Form 5: Submission on notified proposal for policy statement or plan, change or variation

Pursuant to clause 6 of the First Schedule of the Resource Management Act 1991

To: Hamilton City Council (**the Council**)

Name of submitter: Penny Nelson, Director-General of Conservation (the **Director-General**)

1. This is a submission on the following proposed private plan change to the operative Hamilton City Plan

   Plan Change 15 - Tuumata Private Plan Change

2. I could not gain an advantage in trade competition through this submission

3. The specific provisions of the proposal that my submission relates, and the detailed decisions sought to are set out in **Attachment 1** to this submission.

4. I **seek** the following decision from the Council:

   a. That the amendments to Proposed Plan Change 15 sought in Attachments 1 are made; and

   b. Further or alternative relief to like effect to that sought in 4. a. above.

5. The decisions sought in this submission are required to ensure that the Tuumata Private Plan Change

   a. Recognises and provides for the matters of national importance listed in section 6 of the Act and to has particular regard to the other matters in section 7 of the Act;

   b. Promotes the sustainable management of natural and physical resources; and

   c. The changes sought are necessary, appropriate and sound resource management practice.

6. I wish to be heard in support of my submission, and if others make a similar submission, I will consider presenting a joint case with them at the hearing.

Kathryn Holland

Manager Operations

Waikato

Department of Conservation

Acting pursuant to delegated authority on behalf of Penny Nelson, Director-General of Conservation

Date: 24 May 2023

Note: A copy of the Instrument of Delegation may be inspected at the Director-General's office at Conservation House Whare Kaupapa Atawhai, 18/32 Manners Street, Wellington 6011

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ATTACHMENT 1:

PLAN CHANGE 15 – TUUMATA PRIVATE PLAN CHANGE
SUBMISSION BY THE DIRECTOR-GENERAL OF CONSERVATION

Long-tailed Bats

1. Long-tailed bats are a Threatened – Nationally Critical species, the highest threat category for New Zealand species.

2. Long-tailed bats are present in the Hamilton area and are a highly mobile species, with varied habitats for roosting, foraging, commuting, and socialising. The Ecological Impact Assessment (EIA), provided as Appendix 6A to the Plan Change Request, identifies that long-tailed bats have been recorded within the plan change site and that the site contains potential bat roost trees.

3. Hamilton City Council's (HCC) Environment Committee endorsed the Waikato Regional Bat Strategy in February 2022. This strategy was prepared on behalf of the Waikato Bat Alliance. The Alliance is a cross-council, multi-organisation group which includes council staff representatives from Waikato Regional Council, Hamilton City Council, Waipā District Council, Waikato District Council and the Department of Conservation, as well as representatives from Waikato-Tainui, Te Haa o te Whenua o Kirikiriroa and Ngā Iwi Tōpū o Waipā.

4. A key outcome of this operational Strategy is to align plans, policies and methods for bat habitat protection and restoration through high-level strategic collaboration between Alliance members. It is noted that the Bat Strategy is not a statutory document, however district plan changes are identified as opportunities to resolve issues around bat habitat protection.

5. Limited survey work has been undertaken to support the understanding of the current use of the site by long-tailed bats.

6. The Director-General submits that the proposed provisions for bats and bat habitat need to be strengthened to meet the direction of the WRPS, particularly Policies ECO-P1, ECO-P2 and ECO-P3 and Methods ECO-M1, ECO-M2 and ECO-M13.

7. To mitigate the effects of habitat loss the EIA is recommending the installation of artificial bat roosts at a rate of 4:1 for high-risk bat roost trees and 2:1 for medium risk bat roost trees. This would result in 160 artificial bat roosts in replacement for 20 high value and 40 medium value trees. The success of artificial roosts is unknown. A study in south Hamilton found only 31% of artificial roosts were used by long-tailed bats and that occupation was sporadic with no clear seasonal pattern. Only 4% of these occupied roosts were classed as maternity roosts. Artificial roost use is therefore low and are only an interim measure as there is no guarantee that they will be used or that they provide suitable conditions for the rearing of young.

8. Long-tailed bats are very specific about the roost cavities they select, and these can be quite rare in the landscape even in native forest. In a fragmented landscape such as Hamilton, including the site subject of the proposed private plan change, there is limited choice as there are so few trees. A lack of choice may lead to the use of sub-standard roosts for longer time periods. This may influence the survival of young bats and increase the risk of predation or disease. Introducing artificial roost boxes will provide a temporary solution to the loss of potential roost holes but they are not considered a long-term substitute for the loss of trees as potential roosts.

9. The EIA recommends the Roost Protection Protocol to manage the potential injury/mortality of long-tailed bats during tree felling. This approach is supported but the applicant has produced their own tree felling protocol (Appendix 10 of the EIA). It is recommended they use the Bat Recovery Group approved Roost Protection Protocol (attached this this Submission) to ensure a consistent approach is taken to the felling of potential roost trees. It must be noted that there is no research that shows that this Roost Protection Protocol prevents injury or death to bats – the protocol has been designed to lower the risk.

