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Marton Rail Hub

Acoustic Bat Survey and Habitat Assessment

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Contents

1 Background

The development of the Marton Rail Hub (MRH) has been proposed by Rangitikei District Council in partnership with Ngā Wairiki Ngāti Apa, Infrastructure Reference Group and Rangitīkei Forestry Holdings Ltd. To support resource consent applications for the rail hub an Ecological Impact Assessment (AEE) was prepared by WSP (WSP, 2021). As part of the AEE a long-tailed bat survey was undertaken in April 2021 as well as a very broad roost habitat assessment, to determine baseline habitat values for bats.

Through the appeal mediation process the parties agreed that a further assessment of the redefined Comprehensive Development Plan (CDP) was required to confirm presence and value of habitats.

This report is provided as an addendum to the AEE.

2 Purpose and Scope

The purpose of this report is to provide the results from further field surveys that were undertaken to determine relative activity levels and habitat values for roosting long-tailed bats *(Chalinolobus tuberculatus).* Based on the findings from these surveys, the initial outcomes from the AEE with regard to long-tailed bats will be revised where necessary. The outcomes provided in this report will supersede the findings presented in the AEE. The report covers the following scope of work:

- An acoustic bat survey;
- Tree roost assessment;
- Assessment of effects on bats; and
- Recommendations to avoid remedy and mitigate effects.

3 Acoustic Bat Survey

3.1 Methodology

A total of twenty acoustic bat monitors (ABMs) were deployed along shelterbelt habitats within and adjacent to the proposed Marton Rail Hub (MRH). Ten of these were deployed in the same locations as the first acoustic survey conducted in April 2021 (sites 1-10). These were located on the western boundary and to north of the proposed MRH layout. A further ten ABMs (sites 11-20) were deployed within habitats to be affected by the proposed MRH layout. Monitoring locations are shown in Figure 1.

The ABMs were deployed between 22 December 2021 and 20 January 2022 in order to obtain 21 nights of monitoring, where weather conditions remained favourable for bat activity. They were programmed to record each night from 30 minutes before sunset until 30 minutes after sunrise. Upon retrieval, the data were then downloaded from each ABM and processed using BatSearch3 (Nov 2016) software developed by the Department of Conservation (DOC). Activity levels at each monitoring site were calculated by averaging the number of bat passes (total passes/no. of nights monitors were successfully deployed).

