

Before a Board of Inquiry
MacKays to Peka Peka Expressway Proposal

under: the Resource Management Act 1991

in the matter of: Notice of requirement for designation and resource consent applications by the NZ Transport Agency for the MacKays to Peka Peka Expressway Proposal

applicant: **NZ Transport Agency**
Requiring Authority

Statement of evidence of **Dr Leigh Bull** (Avifauna) for the NZ Transport Agency

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STATEMENT OF EVIDENCE OF DR LEIGH BULL FOR THE NZ TRANSPORT AGENCY

QUALIFICATIONS AND EXPERIENCE

- 1 My full name is Dr Leigh Sandra Bull.
- 2 I am an Associate Principal and Senior Ecologist with Boffa Miskell Limited (*BML*). I have worked as an ecologist for 9 years. My area of specialisation is ornithology, particularly seabirds and coastal avifauna.
- 3 I hold the qualifications of Bachelor of Science (Zoology), Masters of Science with Honours (Ecology) and PhD (Ecology) from Victoria University of Wellington. I am a Certified Environmental Practitioner with the Environment Institute of Australia and New Zealand and am bound by the Institute's code of ethics. I am also a member of the New Zealand Ornithological Society.
- 4 After completing my PhD in 2003 I worked for the Department of Conservation (*DOC*) in the Biodiversity Recovery Unit as a Species Protection Officer and later as a Senior Technical Support Officer in the Marine Conservation Unit. Now disbanded, the Biodiversity Recovery Unit was a national unit that focused solely on the recovery of New Zealand's threatened species. In 2005, I was awarded a French Ministry of Research post-doctorate fellowship at the Université Paris Sud XI. After completing my post-doctorate, I contracted to the National Institute of Water and Atmospheric Research Limited (*NIWA*) to undertake seabird field investigations on Antipodes Island.
- 5 I joined BML in 2007, and have since worked on a variety of projects investigating the potential impact of developments on avifauna, including coastal species.
- 6 I have significant experience conducting ecological surveys and monitoring of a variety of fauna in New Zealand, New Caledonia, Tonga and France. These skills combined with a comprehensive understanding of ecological principles provide me with a thorough knowledge regarding species habitat requirements and how they can be managed effectively in different environments.
- 7 To date, I have authored more than 20 international and national peer-reviewed scientific publications and numerous technical reports relating to a variety of ecological matters.
- 8 I have appeared as an expert witness before council hearings and the Environment Court in relation to consent applications for landfill and Council Plan changes in terrestrial and coastal environments. I undertook the avifauna field investigations and appeared as an expert witness at the Board of Inquiry for Transmission Gully.

- 9 My evidence is given in support of the Notice of Requirement (*NoR*) and applications for resource consent lodged with the Environmental Protection Authority (*EPA*) by the NZ Transport Agency (*NZTA*) for the construction maintenance and operation of the MacKays to Peka Peka Expressway Proposal (*the Project*).
- 10 I am familiar with the area that the Project covers and the State highway and local roading network in the vicinity of the Project.
- 11 I am the author of the Ecological Technical Report 3: Avifauna Studies – Descriptions and Values¹ which formed part of the Assessment of Environmental Effects (*AEE*) lodged in support of the Project.
- 12 I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note (2011), and I agree to comply with it as if this Inquiry were before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 13 My evidence will deal with the following:
- 13.1 Executive Summary;
 - 13.2 Background and role;
 - 13.3 Changes since lodgement;
 - 13.4 Description of methodologies;
 - 13.5 Ecological context;
 - 13.6 Existing avifauna features and their values;
 - 13.7 Effects of construction and operation of the Project on avifauna;
 - 13.8 Proposed mitigation and monitoring;
 - 13.9 Response to submissions;
 - 13.10 Response to section 149G reports;
 - 13.11 Proposed conditions; and
 - 13.12 Conclusions.

¹ Technical Report 29.