10. The Director-General submits that the proposed use of artificial roosts and recommended use of the Bat Recovery Group approved Roost Protection Protocol alone will not be adequate to mitigate all effects upon Long-tailed bats. Provision should also be made for replacement plantings of suitable indigenous tree species that upon maturity may provide roosting sites. Dark vegetated corridors should be provided to allow long-tailed bats to navigate through the landscape.

Freshwater Habitat Loss

11. The waterways within the proposed plan change area are known to provide habitat for black mudfish (Neochanna diversus, At Risk – Declining), longfin eel (Anguilla dieffenbachii, At Risk – Declining) and shortfin eel (Anguilla australis, Not Threatened). The private plan change request may have significant impacts on these species as a result of further habitat loss and fragmentation.

12. The EIA indicates that there would be permanent loss of the existing drain waterways, with all waterways within the plan change area removed and replaced with a network of swales and storage basins that will form part of the stormwater treatment and conveyance infrastructure.

13. Assumptions within the private plan change request that habitat provided within the created swales and wetlands will have a positive effect and overall net ecological gain, providing 'higher quality habitat than that lost' ignores the potential restoration value of existing habitat and uncertainties in whether newly created habitat will be able to provide suitable habitat for freshwater fish.

14. It is noted that the primary purpose of the swales and wetlands included in the private plan change request are for stormwater treatment and will be managed as such. The Director-General maintains that when creating new habitat to mitigate for permanent loss of existing habitat, this should be done specifically for the species to ensure that habitat conditions are suitable, and translocated populations are monitored and managed to assess success.

15. In terms of habitat, the outcome of the Ruakura South Native Fish Management Plan is for 9,930 metres of existing mudfish habitat to be replaced with one large wetland (calculated based on total area of the waterway). The Director-General considers that a large wetland will not necessarily provide suitable habitat or equate to the same amount of habitat as that lost.

16. The EIA notes that an ecological outcome of no net loss is required for black mudfish but also notes issues with how this is assessed and implemented. There is a significant assumption that the habitat will be suitable, and mudfish will survive there as long as it meets known habitat preferences. However, the Director-General submits that habitat creation and translocation can be difficult and is not guaranteed to be successful. Further information is required on wetland design and monitoring plans.

17. The assessment is lacking detail and certainty about how effects of permanent habitat loss will be appropriately mitigated or otherwise compensated. There is not enough detail to claim no net loss for black mudfish.

Biodiversity Compensation Model.

18. Biodiversity offsets and compensation are routinely employed to address biodiversity losses driven by ongoing development in Aotearoa/New Zealand. However, there is currently no accepted standard for calculating the type and quantum of offset or compensation required to address this development induced loss. Biodiversity trades are complex and must account for substantial uncertainties; biodiversity offset models are a promising tool that could assist decision-makers. However, models of insufficient quality can exacerbate issues in existing biodiversity trades, perpetuate systematic biodiversity losses and distract decision-makers from discussions regarding real-world ecological consequences of development.

19. Biodiversity offsetting is a high-risk tool for managing biodiversity because it involves trading guaranteed biodiversity losses in the present for estimated future gains resulting from targeted management interventions. Very little evidence concerning the efficacy of offsets and compensation has been published within the Aotearoa/New Zealand context because many consented projects have not yet begun or been completed, and because the compliance and monitoring of outcomes have been inadequate.

20. The Biodiversity Compensation Model (BCM) (Baber et al. 2021) was developed as an alternative and simpler version of existing offsetting accounting models. The BCM uses an aggregated qualitative habitat score to 'sense check' the adequacy of estimated biodiversity gains due to proposed management actions but does not reliably demonstrate No Net Loss (NNL) or Net Gain (NG).

21. The BCM has been used to support a NNL or NG outcome without the rigour of a quantitative offset model. Qualitative models can create an undue impression of robustness that risks further biodiversity loss if relied upon by decision makers.

22. The BCM approach has recently been rejected by the Environment Court for being too uncertain to reliably demonstrate NNL or NG[1].

23. It is acknowledged that models are necessary to assist decision-making of complex or uncertain biodiversity trades. However, there are specific characteristics of models that are essential when looking to preserve current and future biodiversity. If these are adhered to, we believe that the risk of falsely predicting, or misrepresenting, a NG outcome from a biodiversity offset will be reduced.

24. The widespread acceptance and use of poorly designed ecological models will result in real biodiversity loss in Aotearoa/New Zealand.

25. The proposed plan change relies heavily on the BCM to address effects upon black mudfish and is of concern for the D-G given the concerns/limitations of the model described above.

Relief Sought

26. I seek that the plan change includes requirements for the following as part of any consent application to develop the site:

    1. Detailed surveys of bat use of the site.

    2. Identification and protection of active bat roost trees and use of the Bat Recovery Group approved Roost Protection Protocol.

    3. Replanting of native trees to replace high and medium value potential roost trees to establish dark vegetated corridors to allow long-tailed bats to navigate through the landscape.

    4. An ecological management plan to manage effects on bats and mudfish.

    5. The use of an accepted quantitative Biodiversity Offsetting Accounting Model.

1 (Royal Forest and Bird Protection Society of New Zealand Inc. v West Coast Regional Council and Buller District Council [2023] NZEnvC 68).

