

**Before a Board of Inquiry
Northern Corridor Improvements Project**

Under the Resource Management Act 1991 ('the Act')

In the matter of a Board of Inquiry appointed under section 149J of the Act to consider notices of requirement for designations and resource consent applications by the New Zealand Transport Agency for the Northern Corridor Improvements Project

Statement of evidence of Graham Lloyd Don for the New Zealand Transport Agency (Terrestrial ecology)

Dated 20 April 2017

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Table of contents

| | | |
|----|-------------------------------------------------------------------------------------------|----|
| 1 | Qualifications and experience | 2 |
| 2 | Involvement with the Project | 3 |
| 3 | Code of conduct | 4 |
| 4 | Scope of evidence | 4 |
| 5 | Executive summary | 5 |
| 6 | Assessment methodology | 7 |
| 7 | The existing environment | 8 |
| 8 | Construction effects (temporary) | 10 |
| 9 | Operational effects | 12 |
| 10 | Mitigation measures | 13 |
| 11 | Response to section 149G(3) key issues report | 15 |
| 12 | Conclusions | 16 |
| | Annexure A: Location of lizards | 18 |
| | Annexure B: Generalised Ecological Descriptors and Corresponding Valuation | 19 |
| | Annexure C: Location of sectors | 20 |
| | Annexure D: Transport Agency's Guidance in Relation to New Zealand Dotterels on NZTA Land | 21 |

STATEMENT OF EVIDENCE OF GRAHAM LLOYD DON FOR THE NEW ZEALAND TRANSPORT AGENCY

1 Qualifications and experience

- 1.1 My full name is Graham Lloyd Don.
- 1.2 I am the Manager of Bioresearches Group Limited that was established in 1972 and specialises in Ecological Consultancy Services. I have a Bachelor of Science with Majors in both Botany and Zoology, and a Master of Science with Honours in Zoology from the University of Auckland (1975). I have been in private practice for 42 years.
- 1.3 During that time, I have undertaken ecological assessments in a wide range of habitats throughout New Zealand (Karikari Peninsula in the Far North to Tiwai near Bluff) and on Chatham Island in a variety of habitat types (intertidal areas to South Island beech forest). For the past 20 years my principal area of responsibility regarding field assessments has been the wildlife aspects of various development proposals, especially the avifauna.
- 1.4 I have conducted and managed numerous ecological investigations on behalf of regional councils, district councils, private entities and others. Examples include:
- a Terrestrial bird surveys in a 500ha beech forest owned by the Department of Conservation near Reefton;
 - b Baseline ecological surveys and significance assessments of native forest habitat and forest remnants in the Auckland region for Winstone Aggregates, Stevensons, Holcim, Wharehine and Kaipara Excavators;
 - c Terrestrial and wetland bird surveys, vegetation survey, and identification of a long-tailed bat population in the c.200ha Te Puni wetland, Waikato River (Winstone Aggregates);

- d Vegetation, wetland, terrestrial bird, reptile, and pest mammal surveys and identification of a long-tailed bat population within a Significant Natural Area in the context of a Plan Change; Kuratau, Lake Taupo (Maori Trustees – Pukawa D2 and D3 Trusts);
 - e Vegetation, reptile, terrestrial and coastal bird surveys at Hobsonville (Summerset Holdings Ltd retirement village; Hobsonville Land Company - Plan Change and baseline surveys); and
 - f Katipo spider, reptile, vegetation and wetland bird surveys to assess Special Ecological Areas at Te Tumu, Papamoa East (Te Tumu Landowners Group).
 - g Terrestrial habitats survey in the Oteha Valley Road to Kewa Road area in March 2004.
- 1.5 From 2013 I also managed the terrestrial ecological baseline surveys for the Puhoi to Warkworth Road of National Significance, undertook part of the field survey, presented evidence at the Board of Inquiry and was involved in construction bid evaluation. I am currently on the Technical Advisory Group for the project.
- 1.6 I have undertaken avifaunal surveys of the Rosedale Wastewater Treatment Plant's ('**RWWTP**') Ponds 1 and 2 for North Shore City and Watercare since May 2002. Weekly surveys were completed for twelve months as a baseline in 2002 to 2003, followed by monthly surveys generally from November to June in the successive 13 years. The most recent survey was undertaken from November 2016 to June 2017.
- 1.7 My evidence relates to notices of requirement and resource consent applications lodged by the New Zealand Transport Agency ('**Transport Agency**') with the Environmental Protection Authority ('**EPA**') on 14 December 2016 for the Northern Corridor Improvements Project ('**Project**').