EXECUTIVE SUMMARY

- 14 The habitat within and adjacent to the Project designation is highly modified and dominated by exotic plant communities including pasture, weedlands, pine forest and residential gardens. There is no remnant native forest, and only small areas of regenerating native bush along the alignment. There are many small wetland fragments both natural and created and of varying quality, which lie predominantly south of the Wharemauku stream and north of the Waikanae River.
- 15 The avifauna along and adjacent to the Project alignment is dominated, in terms of numbers, by introduced passerines²; a reflection of urban and open country occurring along the route. However, there is a good diversity of native species with 22 species recorded during my surveys³. While a number of the native species were associated with freshwater habitats (i.e. wetlands and waterways), they were typically seen in low numbers (i.e. 5 observations or less from all methods).
- 16 Both Threatened (pied shag, dabchick and bittern) and At Risk (black shag, pipit and fernbird) species were recorded during ecological surveys. They were seen either traversing the site (shags), inhabiting wetlands adjacent to the Project (bittern, dabchick), and rarely within the Project designation (fernbird). However, with the exception of fernbird, risk to these species has been assessed as being low due to their low numbers, separation from the Project (bittern, dabchick), or lack of habitat to attract them to the Project (shags).
- 17 There are five stream mouths and the Waikanae estuary located downstream of the Project footprint that provide habitat for estuarine and coastal bird species. However, of these only the Waikanae provides stable habitat for resident populations and has a diverse range of species present. Even though the risk of indirect effects on these resident birds is considered low, monitoring of marine invertebrates is recommended.
- 18 It is my assessment that of the species assessed, only North Island fernbird is at risk of significant adverse effects due to loss of habitat and disturbance. However, the potential adverse effects associated with the construction and operation of the Project on the fernbird population is uncertain. Until further research is carried out, I have conservatively estimated the risk to this species as **Very High** due to the rarity of this species on the Kāpiti Coast (being at the southern limit of this subspecies' distribution). As a result, I have

² Passerines refers to avifauna belonging to the avian order Passeriformes, which includes the perching birds (e.g. larks, swallows, thrushes, finches, sparrows, blackbirds etc).

³ Refer to Section 5.2.1 of Technical Report 29.

recommended additional study of this population and construction monitoring with requirements for adaptive management in the event that adverse effects are observed. These methods are discussed further in my evidence.

- 19 Overall, I consider the potential adverse effects of this Project on avifauna to be **Low**, subject to resolution of uncertainty regarding fernbird.
- 20 I have reviewed submissions lodged on the Project relevant to my area of expertise. Nothing raised in those submissions causes me to depart from the conclusions reached in my technical assessment of the Project.

BACKGROUND AND ROLE

- 21 My role in the Project has been as avifauna expert. I designed the methodology and undertook all the avifauna investigations for the Project during spring 2010 and summer 2011.
- 22 I used the avifauna investigations undertaken to assess the ecological value of the existing avifauna habitat and species within the Project area (as described in Technical Report 29) and to consider the potential effects of the construction and operation of the Project on those values⁴.
- 23 My evidence closely links with the evidence of **Dr De Luca** (author of Technical Report 31⁵). I have relied on **Dr De Luca's** interpretation of the potential impacts of the Project on the marine invertebrate fauna (food supply) to determine the potential indirect impact on foraging coastal birds.

CHANGES SINCE LODGEMENT

Fernbird

- 24 Since lodgement, I have continued to work on the development of pre-construction baseline monitoring plans for fernbird, a task required by the draft Ecological Management Plan (EMP).⁶
- 25 As there have been no scientific investigations of the risk of traffic to fernbird populations, this is an area of uncertainty. The methodology I have developed aims to:
- 25.1 Determine the presence and distribution of fernbird along and adjacent to the Project alignment;

⁴ Refer Technical Report 26 – Ecological Impact Assessment.

⁵ Ecological Technical Report 5: Marine Habitat and Species – Description & Values (Technical Report 31).

⁶ Appendix M of the Construction Environmental Management Plan (CEMP).