Protocols for minimising the risk of felling bat roosts

(Bat Roost Protocols (BRP))

Version 2: October 2021 approved by the New Zealand Department of Conservation's Bat Recovery Group

The use of these protocols should be a final step in the avoid/remedy/mitigate hierarchy. Avoidance of felling bat roost trees should be the first step in any project.

Purposes of this document:

1. To outline why protection of roosts is important for the persistence of New Zealand bats and why removal of known and potential roosts should be avoided.
2. Where roost removal cannot be avoided, to set out the minimum requirements and protocols for removing trees in areas where bats are present, to minimise the risk of killing bats.

This protocol does not eliminate the risk to bats of death or injury because bats or active bat roosts can be missed. The best way to eliminate risk of felling an active roost is to **avoid** felling any known or potential roosts.

Context

The status of New Zealand bats

New Zealand's two extant bat species (pekapeka) are classified as threatened.

Long-tailed bats are classified as 'Nationally Critical' because the species is likely to have a 70% decline in numbers within three generations.

Lesser short-tailed bats comprise three subspecies. The northern subspecies is classified as 'Nationally Vulnerable' because there are 1000-5000 mature individuals and the predicted decline in numbers is 10-50% within three generations. The central subspecies is 'Declining' because there are 20 000-100 000 mature individuals, and the predicted decline is 10-50% within three generations. The southern subspecies is 'Recovering' because there are 1000-5000 individuals, and the predicted increase is >10% within three generations.

Threats to bats

This document deals specifically with roost protection; however, roost protection is only part of the wider issue of habitat loss. Habitat loss through land clearance, habitat degradation, fragmentation and disturbance and loss of roosts reduces roosting, foraging and socialising areas. Individual bats and colonies are also threatened by the local felling of individual trees.

Bats have large home ranges which can include unprotected peri-urban habitat. Protecting habitat and maintaining connectivity of vegetation are crucial for bats being able to persist and flourish in the environment.

Predation and competition by introduced predators: mustelids, rats, cats, and possums have all been implicated in the decline of bats[1].

Roosts are critical to the survival of bats

Roosts are where bats gather to shelter during the day and at night. They are used to socialise, mate, give birth, and raise young. Bats have very specific requirements when they are choosing roosts and are not just choosing any

[1] O'Donnell CFJ; Christie JE; Hitchmough RA; Lloyd B; Parsons S 2010. The conservation status of New Zealand bats, 2009. New Zealand Journal of Zoology 37: 297– 311.

tree[2]. The specialised features of roosts make them rare and almost irreplaceable in any landscape or habitat type except over very long-time frames. People sometimes falsely suggest that "bats can just move to another tree". This is not the case, particularly where trees suitable as roosts are limited[3].

Bats demonstrate high site fidelity to existing roosts and their specific roosting areas, and they move on a rotation among these. Because roost trees are likely to be rare, and are occupied to fulfil specialised requirements, felling breeding roost trees even when bats are absent will have a significant negative effect. If the number of suitable roosts and their surrounding habitat is reduced in the landscape, bats are forced to use roosts that are less thermally efficient. This means they will use more energy to survive, resulting in reductions in survival and lower reproductive success. In this way, roost removal is likely to result in higher risk of local extinction.

Bats can roost in native or exotic vegetation – therefore it should not be presumed that exotic species such as pine trees will not support bats. Roosts, including maternity roosts, have been found in many exotic species including, but not limited to, pine, poplar, oak, and acacia species, black locust, willow, eucalyptus and Tasmanian blackwoods.

Bats are at risk of being injured or killed when trees are felled

If a tree is felled with a bat in it, it is highly likely that the bat will be injured or killed, although this may not be apparent at the time because injuries, such as bruises and fractures, which would hinder bats' ability to fly well, may take time to be obvious.

The highest risk of injuring or killing bats or trapping them within their roosts is when they are heavily pregnant, when young are still dependent on the roost (late November – February) and when bats are more likely to be in torpor (May – September). Heavily pregnant bats are slower and less agile, and young bats cannot fly, so their chances to escape are reduced when roost trees are felled. Also, it is possible that if the larger female-dominated maternity roosts are cut down when females are raising their young to independence (October-March), a whole colony of bats could be destroyed at one time.

During winter bats use torpor (a type of hibernation) more often than during other times of year, so if trees are cut down in winter, bats may be unable to rouse from torpor and to fly away in time to escape. Additionally, it is significantly harder, sometimes impossible, to detect bats roosting in trees during torpor. For these reasons, trees with potential bat roost features must not be cut down in winter. Bats also use torpor for short periods during summer, for example, if the weather gets cold, so the risk of killing or injuring bats that cannot escape falling trees exists at any time of the year.

Bat roost protocols and the RMA

The occurrence of bats and bat habitat is a matter of 'significance' under Section 6(c) of the Resource Management Act (RMA). Bat roost protocols have become a standard part of bat management plans that may be required under RMA consents. Where developments require consents, and bats (a threatened species) are present, the developments should 'Avoid' impacting bats and bat habitat. Bat roost protocols only attempt to minimise the number of bats killed by tree felling, therefore implementing bat roost protocols where bats are present should be considered a last resort after following the RMA hierarchy of "avoid, remedy, mitigate, offset, compensate".

[2] Whilst we use the word tree frequently in this document, we acknowledge that bats also use non-tree vegetation as roosts and the terms tree and vegetation should be considered as interchangeable in the context of this document. We acknowledge that there are also non-vegetation roosts that are used and require protection. These include rocky bluffs, caves and occasionally buildings.

[3] Many references available, for example, Borkin KM; Parsons S. 2011. Sex-specific roost selection by bats in clearfell harvested plantation forest: improved knowledge advises management. Acta Chiropterologica 13(2): 373-383; Borkin KM; O'Donnell CFJ; Parsons S. 2011. Bat colony size reduction coincides with clear-fell harvest operations and high rates of roost loss in plantation forest. Biodiversity and Conservation 30; Sedgeley JA; O'Donnell CFJ 1999b. Roost selection by the long-tailed bat, *Chalinolobus tuberculatus*, in temperate New Zealand rainforest and its implications for the conservation of bats in managed forests. Biological Conservation 88:261–276; Sedgeley JA; O'Donnell CFJ 2004. Roost use by long-tailed bats in South Canterbury: Testing predictions of roost site selection in a highly fragmented landscape. New Zealand Journal of Ecology 28:1-18.

This protocol has therefore been framed following the RMA hierarchy by first focusing on the avoidance of effects, helping to identify and avoid the removal of roost trees, and to minimise the risk to bats of death or injury if avoidance is not possible. This approach is usually informed by gathering data on bats in the local areas and seeking advice from a competent bat ecologist.

Identifying and protecting *both active and inactive (i.e., trees used by bats at other times of year) roosts* by avoiding their removal is an important step in supporting the survival and persistence of bats.

Bat roost protocols and the Wildlife Act 1953

NZ bats are absolutely protected species under the Wildlife Act 1953. It is an offence to catch alive or kill, hunt, possess, molest, or disturb bats under the Act. Any projects where tree or vegetation removal overlaps with the occurrence of bats, there is a risk of killing or injuring any bats that may be present. Following the bat roost protocols minimises the chance of killing or injuring bats.

Bat roost protocol

When and how to use the protocol

Whenever vegetation removal is proposed in areas where bats are potentially present and where their habitat may be impacted, follow the decision tree (Figure 1) below as a guide to what sort of action should be undertaken. The decision tree is designed firstly to avoid felling bat roost trees, secondarily aimed at moving roost trees, and only if unavoidable, felling roost trees (but only once vacated).

None of the methods of inspecting roosts described below eliminates the risk of failing to identify bats when they are present. Therefore, techniques such as filling in cavities with expandable foam are not supported as a tool. This is because there is a risk of trapping bats that have not been detected within cavities. In addition, this method removes roosts from the landscape that bats are dependent on.

Definitions

Competencies: a set of competencies developed by the NZ Bat Recovery Group[4] to ensure that anyone working with bats is competent to do so. Contact bathandler@doc.govt.nz for a list of competencies and requirements to become an authorised competent bat worker.

Competencies referred to in this document:

2.1 Bagging storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately:
For long-tailed bats: 50 individuals
For short-tailed bats: 50 individuals

3. High risk activities – Roost felling (all of these competencies include the understanding of what to do when bats are found during tree felling as per Appendix 6 of 'Initial veterinary care for New Zealand Bats' https://cdn.ymaws.com/www.nzva.org.nz/resource/resmgr/docs/other_resources/Initial_Vet_Care_NZ_Bats.pdf)

- 3.1 Assessing roost tree use using Automatic Bat Monitors - Demonstrate correct timing, placement, and interpretation of data for 10+ times according to DOC's Tree Felling Protocols.
- 3.2 Undertake roost watches/emergence counts at 10+ occupied roosts where the entrance is visible.
- 3.3 In at least two different forest/habitat types, including the forest/habitat type where trees are going to be assessed: evaluate 10+ potential roost features in trees (e.g., cavities, peeling bark, epiphytes).

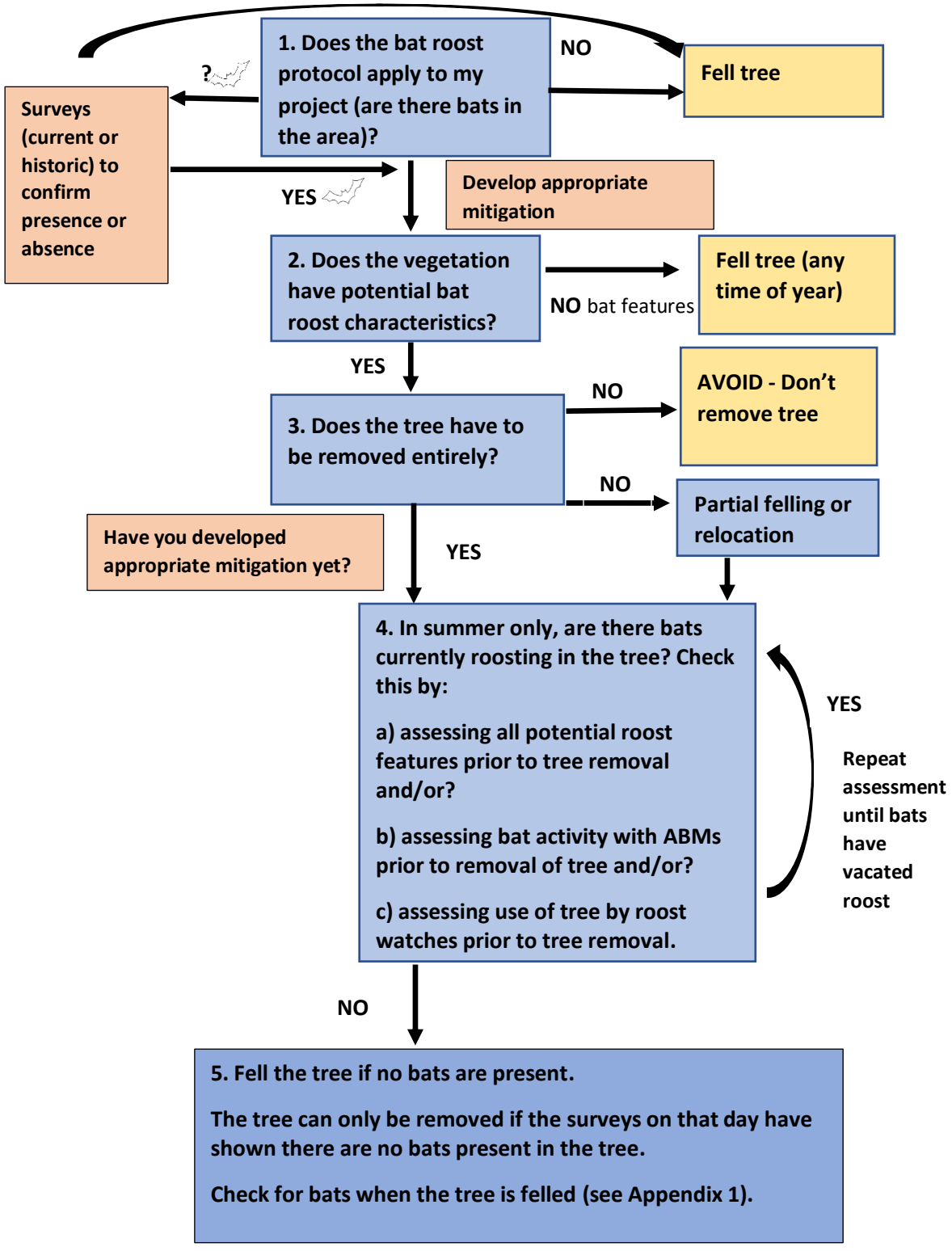
Authorised competent bat worker: A bat worker who has met the required ethical standards to be registered as a competent, authorised bat worker by the New Zealand Bat Recovery Group for the work which they are undertaking.

ABM: automated bat monitoring unit/detector

[4] A group of bat specialists that advise on bat issues and assess bat competencies

Figure 1. Tree removal in bat areas flow chart

Each numbered step relates to a step in the Decision Tool for Tree Removal. Follow each step fully in the text to work through the process.



Mitigation/compensation

If trees are felled and habitat lost, then compensation measures should be considered to address the adverse effects. What these measures should be is beyond the scope of this document. Provision of artificial roosts in the short-term and planting for the long-term are some of the methods commonly used in development projects, but their effectiveness is untested and a future research need.

Step by step decision tool for tree removal in bat areas (to be used in conjunction with Figure 1).

Step 1. Does the bat roost protocol apply to my project?	Response	Who can make this assessment?	When?
a) Is there known bat activity within a radius of 25 km of the vegetation to be removed (see [5] and [6] notes below)?	a) If Yes, proceed to b If No, consider whether survey work needs to be done.	Evidence can come from on-the-ground surveys and reports from the national DOC database, consultants, and/or other credible sources. Evidence should be interpreted by an experienced bat ecologist.	Any time
b) Are bats present in the Project Area?	b) If Yes, go to step c If unknown, undertake comprehensive survey if bats are likely to be present. If no bats are present after comprehensive survey, you do not need to follow protocol.	If surveys are required to support the assessment, then these will need to be designed by an experienced bat ecologist to adequately cover the Project Area[7] (see note below).	Acoustic surveys to determine presence should be undertaken when bats are most active and environmental conditions are suitable (October 1st to April 30th)[8]. Surveys undertaken at other times of year are considered less reliable for determining absence.
c) Is the tree known to provide a roost location for bats? (Previous knowledge).	c) If yes, go to step 3 If no (but bats are present in the project area), go to step 2.		

Notes for Step 1

1a) Bats are a highly mobile species. Long-tailed bats can have home ranges (the areas that they regularly use) as wide as 19km, and short-tailed bats about 24km. Three colonies of long-tailed bats in the Eglinton Valley collectively had a home range of 100km^2.

[5] The largest home range span for the long-tailed bat in the Eglinton Valley was 19 km (O'Donnell 2001. J. Zool., Lond. 253, 253-264).

[6] The largest home range span for the lesser short-tailed bat in the Eglinton Valley was 23.6 km (O'Donnell et al. 1999. New Zealand Journal of Ecology 23(1): 21-30).

[7] Adequately covering the project area means including all habitat that are likely to be used by bats bearing in mind that the detectors most commonly used (DOC-manufactured AR4s) have an estimated 30-60m radius within which they can record bats.

[8] Borkin K.M. 2010. Ecology of New Zealand's Long-tailed bat (*Chalinolobus tuberculatus*) in exotic plantation forest. Unpublished PhD thesis, University of Auckland.

When assessing whether bats might be present at a site you have to consider any surveys that have been done in the wider area, how long ago the surveys were done and whether more surveys are required.

1b) If you are doing a new survey then you should design the survey to cover the project area. Examples of surveys are shown in the Bat Inventory and Monitoring Toolbox (https://www.doc.govt.nz/our-work/biodiversity-inventory-and-monitoring/bats/). See 'Bats: Counting away from bat roosts: bat detectors on line transects' and 'Counting away from bat roosts: automatic bat detectors'.

Send bat data (processed csv files and GPS locations) to batdatabase@doc.govt.nz on a standard spreadsheet available by emailing this address.

Step 2. Does the vegetation proposed to be removed have potential bat roost characteristics?	**Response**	**Who can make this assessment?**	**When?**
a) Is the tree ≥15 cm DBH (Diameter at Breast Height)[9]?	If yes, further assessment is required (2b). If no, the vegetation can be removed at any time[10].	Anyone who can measure a tree DBH.	Any time
b) On visual inspection, does the tree (dead or alive) have features that indicate roost potential? These features include: • hollows • cavities • knot holes • cracks • flaking, peeling, and decorticating bark • epiphytes • broken or dead branches or trunk • cavities/hollows/shelter formed by double leaders This may require climbing the tree if you can't see all the tree from the ground.	If yes go to step 3 If unsure, further assessment is required. This may include climbing the tree. If no potential roost features are present, the vegetation can be removed at any time[11], but if upon felling you find a bat follow section 5.	Anyone that can identify these features.[12] If further assessment required, then use an approved person at Competency Level 3.3.	Visual inspections can occur at any time. If there are **NO** potential roost features, felling can occur at any time of year.

[9] This diameter at breast height is based on dimensions of roosts used by south Hamilton long-tailed bats that were identified by Dekrout (2009, Unpublished PhD thesis, University of Auckland) - the smallest roosts were 15.5 cm DBH; but note that in South Canterbury Sedgeley and O'Donnell (2004, New Zealand Journal of Ecology 28(1): 1-18) found that 25% of long-tailed bat roosts were smaller than 18.8 cm DBH.
[10] Note that there may be roosts that have smaller diameter at breast height (DBH). If any vegetation is suspected to have a bat roost present, then removal shall be halted immediately, and protocols reviewed.
[11] All surveys to assess whether trees are potential roosts shall take place within 6 months of final felling dates. If felling does not take place within this time then assessments will be repeated. This is intended to account for any changes in trees which may occur over time.
[12] It is intended that training on identifying roost features will be developed.

Step 3. Does the tree have to be removed entirely?	Response	Who can make this assessment?	When?
a) Is the only option to remove the tree entirely?	If yes, continue to step 4 If no, consider leaving the tree in place, cutting off specific limbs only or relocating the tree. If any felling, partial felling (where the part to be felled has potential bat roost features) or tree relocation takes place you **MUST** proceed to step 4. If a roost (active/inactive) is confirmed, then advice should be obtained at a project level in writing from DOC before proceeding.	Project leader	Any time

Notes for Step 3

Trees must only be relocated when bats are absent and when standard automated bat monitoring unit (ABM) weather conditions are met (see notes section 4b for appropriate weather conditions), and in consultation with an authorised bat ecologist with all competencies of level 3: 'High risk activities – Roost felling'.

Step 4. Are there bats currently roosting in the tree? (Follow a or b or c or a combination)	Response	Who can make this assessment?	When
a) Are potential features being used by roosting bats? A tree climber may be required to check all features (see notes for 4a below). If roost is occupied repeat 4a another day until roost is vacated.	If yes, **THE TREE MUST NOT BE FELLED UNTIL BATS HAVE VACATED IT**. If no, the tree can be removed on the day of the tree inspection following step 5. If bats continue to use the roost, then the tree must not be cut down until the bats leave the roost. At this point re-consider again	An approved person at Competency Level 3.3 or an experienced tree-climber (e.g., an arborist) working with an approved person at Competency Level 3.3. If the latter, the tree climber must provide information along with photographs or video footage, to the approved person at Competency Level 3.3 who assesses and decides whether the tree can be removed.	October 1st to April 30th when the temperature is 7°C or greater at official sunset in the South Island or 10 °C or greater in the North Island.

	whether this tree must be felled. Advice must be obtained at a project level in writing from DOC prior to felling the tree.	If roosts are known or confirmed through this process, then this information must be communicated to the nominated DOC bat ecologist for this project.	
b) Is bat activity recorded at any time during two consecutive, valid survey nights preceding tree felling[13]? At least two nights are required as it is possible for bats to enter or leave a roost without echolocating, or to not leave the roost for a night.	<u>If yes (bats are detected)</u>, survey must continue on subsequent nights[14] until no bat activity is recorded for two consecutive nights (to indicate bats have left the area) prior to felling. **OR** roost features of each tree must be visually assessed via climbing as in 3. <u>If bat activity is consistent in the area and 2 nights with zero bat passes cannot be obtained</u>, Go to 4c or 4a. <u>If no bats are detected for two consecutive nights</u>, the vegetation can be removed on the day immediately following the survey nights using the method in 5.	An approved person at Competency Level 3.1	October 1st to April 30th and when conditions meet the requirements for standard ABM weather conditions (see 4b notes).
c) Are bats observed entering the vegetation? This involves watching vegetation to identify bats returning to or exiting roosts. It should only be used in combination with previous ABM monitoring (4b) (see notes 4c for method). At	<u>If yes (bats are seen at either watch)</u>, it is a confirmed roost. Removal of a roost should be avoided to minimise effects	An approved person at Competency Level 3.2[15].	Between October 1st and April 30th only **AND** when weather parameters meet