2 Involvement with the Project

- 2.1 I have been involved in this Project since early 2016. I managed the terrestrial field investigation, undertook the dotterel field surveys and

prepared the section of the *Assessment of Terrestrial Ecological Effects* ('**Terrestrial Report**') relating to avifauna within the RWWTP. Through my field investigations for this Project, and my previous surveys of the RWWTP and at Oteha Valley Road, I am very familiar with the area that the Project covers.

2.2 I am the reviewer of the Terrestrial Report that formed part of the *Assessment of Environmental Effects* lodged in support of the Project. This report was mainly prepared by my colleagues Chris Wedding and Jennifer Shanks¹ of Bioresearches Group, and I agree with and support the entire contents of this report.

3 Code of conduct

3.1 I have read and am familiar with the Code of Conduct for Expert Witnesses in the current Environment Court Practice Note (2014), have complied with it in the preparation of this evidence, and will follow the Code when presenting evidence to the Board. I also confirm that the matters addressed in this statement of evidence are within my area of expertise, except where I rely on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

4 Scope of evidence

4.1 This evidence addresses the following matters:

- a A summary of my evidence;
- b Assessment methodology;
- c The existing environment;
- d The construction effects;
- e The operational effects;

¹ Chris Wedding (MSc Hons) is a Wildlife Ecologist and has 12 years experience. Jennifer Shanks (MSc Hons) is a Botanist and has 11 years consultancy experience.

- f The proposed mitigation measures;
- g Response to section 149G(3) key issues report; and
- h Conclusions.

4.2 In preparing this evidence, I have reviewed the following evidence:

- a Mr Glucina, Transport Agency;
- b Mr Moore; Project Design;
- c Mr Hale; Construction;
- d Mr Hughes; Stormwater;
- e Mr Bray, Landscape, Visual and Urban Design; and
- f Ms Barnett, Freshwater Ecology.

5 Executive summary

5.1 The potential terrestrial ecological values within the Project area include vegetation (flora) and fauna (including lizards, birds and bats). I carried out a desktop study together with field inspections and surveys to establish the ecological values within the Project area.

5.2 The existing terrestrial ecological environment is of low value, being predominantly planted areas. Given the highly urbanised nature of the Project area, the majority of planting is associated with the State highway corridor, and is not natural regenerating vegetation. Areas of more significant terrestrial vegetation have been avoided by the Project.

5.3 In terms of existing fauna within the Project area:

- a No long tail bats were record within the Project area;
- b The habitat quality for lizards was low except for two sites where potential lizard habitat was identified;
- c There is a potential for New Zealand dotterel to nest on freshly worked construction areas within the Project area; and

- d The RWWTP provides habitat for a wide variety of waterfowl, wading birds, gulls, shags, occasional terns and NZ dabchick.
- 5.4 During construction, the key potential adverse effects of the Project are:
- a Loss of lizard habitat;
 - b Disruption to birds nesting at the RWWTP;
 - c Destruction of New Zealand dotterel nests within construction areas; and
 - d Loss of riparian planting.
- 5.5 No potential adverse effects on flora or fauna during the operational effect of the Project have been identified.
- 5.6 The following mitigation measures will ensure that any potential adverse effects are addressed during the construction period:
- a Replanting in accordance with the Landscape Mitigation and Enhancement Plans;²
 - b Vegetation clearance around the RWWPT at times that will avoid effects on nesting native birds;³
 - c Deterrent measures to avoid New Zealand dotterels nesting on construction sites;⁴ and
 - d Relocation of any lizards from two sites that contain potential lizard habitat prior to the commencement of construction.⁵
 - e As a result of the implementation of the Landscape Mitigation and Enhancement Plans it is anticipated that the Project will result in ecological enhancements in terms of riparian planting proposed as part of the stormwater treatment system and other planting. The replacement and enhancement planting proposed will enhance habitat connectivity and provide a net gain in terms of terrestrial

² Section 6 of the UDLF and designation condition UDL.5 attached as Annexure A of Mr Burn's evidence.