- 25.2 Investigate the potential for a fernbird population to exist adjacent to an operating motorway, using the SH1 Northern Gateway (between Orewa and Puhoi, north of Auckland) as a study site.
- 26 I developed a draft monitoring methodology plan in March 2012 which was agreed with by Department of Conservation (*DOC*) before the plan was finalised.⁷ The M2PP Alliance has now authorised me to commence this baseline monitoring.
- 27 I have completed one stage of this study, investigating the potential risk of an operating motorway on the fernbird population at the Northern Gateway motorway. In 2001 and 2002, a total of 25 fernbird were translocated from the site during construction.
- 28 I visited the Northern Gateway site on 29 August 2012 with Dr Kevin Parker, the scientist who undertook the translocations. During this visit, the fernbird population was found to have returned to the levels that occurred prior to road construction. Furthermore, fernbird were observed within 25 m of the operating motorway.
- 29 In my assessment of effects, and in the absence of any information on survival of fernbird adjacent to motorways, I considered there to be potentially a very high adverse on fernbird from road operation. However, this new information has allowed me to clarify where the risk to the Kāpiti fernbird population lies and gives me greater confidence that potential adverse affects can be reduced and mitigated.
- 30 My original assessment was concerned with the following three potential effects:
- 30.1 Construction of the road will remove an area of existing habitat;
 - 30.2 Potential disturbance and displacement due to construction and road operation; and
 - 30.3 Given the very small size of the population, a single mortality would have a disproportionate effect.
- 31 With this new information, my updated assessment is as follows:
- 31.1 There will still be a loss of habitat and that will need to be provided for. This has been addressed in the proposed consent conditions;
 - 31.2 At Northern Gateway, the fernbird population has not been displaced by the operational road; and

⁷ That monitoring methodology is contained in **Annexure B** to my evidence.

- 31.3 The very small size of the Kāpiti population is still a concern. However, as the Northern Gateway survey has shown, fernbird can co-exist with an operative motorway if the habitat is of sufficient quality.
- 32 I continue to recommend a number of actions necessary to ensure this small fernbird population is protected, as follows:
- 32.1 Complete the proposed survey of fernbird to confirm their distribution and population size along and adjacent to the Project alignment;
- 32.2 Where fernbird are found, the design of terrestrial and wetland revegetation should have a requirement to provide or enhance fernbird habitat; and
- 32.3 Monitoring of the population is still required through construction and for a period post-construction to confirm that it has not been adversely affected and that the mitigation actions have been effective.
- 33 The results of the fernbird baseline monitoring will be used to inform the requirements of any construction and post-construction monitoring along the Project alignment.

AVIFAUNA METHODOLOGY

- 34 A combination of desktop investigations and three field-based methods were used to assess the ecological value and composition of the avifauna communities and habitats within and adjacent to the proposed alignment⁸. The habitat context is detailed in Technical Report 29⁹.
- 35 The initial desktop investigations identified the bird species recorded in the wider study area, as well as their primary habitat and New Zealand threat status¹⁰.
- 36 The three standardised field-based methods used in my investigations included:
- 36.1 Five-minute point counts¹¹ - This was undertaken at 23 sites along the proposed alignment. All avifauna species seen and heard during the count period were recorded over a five minute period.

⁸ See further detail in Section 3 of Technical Report 29.

⁹ See Section 2 and Maps 1-3d.

¹⁰ See Appendix 29.E of Technical Report 29.

¹¹ Dawson, D.; Bull, P. (1975). Counting birds in New Zealand forests. *Notornis* 22: 101-109.

