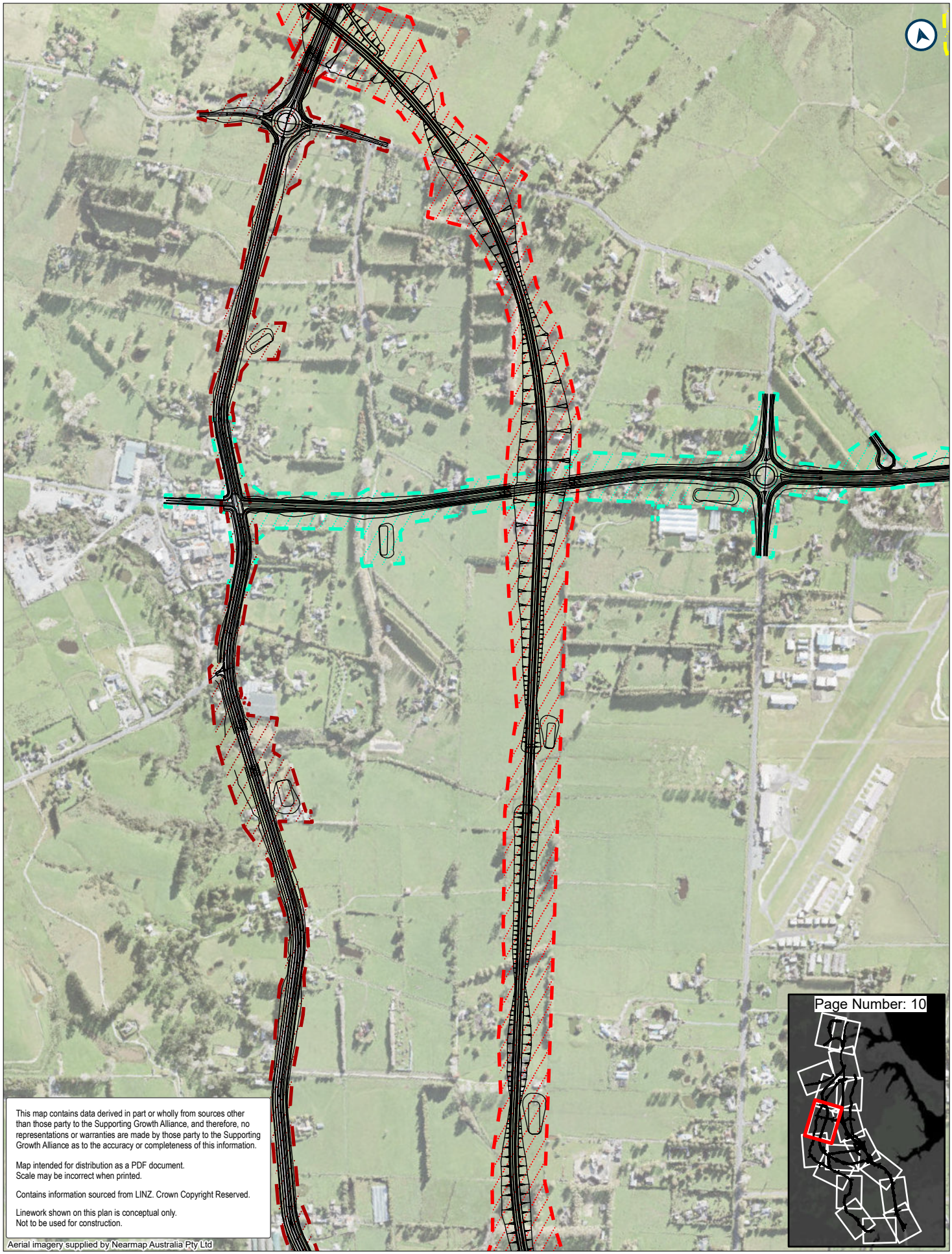

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LEGEND

0 270 540
Metres

Route Options
NoR 1
NoR 4
NoR 8
NoR 11

Name of Map: SGA-North-Mitigation

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LEGEND

0 270 540
Metres

- Route Options
- NoR 1
- NoR 8
- NoR 12
- Indicative Bat Mitigation

Name of Map: SGA-North-Mitigation

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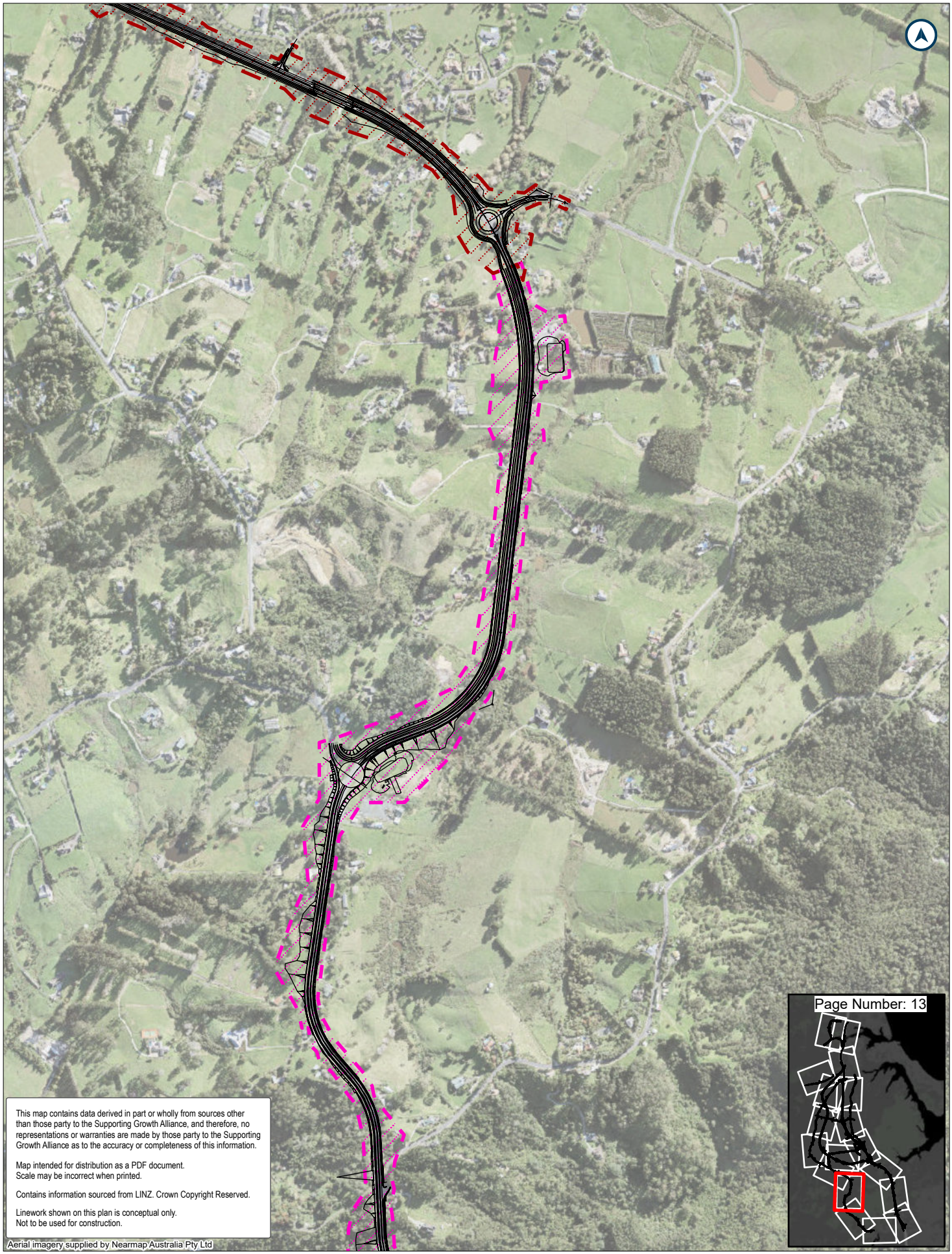
LEGEND

0 270 540
Metres

- Route Options
- NoR 1
- NoR 8
- NoR 12
- Indicative Bat Mitigation
- Indicative Bird Mitigation



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LEGEND

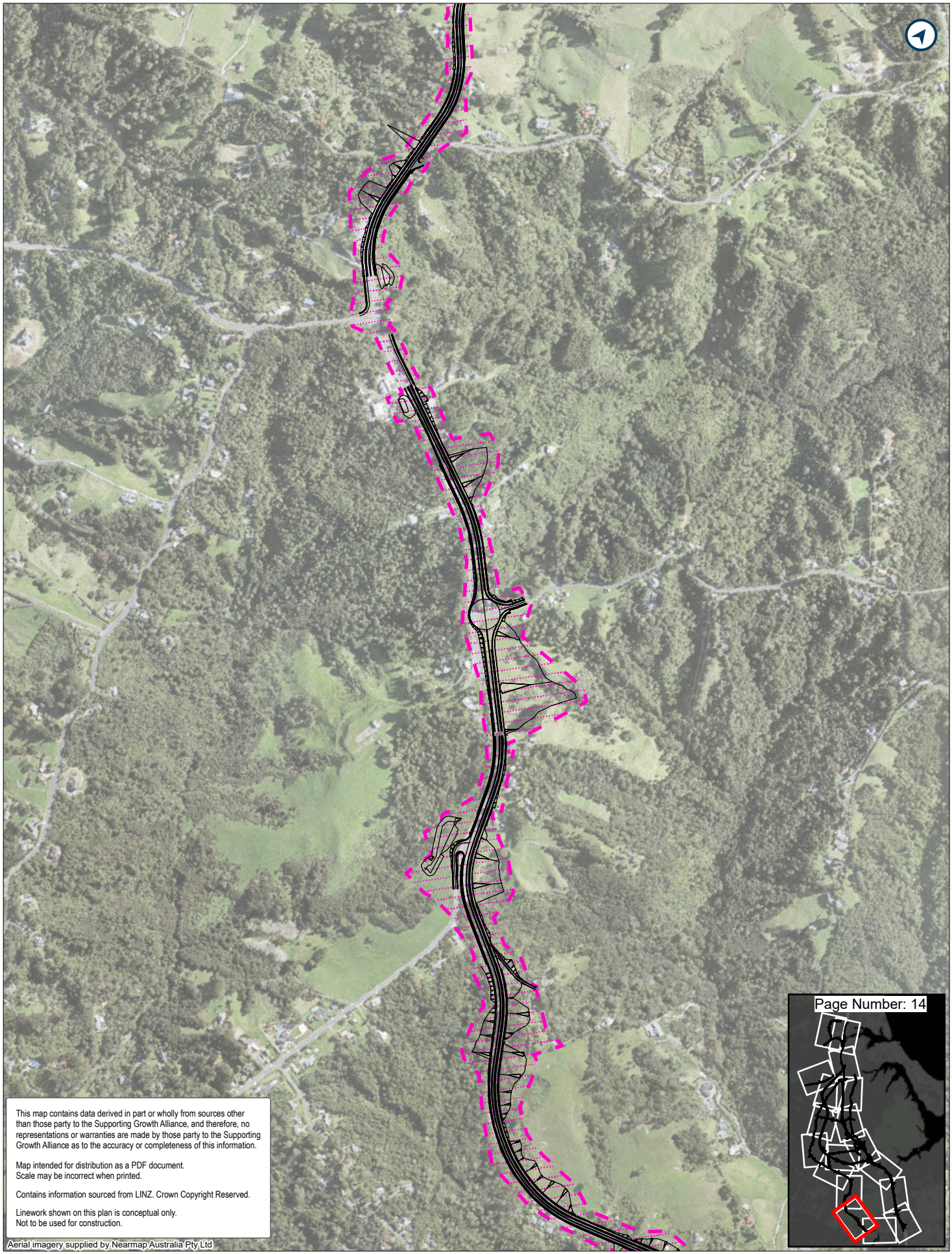
Route Options

NoR 8

NoR 9

0 270 540

Metres



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LEGEND

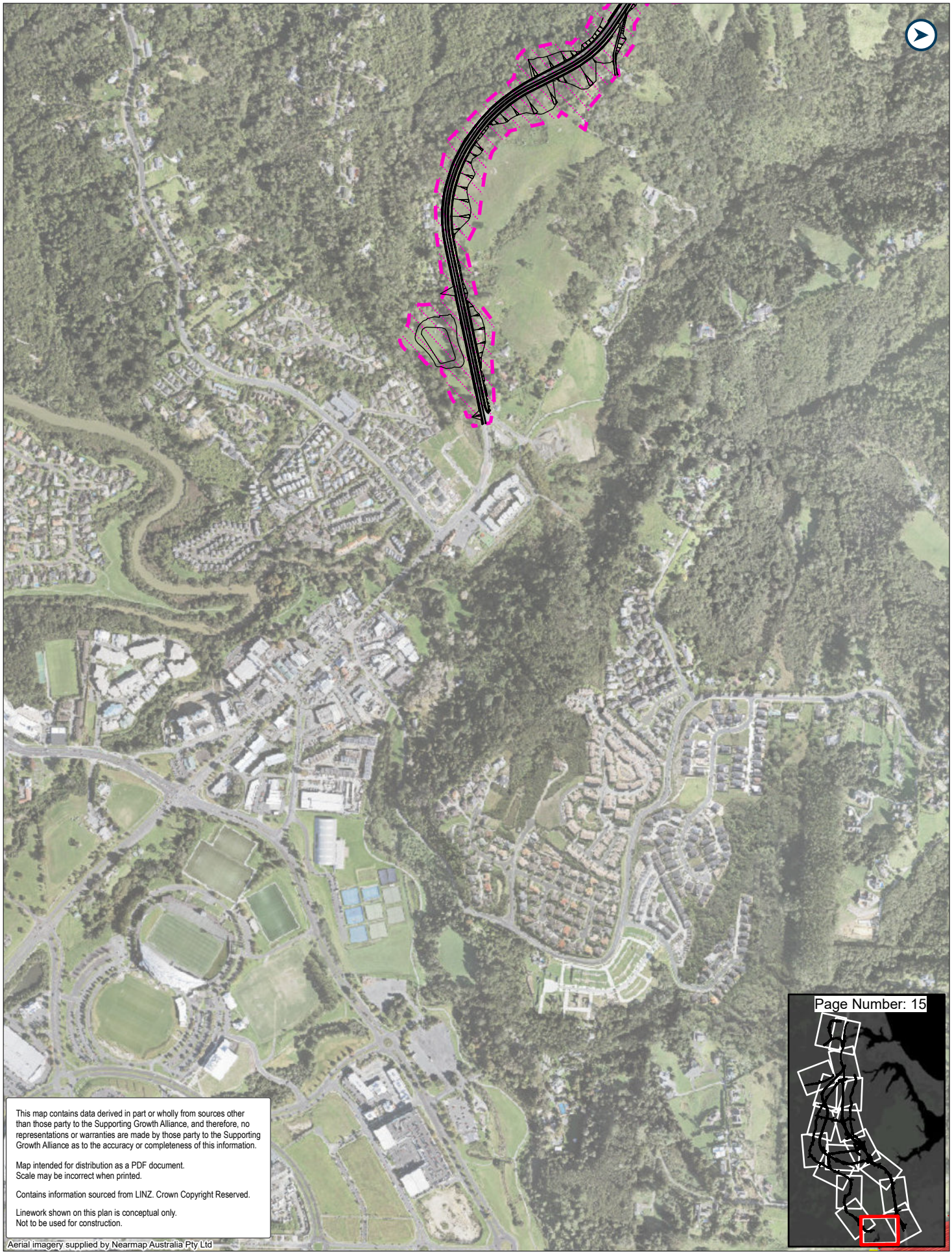
Route Options

NoR 9

0 270 540

Metres

Name of Map: SGA-North-Mitigation



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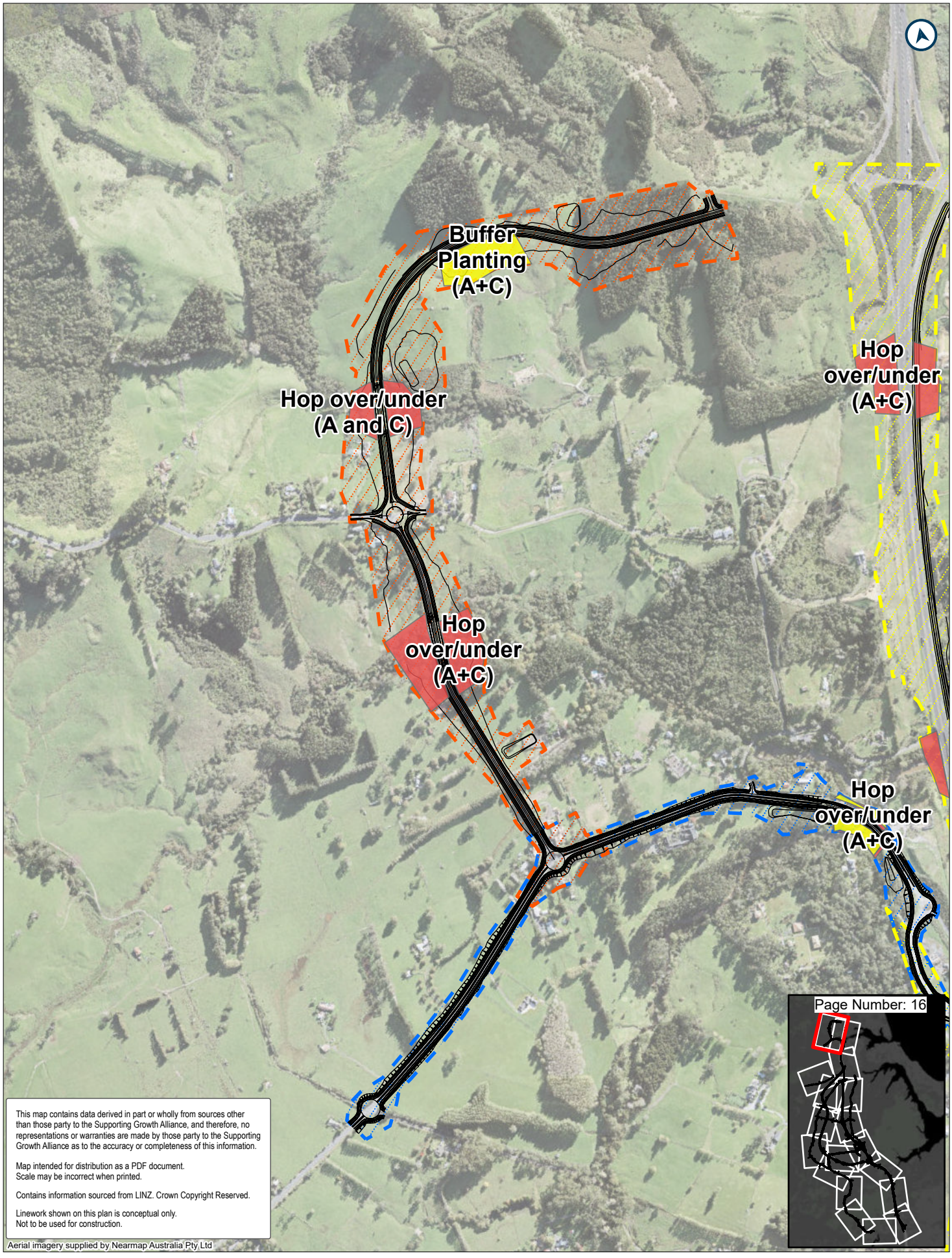
LEGEND

- Route Options
- NoR 1
- NoR 4
- NoR 9
- Indicative Bat Mitigation

0 270 540
Metres



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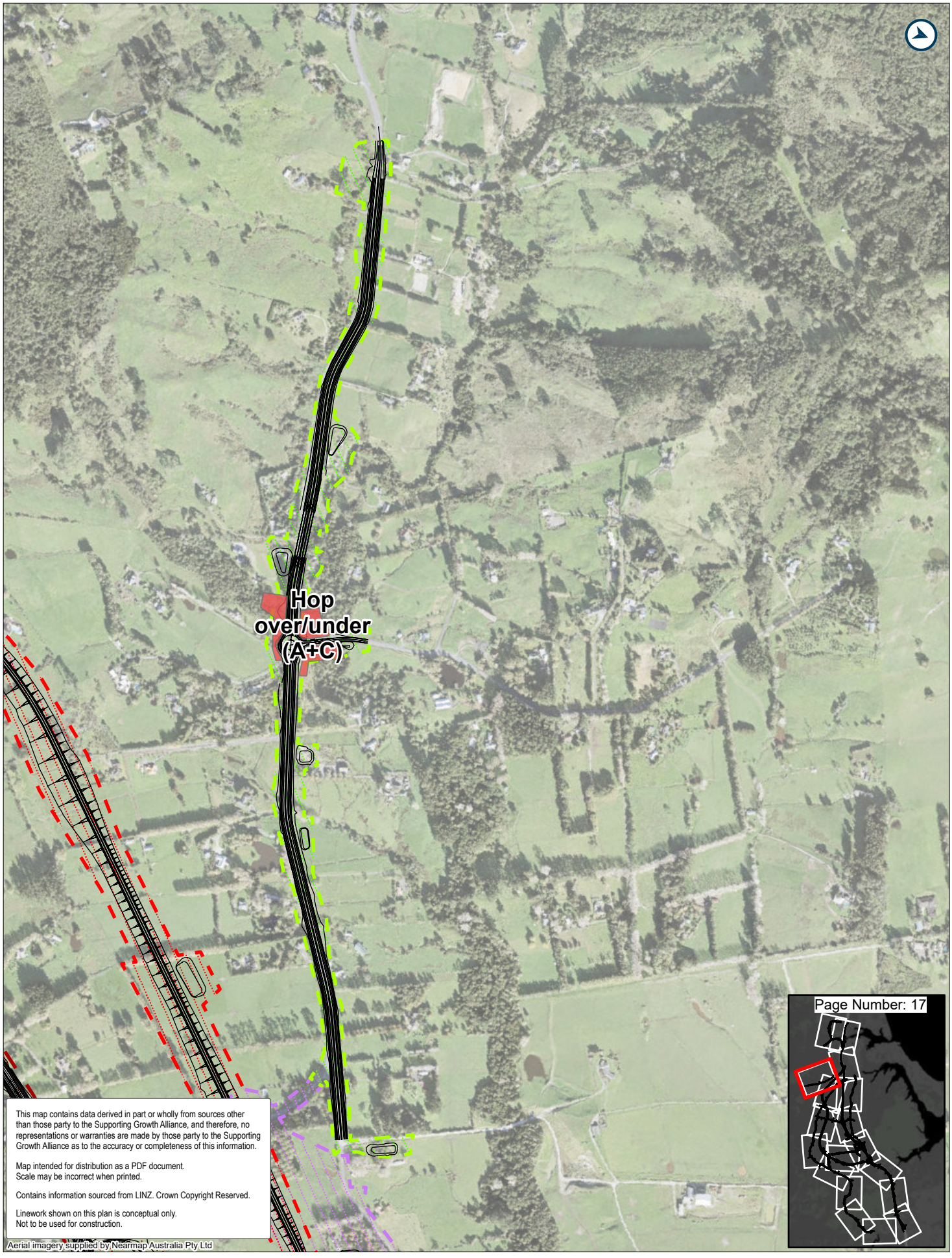
LEGEND

0 270 540
Metres

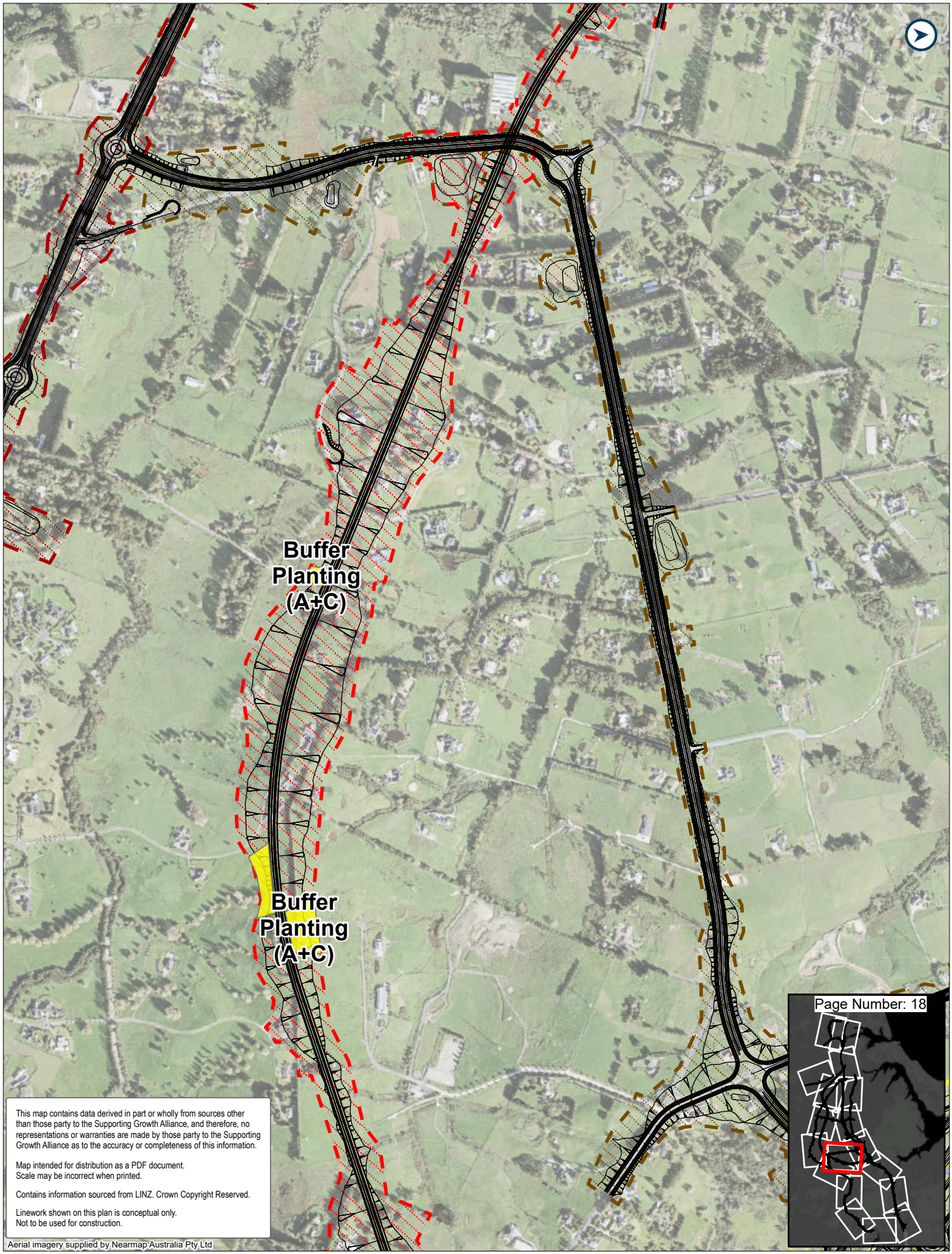
- Route Options
- NoR 4
- NoR 6
- NoR 10
- Indicative Bat Mitigation
- Indicative Bird Mitigation



LEGEND

0 270 540
Metres

- Route Options
- NoR 1
- NoR 3
- NoR 7
- NoR 8
- Indicative Bat Mitigation



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LEGEND

0 270 540
Metres

- Route Options
- NoR 1
- NoR 4
- NoR 8
- NoR 12
- Indicative Bird Mitigation

15 Appendix 15 – Biodiversity Compensation Model (BCM) for potential SEA loss

Model Inputs

Input descriptors	Input data			
Project/reference name	SGA North			
Biodiversity type	SEA			
Technical expert(s) input	Michiel Jonker			
Benchmark	5			
How many habitat types OR sites are impacte	4			
Number of proposed compensation actions	1			
Net gain target	10%			
Habitat/Site Impact(s)	**PL2**	**VS2**	**MF4**	
Impact risk contingency:	2	2	3	
Impact uncertainty contingency:	2	2	3	
Areal extent of impact (ha):	0.4	2.1	0.04	
Value score prior to impact:	3	4	5	
Value score after impact:	0.01	0.01	0.01	
Compensation Action(s)	**Compensation Action 1**			
Discount rate:	3.0%			
Finite end point (years):	30			
Compensation confidence contingency:	3			
Areal extent (ha) of compensation type:	12.2			
Value score prior to compensation:	0.01			
Value score after compensation:	4			

Model outputs

	Total impact score	PL2	VS2	MF4	0
Impact score	-2.26452	-0.27628	-1.93555	-0.05269	
	Total compensation score	**Compensation Action 1**			
Compensation score	2.50684	2.50684			
Net gain outcome	10.7%				

This Biodiversity Compensation Model (BCM) and the accompanying User Guide has been developed by:
M. Baber, J. Dickson, J. Quinn, J. Markham, G. Ussher, S. Jackson and S. Heggie-Gracie

Figure 10-1 Biodiversity Compensation Model inputs and outputs for NoR 1 – New Rapid Transit Corridor (TRC) between Albany and Milldale

Model Inputs		
Input descriptors	**Input data**	
Project/reference name	SGA North	
Biodiversity type	SEA	
Technical expert(s) input	Michiel Jonker	
Benchmark	5	
How many habitat types OR sites are impacted	2	
Number of proposed compensation actions	1	
Net gain target	10%	
Habitat/Site Impact(s)	**TL3**	
Impact risk contingency:	2	
Impact uncertainty contingency:	2	
Areal extent of impact (ha):	0.02	
Value score prior to impact:	3	
Value score after impact:	0.01	
Compensation Action(s)	**Compensation Action 1**	
Discount rate:	3.0%	
Finite end point (years):	30	
Compensation confidence contingency:	2	
Areal extent (ha) of compensation type:	0.056	
Value score prior to compensation:	0.01	
Value score after compensation:	4	

Model outputs			
	Total impact score	**TL3**	**0**
Impact score	**-0.01381**	-0.01381	
	Total compensation score	**Compensation Action 1**	
Compensation score	**0.01519**	0.01519	
Net gain outcome	**10.0%**		

This Biodiversity Compensation Model (BCM) and the accompanying User Guide has been developed by:
M. Baber, J. Dickson, J. Quinn, J. Markham, G. Ussher, S. Jackson and S. Heggie-Gracie

Figure 10-2 Biodiversity Compensation Model inputs and outputs for NoR 4 – SH1 Improvements

Model Inputs		
Input descriptors	**Input data**	
Project/reference name	SGA North	
Biodiversity type	SEA	
Technical expert(s) input	Michiel Jonker	
Benchmark	5	
How many habitat types OR sites are impacted	2	
Number of proposed compensation actions	1	
Net gain target	10%	
Habitat/Site Impact(s)	**VS2**	
Impact risk contingency:	2	
Impact uncertainty contingency:	2	
Areal extent of impact (ha):	0.1	
Value score prior to impact:	4	
Value score after impact:	0.01	
Compensation Action(s)	**Compensation Action 1**	
Discount rate:	3.0%	
Finite end point (years):	30	
Compensation confidence contingency:	2	
Areal extent (ha) of compensation type:	0.38	
Value score prior to compensation:	0.01	
Value score after compensation:	4	

Model outputs			
	Total impact score	**VS2**	**0**
Impact score	**-0.09217**	-0.09217	
	Total compensation score	**Compensation Action 1**	
Compensation score	**0.10307**	0.10307	
Net gain outcome	**11.8%**		

This Biodiversity Compensation Model (BCM) and the accompanying User Guide has been developed by:
M. Baber, J. Dickson, J. Quinn, J. Markham, G. Ussher, S. Jackson and S. Heggie-Gracie

Figure 10-**3** Biodiversity Compensation Model inputs and outputs for NoR 7 – Pine Valley Road upgrade

Model Inputs

Input descriptors	Input data
Project/reference name	SGA North
Biodiversity type	SEA
Technical expert(s) input	Michiel Jonker
Benchmark	5
How many habitat types OR sites are impacted	4
Number of proposed compensation actions	1
Net gain target	10%

Habitat/Site Impact(s)	ES	TL3	VS2	WF9,WF11, WF12
Impact risk contingency:	1	2	2	3
Impact uncertainty contingency:	1	2	2	3
Areal extent of impact (ha):	0.153	0.131	0.297	1.36
Value score prior to impact:	2	3	4	5
Value score after impact:	0.01	0.01	0.01	0.01

Compensation Action(s)	Compensation Action 1
Discount rate:	3.0%
Finite end point (years):	50
Compensation confidence contingency:	3
Areal extent (ha) of compensation type:	21.5
Value score prior to compensation:	0.01
Value score after compensation:	4

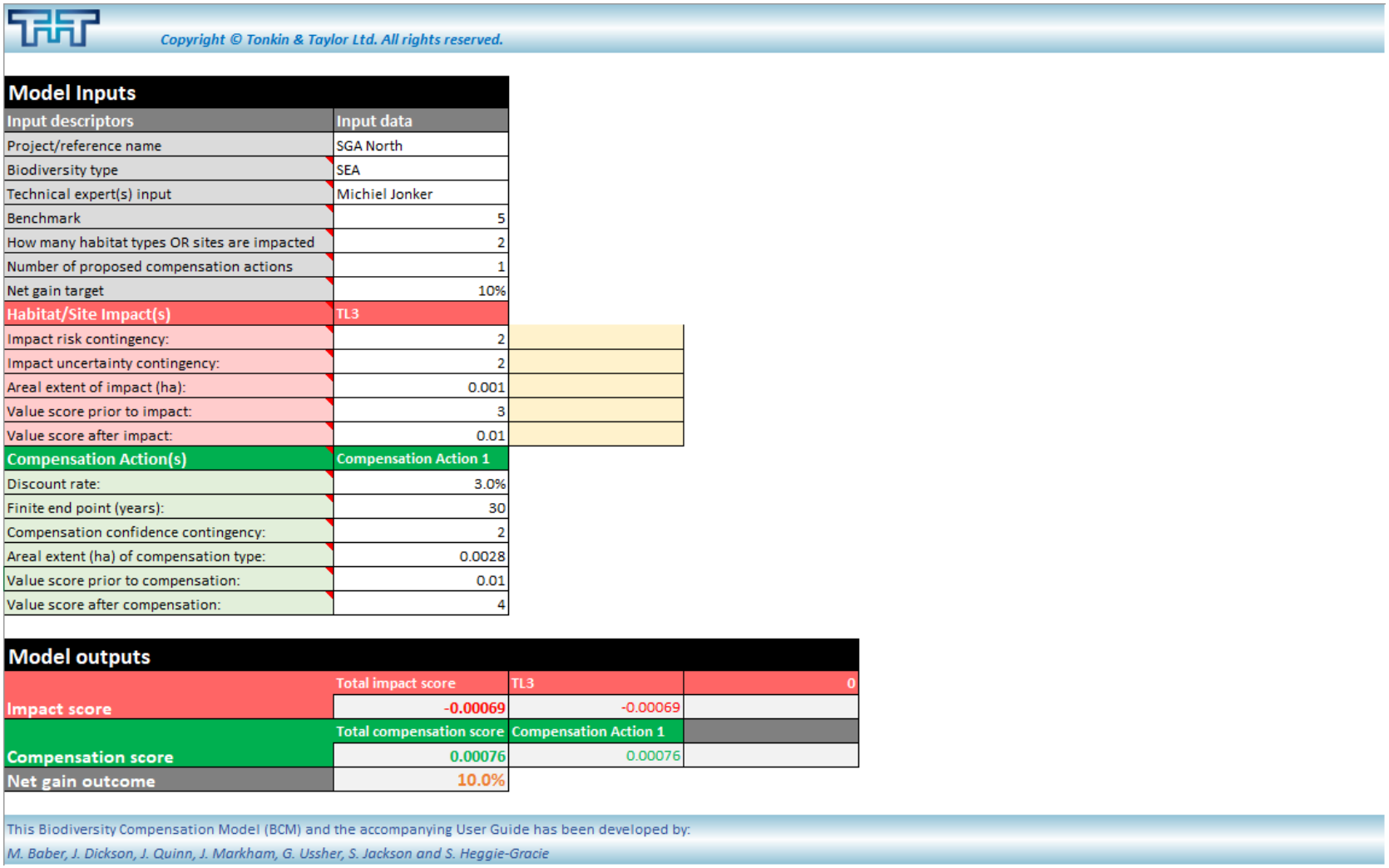
Model outputs

	Total impact score	ES	TL3	VS2	WF9,WF11, WF12
Impact score	-2.21977	-0.06394	-0.09048	-0.27374	-1.79161
	Total compensation score	Compensation Action 1			
Compensation score	2.44602	2.44602			
Net gain outcome	10.2%				

This Biodiversity Compensation Model (BCM) and the accompanying User Guide has been developed by:

M. Baber, J. Dickson, J. Quinn, J. Markham, G. Ussher, S. Jackson and S. Heggie-Gracie

Figure 10-4 Biodiversity Compensation Model inputs and outputs for NoR 9 – Dairy Flat Highway to Albany upgrade



Model Inputs

Input descriptors	Input data
Project/reference name	SGA North
Biodiversity type	SEA
Technical expert(s) input	Michiel Jonker
Benchmark	5
How many habitat types OR sites are impacted	2
Number of proposed compensation actions	1
Net gain target	10%
Habitat/Site Impact(s)	**TL3**
Impact risk contingency:	2
Impact uncertainty contingency:	2
Areal extent of impact (ha):	0.001
Value score prior to impact:	3
Value score after impact:	0.01
Compensation Action(s)	**Compensation Action 1**
Discount rate:	3.0%
Finite end point (years):	30
Compensation confidence contingency:	2
Areal extent (ha) of compensation type:	0.0028
Value score prior to compensation:	0.01
Value score after compensation:	4

Model outputs

	Total impact score	TL3	0
Impact score	-0.00069	-0.00069	
	Total compensation score	Compensation Action 1	
Compensation score	0.00076	0.00076	
Net gain outcome	10.0%		

This Biodiversity Compensation Model (BCM) and the accompanying User Guide has been developed by:
M. Baber, J. Dickson, J. Quinn, J. Markham, G. Ussher, S. Jackson and S. Heggie-Gracie

Figure 10-5 Biodiversity Compensation Model inputs and outputs for NoR 10 – Wainui Road upgrade

16 Appendix 16 – Bat Survey Report

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North Long-Tailed Bat Acoustic Survey Report 2022-2023

August 2023

Version 1.0

WAKA KOTAHI NZ TRANSPORT AGENCY

New Zealand Government

Document Status

Responsibility	Name
Author	Dannie Cullen
Reviewer	Michiel Jonker
Approver	Kathleen Bunting

Revision Status

Version	Date	Reason for Issue
1.0	31 August 2023	Final for lodgement

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1 Introduction

1.1 Background

As part of the Supporting Growth Programme, Te Tupu Ngātahi Supporting Growth (SG) is preparing 13 Notices of Requirement (NoRs), on behalf of Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT) as requiring authorities, to designate land, under the Resource Management Act 1991 (RMA). The notices are to designate land for future strategic transport corridors and two rapid transit corridor stations to enable the future construction, operation and maintenance of transport infrastructure in the North area of Auckland. The North area extends from Albany to Ōrewa and via the growth areas of Dairy Flat, Silverdale West, Wainui East, and Redvale. The North projects are hereinafter referred to as the 'Projects'.

An overview of the Projects is provided in Figure 1-1 below.

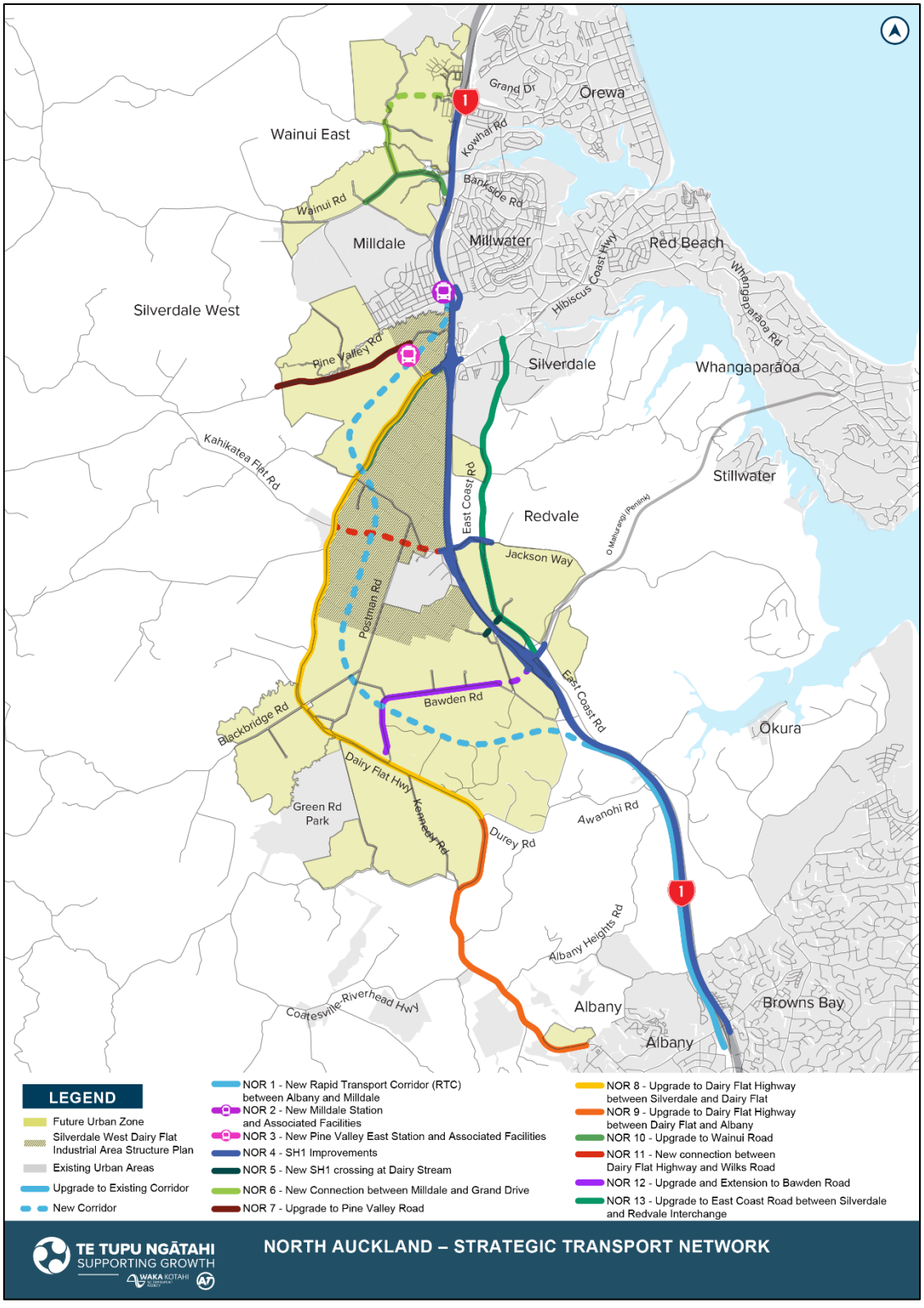

Figure 1-1 Project Overview

1.2 Acoustic Monitoring

Long-tailed bats (pekapeka) (*Chalinolobus tuberculatus*) are considered 'Threatened – Nationally Critical' (O'Donnell et al., 2018) and are known to be present within the Northern Auckland region (Riverhead Forest, Waitoki etc) (DOC, 2023). Although desktop records confirm their presence within a 10 km radius of the NoRs, the understanding of how bats use the wider landscape is limited.

To gain an understanding of the habitat features that are of value to long-tailed bats it is necessary to monitor the landscape in a manner that reflects how they use it. Therefore, to establish an ecological baseline and identify if there are vegetated corridors that bats are using frequently to move through the landscape, acoustic monitoring for bats was undertaken at an areawide level.

2 Methodology

2.1 Acoustic Monitoring

Automatic Bat Monitors (ABM)s (Song Meter SM4BAT-FS Ultrasonic Bat Detectors with SMM-U2 microphones) were deployed across the North Projects area. ABMs were deployed in two separate survey sessions. The first (December 2022) was completed within the bat maternity period (December - February) and the second (March 2023) within the bat mating season (March - May). The intent of surveying in two sessions was to cover any potential changes in bat activity patterns between the maternity and mating seasons.

Once deployed, ABMs were pre-set to start recording 60 minutes before sunset and cease recording 60 minutes after sunrise (a 'night'). Each ABM was left in-situ for at-least 14 nights with suitable weather conditions (O'Donnell & Sedgeley, 2001). Suitable weather conditions for ABM surveys have been defined by Department of Conservation (2021) as:

- Temperature 10°C or greater for the first four hours after official sunset time for the North Island.
- Precipitation < 2.5 mm in the first 2 hours after official sunset, and < 5 mm in the first 4 hours after official sunset.

2.1.1 December 2022 Survey

ABMs were placed in a network within habitats that would be affected by the Projects and would provide suitable habitat for bat roosting, foraging, and commuting. Specifically, pre-determined survey locations were selected based on the current understanding of habitats that are favoured by bats, existing bat records (Department of Conservation and Auckland Council), and a heat map produced by Auckland Council (Crewther, 2016).

28 ABMs were left in-situ during the period 9 December 2022 until 13 January 2023. The locations of the December 2022 survey sites are detailed in Table 2-1 and presented in Figure 2-1.

Table 2-1 December 2022 ABM survey locations

Site	Latitude (Y)	Longitude (X)
Dec #2	-36.69777	174.70808
Dec #3	-36.68727	174.69031
Dec #4	-36.68312	174.69765
Dec #5	-36.67388	174.70593
Dec #6	-36.66437	174.67551
Dec #7	-36.57458	174.68860
Dec #8	-36.59274	174.65051
Dec #9	-36.58929	174.64071
Dec #10	-36.61681	174.65980

Site	Latitude (Y)	Longitude (X)
Dec #11	-36.62681	174.64389
Dec #12	-36.65173	174.66465
Dec #13	-36.63798	174.63733
Dec #14	-36.64728	174.65086
Dec #16	-36.64582	174.64704
Dec #11108	-36.65611	174.62906
Dec #11109	-36.67092	174.63602
Dec #11111	-36.67177	174.64686
Dec #11112	-36.67747	174.64281
Dec #11113	-36.68038	174.62592
Dec #11115	-36.67529	174.68077
Dec #11116	-36.68377	174.68306
Dec #11118	-36.69825	174.66434
Dec #11119	-36.71340	174.66614
Dec #11120	-36.71750	174.67197
Dec #5116603	-36.72253	174.69509
Dec #5178985	-36.67172	174.66109
Dec #5266742	-36.72125	174.70401
Dec #NEW	-36.71064	174.67896

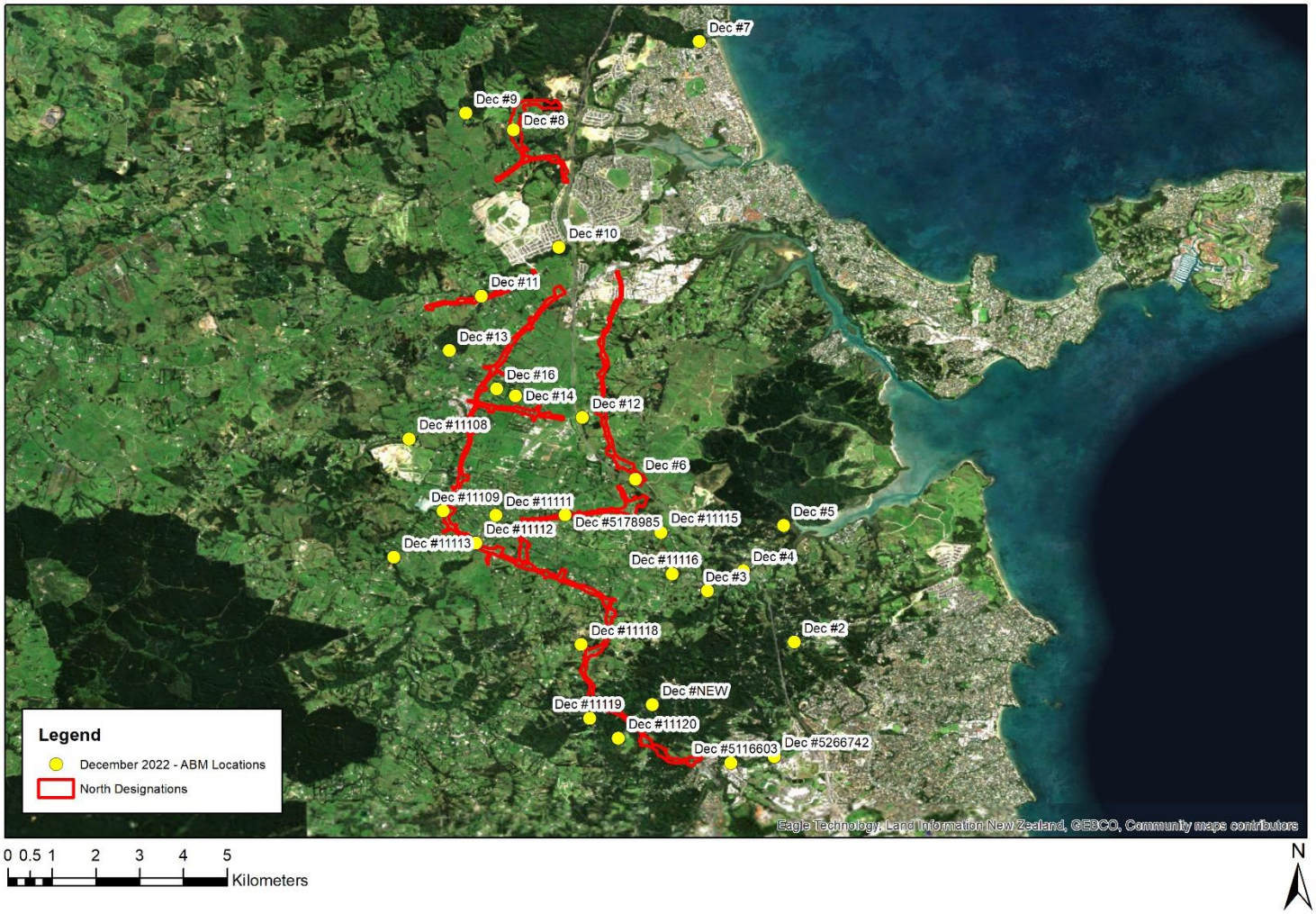

Figure 2-1 ABM locations (December 2022 survey)

2.1.2 March 2023 Survey

Based on the results of the first survey, ABMs locations were specific to the stream and river corridors associated with each NoR.

A total of 18 ABMs were left in-situ from 22 March 2023 until 11 April 2023. The locations of the March 2023 sites are detailed in Table 2-2 and presented in Figure 2-2.

Table 2-2 March 2023 ABM survey locations

Site	Latitude (Y)	Longitude (X)
Mar #1	-36.67824	174.64081
Mar #3	-36.69166	174.70254
Mar #4	-36.66779	174.67409
Mar #5	-36.66431	174.67558
Mar #6	-36.65169	174.66470
Mar #7	-36.61693	174.65980
Mar #8	-36.69763	174.70589
Mar #9	-36.59445	174.64977
Mar #10	-36.71685	174.67082
Mar #11	-36.71887	174.71064
Mar #12	-36.72266	174.69327
Mar #13	-36.67527	174.68091
Mar #15	-36.61986	174.66515
Mar #16	-36.62679	174.64374
Mar #18	-36.67079	174.63614
Mar #19	-36.67263	174.70764
Mar #20	-36.68205	174.70147
Mar #21	-36.58611	174.66298

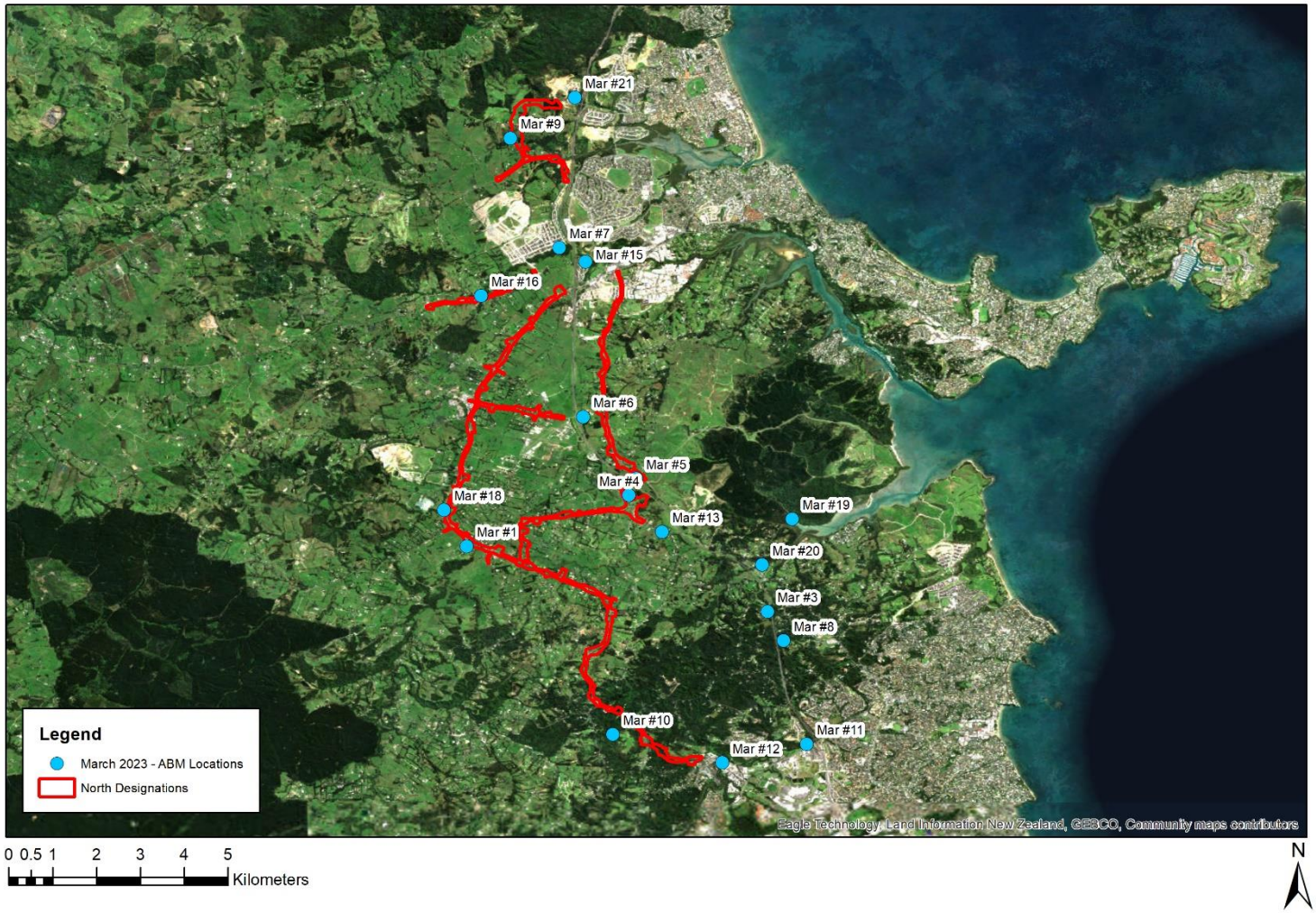

Figure 2-2 ABM locations (March 2023 survey)

2.2 Data Analysis

2.2.1 Long-tailed bat detection and behaviour

The ABM recordings were analysed by an experienced ecologist using Kaleidoscope Pro Analysis[1] software. Confirmed bat recordings (several bat echolocation calls recorded in a sound file) were further classified into:

- Echolocation calls i.e. regularly-spaced calls;
- Echolocation calls with foraging calls (feeding buzzes); and
- Echolocation calls with social calls.

The ABM data was removed from the analysis of trends if there was instrument error or weather conditions overnight were suboptimal for bat activity. Weather data for the survey period was provided by the nearest NIWA CliFlo weather station with relevant data available (North Shore Albany Ews, Agent 37852)[2] and the weather conditions during this period are included in Appendix 1.

2.2.2 First and Last Bat Pass

A review of the ABM data was undertaken to determine when the first and last bat pass was detected in comparison with sunset or sunrise time (data collected from the Time and Date website[3]). The purpose of this analysis was to gain an understanding as to whether bats could potentially be roosting in close proximity to an ABM site. Griffiths (2007) found that long-tailed bats emerged on average 30.1 ± 1.5 minutes after sunset and between January – February bats returned to their roost just before sunrise. However, by March bats were observed to be returning earlier to their roosts and by the end of May they returned as early as 40 minutes after emerging.

The following information was reviewed:

- Percentage of nights at each site where first/last bat pass is recorded within 30 minutes of sunset / sunrise;
- First and last bat pass recorded at each site during the survey period; and
- Minimum time difference between sunset/sunrise and the first/last bat pass.

[1] https://www.wildlifeacoustics.com/download/kaleidoscope-software.
[2] https://cliflo.niwa.co.nz/
[3] https://www.timeanddate.com

3 Results

3.1 December 2022

Table 3-1 and Figure 3-1 present the overall results of the bat surveys completed for the North during the December 2022 survey. Raw survey data is included in Appendix 2.

Four of the 28 ABM sites (December sites #6, #10, #12, and #11115) detected bat activity during the survey period. The site with the greatest number of bat passes was December site #10 (two bat passes), all other sites recorded one bat pass (Figure 3-2). One foraging call was recorded at December site #10, and no social calls were recorded during the survey.

One bat pass at December site #10 was recorded within 30 minutes of sunset/sunrise (Appendix 3). The site with the lowest minimum time difference between sunset and first bat pass was at December site #10, with a time of 16 minutes. The site with the lowest minimum time difference between sunrise and last bat pass was at December site #11115, with a time of 3 hours 10 minutes. These results suggest there is potential for bat roosts to be present within the immediate vicinity of December site #10 (an area of kahikatea forest alongside Wēiti Stream).

Table 3-1 December 2022 survey results of sites with bat activity

Site	Total Number of Echolocation Calls	Total Number of Foraging Calls	Total Number of Social Calls
Dec #6	1	0	0
Dec #10	2	1	0
Dec #12	1	0	0
Dec #11115	1	0	0

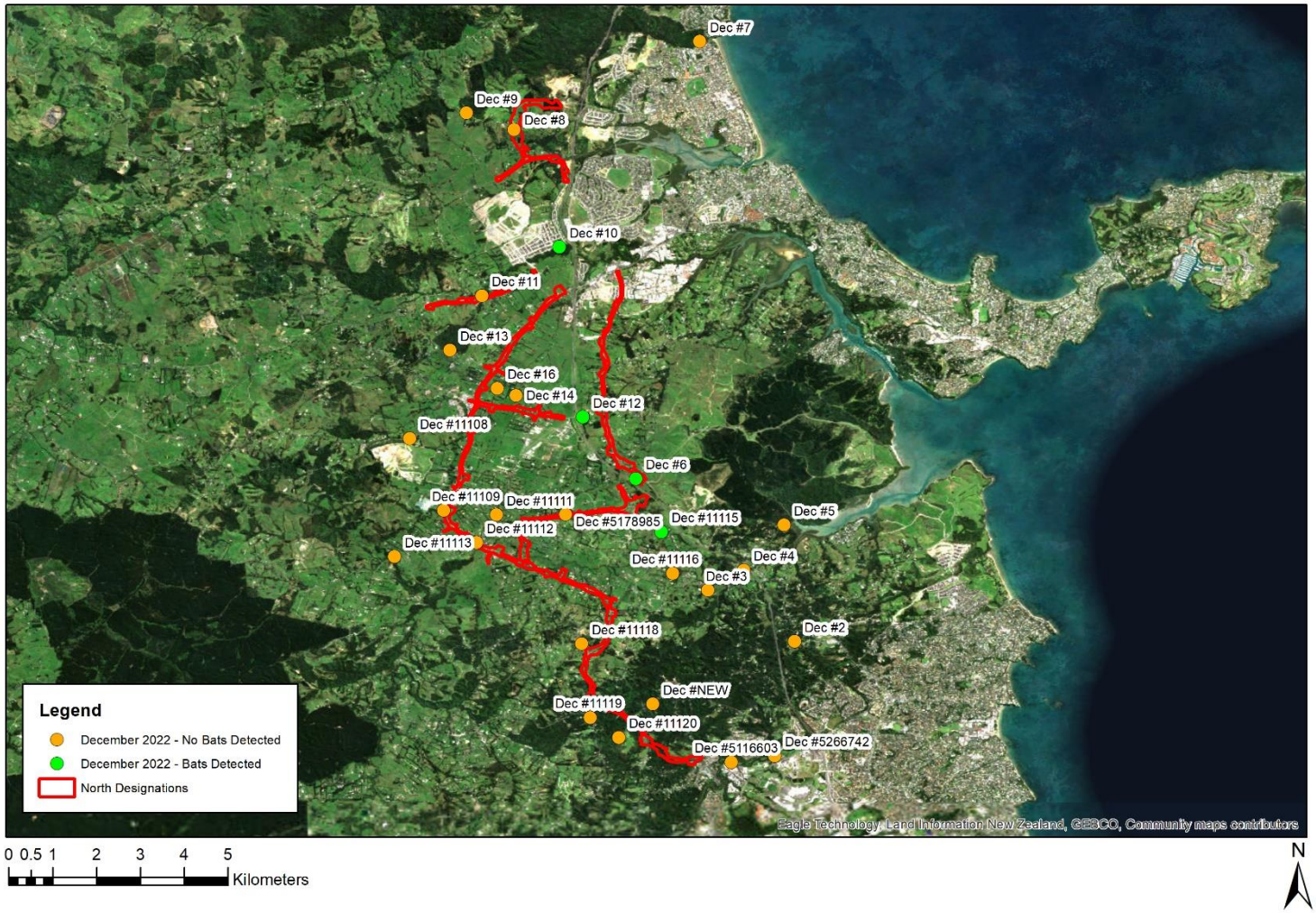

Figure 3-1 Long-tailed bat presence/absence (December 2022 survey)

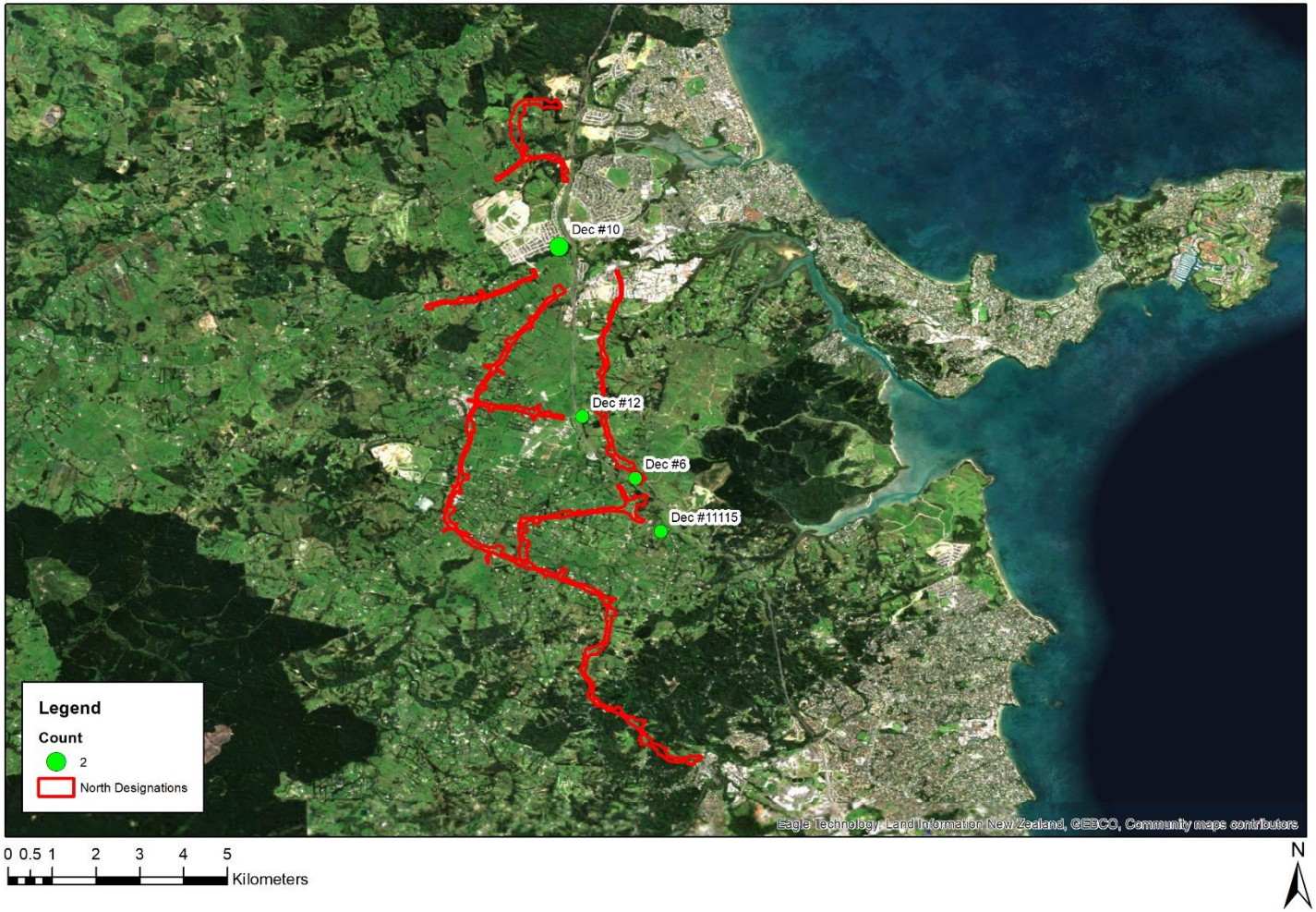

Figure 3-2 Sites with confirmed long-tailed bat presence (December 2022 survey). Proportional symbology indicates the relative proportion of bat passes in relation to the site with the highest number of bat passes (Dec #10).

3.2 March 2023

Table 3-2 and Figure 3-3 present the overall results of the bat surveys completed for the North during the March 2023 survey. Raw survey data is included in Appendix 2.

One ABM site detected bat activity during the survey period (March site #6[4]). A total of 18 bat passes were recorded at March site #6 during the survey. No foraging or social calls were recorded during the survey.

No bat passes were recorded within 30 minutes of sunset or sunrise (Appendix 3). At March site #6 the lowest minimum time difference between sunset and first bat pass was 2 hours 46 minutes, and the lowest minimum time difference between sunrise and last bat pass was 3 hours 18 minutes.

Table 3-2 March 2023 survey results of sites with bat activity

Site	Total Number of Echolocation Calls	Total Number of Foraging Calls	Total Number of Social Calls
Dec #6	18	0	0

[4] March site #6 is the same site as the December site #12 during the previous survey.

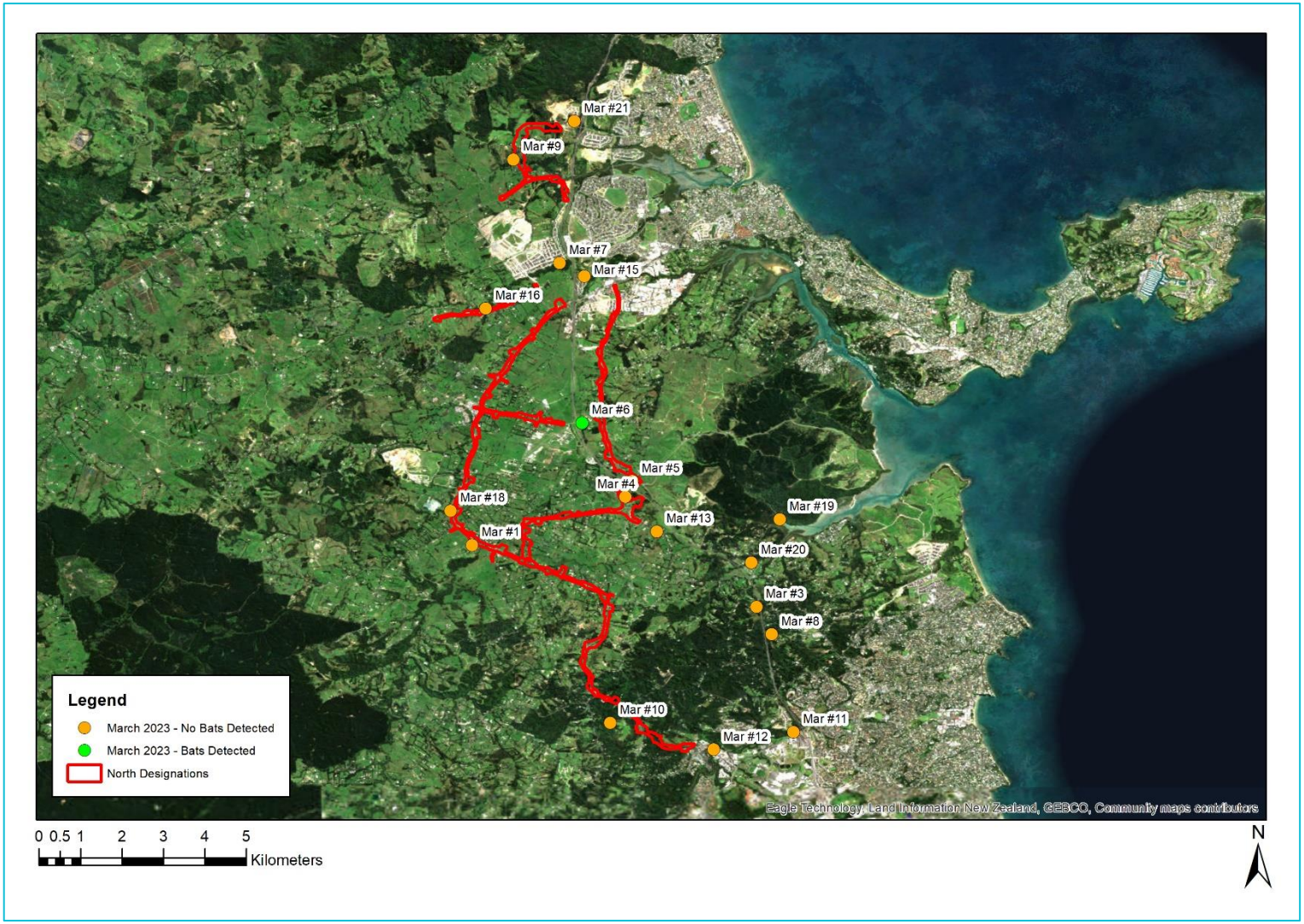

Figure 3-3 Long-tailed bat presence/absence (March 2023 survey)

3.3 Survey Limitations

Some survey locations were limited by access to private property. If access was not available for a pre-determined survey location, then an alternative survey location as close as possible to the original survey site was used.

Instrument error was recorded during both the December 2022 and March 2023 surveys. An overview of when and where instrument error occurred is included in Appendix 2. Additionally, no data was collected at December site #7 as the ABM was stolen during the monitoring period.

4 Conclusion

Both the December 2022 and March 2023 surveys found evidence of long-tailed bat presence in the North Projects area. Bats were observed to be most active during the March 2023 survey (bat mating season) with a mean number of 1 nightly bat pass recorded at March site #6. During the December 2022 survey, the mean number of bat passes was lower (with the highest mean number of 0.06 nightly bat passes recorded at December site #10), however bats were detected at more sites (four sites during the December 2022 survey and one site during the March 2023 survey).

One foraging call was recorded during the December 2022 survey at December site #10, and no foraging calls were recorded during the March 2023 survey. Social calls were not recorded during either survey. Additionally, long-tailed bat activity was recorded at the same site during both surveys (December site #12 and March site #6), in an area of exotic-dominated treeland located to the east of the Wilks Road bridge over State Highway 1.

Analysis of the first and last bat pass suggests that there is potential for bat roosts to be present within the immediate vicinity of December site #10 (located in an area of kahikatea forest alongside Weiti Stream, west of State Highway 1).

Using the information obtained from the surveys, the results suggest that bats are present and active in the North Projects area.

5 References

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1 Appendix 1 - Weather Conditions

Analysis of the nightly weather against the criteria described in Section 2 led to the exclusion of data whilst the ABMs were in situ during the 2022-2023 surveys. The dates that met weather criteria and were selected for data analysis are presented in Table 1 and Table 2.

Table 1 Weather conditions during the December 2022 survey

Date	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Total rainfall in first four hours after sunset (mm)	Suitable Weather Conditions?
9-Dec-22	18.7	0.0	0.0	✓
10-Dec-22	18.4	0.0	0.0	✓
11-Dec-22	17.4	0.0	0.0	✓
12-Dec-22	17.9	0.0	0.0	✓
13-Dec-22	19.3	0.0	0.0	✓
14-Dec-22	17.7	6.2	10.3	X
15-Dec-22	19.6	0.2	0.3	✓
16-Dec-22	19.6	0.0	0.0	✓
17-Dec-22	18.0	0.3	1.1	✓
18-Dec-22	16.5	0.0	0.0	✓
19-Dec-22	16.8	0.0	0.0	✓
20-Dec-22	17.6	0.0	0.0	✓
21-Dec-22	19.8	0.0	0.0	✓
22-Dec-22	18.0	0.0	0.0	✓
23-Dec-22	17.4	0.0	0.0	✓
24-Dec-22	16.9	0.0	0.0	✓
25-Dec-22	18.0	0.0	0.0	✓
26-Dec-22	18.7	0.0	0.0	✓
27-Dec-22	20.1	0.0	0.0	✓
28-Dec-22	20.2	0.0	0.0	✓
29-Dec-22	18.3	0.0	0.0	✓
30-Dec-22	17.7	0.0	0.0	✓

Date	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Total rainfall in first four hours after sunset (mm)	Suitable Weather Conditions?
31-Dec-22	20.8	0.0	0.0	✓
1-Jan-23	19.0	0.0	0.0	✓
2-Jan-23	19.0	0.0	0.0	✓
3-Jan-23	19.0	0.2	1.0	✓
4-Jan-23	19.2	0.3	3.8	✓
5-Jan-23	19.4	0.4	0.8	✓
6-Jan-23	19.7	0.6	2.4	✓
7-Jan-23	19.3	0.0	0.0	✓
8-Jan-23	21.6	0.0	0.0	✓
9-Jan-23	20.6	0.0	1.7	✓
10-Jan-23	16.2	0.3	0.3	✓
11-Jan-23	16.9	0.0	0.0	✓
12-Jan-23	18.0	3.1	3.4	X

Table 2 Weather conditions during the March 2023 survey

Date	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Total rainfall in first four hours after sunset (mm)	Suitable Weather Conditions?
22-Mar-23	12.7	0.0	0.0	✓
23-Mar-23	12.1	0.0	0.0	✓
24-Mar-23	12.3	0.0	0.0	✓
25-Mar-23	14.0	0.0	0.0	✓
26-Mar-23	18.6	0.0	0.0	✓
27-Mar-23	15.4	0.0	0.0	✓
28-Mar-23	14.0	0.0	0.0	✓
29-Mar-23	11.5	0.0	0.0	✓
30-Mar-23	10.0	0.0	0.0	✓
31-Mar-23	16.6	0.0	0.0	✓

Date	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Total rainfall in first four hours after sunset (mm)	Suitable Weather Conditions?
1-Apr-23	18.2	0.0	0.0	✓
2-Apr-23	15.9	0.0	0.0	✓
3-Apr-23	13.5	0.0	0.0	✓
4-Apr-23	11.6	0.0	0.0	✓
5-Apr-23	12.8	0.0	0.0	✓
6-Apr-23	14.1	5.0	8.5	X
7-Apr-23	16.5	0.0	0.0	✓
8-Apr-23	12.4	0.0	0.0	✓
9-Apr-23	18.5	0.6	5.6	X
10-Apr-23	17.3	0.0	0.0	✓

2 Appendix 2 - Survey Results

2.1 December 2022

Date	Site																									
	Dec #2	Dec #3	Dec #4	Dec #5	Dec #6	Dec #7	Dec #8	Dec #9	Dec #10	Dec #11	Dec #12	Dec #13	Dec #14	Dec #16	Dec #11108	Dec #11109	Dec #11111	Dec #11112	Dec #11113	Dec #11115	Dec #11116	Dec #11118	Dec #11119	Dec #11120	Dec #5116603	Dec #5178985	Dec #5266742	Dec #NEW
9-Dec-22	0	0	0	0	0	ABM unit stolen.	0	E	0	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Dec-22	0	0	0	0	0		0	E	2	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Dec-22	Weather conditions unsuitable.																											
15-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Dec-22	0	0	E	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-22	0	0	E	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Dec-22	0	0	E	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Dec-22	0	0	E	0	0		0	E	0	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Dec-22	0	0	E	0	0		0	E	0	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Dec-22	0	0	0	0	0		0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-22	0	0	0	0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
26-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Dec-22	0	0	0	0	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Dec-22	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-23	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Jan-23	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jan-23	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date	Site																									
	Dec #2	Dec #3	Dec #4	Dec #5	Dec #6	Dec #7	Dec #8	Dec #9	Dec #10	Dec #11	Dec #12	Dec #13	Dec #14	Dec #16	Dec #11108	Dec #11109	Dec #11111	Dec #11112	Dec #11113	Dec #11115	Dec #11116	Dec #11118	Dec #11119	Dec #11120	Dec #5116603	Dec #5178985	Dec #5266742	Dec #NEW
4-Jan-23	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jan-23	0	0	0	0	0		0	E	0	0	0	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0
6-Jan-23	0	0	0	0	0		0	E	0	0	0	0	0	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
7-Jan-23	0	0	0	0	0		0	E	0	0	0	E	0	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
8-Jan-23	0	0	0	0	0		0	E	0	0	0	E	0	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-23	0	0	0	0	0		0	E	0	0	0	E	0	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
10-Jan-23	0	0	0	0	0		0	E	0	0	0	E	E	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
11-Jan-23	0	0	0	0	0		0	E	0	E	E	E	E	E	0	E	0	0	0	0	0	0	0	0	0	0	0	0
12-Jan-23	Weather conditions unsuitable.																											
Total Count of Bat Passes	0	0	0	0	1	N/A	0	0	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
# Valid Nights Recorded	33	33	28	33	33	N/A	33	13	33	31	32	28	31	23	33	25	33	33	33	33	33	33	33	33	33	33	33	33
Mean # Nightly Bat Passes	0.00	0.00	0.00	0.00	0.03	N/A	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: N/A = ABM not deployed. E = Instrument error. Highlighted blue cells = Number of bat calls.

2.2 March 2023

Date	Site																	
	Mar #1	Mar #3	Mar #4	Mar #5	Mar #6	Mar #7	Mar #8	Mar #9	Mar #10	Mar #11	Mar #12	Mar #13	Mar #15	Mar #16	Mar #18	Mar #19	Mar #20	Mar #21
22-Mar-23	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
23-Mar-23	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date	Site																	
29-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Mar-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Apr-23	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Apr-23	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-23	0	0	0	0	1	0	0	0	0	0	0		0	0	0	0	0	0
4-Apr-23	0	0	0	0	0	E	0	0	0	0	0	E	0	0	0	0	0	0
5-Apr-23	0	0	0	0	7	E	0	0	0	0	0	E	0	0	0	0	0	0
6-Apr-23	0	0	0	0	0	E	0	0	0	0	0	E	0	0	0	0	0	0
7-Apr-23	0	0	0	0	0	E	0	0	0	0	0	E	0	0	0	0	0	0
8-Apr-23	0	0	0	0	2	E	0	0	0	0	0	E	0	0	0	0	0	0
9-Apr-23	0	0	0	0	0	E	0	0	0	0	0	E	0	0	0	0	0	0
10-Apr-23	0	0	0	0	0	E	0	0	0	0	0	E	0	0	0	0	0	0
Total Count of Bat Passes	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0
# Valid Nights Recorded	18	18	18	18	18	13	18	18	18	18	18	12	18	18	18	18	18	18
Mean # Nightly Bat Passes	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: E = Instrument error. Highlighted blue cells = Number of bat calls.

3 Appendix 3 - First and Last Bat Pass Results

Table 3 Times in which the first and last bat call was recorded each night, in relation to sunset and sunrise times (December 2022 survey)

Site	Sunset			Sunrise		
	First bat pass recorded during the survey period (hh:mm)	Minimum time difference between sunset and first bat pass (h:mm)	Percentage of nights where first bat pass is within 30 minutes of sunset (%)	Last bat pass recorded during the survey period (hh:mm)	Minimum time difference between last bat pass and sunrise (h:mm)	Percentage of nights where last bat pass is within 30 minutes of sunrise (%)
Dec #6	21:36	0:54	0.00	21:36	8:25	0.00
Dec #10	20:48	0:16	100.00	20:48	9:06	0.00
Dec #12	22:01	1:20	0.00	22:01	7:59	0.00
Dec #11115	02:50	6:09	0.00	02:50	3:10	0.00

Table 4 Times in which the first and last bat call was recorded each night, in relation to sunset and sunrise times (March 2023 survey)

Site	Sunset			Sunrise		
	First bat pass recorded during the survey period (hh:mm)	Minimum time difference between sunset and first bat pass (h:mm)	Percentage of nights where first bat pass is within 30 minutes of sunset (%)	Last bat pass recorded during the survey period (hh:mm)	Minimum time difference between last bat pass and sunrise (h:mm)	Percentage of nights where last bat pass is within 30 minutes of sunrise (%)
Mar #6	22:01	2:46	0.00	04:08	3:18	0.00