³ Resource consent conditions AMP.3(d) and (e) attached as Annexure A of Mr McGahan's evidence.

⁴ Resource consent conditions AMP.3(a) to (c) attached as Annexure A of Mr McGahan's evidence.

⁵ Resource consent conditions LM.1 to LM.3 attached as Annexure A of Mr McGahan's evidence.

habitats. Additional habitat will be created by underplanting 'left over' vegetation at interchanges, and there will be extensive native enhancement planting to support the Northwest Wildlink near the SH1 and SH18 interchange. In particular, this is likely to positively affect mainly common native birds.

- 5.7 In my opinion, with the mitigation measures outlined above, any potential adverse effects on terrestrial ecology will be less than minor or negligible. In my opinion, the overall effect of the Project on terrestrial ecology will be no more than minor and will overall result in positive benefits in terms of terrestrial and riparian planting.

6 Assessment methodology

- 6.1 The ecological characteristics within the Project area were established using a combination of desktop study together with field inspections and surveys. The vegetation, flora and fauna were assessed between 29 March and 13 May 2016. For the RWWTP, information collected since 2002 was relied on including that from the November 2015 to June 2016 survey.
- 6.2 Database searches were undertaken⁶ and the ecological values and effects within or near to the Project area were then assessed. Site visits were undertaken covering the entire Project area to ascertain actual or potential presence of indigenous vegetation and fauna.
- 6.3 Key areas of vegetation were assessed during site visits by an experienced botanist. Lizards were surveyed by a herpetologist acting under Wildlife Authority WA-37604-FAU. The assessment methodology involved identifying areas as potential habitat for lizards, visiting these areas, and the installation of double-end funnel traps baited with bananas. The locations of the lizard surveys are shown in **Annexure A**.
- 6.4 Long tailed bats were surveyed using two Automatic Bat Monitoring Boxes installed in areas where the potential to encounter bats was most

⁶ Bioweb Auckland Council Fauna Records.

likely (one at the bottom of Oteha Valley escarpment and one near the pine trees adjacent to Pond 2).

- 6.5 **Annexure B** sets out the generalised ecological descriptors (values ascribed to vegetation and fauna) that were used in the assessment.

7 The existing environment

Vegetation and flora

- 7.1 To assess the existing environment, the Project area was split into five sectors:
- a Oteha Valley Road to McClymonts Road;
 - b McClymonts Road to Rosedale Road;
 - c Rosedale Road to Constellation Drive;
 - d Upper Harbour Highway from SH1 to Albany Highway; and
 - e Constellation Drive to Sunnynook Road.
- 7.2 The sectors are shown on the map in **Annexure C**. The existing environment can be generally characterised as urban, commercial and industrial settings. The majority of existing vegetation and flora values in the Project area are low, and any higher value vegetation is proposed to be avoided. The affected vegetation is predominantly native motorway plantings and common native shrubs and trees. The vegetation is generally less than 20 years old and under 15 metres in height with three exceptions as follows:
- a An area within the Oteha Valley Road to McClymonts Road sector contains vegetation classified as a Significant Ecological Area ('**SEA**') under the Auckland Unitary Plan, Operative in Part (15 November 2016).⁷ This area contains tall kanuka (20-25m), tanekaha, rewarewa and kahikatea with broadleaf-podocarp riparian vegetation at Oteha

⁷ SEA_T_8297 in the AUP.

Valley Road. However, this vegetation is not affected by the proposed works.

- b The riparian vegetation by Lucas Creek is primarily native with a canopy of 20-25 metres. In general, the riparian vegetation along the stream is good quality with moderate to high botanical values. The SEA vegetation further up the slope contains more weeds and thus is of moderate to low botanical value. Riparian vegetation on the eastern side of the motorway is more sparse and fragmented. There are some large native trees, and other native vegetation is restoration plantings of kanuka with low botanical value. The Project does not affect this vegetation.
- c A locally notable area within the Upper Harbour Highway from SH1 to Albany Highway, called the Omega Reserve. The reserve is also classified as a SEA under the AUP⁸ and consists of planted and remnant native vegetation. This area will also be avoided by the proposed works.

7.3 The areas listed above are the only areas of significant vegetation within the immediate vicinity of the Project area. As outlined above, none of these areas are affected by the proposed works. Therefore, no plant species of conservation concern will be affected by the Project.

7.4 The botanical values within the proposed works areas that are affected by the Project are all low. The only SEA where works will occur as part of the Project is within the RWWTP. A stormwater pond is proposed in an area adjacent to Pond 2 which is currently grazed pasture and pines. Within the part of the RWWTP adjacent to Pond 1 (which is also an SEA) works would be restricted to re-battering alongside the motorway.

Fauna

7.5 No lizards were recorded during the surveys.⁹ Following detailed site assessment, the potential for clearance or disturbance of potential lizard habitat was confined to only two of the nine potential sites in the Project

⁸ SEA_T_8084 in the AUP.

⁹ Note that tuatara was not considered in this assessment because they are not present in mainland New Zealand aside from in sanctuaries.

area (north of Oteha Valley Road).¹⁰ Otherwise the habitat quality for lizards was low.

- 7.6 No long-tailed bats were recorded and none are likely to utilise the Project area. While the Project area is in an urban environment, there is however potential for bats to visit parts of the area. However, if any such use occurs, it would occur intermittently.
- 7.7 During the surveys, 22 bird species were recorded, including 13 native species. The terrestrial birds that would be affected by the Project are common native and introduced species. No species of conservation concern (At Risk or Threatened) were recorded within the Project area and none are likely, even on an intermittent basis.
- 7.8 Two individuals of a species of conservation concern (New Zealand dotterel) were observed at the proposed construction yard alongside Elliot Rose Avenue in August only. The dotterel is typically a coastal bird, and utilises cleared and developing areas within the Albany Basin for nesting. No birds were observed using any parts of the construction area footprint during seven visits in September and October. No nesting in the proposed Project works area was recorded.
- 7.9 The RWWTP provides habitat for a wide variety of waterfowl (Canada goose, black swan, and ducks), wading birds (pied stilt, and white-faced heron), gulls, shags and occasional terns. The most notable resident species is New Zealand dabchick, a threatened endemic species. Over the past 14 years a total of 27 species have been recorded. Overall, the ponds support a high diversity of birds, some species of which reach relatively high numbers in a regional context.

8 Construction effects (temporary)

- 8.1 The only area of vegetation supporting moderate to high values is the riparian vegetation surrounding Lucas Creek (regenerating podocarp broadleaved forest, and late successional kanuka forest further upslope).

¹⁰ The habitat values are high, four 'At Risk' species may occur at this site.

The fragmented riparian vegetation extending along Lucas Creek (under SH1) is also considered to have moderate botanical values.

- 8.2 The only potential effects on this vegetation are where a proposed culvert from the base of the shared use path will enter Lucas Creek. Provided that care is taken to avoid mature trees in the riparian zone of the creek, the effects of the installation of the outfall are likely to be minor. Any disturbed areas of the riparian zone should be replanted with appropriate native shrubs and trees as set out in the Landscape Mitigation and Enhancement Plan set out in Section 6 of the Urban Design and Landscape Framework ('**UDLF**').¹¹
- 8.3 Some of the planted vegetation within the RWWTP site is also proposed to be removed. This includes the planting to the north of Pond 2 near Arrenway Reserve and to the south of Pond 1. All the affected planting is of low botanical value and mitigation planting is proposed as set out in the Landscape Mitigation and Enhancement Plan.
- 8.4 Overall, the effects on vegetation and flora will be minor, reducing to less than minor on implementation of the Landscape Mitigation and Enhancement Plan. The vegetation to be removed consists of common native shrubs and trees, most of which have been planted in association with State highway enhancement and none of which are within a SEA that comprise native vegetation.
- 8.5 There will be no adverse effects on populations of reptiles, terrestrial birds or long-tailed bats. As a precaution, two sites (Oteha Valley Road North and Rosedale Closed Landfill) will be checked for native skinks during site clearance. Any skinks present will be captured and relocated as required by proposed resource consent conditions LM.1 to LM.3.¹²
- 8.6 There is potential for disruption of nesting waterfowl (At Risk or Threatened Species) along the Pond 2 edge at the RWWTP. Birds using the ponds are currently subject to continual traffic noise, helicopter over-flights, movement and lighting. Recent works on fencing along the Pond 1 motorway edge had a negligible effect on the Pond 1 population. Because

¹¹ The updated UDLF is attached as Annexure A of Mr Bray's evidence in chief.

¹² Annexure A of Mr McGahan's evidence in chief.

of the existing relatively high level of continuous disturbance the effects of the proposed works in this context will be less than minor.

- 8.7 New Zealand dotterel is a threatened, conservation dependent species, and therefore loss of nesting habitat, nest destruction or abandonment would cause significant adverse effects. Given the birds are known to nest near the Albany commercial block adjacent to the Project area, the dotterel may choose to roost/nest at the construction yard at Elliot Rose Avenue (inside the Project area, but outside of the RWWTP area), or similar construction areas within the Project area. Management of works areas will be required to discourage birds from nesting, especially in recently cleared sites and construction yards.
- 8.8 In conclusion, the existing terrestrial ecological environment is of low value, and any vegetation clearance proposed is within areas of low value vegetation. Any other effects on terrestrial ecology on the wider environment within the Project area can be effectively mitigated to a level where the effects are negligible.

9 Operational effects

- 9.1 There will be no adverse effects during the operation of the Project on vegetation or flora.
- 9.2 The potential effects on fauna during the operational phase of the Project are as follows:
- a Ongoing maintenance required in the Project area (such as grass mowing) could potentially adversely affect lizards. However, as set out in the UDLF, areas of grass will be avoided within the Project area with mitigation planting focused a variety of plants and trees.¹³
 - b The Project, once constructed, has the potential to affect birds at the RWWTP. However, this risk is mitigated by the fact that industrial, farming, motorway and helicopter activity is already present in this area and therefore the risk of adverse effects is negligible. In fact, the

¹³ Section 5.2 of the UDLF.

proposed stormwater ponds and vegetation may enhance the current habitat, thus having a positive effect.

- 9.3 Therefore, it is very unlikely that there will be operational effects on any fauna within the Project area.
- 9.4 In addition to the adverse effects identified, there are positive effects on terrestrial ecology identified as part of the Project:
- a Riparian planting is proposed as part of the stormwater treatment upgrade which is described by **Mr Hughes** and shown in the Landscape Mitigation and Enhancement Plans included in the UDLF.
 - b The replacement and enhancement planting proposed will enhance habitat connectivity and provide a net gain in terms of terrestrial habitats. Additional habitat will be created by underplanting 'left over' vegetation at interchanges, and there will be extensive native enhancement planting to support the Northwest Wildlink near the SH1 and SH18 interchange. In particular, this is likely to positively affect mainly common native birds.

10 Mitigation measures

- 10.1 The mitigation measures outlined below will mitigate any potential effects to a level that is negligible, and thus the life-supporting capacity of the ecosystems within and adjoining the Project area will be adequately safeguarded by the proposed mitigation measures in accordance with section 6 of the Act.

Vegetation and flora

- 10.2 Given the existing urbanised nature of the Project area, the Project works will only affect low value vegetation. As outlined above, the Project design specifically avoids vegetation of moderate to high botanical value within SEAs. Accordingly, the only vegetation that is affected is of low ecological value.¹⁴

¹⁴ The exception is the mature native trees on the southern side of Lucas Creek, however it is proposed that care is taken to avoid this area.

- 10.3 The mitigation methods proposed are as follows:
- a The first step is to avoid impacting native vegetation where possible. Any moderate value vegetation has been purposefully avoided as part of the Project design.
 - b Acknowledging that avoidance is not always practicable, reinstatement or replacement planting for loss of vegetation will occur in accordance with the Landscape Mitigation and Enhancement Plan. Mitigation planting will consist of standard landscape planting in some areas,¹⁵ and extensive replacement planting on a 'like for like' basis in other areas,¹⁶ to ensure there is no net loss of native biodiversity.
 - c Native vegetation adjacent to the construction works should be protected where practicable. The protection measures will include fencing off the relevant areas.
- 10.4 As outlined in **Mr Bray's** evidence, the designation conditions will ensure that the Landscape Mitigation and Enhancement Plans are given effect to through the Urban Design and Landscape Plans.¹⁷

Fauna

- 10.5 The mitigation measures proposed are as follows:
- a Any native reptiles present at the two identified risk sites (North of Oteha Valley Road, and Rosedale Closed Landfill) will be salvaged during vegetation clearance (prior to construction) and relocated by a herpetologist. A lizard management plan is recommended to mitigate the potential effects of construction at the two identified sites. This should contain details of the capture and relocation plan.¹⁸
 - b Potential adverse effects on native birds nesting adjacent to the RWWTP will be avoided by undertaking vegetation clearance in the March to July inclusive period, prior to nest establishment.¹⁹

¹⁵ Plantation of radiata pines adjacent to Arrenway Reserve on the northern side of Pond 2 RWWTP.

¹⁶ Native vegetation on the south of Pond 1 RWWTP.

¹⁷ Section 9 of Mr Bray's evidence in chief.

¹⁸ Resource consent conditions LM.1 to LM.3 attached as Annexure A of Mr McGahan's evidence.

¹⁹ Resource consent condition AMP.3(d) attached as Annexure A of Mr McGahan's evidence.

- c The Avifauna Management Plan required by the resource consent conditions also requires procedures to be put in place to manage any native birds found nesting within the Moro Pond area of the RWWTP (to the north of Pond 1).²⁰
- d In addition, the Avifauna Management Plan will require measures to be put in place to deter New Zealand dotterel from works areas and construction yards prior to, and during construction, in general accordance with the Transport Agency's Guidance in Relation to New Zealand Dotterels on Transport Agency Land. A copy of the relevant part of the guidance document is included as **Annexure D** of my evidence.

11 Response to section 149G(3) key issues report

- 11.1 Paragraph 70 suggests the Board may want to request a peer review of the proposed effects on the SEAs. In response, it should be noted that no work is proposed within native vegetation-dominated SEAs within the Project area.
- 11.2 Paragraph 73 suggests that the Board could request a review of the application documentation relating to removal of non-SEA vegetation. In response, this vegetation is predominantly recent plantings of low botanical and habitat value.
- 11.3 Paragraph 190 suggests that the Board could request further information on the total area of vegetation removal in the SEA; whether there are any trees to be removed in roads or open space zones; and the total length of the replacement pond link. **Mr Moore** covers the length of the replacement pond link in his evidence.²¹ No significant native vegetation removal is proposed within SEAs. The Arboricultural Statement attached as Appendix A of the Terrestrial Report identifies all trees that are likely to be removed as a result of the Project including those trees within roads and open space zones.

²⁰ Resource consent condition AMP.3(e) attached as Annexure A of Mr McGahan's evidence.

²¹ Section 10 of Mr Moore's evidence in chief.

12 Conclusions

- 12.1 In my opinion, the potential effects that may occur as a result of construction of the Project will be appropriately mitigated through the recommended conditions of consent outlined in my evidence above. Accordingly, the effects on terrestrial during the construction and operational periods will be no more than minor.
- 12.2 Positive effects that will arise as a result of the Project include the benefits from increased riparian planting associated with the new stormwater wetlands and enhancement planting. This planting will provide the opportunity for enhancing habitat connectivity, and therefore is likely to bring a benefit to the terrestrial ecology within the Project area, including increased habitat for birds.



Graham Lloyd Don

20 April 2017

List of Annexures

Annexure A – Location of Lizards

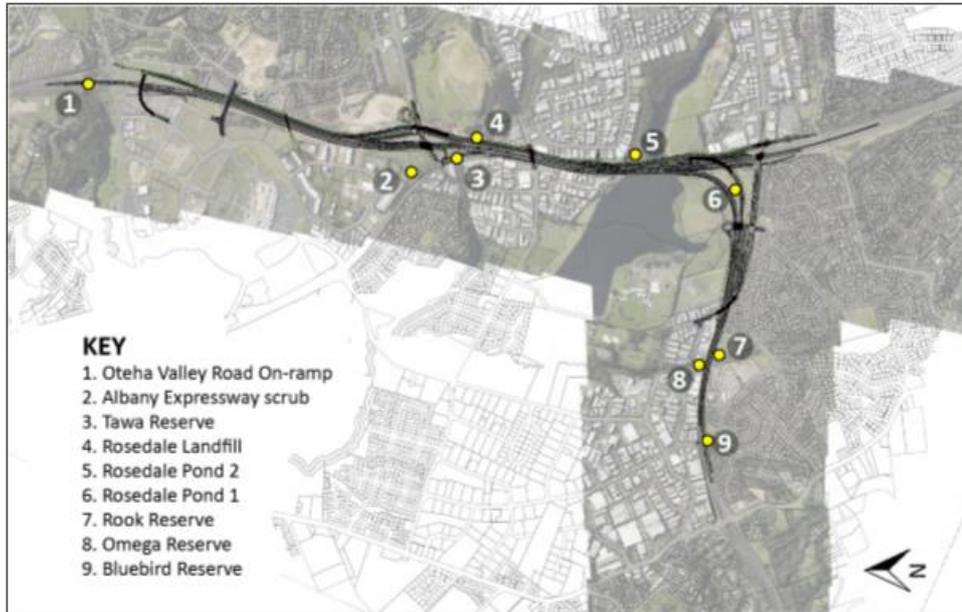
Annexure B - Generalised Ecological Descriptors and Corresponding Valuation

Annexure C - Location of sectors

Annexure D - Transport Agency's Guidance in Relation to New Zealand
Dotterels on NZTA Land

Annexure A: Location of lizards

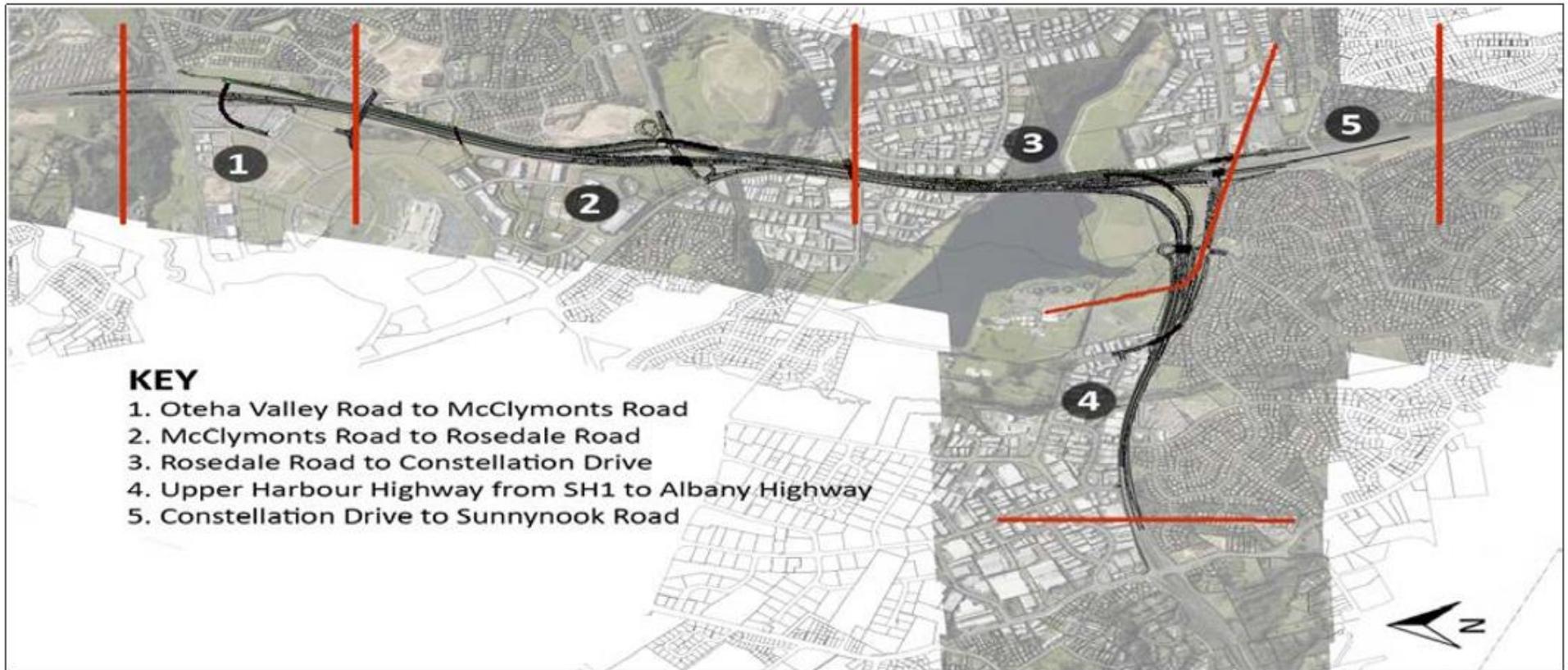
Figure 2 Sites Identified as Supporting Potential Habitat for Indigenous Lizards



Source: Base image from Aurecon NZ Ltd

Annexure B: Generalised Ecological Descriptors and Corresponding Valuation

| Vegetation/ Habitat Description | Ecological Value Descriptor |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <p>Vegetation: Entirely or predominantly exotic pest plants; may have some scattered common natives.</p> | Very Low |
| <p>Fauna : May support some habitat value to common native fauna (birds and lizards), though potential habitats are largely occupied by introduced fauna.</p> | |
| <p>Vegetation: Planted young (<20 years) native vegetation comprising common species. Vegetation is generally of small size (<15m tall)</p> | Low |
| <p>Fauna: Potential habitat likely to support some common native fauna (birds and lizards).</p> | |
| <p>Vegetation: Naturally regenerating kanuka/ broadleaf forest with understorey.</p> | Moderate |
| <p>Fauna: Potential habitat likely to support common native fauna. Some Nationally 'At Risk' species may potentially occur.</p> | |
| <p>Vegetation: Naturally regenerating podocarp or broadleaved forest with mature trees.</p> | High |
| <p>Fauna: Potential habitat likely to support common native and Nationally 'At Risk' or 'Threatened' fauna.</p> | |

Annexure C: Location of sectors**Figure 4 Location of Sectors referred to in Vegetation Descriptions**

Source: Base image from Aurecon NZ Ltd

Annexure D: Transport Agency's Guidance in Relation to New Zealand Dotterels on NZTA Land

| Method | Description | Suitable for: | Success | Comments |
|---------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------|
| Dog | Walk a dog on a leash and disturb adult dotterels | All sites | Success | Walk dog throughout day for a number of days |
| False Hawk | Use a 'false hawk' to circle the area | Where it won't interfere with traffic or overhead lines. | Unsuccessful | Worked for a short time and then birds got used to it. |
| Long grass | Allow grass to grow long so not considered by dotterels to be a good place to lay eggs. | Sites that will be worked a some point during breeding season that have existing grass | | Grass has to be long. It should be left to grow from at least April before earth works season. |
| Machinery | Park machinery close to wear dotterels are showing interest. Start the engine from time to time. | Construction sites with large machinery. | Moderate | Machinery cannot be left for long periods or the birds may get used to it. |
| Silt fences | Erect shade cloth at knee height. Place in rows. Space at 5-10 m. | All sites | Success | The block the birds' view. Hay bales could also potentially be used. |
| Metallic tape | Tape / streamers that flutter when there is wind | All sites | Moderate | It worked for three weeks then birds got used to it. |