- 36.2 Waterbird counts - Waterbird species diversity and abundance were surveyed at 9 open waterbodies located along and adjacent to the proposed alignment.
- 36.3 Cryptic marshbird surveys – Playback of cryptic species (bittern, North Island fernbird, spotless crane and marsh crane) were undertaken at 9 sites which were determined to have suitable potential habitat (e.g. raupo- or *Eleocharis*-dominated wetlands and manuka-edged wetlands).
- 37 The avifauna survey sites were selected to sample representative habitats along and adjacent to the proposed alignment. The survey sites included wetlands, streams / rivers, pasture, native regenerating shrublands, rural / residential gardens and exotic plantation forest.¹²
- 38 Two survey sessions were undertaken, one during spring (20-23 September 2010) and the other during summer (31 January – 3 February 2011). Within each session, surveys were replicated to allow for temporal variability in activity at each location.¹³
- 39 In addition to the three standardised field methodologies, all incidental observations were recorded while moving during the avifauna surveys and by other BML ecologists working in the study area. Features such as unusually large numbers of a common or exotic bird species, or any unusual and noteworthy behaviour were also noted.

Survey constraints and rationale

- 40 Though a widely used and well-recognised method for surveying avifauna, one of the limitations of the 5-minute bird count method is that there is the potential to not detect some species that may be present (e.g. cryptic species or those that are less vocal). In order to reduce the potential for this, all incidental observations made outside of the standardised survey period were recorded, as well as replicating counts at each point count site over multiple days and in different months. Furthermore, the inclusion of waterbird and playback surveys provided additional opportunities to record target species that may not otherwise have been detected through the 5-minute counts.

¹² The locations of the survey sites are identified on Figure 4 (pg 18) of Technical Report 29.

¹³ Further detail on the timing of the surveys is contained in Section 3 of Technical Report 29.

- 41 Coastal avifauna surveys were not undertaken within the Waikanae estuary for the following reasons:
- 41.1 Species inventories have recently been produced by both the DOC¹⁴ and the Ornithological Society of New Zealand (OSNZ);¹⁵ and
 - 41.2 Previous avifauna studies have documented utilisation patterns of shorebird species within the estuary¹⁶;
 - 41.3 The point at which the alignment crosses the Waikanae River is approximately 2 km upstream of the estuary and therefore direct effects will not occur;
 - 41.4 Any potential impact on coastal birds would be limited to indirect effects of sediment or stormwater discharge on food supply. Any significant changes in marine invertebrates occurring during and post-construction will be detected through the proposed marine monitoring programme.¹⁷

ECOLOGICAL CONTEXT

- 42 Prior to human occupation, the Kāpiti coast was characterised by an extensive sand dune system, estuaries, coastal swamp forests, wetlands and podocarp forests.
- 43 Today the habitat along and adjacent to the Project designation is highly modified¹⁸ and dominated by exotic plant communities, pasture (54%), weedlands (16%), pine (16%), residential gardens and commercial areas (8%).¹⁹ There is no remnant native forest along the alignment, and only small areas of regenerating native bush (3%) and wetlands of varying quality (0.8%). The wetlands lie predominantly south of the Wharemauku stream and north of the Waikanae River.

¹⁴ Todd, M.; Graeme, C.; Kettles, H.; Sawyer, J. (2010). DRAFT – Estuaries in Wellington Hawke’s Bay Conservancy (excluding Hawke’s Bay and Chatham Islands Areas): Current status and future management. Department of Conservation, Wellington Hawke’s Bay Conservancy. Pp. 275.

¹⁵ Robertson, C.J.R., Hyvonen, P., Fraser, M.J. & Pickard, C.R. (2007). Atlas of Bird Distribution in New Zealand 1999-2004. The Ornithological Society of New Zealand, Wellington.

¹⁶ McConkey, K.R.; Bell, B.D. (2005). Activity and habitat use of waders are influenced by tide, time and weather. *Emu* 105: 331-340.

¹⁷ This is further discussed in the evidence of **Dr De Luca**.

¹⁸ Refer to Sections 2.2, 2.3 and 2.4 of Technical Report 29 for detailed descriptions.

¹⁹ Refer to Section 3.10 (including Tables 6 and 7 and Maps 9a to 9d) of Technical Report 27 for plant community calculations, locations and descriptions along the designation.

