under the Wildlife Act.

The relevant provisions of the Act are copied below[1].

S. 63(1)(c) No person may, without lawful authority,—

> rob, **disturb, or destroy,** or have in his or her possession the nest of any absolutely protected or partially protected wildlife or of any game. (*doing so constitutes an offence – S63(1A)(a)(b))*

S. 65 (1) (f) Every person commits an offence against this Act and is liable on conviction to the penalty set out in section 67F(5) who— without a licence, permit, concession, or other right or authority, does or causes to be done any act, matter, or thing for which a licence, permit, concession, or other right or authority is required by this Act or by any regulations under this Act:

S 3 Wildlife to be Protected

Subject to the provisions of this Act, all wildlife is hereby declared to be subject to this Act and (except in the case of wildlife for the time being specified in Schedule 1, Schedule 2, Schedule 3, Schedule 4, or Schedule 5) to be absolutely protected throughout New Zealand and New Zealand fisheries waters.

[1] https://www.legislation.govt.nz/act/public/1953/0031/latest/whole.html%20-%20DLM277094

Absolutely protected wildlife – Tuis, bellbirds, fantails, grey warblers (not threatened).

Falcon (At-Risk: recovering) and kereru (not threatened) may perch in them. However, no falcon or kereru were not seen during the surveys and no evidence of nesting by kereru was identified by the NSN surveys.

Partially protected wildlife - **Schedule 2** – Silvereyes

Wildlife Not Protected - **Schedule 5** – Including: Blackbird, Finch – Chaffinch, Goldfinch, Greenfinch, Lesser redpoll, Magpie, song thrush, sparrow, starling

4.2 Resource Management Act, 1991

The Eucalypts do not provide significant habitat of indigenous fauna (Section 6 (c)). The Eucalypts are mature, isolated but ***introduced*** trees, the Chapter 33 objectives, policies and rules of the Proposed District Plan Decisions Version (April 2021) therefore do not apply with the exception that they may provide habitat in the form of a perching post for hunting within the range of at least 2 pairs of At Risk (recovering) falcon.

5 Conclusion and Recommendations

5.1 Significance of the trees

Noting the limitations of the surveys described in Section 2.1 above;

1. NSN observed no indication that the trees were supporting nests at the time of the surveys.
2. The trees are used for foraging (gleaning insects/ nectar feeding), roosting, perches as part of territorial song display by the species noted in this report.
3. The trees provide a year-round supply of nectar and at the time of the surveys they were developing a good supply of opening flower buds.
4. The trees are in an area of Queenstown popular with visitors and being developed to further increase the use of the area by visitors thereby providing a site where visitors may encounter these melodious and vocal endemic birds, particularly during the winter, (relying on Mr Kavanagh's advice).
5. NSN agrees with the public comments of local arborist, Mr Jimmy Carling that the mature trees are inter-generational in their age and stature and this value cannot be replaced in one's lifetime; the removal of an opportunity to connect with mature elements of nature in an urban setting should therefore be carefully weighed against the full suite of options.
6. The trees are introduced in New Zealand but *Eucalyptus gunnii*, an endangered species endemic to Tasmania, Australia.

5.2 Recommendations

1. NSN recommends further consideration be given to whether a compromise can be reached where the larger, more mature trees north of the intersection might be accommodated by the streetscaping plans and the removal of trees is limited to the 3 or 4 smaller trees closer to the Cemetery Road intersection as required to provide safe pedestrian use of the proposed streetscape; refer to **Figure 3** above and **Figure 4** below**.**
2. The adoption of the Protocol for Nest Detection is recommended for the Brecon Street trees.
3. NSN further recommends that Council consult with the Department of Conservation regarding the protocols prior to commencement of work.