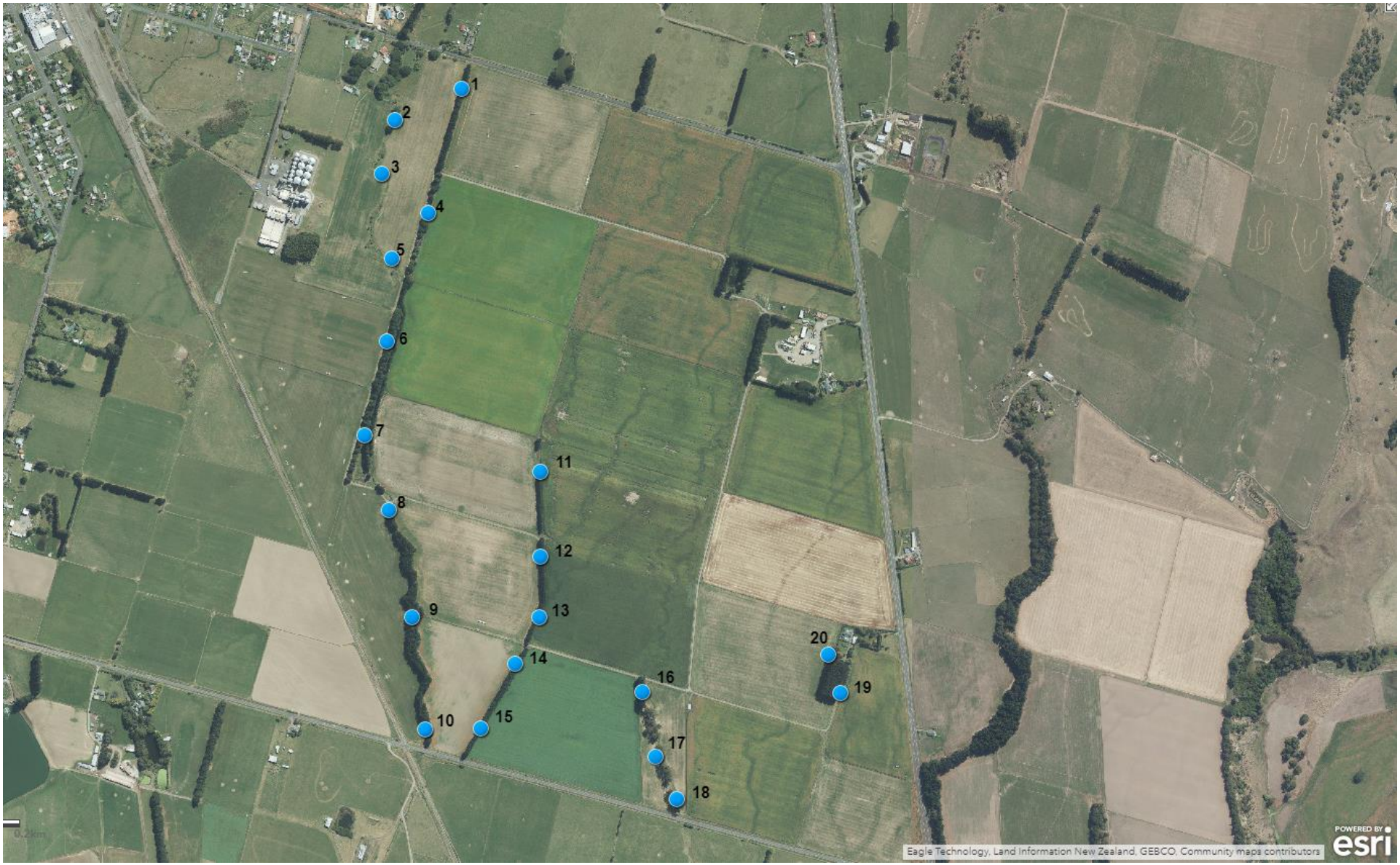


Figure 1. Location plan of acoustic monitoring sites.

3.2 Results

3.2.1 Summary

When uploading the data, it was found that the majority of monitoring sites recorded sufficient data, however some monitors (Table 1 (*)) were subject to failures after only a few nights. This is not uncommon, and it is expected that the data collected from fully functioning monitors are representative of activity levels across the MRH.

A total of 797 bat passes were recorded across all twenty monitors for the duration of the deployment (up to 29 nights). Long-tailed bats were recorded at all monitoring sites with ABMs that were partially or successfully deployed. Bat activity was variable across all sites ranging from 0.05 passes per night (ppn) at site 3 to 6.86 ppn at site 19. These are considered very low to low levels of activity. Activity levels recorded during the survey in April 2021 were more than double those recorded during this survey.

It is important to note that the number of passes cannot be considered indicative of population size, as the movement of an individual bat can generate multiple passes.

Table 1. Summary results of acoustic bat survey. The asterix (*) reflects those sites which did not obtain a full dataset.

Site #	Total passes	Number of valid survey nights	Valid survey nights with bat passes	Average activity levels (passes/night)
1	16	18*	6	0.89
2	10	29	8	0.34
3	1	21	1	0.05
4	33	27	18	1.22
5	5	16*	4	0.31
6	1	2*	1	0.50
7	13	29	6	0.45
8	94	29	22	3.24
9	10	3*	3	3.33
10	65	29	17	2.24
11	17	29	10	0.59
12	Fail			
13	40	15*	11	2.67
14	95	29	24	3.28
15	8	4*	3	2.00
16	23	9*	8	2.56
17	33	29	14	1.14
18	29	29	10	1.00
19	199	29	25	6.86
20	105	29	22	3.62

Activity recorded at all sites was variable between 9 pm and 5 am with peak activity occurring between 12am and 3 am (Figure 2). There was minimal activity in the hours close to sunrise and sunset with only a single pass detected around sunrise on a single night (Site 19).

These activity level patterns are reasonably consistent with those recorded from the first survey in April 2021, however, they provide stronger evidence that bats are unlikely to be regularly roosting within the habitats of the MRH. However, it is common for bats to utilise different habitats at different times of the season therefore it is reasonable to assume that bats will likely roost in trees within the MRH, at least intermittently.

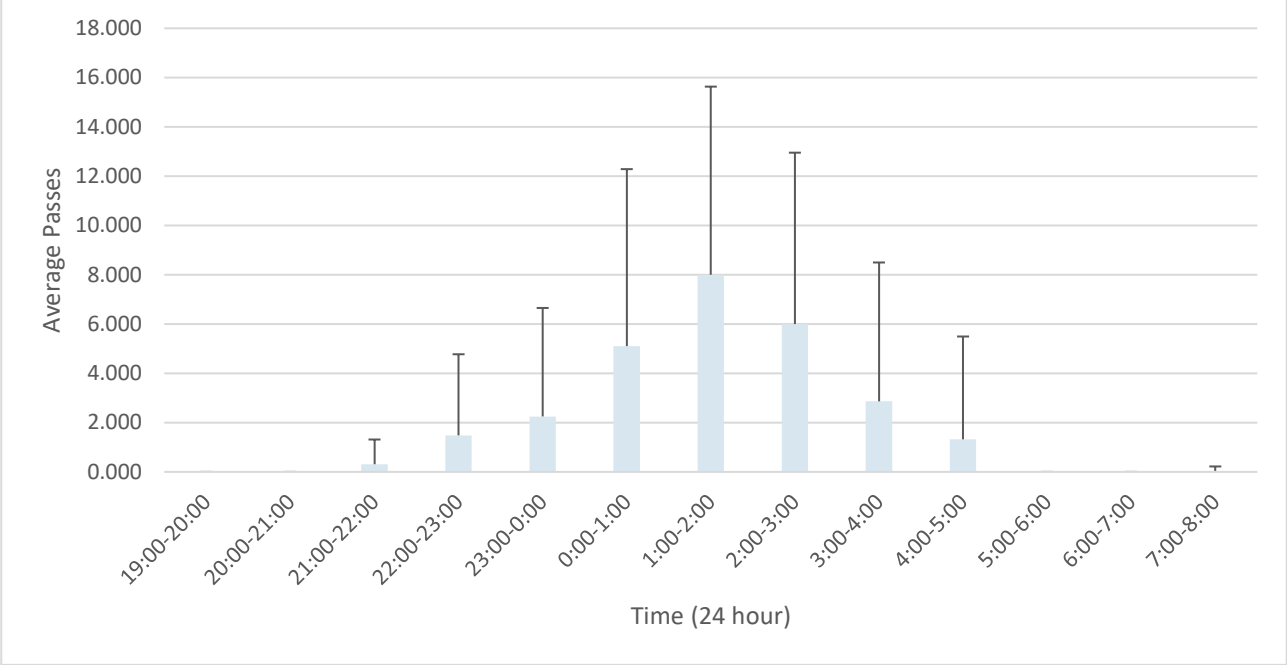


Figure 2. Average passes ± standard deviation at each hour after sunset across all sites.

4 Roost Tree Assessment

4.1 Methodology

A comprehensive roost tree assessment was conducted by WSP Ecologist Caitlin Dodunski, who is certified by the Department of Conservation (DOC) as competent to undertake such an assessment (Level 3: High-risk activities). All trees within the CDP, and adjacent, were assessed as to their roosting value for long-tailed bats.

Trees identified as potential bat roosts are those >15 cm diameter at breast height (DBH) and have one or more of the following attributes:

- Cracks, crevices, cavities, fractured limbs, or other deformities, large enough to support roosting bat(s);
- Sections of loose flaking bark large enough to support roosting bat(s);
- A hollow trunk, stem or branches; and/or
- Deadwood in canopy or stem of sufficient size to support roost cavities or hollows.