- 44 Of the three estuaries (Waikanae, Ngarara and Wharemauku) that lie along the section of coast paralleled by the Project,²⁰ only the Waikanae estuary is considered to be sufficiently large and sheltered from ocean swells to contain noteworthy populations of resident and migratory bird.
- 45 From my desktop review,²¹ an inventory collated from five 10 x 10 km squares which encompassed the Project designation recorded 54 avifauna species²². A separate inventory recorded some 50 species at the Waikanae Estuary.²³ However, not all birds seen historically along the coast, within the estuary, and in the forested foothills of the Tararua Ranges, will be found along the Project alignment.
- 46 Thus, the desktop review served to provide a broad indication of species that have historically been recorded present in the wider landscape.

EXISTING AVIFAUNA FEATURES AND THEIR VALUES

- 47 A total of 41 avifauna species were recorded during my targeted avifauna investigations.²⁴ One additional native species (dabchick) was recorded by a BML ecologist at a waterbird survey site (at WB09)²⁵ outside of the targeted avifauna survey sessions. Given that this species was identified in the avifauna methodology as a key species,²⁶ I have included it in the subsequent assessment and discussion which follows in my evidence.
- 48 Of the total 42 avifauna species recorded from all methods, 19 were introduced (exotic) and 23 native (including 8 endemic) species. Of the native species, 17 are 'Not Threatened', 3 are classed as being 'At Risk' (New Zealand pipit, North Island fernbird and black shag) and 3 are 'Threatened' (dabchick, pied shag and Australasian bittern).²⁷

²⁰ Refer to Section 2.1 of Technical Report 29 and Section 2 (and Map 1) of Technical Report 31 for a description of the estuaries.

²¹ Refer to Sections 3.1 and 5.1 of Technical Report 29.

²² Robertson, C.J.R., Hyvonen, P., Fraser, M.J. & Pickard, C.R. (2007). Atlas of Bird Distribution in New Zealand 1999-2004. The Ornithological Society of New Zealand, Wellington.

²³ Todd, M.; Graeme, C.; Kettles, H.; Sawyer, J. (unpubl.). DRAFT – Estuaries in Wellington Hawke's Bay Conservancy (excluding Hawke's Bay and Chatham Islands Areas): Current status and future management. Department of Conservation, Wellington Hawke's Bay Conservancy. Pp. 275.

²⁴ Refer to Appendix 29E of Technical Report 29 and **Annexure A** of this evidence for a complete species list.

²⁵ Refer to Map 4 in Technical Report 29.

²⁶ Refer to Section 3.2 and Table 2 in Technical Report 29.

²⁷ Threat classification rankings according to Miskelly, C.M., Dowding, J.E., Elliot, G.P., Hitchmough, R.A., Powlesland, R.G., Robertson, H.A., Sagar, P.M., Scofield, R.P. & Taylor, G.A. (2008). Conservation status of New Zealand birds, 2008. *Notornis* 55: 117-1350. These rankings are based on the threat classification system outlined in: Townsend, A., de Lange, P., Duffy, C., Miskelly, C., Molloy, J., & Norton, D. (2008).

- 49 One species, the spotless crake (At Risk - Relict), which has been recorded on the Kāpiti Coast historically^{23,28}, is conspicuously absent from my studies. I can only conclude that its population is at such a low level that none were present at my sampling locations, but may be present elsewhere. This species is associated with raupo and sedge-dominated wetlands, and seldom in flax-dominated wetlands.²⁹ Given this species utilises the same habitats as bittern and dabchick, it is assessed in the following sections with these two species.
- 50 The Threatened and At Risk species were seen in a number of locations along the proposed alignment³⁰, but were only recorded in very low numbers (0.8% of all observations) and only associated within certain habitats. For instance, of the 11 species recorded that are primarily associated with forest and bush/scrub habitats, six were native and none of these were Threatened³¹ or At Risk. Of the 16 species recorded which are primarily associated with farmland/open country habitats, only 4 were native and only one of these (New Zealand pipit) is At Risk. Of the 13 species recorded that are primarily associated with freshwater habitats, 12 were native and 5 of these are either Threatened or At Risk.
- 51 In terms of total abundance, the avifauna community along and adjacent to the proposed alignment was dominated by introduced passerines, a reflection of dominance of urban and open country (farmland) habitat occurring along the route. These habitat types are considered to be of low ecological value.
- 52 The fragmented native forest habitats along and adjacent to the proposed alignment provide an important habitat for a number of native species through the provision of feeding resources and nesting sites. These fragments also provide a series of forested areas that serve as corridor to encourage the dispersal of avifauna across the wider area (including species such as kaka from Kāpiti Island). Consequently, these forest fragments are considered to be of high ecological value for avifauna.
- 53 Native avifauna associated primarily with freshwater habitats (i.e. wetlands and waterways) were recorded in low numbers. Both Threatened (pied shag, bittern and dabchick) and At Risk (black shag