[13] Le Roux et al (2013) found that in and around Hamilton "The longest consecutive monitoring period without bat detections at each site was three nights during winter." Le Roux et al 2013. New Zealand Journal of Zoology (2013): Spatial and temporal variation in long-tailed bat echolocation activity in a New Zealand city, New Zealand Journal of Zoology, DOI: 10.1080/03014223.2013.827125.

[14] Subsequent nights may be those immediately following bat detection or later dates.

[15] If more than one person is required for a roost watch at a tree, a minimum of one approved person at Competency Level 3.2 must be present on site for the duration of the roost watch to supervise.

least two nights are required as it is possible for bats to enter or leave a roost without being detected, or to not leave the roost for a night.	of vegetation removal on bats. Techniques used previously to ensure previously active roosts are no longer active have included the following: Watches must continue on subsequent nights until no bats are observed entering or exiting the roost for two consecutive nights (to indicate the roost is no longer active) prior to felling. <u>If no bats are observed entering or exiting for two consecutive nights</u>, the vegetation can be removed on the day immediately following the survey nights using the method in 5.		the roost watch requirements.

Notes for Step 4.

4a) Tree climbing and inspection

Care must be taken while climbing trees to avoid disturbing, removing or destroying tree features with bat roost potential such as sections of loose bark or cavities in dead wood. Using mobile elevated platforms can be a good option. Bats are less likely to be active over colder periods, so climbing to check whether bats are present in potential roost features must take place between October 1st to April 30th when the temperature is 7 °C [16] (South Is) or 10 °C (North Is) or greater at official sunset on the night previous to inspection.

A tree climber may be required to check all potential bat roost features:

- Can bats be seen? An endoscopic camera should be available for this step and every possible corner of each potential roosting feature inspected, i.e., cavity/crack etc. Cracks, holes, and splits may lead to cavities or may be superficial. A cavity may be wet indicating no/low potential as a bat roost.

[16] O'Donnell CFJ 2000. Influence of season, habitat, temperature and invertebrate availability on nocturnal activity of the New Zealand long-tailed bat (*Chalinolobus tuberculatus*). New Zealand Journal of Ecology 207-221.

- Can bats be heard? Search of tree features should be accompanied by use of a hand-held bat detector. If bats are present and not in torpor, then detection of presence listening at 25 kHz (for social calls) and 40 kHz (for echolocation calls) may help to determine if long-tailed bats are present. Short-tailed bat social calls are often audible or detected at 25-27 kHz.
- Is guano present or urine staining?

4b) ABM survey work

Bat activity is to be recorded using ABMs. Location of ABMs must provide sufficient coverage to be able to determine if bat roosts are present in one or more of the trees[17]. 'Valid' survey nights must have the following features:

- Begin one hour before official sunset and end one hour after official sunrise.
- Temperature 10°C or greater for the first four hours after official sunset time for the North Island and 7°C for the South Island[18].
- Precipitation < 2.5 mm in the first 2 hours after official sunset, and < 5 mm in the first 4 hours after official sunset.

Prior to the commencement of surveys, ABMs must be checked for correct operation at a site where bat activity is known to be regular, or by using the DOC – Bat Recorder Tester (Tussock Innovation Ltd) phone app made for this and available from Google Play Store. Faulty or suspect ABMs must not be deployed, and ABMs must be redeployed if faults occur.

4c) Roost watches

The following weather conditions define a valid night for roost watches:

- Temperature greater than 10°C all night between official sunset and sunrise for the North Island and 7 °C for the South Island.
- Precipitation < 2.5 mm for each two-hour period between official sunset and sunrise

Roost watches should include the deployment of ABMs and analysis of data for the night of the roost watch.

Emergence watches

- Each tree must be watched initially from sunset until it becomes too dark to see by sufficient people to observe all potential exit points. This must be supported by the use of handheld detectors. The aim of emergence watches is to identify potential roost locations within the vegetation. Infra-red and thermal imaging cameras may be useful in this process.

[17] Department of Conservation-manufactured AR4 bat detectors are considered likely to detect long-tailed bats only over short distances i.e., up to 30-60 m distant from the detector (S. Cockburn, Department of Conservation, pers. Comm.). This is similar to detection distances of other detector types.

[18] South Island temperatures are based upon O'Donnell (2000) as above. North Island temperatures are based on data collected in Kinleith plantation forest, centred around Tokoroa, Central North Island; Smith D, Borkin K. 2017. Appendix B: Influence of climate variables on long-tailed bat activity in an exotic conifer plantation forest in the central North Island. P 136-145. In: Smith, D, K Borkin, C Jones, S Lindberg, F Davies and G Eccles (2017). Effects of land transport activities on New Zealand's endemic bat populations: reviews of ecological and regulatory literature. NZ Transport Agency research report 623. 249pp.

Roost re-entry watches

The time when bats return to roosts can vary based on temperature and time of year.[19,20]

- Observers must then return the next morning and watch the tree to determine whether bats return to the vegetation.
- Roost re-entry watch timing should be based on patterns of activity recorded onsite with ABMs, i.e., as a guide watches should begin two hours prior to when the last passes were recorded on the ABMs on previous nights and finish one hour after official sunrise time. Where this information is not available and at minimum, watches shall begin two hours prior to official sunrise until one hour after sunrise. Infra-red and/or thermal imaging cameras may be useful as a supplementary tool in this process.

The methods above (Climbing and inspecting; ABM use and roost watches) can be implemented as in steps 4.

If bats are sighted, or sign detected, or a roost (active/inactive) is confirmed, the approved bat ecologist, as soon as possible, shall:

- Call the tree felling supervisor to inform them which affected tree(s) cannot be felled due to detection of bat sign.
- Send an email to the site manager, and a bat ecologist representing the council and DOC detailing the results of the survey and outlining the measures for protection or relocating the roost tree.
- A record (including photos) of any vegetation containing bat roosts shall be kept detailing the date; size, location and species of tree or other vegetation; roost type, e.g., cavity, peeling bark, broken branch; detail outlining how presence of bats was confirmed; the number of bats present; and species present, if known.

Step 5. Fell the tree if no bats present	**Response**	**Who can make this assessment?**	**When**
NB: Vegetation removal must take place on the day of tree inspection or the day immediately following night surveys that confirm that there are no bats present.			
a) If you have undertaken a visual inspection of the vegetation (following step 4a, then the vegetation can be removed **ONLY ON THE DAY OF INSPECTION** and meets the valid weather conditions (defined in notes 4c) at official sunset the day prior to inspection. If you have undertaken ABM surveys or roost watches 4b or 4c the vegetation can be removed **ONLY ON THE DAY IMMEDIATELY FOLLOWING SURVEY COMPLETION** (i.e., if the survey ends in morning the tree can be felled the same day only).		People who are familiar with the document shown in footnote[21], and physically able to check/inspect tree for signs of bats once felled.	When the inspection method chosen allows.

[19] Dekrout AS 2009. Unpublished PhD thesis. University of Auckland, New Zealand Pp 168.
[20] Griffiths R. 2007. Activity patterns of long-tailed bats (Chalinolobus tuberculatus) in a rural landscape, South Canterbury, New Zealand. New Zealand Journal of Zoology, 34:3, 247-258, DOI: 10.1080/03014220709510083.
[21] https://cdn.ymaws.com/www.nzva.org.nz/resource/resmgr/docs/other_resources/Bat_Care_Advice.pdf

Trees must be inspected for signs of bats once felled and before removing from the site, if safe to do so. Follow Appendix 1 if bats are detected during vegetation removal.			

Appendix 1. If bats are detected during tree relocation or removal

NB: Vegetation removal must take place on the day of tree inspection or the day roost watches or two consecutive nights of ABM data have confirmed that there are no bats present. If practical, trees are to be inspected for signs of bats once felled and before removing from site. People inspecting trees should be familiar with the Bat Care Advice document shown in footnote[22] and able to check/inspect tree for signs of bats once felled.

If during the felling of a tree bats are detected, felling of that tree must stop immediately if safe to do so, and DOC and an approved bat ecologist at Competency Level 2.1 must be consulted.

If bats do not fly away or are potentially injured/found on the ground, felling can only re-start once permission has been obtained from DOC after consultation with an approved bat ecologist at Competency Level 2.1.

If bats are detected once the tree has been felled**,** all further work must stop, and DOC and an approved bat ecologist at Competency Level 2.1 must be contacted. The felled tree must be thoroughly inspected by the approved bat ecologist for further bats**.**

If any bats are found on the ground or in the tree once felled, place the bat in a cloth bag in a dark, quiet place at ambient (or slightly warmer) temperature and take to a veterinarian for assessment as soon as possible. A maximum of two bats should be kept in one bag. After delivering the bat to the vet, contact an approved bat ecologist at Competency Level 2.1 in consultation with the vet and DOC (0800 DOC HOT, 0800 362 468).

Bats must be kept for three days under observation and must be kept out of torpor for this time. Additional detail is found at the links provided in this footnote[23]. Vets must euthanise bats whose injuries are causing suffering and are not likely to heal sufficiently to allow rehabilitation and return to the wild. The approved bat ecologist at Competency Level 2.1 and vet must consult with DOC to consider appropriate rehabilitation options where suffering is minimal and chances of return to the wild are high.

Euthanised bats or any dead bats (or bat parts) found must be handed to DOC.

[22] https://cdn.ymaws.com/www.nzva.org.nz/resource/resmgr/docs/other_resources/Bat_Care_Advice.pdf

[23] https://cdn.ymaws.com/www.nzva.org.nz/resource/resmgr/docs/other_resources/Initial_Vet_Care_NZ_Bats.pdf