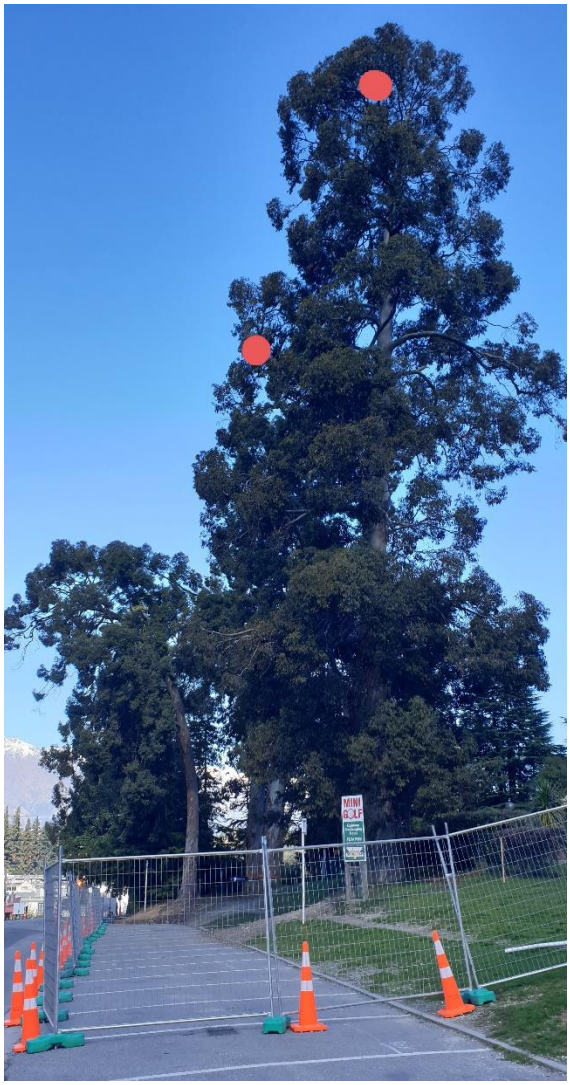

Figure 4: Largest Eucalypts - Trees 5 and 6 recommended for retention.

5.2 Protocol for Nest Detection

1. An arborist must undertake a thorough and methodical pre-work inspection prior to the commencement of any work to remove or limb a tree to confirm that it is not occupied and is void of all absolutely or partially protected bird nests, active or not.
2. If a nest is found on initial inspection, work must stop and must not proceed until such time as the confirmation can be provided by a suitably qualified ecologist/ ornithologist that the nest is no longer active, refer to **Table 2** for a guide to nesting seasons. No action by the arborist shall result in the abandonment of the nest.
3. If at any time an arborist upon commencing to fell or remove the tree, discovers a nest, work must cease until such time as the nest can be confirmed as active or not; if the nest is active, work must cease until the nest is no longer active, refer to **Table 2** for a guide to nesting seasons. No further action by the arborist shall result in the abandonment of the nest.
4. There shall be no disturbance of an active nest unless Council has first obtained a permit to relocate the nest of the absolutely protected bird. This would require an investigation into whether nest relocation for the species concerned were even a viable prospect; refer to **Table 2** for a guide to nesting seasons.

Table 2 Summary of Nesting Behaviour of Indigenous Species

Species	Typical Nesting Habitat	Typical Nesting/Breeding Season[2]
Korimako/ Bellbird *Anthornis melanura*	In a fork under dense cover Heights: 1.5m - 12m	BS: Sept - Jan EL: Sept-Jan IN: 15 days FL: 19 days IND: 40 days
Grey Warbler *Gerygone igata*	Outer branches of the canopy, with preference to small-leafed tree species such as manuka, kanuka and *coprosma* sp. Heights: 2m - 4m	BS: Aug - Feb EL: Aug - Dec IN: 21 days FL: 19 days IND: 35 days
Kereru/NZ Pigeon *Hemiphaga novaeseelandiae*	Dense foliage in canopy/sub canopy for native or exotic trees Heights: 1.8m - 20m	BS:Mostly Sept - April, but can occur year-round EL: As Above IN: 30 days FL: 45 IND: Unknown
Tui *Prosthemadera novaeseelandiae*	Canopy/Sub canopy Heights: 2m - 30m	BS: Sept - Jan EL: Sept - Jan IN: 14 days FL: 21 days IND: 35 days
Fantails *Rhipidura fuliginosa*	Sheltered from above by foliage in trees Heights: 0.8m - 11m	BS: Aug - Feb EL: Sept - Jan IN: 16 days FL: 14 days IND: 36 days

Source: https://www.nzbirdsonline.org.nz/

[2] Table Abbreviations: BS: Breeding Season, EL: Egg-laying dates, IN: Maximum Incubation period, FL: Maximum fledging age, IND: Mean age of independence.

6 References

Heather, B.D.; Robertson, H.A. 2005. The field guide to the birds of New Zealand. Penguin Books, Auckland.

Higgins, P.J.; Peter, J.M.; Steele, W.K. 2001. Handbook of Australian, New Zealand and Antarctic birds. Vol. 5, tyrant-flycatchers to chats. Oxford University Press, Melbourne.

iNaturalist. (2021, September 29). Cider Gum *Eucalyptus Gunnii*. https://inaturalist.nz/taxa/323288-Eucalyptus-gunnii

Robertson, H.A. 2013. Tui. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz

Roberstons, H.A. et al,. (2016): Conservation status of New Zealand birds. *New Zealand Threat Classification Series 19. 27* p

Sagar, P.M. 2013. Bellbird. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz