

**BEFORE THE TARANAKI REGIONAL COUNCIL AND NEW PLYMOUTH
DISTRICT COUNCIL**

MT MESSENGER BYPASS PROJECT

In the matter of the Resource Management Act 1991

and

In the matter of applications for resource consents, and a notice of requirement by the NZ Transport Agency for an alteration to the State Highway 3 designation in the New Plymouth District Plan, to carry out the Mt Messenger Bypass Project

**SECOND SUPPLEMENTARY STATEMENT OF EVIDENCE OF ROGER JOHN
MACGIBBON (ECOLOGY MITIGATION AND OFFSETS) ON BEHALF OF THE
NZ TRANSPORT AGENCY**

28 September 2018

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INTRODUCTION

1. My full name is Roger John MacGibbon.
2. This second supplementary statement of evidence is given in relation to applications for resource consents, and a notice of requirement by the NZ Transport Agency ("the **Transport Agency**") for an alteration to the State Highway 3 designation in the New Plymouth District Plan, to carry out the Mt Messenger Bypass Project ("the **Project**").
3. It is my fourth statement of evidence, following:
 - (a) My statement of evidence in chief ("**EIC**") dated 25 May 2018;
 - (b) My (first) supplementary statement of evidence dated 17 July 2018; and
 - (c) My statement of rebuttal evidence dated 30 July 2018.
4. I have the qualifications and experience set out in my EIC.
5. I repeat the confirmation given in my EIC that I have read the 'Code of Conduct' for expert witnesses and that my evidence has been prepared in compliance with that Code.
6. In this evidence I use the same defined terms as in my EIC.

SCOPE OF EVIDENCE

7. The purpose of this second supplementary statement of evidence is to present and explain the amendments made by the Transport Agency to the ecological Restoration Package since the hearing was adjourned on 16 August 2018.
8. In particular, my evidence addresses changes made to:
 - (a) the proposed measures to address effects on herpetofauna;
 - (b) the proposed measures to address effects on bats (in particular the now-proposed programme of capturing and monitoring long-tailed bats);
 - (c) the proposed Pest Management Area ("**PMA**"), and the process (linked to the long-tailed bat monitoring programme) of finalising the PMA; and
 - (d) the ELMP.
9. Since 16 August, careful consideration has been given to these matters. I have (along with Mr Chapman and others) attended six meetings with DOC, and two with NPDC (and their consultant ecologists, Wildlands) to discuss lizards, bats and the ELMP.

ADDRESSING EFFECTS ON HERPETOFAUNA

Changes to herpetofauna compensation

10. Since the adjournment of the hearing, discussions have been held between the herpetofauna and mitigation/offset experts of DOC, NPDC and the Transport Agency to clarify the herpetofauna compensation package offered in evidence and detailed in the ELMP, and to consider alternatives.
11. The herpetofauna compensation package offered at the hearing consisted of construction of a pest proof enclosure of 1 ha or larger around habitat with recent striped skink records, the translocation of any striped skink and arboreal geckos salvaged from the Project footprint to the enclosure, and the management of the enclosure fence for a period of 12 years. If the striped skink population within the enclosure increased to detectable densities by year 12 some of that skink population would be translocated back to the PMA or to an alternative fenced sanctuary.
12. In her evidence, the DOC herpetologist, Ms Adams, questioned whether there would be any ecological benefits if the enclosure fence was only to be managed for 12 years.
13. Discussions between Ms Adams and Mr Chapman identified that there was a significant likelihood of no benefit to lizards eventuating irrespective of the duration for which the enclosure is actively managed. This is because there is no guarantee that striped skink are currently resident within the area to be fenced and no sure method of verifying their presence at the time of fence construction. In addition, it is possible that no striped skink will be salvaged from along the Project footprint. As a consequence, considerable resources could be expended with no certainty that there will be any benefits to lizards.

Revised herpetofauna compensation

14. Recognising the uncertainty associated with construction of an enclosure, it is proposed that the compensation for the effects of the Project on lizards consist of payment of \$200,000 to DOC to be utilised on research that will benefit indigenous herpetofauna. A new condition to that effect is now proposed (as discussed by Mr Roan in his second supplementary statement of evidence).
15. The sum of \$200,000 equates approximately to the cost of construction of the pest proof fenced lizard enclosure and eradication of all pests from within the enclosure.
16. The potential value of a \$200,000 contribution towards herpetofauna research and the suitability of this contribution as compensation for the effects of the Project on lizards is discussed in the second supplementary evidence statement of the Project's lizard expert, Mr Chapman.

17. In addition, any striped skink or other lizards belonging to species with a threat classification salvaged from the Project footprint will be released into the pest free Rotokare Scenic Reserve inland from Eltham.¹
18. The manager of the Rotokare Scenic Reserve has been contacted and has provided approval in principle to allowing lizards to be translocated to the reserve, and (depending on the species) to be held in a soft release pen but requires the consent of the Reserve Trustees before this can be confirmed.² Once Trustee approval is received, Ngāti Tama, and the iwi local to the Rotokare area, will be consulted.

ADDRESSING EFFECTS ON BATS

19. Since the adjournment of the hearing, Mr Chapman and I have been working with the Project team to develop a proposal to provide for long-tailed bat monitoring (in the form of radio tracking) from October 2018 to March 2019, which will then inform the final location of the proposed 3,650 ha PMA.
20. As a key part of that effort, two meetings³ have been held between the Project and DOC ecologists, and one between the Project and the NPDC ecologists, to specifically discuss mitigation / offset / compensation in respect of long-tailed bats.
21. The focus on long-tailed bat monitoring has picked up on the discussion during the hearing, and in particular the evidence of the DOC bat expert Dr Colin O'Donnell.

Bat radio tracking programme

22. Mr Chapman notes in his second supplementary statement of evidence that he considers, in the absence of any additional compensation measures being offered, that *“the risk of the PMA failing to protect important roosting habitat for long-tailed bats is negligible”*.
23. However, to add greater certainty to the outcome, the Transport Agency now proposes to undertake a comprehensive bat radio tracking programme from October 2018 to March 2019. This survey will be undertaken to verify the presence of long-tailed bat maternity roost trees within the PMA and, in determining the presence of roosts, confirm the intended 3650ha PMA as suitable compensation for the potential effects of the Project on bats.
24. Mr Chapman provides details of the methodology to be used for the bat radio tracking programme, including the effort and duration of the survey, in his second supplementary statement of evidence.

¹ Copper skinks would be released in the vicinity of the Project footprint.

² The ELMP provides more detail in terms of specific release requirements for different species.

³ Six total meetings have occurred with DOC staff during the adjournment period.

25. As detailed in the bat radio tracking methodology outlined in Mr Chapman's second supplementary statement, and as defined in the new draft bat condition that is referred to by Mr Chapman and in Mr Roan's second supplementary statement, thresholds have been determined which, if met, will result in the Intended PMA⁴ (**Figure 1**) being verified as the Confirmed PMA.⁵
26. In effect, the Intended PMA will become the Confirmed PMA if:
 - (a) 10 or more maternity roosts are located within the Intended PMA; or
 - (b) 10 or more maternity roosts located in the Study Area⁶ (**Figure 3**) of which 70% or more are located within the Intended PMA.
27. The proposed draft bat condition⁷ describes a process that will be followed to evaluate the suitability of the Intended PMA, Wider PMA⁸ (**Figure 2**) or Study Area as compensation for long-tailed bats. Aspects of this process are described below.

Increased pest management intensity around maternity roosts within 500 metres of the PMA edge

28. The maternity roosts identified by the radio tracking programme, and which are located within the (final) PMA, may occur anywhere across the PMA. Those roosts are likely to represent only a proportion of the maternity roost trees that are being used by bats.
29. Roosts located close to the edges of the PMA, especially those close to mature forest containing unmanaged pest populations, are likely to be more vulnerable to predation than those located further away from the edge.
30. Acknowledging the increased risk of predation along the PMA edge, if less than 10 roosts are found 500 metres or more away from the PMA edge, intensified pest management is proposed around up to five known and utilised maternity roosts (ie, those identified through the radio-tracking programme) that are located inside the PMA, and within 500 metres of the PMA edge. If more than five of the identified maternity roost trees are within 500 metres of the PMA edge, five of those roosts located in areas of greatest predation risk – close to unmanaged mature forest or other areas of known high pest densities – will be selected for intensive management.

⁴ **Intended PMA:** the 3,650ha area shown in Figure 1 that is within the Wider PMA and is intended to become the Confirmed PMA subject to the confirmation process set out in the bat condition.

⁵ **Confirmed PMA:** the 3,650ha area within the Wider PMA that is selected as the PMA through the process set out in the bat condition (presuming that process results in the final PMA being selected from the Intended PMA, Wider PMA, or Study Area).

⁶ **Study Area:** the area, including the Project Area, the Intended PMA and land beyond both, over which bats will be tracked.

⁷ Condition 30 in the Designation Conditions.

⁸ **Wider PMA:** the area shown in Figure 2, that has an area greater than 3,650ha, from which the Confirmed 3,650ha PMA will be selected.

31. The intensified pest management will consist of traps and bait stations installed at 20 metre spacings extending 50 metres out from the roost tree. This equates to a trapping density that is between 12 and 25 times that used over the rest of the PMA.
32. The additional traps and bait stations will be activated prior to the bat breeding season every year, and will be maintained until the young of the year have left the maternity roosts (ie. late September to March). An adaptive management approach will be applied as to trap and toxin types and configuration within the 50m radius to achieve the best results.
33. Intensification of pest management around known nesting sites is sometimes referred to as the “ring of steel”. It is a tool that is now being used more commonly to keep predators out of known nesting trees of threatened bird species, especially kokako. Ngāti Tama, upon the advice of recognised kokako expert David Brydon, are using this technique in the Parininihi to protect kokako nests during the breeding season. From the information supplied to me by Ngāti Tama, this method has resulted in increased kokako fledging success (Conrad O’Carroll pers com).
34. Other kokako conservation projects have recorded success with intensified pest management around known nesting trees. The Ark in the Park kokako breeding programme in the Waitakere Ranges reported zero predation at the only known nest site in 2011/12⁹ and again the following summer¹⁰ when intensified trapping was undertaken around the nest tree.
35. The bat radio tracking programme will enable the exact location of maternity roost trees to be identified, which is a key requirement for localised intensive pest management to successfully reduce predation during the breeding season. While I am not aware of examples where intensified pest management around bat roosts has been attempted, I consider that application of this method around known roost trees within 500 metres of the edge of the PMA, as described above, has a high likelihood of reducing the rate of predation at those roost sites. Long-tailed bats are known to re-use maternity roost trees over many years so the benefit of protection of these trees from predators will endure.
36. I understand¹¹ that DOC's position is that there would need to be 10 identified maternity roosts within the PMA, and at least 1km away from the PMA edge (ie. beyond a 1 km 'buffer') to substantiate the PMA as suitable roost habitat for bats. If any roosts were to occur within the 1km 'buffer', DOC considers

⁹ DePoorter, M., Warneford, A, Bechet, L. and Waite, J. 2012. Ark in the Park Highlights, Kokako season 2011-2012. Summary Report for the Kokako Recovery Group.

¹⁰ Warneford, A. 2013. Summary of the Ark in the Park Kokako Breeding Season 2012-2013

¹¹ Email from DOC's lawyer, Ms Ongley, dated 21 September 2018.

that a rat RTI of 1% and mustelid densities of zero detections should be sustained for those roosts to “count” towards verification of the PMA.

37. For several reasons I disagree with DOC's position on this matter:
- (a) The suggestion that a 1km 'buffer' is required assumes that only maternity roosts located 1km or further away from the margin of the PMA will benefit in a significant way from pest management. This is not the case. While more mobile predators, such as stoats and cats, can on occasions penetrate long distances (well beyond 1km) into areas managed intensively for pests, the percentage and frequency with which this occurs is very low. Most mobile pests engage with traps and/or bait stations within the first few hundred metres of the edge of a managed area.
 - (b) Rats do not travel over the same distances as stoats nor as quickly. My experience is that away from the immediate margins of a managed area, rat reoccupation of habitat after pest control occurs as much or more through breeding of residual animals as opposed to mass reinvasion from the edges. Provided the intensity of trapping and toxin application is sufficient, rat densities within all but the outer 100 to 200 metres should be controlled effectively at or near 5% RTI on a consistent basis.
 - (c) Dr O'Donnell's Fiordland study¹² shows that even in beech seed mast years rats were able to be reduced to densities at or close to 5% RTI¹³ and at these rat densities bat survival was substantially improved.
 - (d) The DOC requirement that a rat RTI of 1% would need to be achieved if roosts were located within 1km of the PMA edge has no scientific basis. If an RTI of 5% is sufficient in the core areas to be of benefit to bats then achievement of the same 5% RTI wherever the roosts occur should be of equal benefit.
 - (e) Furthermore, a rat RTI of 1% or lower is not a realistically achievable target in the steep, heavily forested conditions found in the Intended PMA, the Wider PMA, the Study Area and also the Waitaanga Alternative PMA area. I am not aware of any ground-based rat control operations on mixed podocarp – hardwood forested hill country in the North Island that have managed to hold rats consistently at densities at or close to 1% RTI.
 - (f) The suggested application of a 1 km buffer around the full PMA assumes that stoats and rats exist in equally high densities around the full margin. This is not the case. While the highest densities of stoats

¹² O'Donnell, C., Pryde, M., Dam-Bates, P. and Elliot, G. 2017. Controlling invasive predators enhances the long-term survival of endangered New Zealand long-tailed bats (*Chalinolobus tuberculatus*): Implications for conservation of bats on oceanic islands. Department of Conservation 156-167

¹³ 2009/10 average RTI from two surveys was 6.5; for 2011/12 the average RTI was also 6.5

and rats (and therefore the highest reinvasion pressure) will occur along PMA margins that adjoin unmanaged areas of mature forest, at least one third of the margin of the Intended PMA is pasture covered farmland that will have considerably lower pest densities. Intensified pest management will be implemented around roost trees located close to forested areas which are expected to be high reinvasion risk areas.

- (g) Application of a 1km buffer to the Intended PMA would leave an area of 458 ha (12.5% of the PMA land area) within which the 10 roosts need to be located (adopting the DOC approach) (**Figure 4**). The likelihood of finding 10 maternity roosts with one season of radio tracking within 12.5% of the PMA is very low. Furthermore, there is a high likelihood (due simply to roosts beyond the 1km buffer not being located by the tracking effort) that the radio tracking results will produce a false negative result, (that is, lead to a conclusion that the PMA is not suitable habitat for bats when in fact it is suitable).
 - (h) The core to edge ratio has been optimised as far as possible with the selection of the Intended PMA. Even with the additional forest area in the Wider PMA (5600ha) the amount of land beyond 1km of the edge is small (**Figure 5**). This is the nature of the fragmented forest landscape of North Taranaki.
38. In summary, I consider the DOC position, especially with regard to the 1km buffer and 1% rat RTI, to be an overly stringent application of existing research findings and knowledge, and has a high likelihood of all of the offered PMA options having to be abandoned, because of the heavy focus on bats, for a less suitable offset/compensation site.
39. For the reasons discussed below, in my view the Intended PMA is the best location, in terms of overall ecological benefits and ability to successfully implement pest management, for the PMA. For effectively the same reasons, the Wider PMA and the broader Study Area are the next best options.

Value of the PMA and intensive pest management to long-tailed bats

40. Introduced predators have been implicated in the decline of long-tailed bats throughout New Zealand.¹⁴ Dr O'Donnell's Fiordland research has shown sustained and intensive predator control over areas of 3350ha and greater can lead not only to a halt in the decline of bat populations but also to population increase.
41. The intensive enduring multi-species pest management proposed over the 3650ha PMA at Mt Messenger has been designed to provide sufficient long term ecological benefit to long-tailed bats to compensate for the residual effects of the Project on bats.

¹⁴ Refer to Dr O'Donnell's evidence in chief at 4.5.

42. Control of introduced predators to the target densities proposed, supported by additional intensified pest management around roosts, will reduce the number of predators present in the PMA in a substantial way compared to the current state. That will in turn significantly reduce the rate of predation of indigenous fauna.
43. Compensation for the effects of the Project on bats will be achieved if the existing rate of population decline of long-tailed bats is slowed. If the pest management programme is particularly successful, the outcome will be a long-term halt to the current decline in the long-tailed bat population or an increase in the local bat population (as has been achieved in Fiordland). As Mr Chapman has explained, either outcome provides ecological benefits considerably in excess of the Project's effects.

THE PMA

44. A PMA of 3650ha remains as the primary component of the Restoration Package. As previously stated in my EIC and supplementary evidence, I am of the opinion that a 3650ha PMA, where intensive enduring control of rats, possums, mustelids, feral cats, goats, and pigs and the exclusion of farm livestock is undertaken, will induce:
 - (a) regeneration of many palatable plant species;
 - (b) measurable improvement in forest canopy condition; and
 - (c) increased recruitment of kiwi and many other bird species, long-tailed bats, many invertebrates, and some lizard species.
45. The proposed radio monitoring programme for long-tailed bats, and the associated 'scenarios' for confirming the location of the PMA following that programme, has been developed to address concerns expressed during the hearing as to whether the previously proposed PMA adequately compensates for the effects of the Project on long-tailed bats.
46. In addition, further consideration has been directed at refining the precise location of the Intended PMA to:
 - (a) achieve the greatest ecological benefits;
 - (b) decrease the amount and proportion of PMA edge to core (and thus improve the ability to defend the PMA against pest reinvasion); and
 - (c) to generate additional certainty about the willingness of landowners to contribute their land to the PMA.
47. This process has included discussions with Ngati Tama and DOC. As a result of those discussions the 1335ha Ngati Tama owned Parininihi area (west of the existing SH3) has been included in the Intended PMA.

48. These steps have resulted in:
- (a) adjustments being made to the Intended PMA (as in, to the PMA previously presented at the hearing); and
 - (b) the development of a Wider PMA, Study Area and Alternative PMA, for the purposes of confirming the final location of the PMA in light of the results of the bat radio monitoring programme.
49. Each of these areas are described below.

The Intended PMA

50. The now-proposed Intended (3650ha) PMA is shown in **Figure 1**. It includes all of the Parininihi (1335ha), Ngati Tama land east of SH3 (255ha), 56ha of road reserve, and 2004ha of DOC conservation area.
51. Two areas are shown 'hatched' on Figure 1:
- (a) the forest and valley land owned by the Pascoes (purple hatched); and
 - (b) an equivalent area of DOC land.
52. The intention is that the Pascoes' land will be included if land procurement negotiations are successful; otherwise the green hatched DOC land will be included in the final PMA.¹⁵
53. I consider the Intended PMA presented in Figure 1 is the best option in terms of overall ecological benefit and pest management because:
- (a) Pest management over a contiguous forest sequence extending from the coast to lowland hill country will improve the condition of a broader diversity of vegetation and a greater seasonal range of habitat for fauna, and as a result, will benefit a greater diversity of fauna than would occur with an inland site only.
 - (b) As described by Mr Singers in his EIC (paragraph 35), Parininihi contains the best remaining example of primary coastal broadleaved to podocarp broadleaved forest on the west coast of the North Island and includes the Waipingao Stream, which has a catchment that is entirely indigenous forest (from coast to headwaters).
 - (c) There is evidence that current funding for pest management in the Parininihi is less than required to maintain pest densities at permanently low levels (Conrad O'Carroll pers com). There is also uncertainty (acknowledged in the evidence of Dr Barea, paragraphs 2.8 and 4.69) as to the availability of ongoing funding to support pest management in the Parininihi, with no guarantee of funding beyond 2 years. The ecological gains resulting from pest management will be very quickly

¹⁵ That is, only one of the two hatched areas shown on Figure 1 would be included in the final version of the PMA.

undone if a lack of funding prevents or reduces the current pest management effort. Inclusion of the Parininihi in the PMA provides certainty for the future of this ecologically important site.

- (d) In comparison to the PMA as previously proposed, the new Intended PMA has less total edge over which pests can create reinvasion pressure, and a greater core area that can confidently be maintained at low pest densities. In addition, the Intended PMA has less boundary length that passes through dense mature forest, where reinvasion pressure can be at its greatest, than previously considered PMA options.

The Wider PMA

- 54. A larger possible pest management area, the Wider PMA, has been identified to cater for scenarios where sufficient bat roosting habitat is not identified entirely within the Intended PMA, but suitable bat roosting habitat is located in adjacent forest.
- 55. Under these scenarios, the PMA would remain at 3650ha but would be reconfigured within the Wider PMA to include as many maternity roost sites as possible. In reconfiguring the PMA, consideration will also be given to ensuring that pest management over the new area will benefit indigenous flora and other fauna to the same extent as the current Intended PMA.
- 56. The Wider PMA, which includes all of the Intended PMA, has a total area of approximately 5600ha. The Wider PMA is shown on **Figure 2**.

The Study Area

- 57. The Study Area is larger again than the Wider PMA, and is shown on **Figure 3**. It is essentially the area across which it is anticipated bats will be tracked.
- 58. In the event that the majority of bat maternity roosts are found within the Study Area but outside both the Intended PMA and the Wider PMA, consideration will be given to reconfiguring the boundaries of the PMA within the Study Area to include as many maternity roosts as reasonably possible. The PMA boundary reconfiguration will be undertaken by the Project's bat ecologist in consultation with the Project avifauna and vegetation ecologists and DOC's bat expert. Consideration will be given to:
 - (a) the location of the identified maternity roosts;
 - (b) minimising the overall length of the edge of the reconfigured PMA (which will become the Confirmed PMA);
 - (c) minimising the length of the edge of the PMA that adjoins mature forest;
 - (d) the practicality of implementing pest management, including access;

- (e) the effectiveness of the PMA in offsetting or compensating for the effects of the Project on other ecological values, in particular vegetation and avifauna; and
 - (f) the availability of the land for inclusion in the PMA.
59. The option of giving consideration to locating the PMA on land that is beyond but adjacent to the Intended PMA and Wider PMA sites is to address the ecological principles of proximity to the area of effects and like-for-like mitigation, offset or compensation. Vegetation types, and therefore habitat for indigenous fauna, are more similar in the Study Area than at the more distant, higher altitude Alternative PMA site referred to in the paragraphs below.

The Alternative PMA

60. In the event that the bat radio tracking results indicate that the Intended PMA, the Wider PMA and the Study Area are not suitable as bat roosting habitat an Alternative PMA site has been identified in the Waitaanga Conservation Area to the northeast (refer to **Figure 3**). The Alternative PMA is intended to be a fall-back option.
61. This area was previously identified as a potential alternative pest management site by DOC. It is an area of known long-tailed bat activity and contains known short-tailed bat roost trees.
62. While no recent biodiversity surveys have been undertaken in the Waitaanga Conservation Area, it is known by DOC field staff to be an area occupied by kiwi and likely to be inhabited by all or most of the forest bird species present in areas adjacent to the Project Area. The forest is at a higher altitude than the Intended PMA or Wider PMA and has less coastal vegetation as a result. I understand from discussions with DOC that it has not received regular pest management, and indigenous flora and fauna would likely benefit from an intensive and enduring pest management programme as proposed.
63. A zone of approximately 8000ha has been identified (**Figure 3**) from which a 3650ha PMA will be determined taking into account all available information about the presence and location of long and short-tailed bats, kiwi, forest birds and forest composition. Determination of where the PMA boundaries would occur at this Alternative PMA site would give due consideration to the aspects outlined in paragraph 58 above.

UPDATES TO THE ELMP

64. Chapter 7 of the ELMP, the Herpetofauna Management Plan, has been substantially altered to reflect the new compensation package outlined in paragraphs above.

65. The Bat Management Plan, Chapter 5 of the ELMP, has been updated to include the methodology and performance targets for the bat radio tracking programme that will be undertaken from October 2018 to March 2019.
66. The Pest Management Plan, Chapter 9, has been amended to incorporate the Parininihi into the Intended PMA, and to provide for the process that will be followed to select the final PMA when the bat radio tracking data and recommendations are received.
67. Additional corrections and amendments have been made throughout the rest of the ELMP, including to correct errors and to incorporate suggestions made by NPDC and DOC staff and ecologists. Of particular note:
 - (a) Chapter 4, section 4.5.5 now includes a table setting out the basis on which the 17 'significant trees' identified by Mr Singers have been classified as such; and
 - (b) The ELMP now clarifies that the Ecological Constraints Maps are to be finalised at a later date, but before construction commences. Mr Roan explains the new condition framework to provide for that process in his second supplementary statement of evidence.

SUMMARY OF THE AMENDED PROJECT RESTORATION PACKAGE

68. With the changes outlined above, the proposed Restoration Package to mitigate, offset and compensate for all residual ecological effects of the Project, is now as follows:
 - (a) Pest management over an area of 3650ha that will include the intensive management of rats, mustelids, possums, feral cats, goats and pigs in perpetuity, as well as the exclusion of all farm livestock. The Intended PMA will include the Parininihi unless the bat radio tracking programme produces results that require that the PMA be located at an alternative site to provide ecological benefits to bats.
 - (b) Implementation of a comprehensive bat radio tracking programme from October 2018 until March 2019 to locate maternity roost trees in the PMA and to verify the suitability of the PMA as habitat suitable for long-tailed bats.
 - (c) 6ha of kahikatea swamp forest will be planted (unchanged).
 - (d) 9ha of mitigation planting (unchanged).
 - (e) Fencing and planting of 8.455km of stream (or 10,738m² of stream surface area). This equates to 16.91ha of riparian planting (unchanged from my first supplementary statement).
 - (f) 200 seedlings will be planted of the same species as each of the significant trees that will be felled along the Project footprint. Seventeen

significant trees have been identified so 3400 seedlings will be planted (unchanged).

- (g) The residual ecological effects on lizards will now be compensated for by the provision of \$200,000 to DOC to be directed to research that will benefit indigenous herpetofauna.
 - (h) Kiwi roadside barrier fencing will be built along areas of roadside margin that are considered to be locations where there is a high risk of kiwi attempting to cross the road during construction and road operation (unchanged).
 - (i) The bat vegetation removal protocol to include all trees of 80cm dbh (diameter at breast height) or larger, and trees between 50cm and 80cm dbh at the discretion of the bat ecologist (unchanged from my first supplementary statement).
 - (j) Establishment of an Ecological Review Panel to provide independent review of the pest management, aquatic ecology, botany, avian ecology and herpetology mitigation, offset, compensation and monitoring programmes and to provide guidance and recommendations in the event that the pest management programme fails to meet any performance targets (unchanged from my rebuttal statement).
69. I remain of the opinion that the Restoration Package, as summarised above, will provide substantial biodiversity gains by year 15, including a reduction (or better) in the rate of decline of long-tailed bats, well in excess of the effects caused by the Project. Therefore, the Restoration Package appropriately addresses the ecological effects of the Project and will provide substantial biodiversity gains in perpetuity.

Roger MacGibbon

28 September 2018

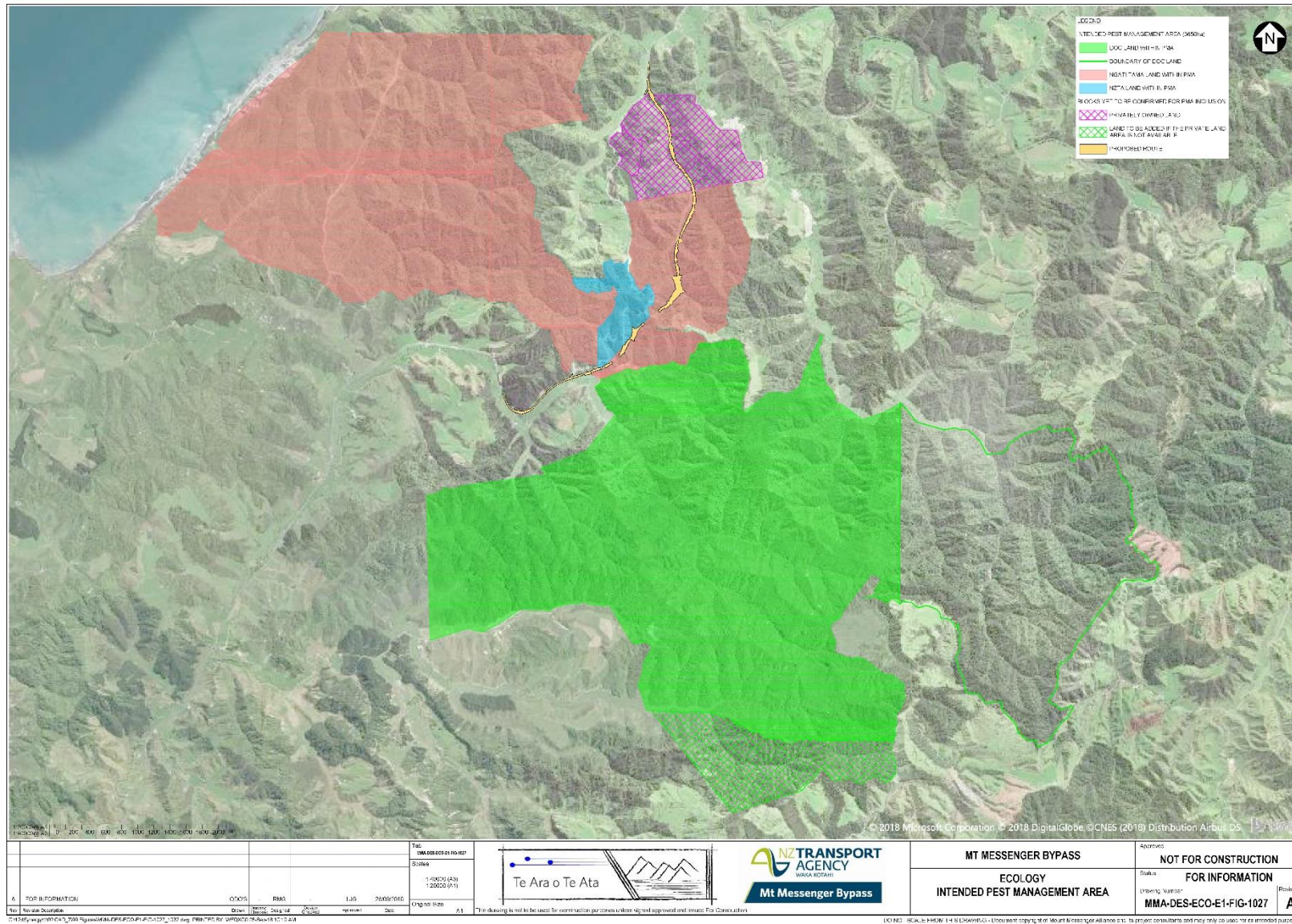


Figure 1: the Intended PMA (all the solid coloured land; plus one of the two hatched areas)

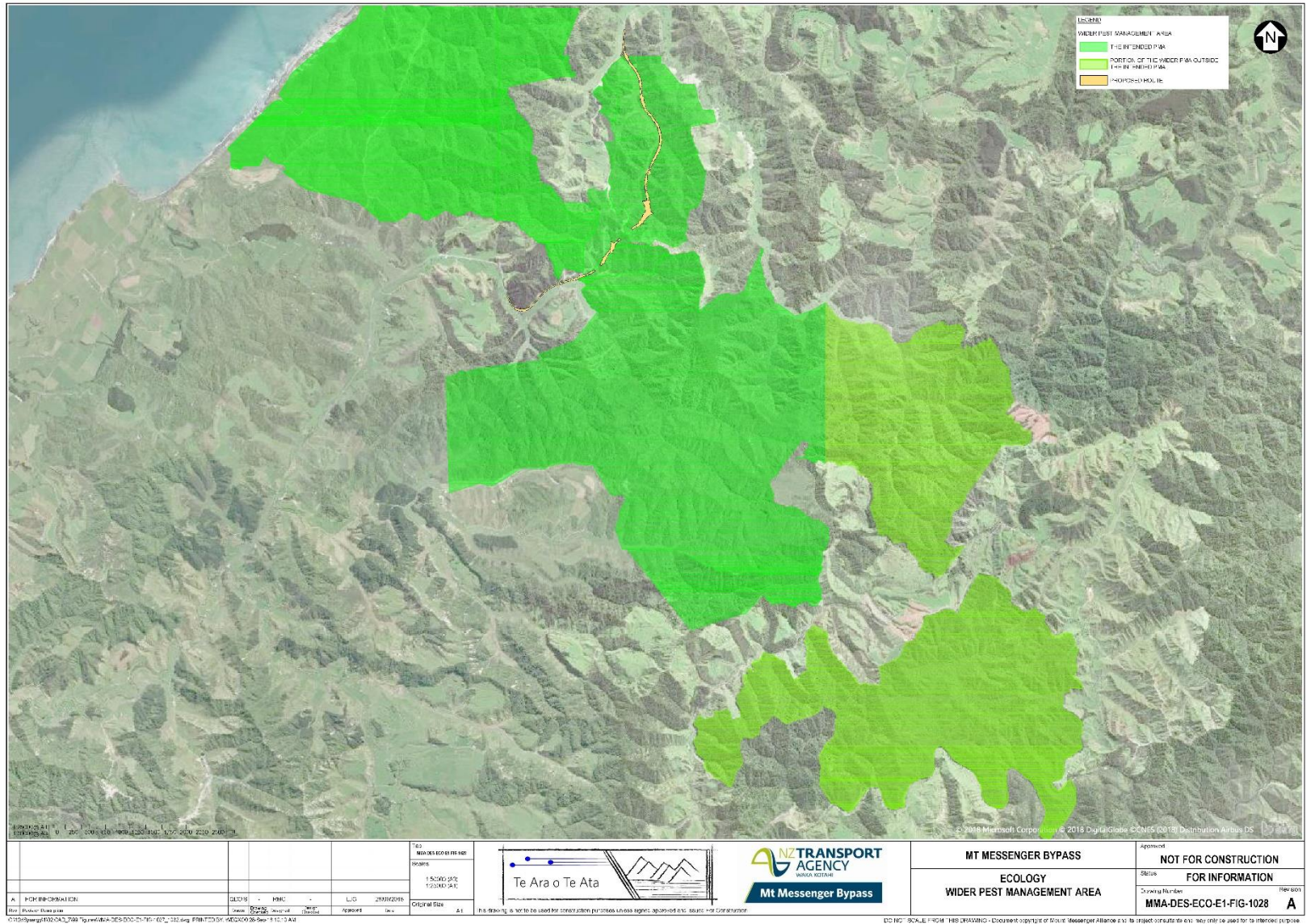


Figure 2: the Wider PMA (all the solid coloured land)

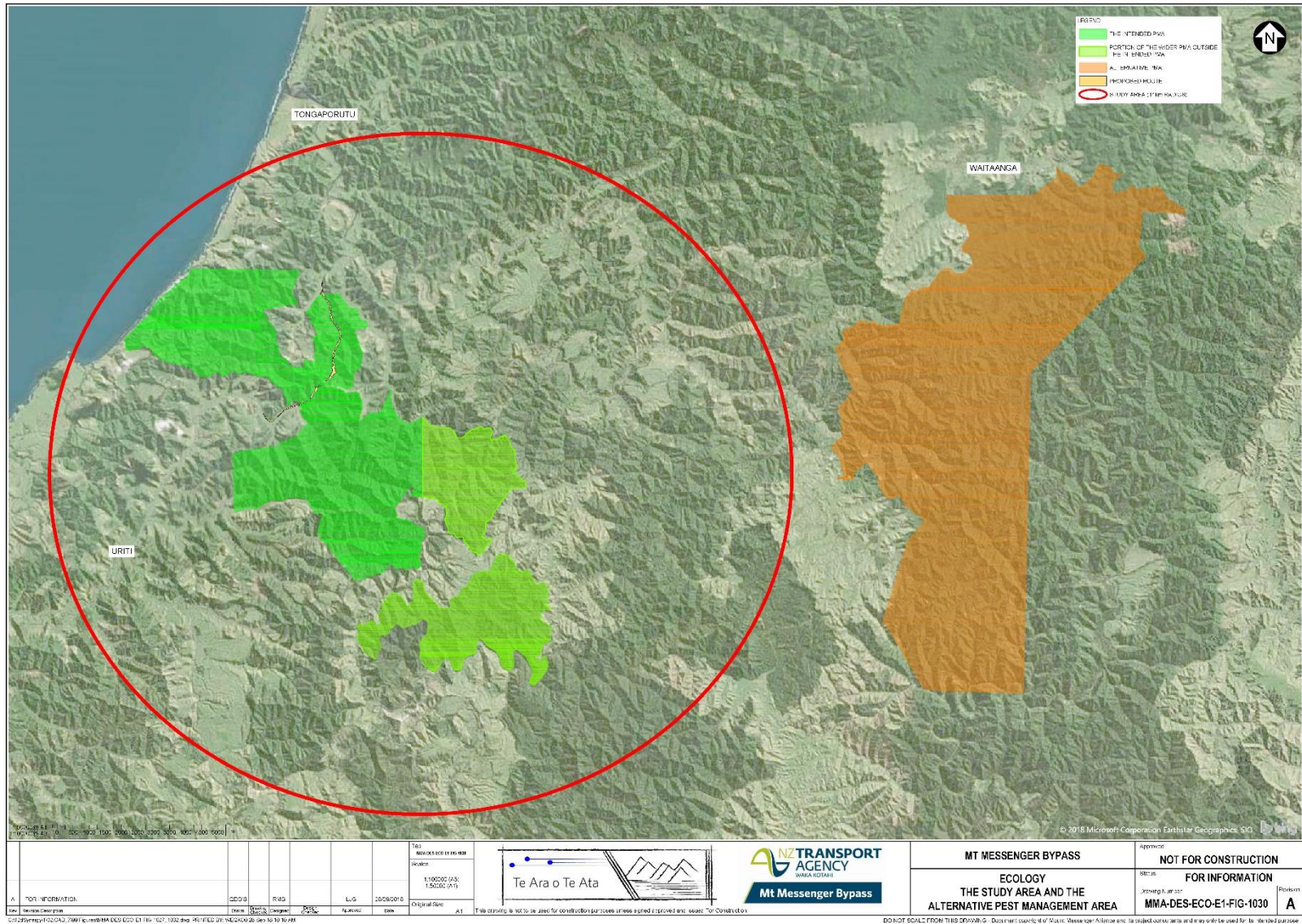


Figure 3: the Study Area (all land within the red circle) and Alternative PMA (shown orange)

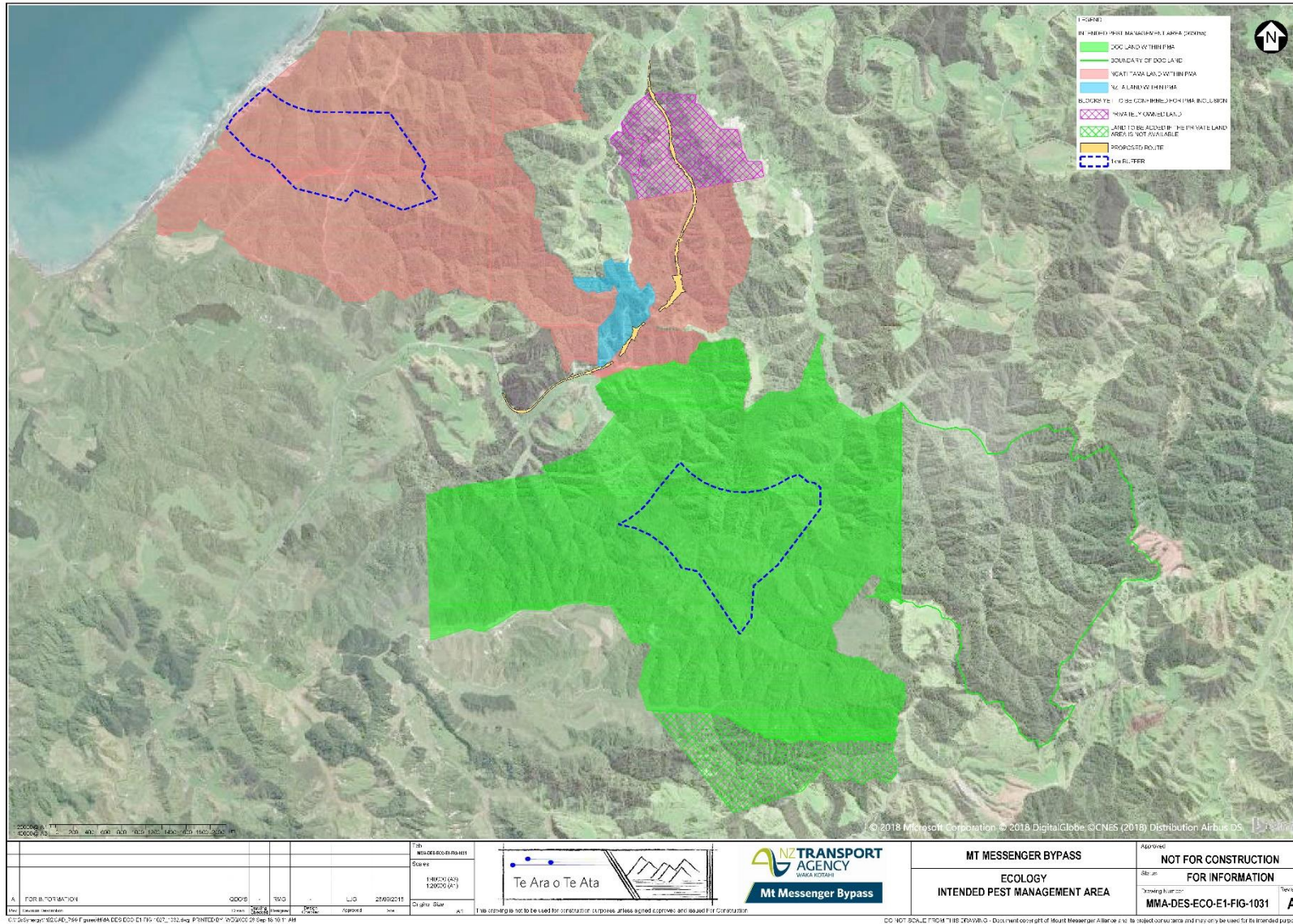


Figure 4: the Intended PMA showing a 1 km 'buffer' from the PMA edges (blue dotted lines)

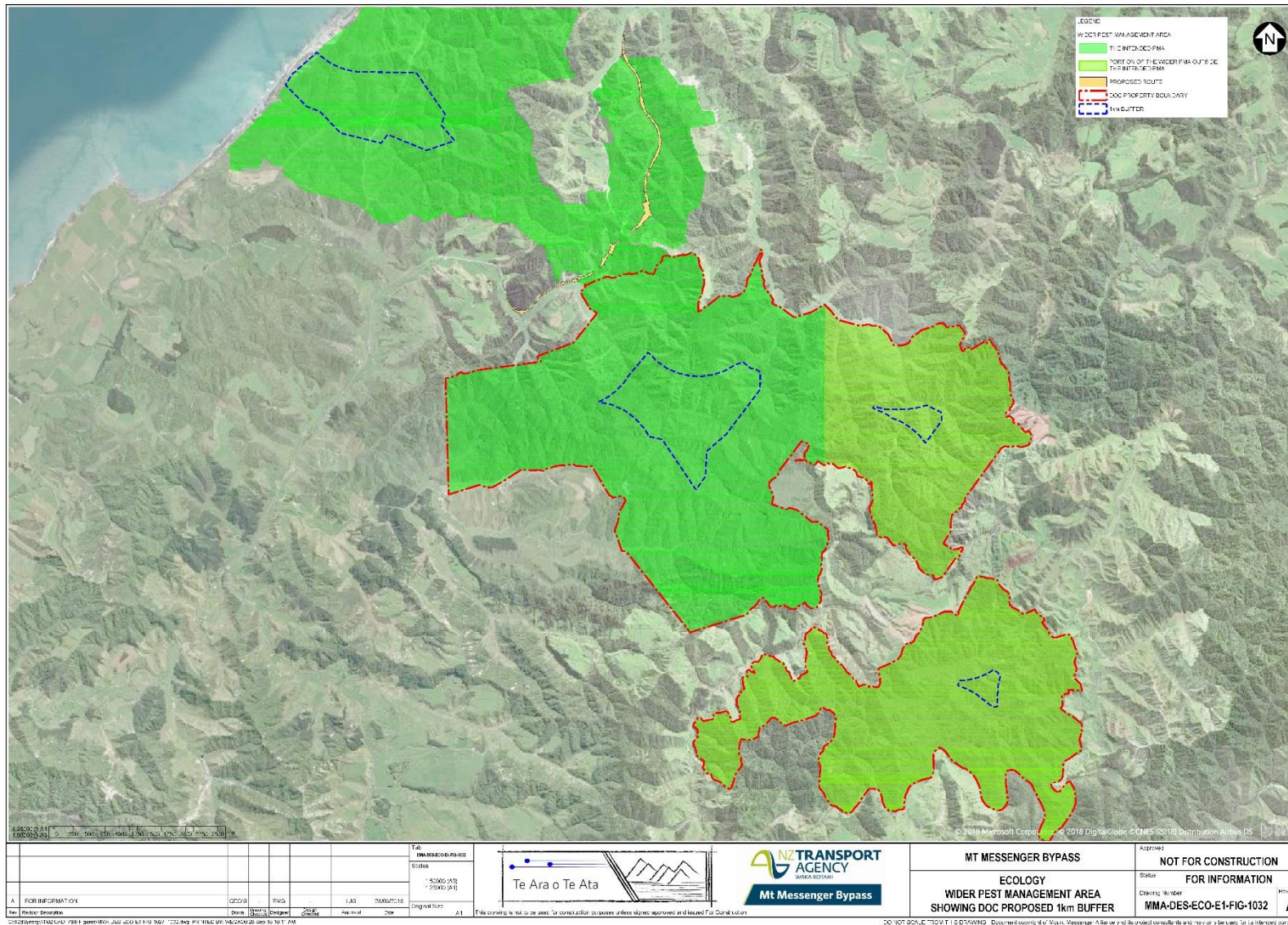


Figure 5: the Wider PMA showing a 1 km ‘buffer’ from the edges (blue dotted lines)