The criteria in Table 2 were applied to all trees to determine roosting value.

Table 2. Criteria for determining roost value.

Value as a roost	Justification of assessment	Further survey required?
Negligible	A tree of at least 15 cm DBH but no roosting potential whatsoever.	No
Low	A tree of at least 15cm DBH but no roost features visible or with only limited roosting potential i.e. loose bark present, but not sufficient to provide shelter for roosting bats.	No
Moderate	A tree of at least 15cm DBH with one or more roost features that could be used by individual bats or where it is not clear from the ground inspection whether roost features are present or not and therefore requires further inspection.	Yes
High	A tree of at least 15cm DBH with one or more roost features which could provide habitat for several bats due to their size and ability to provide sufficient shelter and protection.	Yes
Confirmed	A tree known to have been used by bats as a roost tree.	Yes

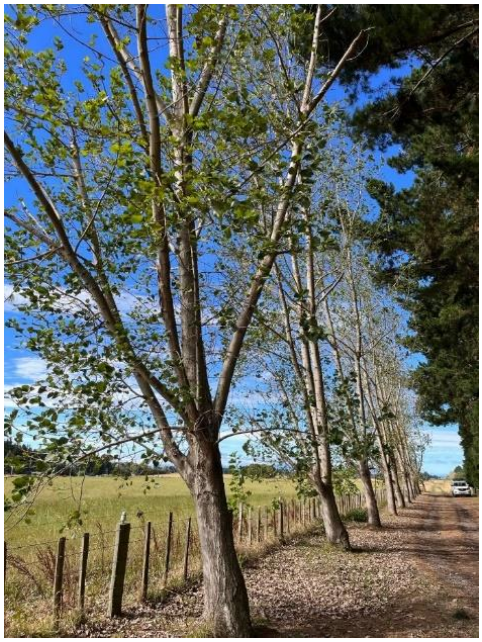
4.2 Results

Due to the large number of individual trees, and as each area consisted of the same tree species of the same age, not every individual tree was subject to a comprehensive assessment (with the exception of Area 5). Instead, a walk through of each area was undertaken and a broad assessment based on the type of roost features present (or lacking) within each tree area was considered sufficient. Considering the majority of the trees were plantation pines grown in the same conditions and of the same age, it is reasonable to assume that all trees are likely to be of similar value for roosting bats.

See below for a description of the tree assessment for each area. Refer to Figure 3 for a map showing tree areas.

4.2.1 Area 1

Ten young poplar trees *(Populus spp.)* (Figure 3). No roost features were identified on any of the trees. **Negligible** value for roosting bats. it is likely that the majority of these trees will need to be removed for construction of the MRH.



4.2.2 Area 2

Approximately 400 plantation pines *(Pinus spp.).* **Low** value for roosting bats. Roost features only limited to minor crevices on some trees where branches meet. These crevices would not provide optimal shelter and protection. **Low** value for roosting bats. It is likely that the majority of these trees will need to be removed for construction of the MRH.

4.2.3 Area 3

Approximately six pines trees and a gum tree *(Ecualyptus spp.).* Larger than the plantation pines in Area 2. Roost features include broken branches and crevices, with potential cavities that cannot be seen from the ground. **Moderate** value for roosting bats. Would require implementation of Vegetation Removal Protocols if needing to be felled. These trees are not currently proposed for removal.

4.2.4 Area 4

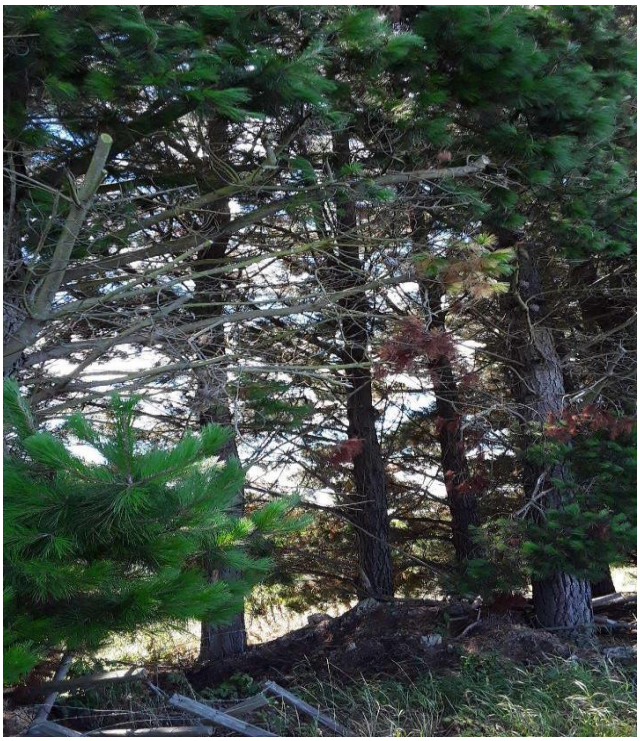
Approximately 70 plantation pine trees of 15 years old. Roost features only limited to minor crevices on some trees where branches meet. These crevices would not provide optimal shelter and protection. **Low** value for roosting bats.

4.2.5 Area 5

Approximately 45 large gum trees. Roost features were present on all trees and were predominantly large pieces of flaking bark, and splits in branches. There were also a number of possible cavities that couldn't be confirmed from the ground. Many trees were presenting with decaying limbs and dead spurs, all capable of providing valuable roosting habitat for bats. **High** value for roosting bats. Five of these trees are likely to be removed for construction of the rail siding. Tree removal protocols must be implemented prior to the removal of these trees.

4.2.6 Area 6 and Area 8

Approximately 370 plantation pines. The majority of trees are of negligible value for roosting bats, however there are potentially some roost features present where branches deviate from the main trunk. These are likely to be minor crevices, facing upwards and open to the elements. Overall, these roost features would provide less than optimal thermal and protective properties. Therefore, this area has **Low** value for roosting bats. it is likely that the majority of these trees will need to be removed for construction.



4.2.7 Area 7

Four eucalyptus trees. Two of **High** roosting value, one **Moderate** value, one **Low** value. Moderate and high value trees are highly decayed with significant flaking bark and split limbs. Tree removal protocols must be implemented prior to the removal of these trees.

4.2.8 Area 9

The majority of trees are of negligible value for roosting bats, however there are potentially some roost features present where branches deviate from the main trunk. These are likely to be minor crevices, facing upwards and open to the elements. Overall, these roost features would provide less than optimal thermal and protective properties. Therefore, this area has **Low** value for roosting bats. Approximately 30 trees are likely to be removed for construction of the rail siding.

Figure 3. Map showing tree areas assessed for roosting value.

5 Effects on Bats

5.1 Assessment of effects methodology

This assessment of effects on long-tailed bats follows the guidelines for undertaking ecological impact assessment recommended by the Environment Institute of Australia and New Zealand (Roper-Lindsay *et. al*., 2018). An outline of the methodology is provided in section 2.4 of the main AEE report (WSP, 2021).

5.2 Injury/Death During Vegetation Removal

As there will be removal of potential roost trees there is a risk of felling a tree while there are bats actively roosting within, which could result in injury or death to a bat. This is an offence against the Wildlife Act (1953).

The implementation of Vegetation Removal Protocols, prior to felling of all trees within areas 3, 5 and 7 (Figure 3) are critical to ensure no bats are actively roosting within while trees are being felled.

5.3 Habitat Loss

Potential roost trees will likely be removed for construction of the elements within the MRH. Though this may reduce the pool of roosts within the immediate area of the landscape, the loss of these trees is relatively low in the context of the wider landscape. For example, it is likely that only 5 of the gum trees within Area 5 will need to be removed, however approximately 40 trees of similar roosting value will remain. Furthermore, the majority of trees to be removed will be pine trees of a relatively young age and of Low roosting value.

There is significantly better roosting habitat present within the eucalyptus stand, and while only few of these trees are likely to be removed, the MRH will be built up completely around it. The construction of these buildings and associated disturbances from operations will likely deter bats or alter their utilisation of this habitat. It is also possible that bats may cease to use this habitat altogether.

However, as stated above, the loss of this habitat as roosting trees is relatively low due to the availability of similar trees in the wider landscape outside of the MRH. Furthermore, the acoustic data indicates that roosting within the site is likely to be intermittent. The magnitude of the loss or disturbance of this habitat is therefore assessed as **Low** giving a **Moderate** overall level of effect.

5.4 Fragmentation

The loss of the shelterbelt of pines within the middle of the MRH (Areas 6-8), combined with the construction of buildings will result in a physical change in the landscape. However, as the landscape is already highly fragmented, bats are likely already adapted to these environments.

The large shelterbelt of vegetation will remain present to the west of the MRH. There will therefore be suitable commuting routes remaining outside the MRH and this will ensure that there are commuting corridors within the adjacent landscape. In a worst-case scenario, there may be an alteration of commuting routes of less than 1km.

The magnitude of potential fragmentation effects is therefore expected to be **Low** giving a **Moderate** overall level of effect.

It should be noted that significant planting of vegetation buffers around the entire MRH are being incorporated as part of the landscape visual mitigation. Incorporation of suitable bat roost forming trees and connected vegetation corridors into these plans will significantly reduce fragmentation

effects and possible result in a net gain in time due to increase of edge habitats compared to that which is currently present.

5.5 Lighting Effects

Long-tailed bats tend to avoid lit-zones and will respond by flying alongside or above these areas when commuting. It is not yet known what lighting will be present within the MRH. However, it is likely that any lighting will be directed towards operations, away from bat habitats. Magnitude of lighting effects on bats are therefore expected to be **Low** giving an overall **Moderate** level of effect providing that lighting is specifically designed to minimise effects. Best practise lighting design for bats is essential to ensure that light spill is minimised beyond the MRH.

5.6 Recommendations to avoid, remedy or mitigate effects

The following management measures are recommended to mitigate any potential effects on bats:

- The removal of all vegetation within areas 3, 5 and 7 must be subject to pre-felling Vegetation Removal Protocols (VRP) and must be implemented by a suitably qualified bat ecologist.
- In the event any active bat roosts are identified while enacting the VRP, mitigation should be provided. This should be in the form of predator banding of natural roosts within, or adjacent to, the MRH.
- Supplementary planting of both exotic and native tree species known to provide roosting habitats should be incorporated into planting plans and designed to retain edge effects allowing commuting routes between other habitats around the area of the MRH.
- If lighting is to be installed within the MRH, best practice design for bats should be incorporated wherever possible. These specifications include:
    - Luminaires shall produce no direct upwards light and face away from bat habitats;
    - Luminaires shall have a maximum colour temperature of 2700K (white); and
    - Light levels on the boundary of bat habitats that will not exceed 0.3 Lux.

5.7 Level of mitigated effects

Assuming the mitigation suggested above is implemented, it is considered that there will be overall effects of no greater than **Low** for long-tailed bats.

6 Conclusions

The findings from the additional acoustic survey have confirmed presence of long-tailed bats within all areas of the proposed MRH and patterns of activity have suggested the habitats are more commonly used for commuting and foraging habitat rather than for roosting, particularly during the peak maternity period of bats (i.e., December-January). The highest value roosting habitat was identified in the area of gum trees within the middle of the proposed MRH, with significant roost features present. All other habitats to be affected provide negligible to low value habitat for roosting bats. The potential effects identified are expected to have an overall **Low** impact on bats, provided the management measures such as Vegetation Removal Protocols, supplementary planting and best practice lighting specifications are implemented.

References

Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. (2018). Ecological impact assessment. *EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.*

WSP (2021). Marton Rail Hub Development: Assessment of Ecological Effects. *Prepared for Rangitikei District Council, August 2021. WSP NZ LTD No. 5-WT696.00/00005.*

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