New Zealand Threat Classification System Manual. Wellington: Department of Conservation.

²⁸ Wildlands (2002). Ecology and Restoration of Te Harakeke Wetland, Waikanae. Report Prepared by Wildland Consultants Ltd for Wellington Regional Council. Report No. 490.

²⁹ Heather, B., & Robertson, H. (2000). *The Field Guide to the Birds of New Zealand.* Viking, New Zealand.

³⁰ **Annexure C** provides a map of the locations at which Threatened or At Risk avifauna species were recorded.

³¹ Note that Figure 1 in Technical Report 29 incorrectly shows two Threatened species primarily associated with bush habitat. These two species were silver eye and grey warbler which are in fact Not Threatened natives.

and fernbird) species were recorded along or adjacent to the proposed alignment. The shags were recorded traversing the site rather than utilising the waterbodies. However, the bittern, fernbird and dabchick were associated with wetland habitats and are likely to be resident in the area. Therefore, from an avifauna perspective, a number of the wetlands occurring along the proposed alignment and within the wider area are considered to be of high ecological value.

- 54 The wetlands in the less developed area near the Project alignment north of Te Moana Road (comprising Te Harakeke / Kawakahia Wetland, Ti Kouka Wetland, Ngarara Wetland and Nga Manu Nature Reserve) provide the best quality habitat for freshwater bird species due to the extent and diversity of habitat types present.
- 55 In summary, the six species of particular ecological importance which have been identified along or near the Project alignment are:
- 55.1 **New Zealand Pipit** (At Risk – Declining); a bird of open country which opportunistically utilises open farmland near the coast. This was the only At Risk species recorded in open country (4 observations) along the proposed alignment.
- 55.2 **Australasian bittern** (Threatened - Nationally Endangered, with qualifiers Sparse and Threatened Overseas); a secretive/cryptic species that utilises wetland areas with open water and dense marginal vegetation, typically raupo. A single bird responded to a playback survey in the Te Harakeke wetland (PB07),³² outside of the Project alignment.
- 55.3 **Dabchick** (Threatened - Nationally Vulnerable); similar to bittern in preferring open water with dense marginal vegetation, typically raupo. One bird was recorded by a BML ecologist at a waterbird survey site (adjacent to the Project alignment at WB09³²) outside of the targeted avifauna survey sessions.
- 55.4 **Pied shag** (Threatened - Nationally Vulnerable); a coastal species which roosts on logs, rocks and large trees. A total of five birds were recorded traversing the proposed alignment at three locations (5M06, 5M08, 5M10³²).
- 55.5 **Black shag** (At Risk – Naturally Uncommon, with qualifiers Sparse and Secure Overseas); most often associated with rivers, streams and lakes, but also estuaries, harbours and sheltered coasts.³³ Generally nest in large trees overhanging water or cliffs. A total of three birds were recorded

³² See Map 4 of Technical Report 29.

³³ Heather, B., & Robertson, H. (2000). *The Field Guide to the Birds of New Zealand*. Viking, New Zealand.

traversing the proposed alignment at three locations (5M05, 5M15, 5M24³²).

55.6 **North Island fernbird** (At Risk – Declining, with qualifiers Range Restricted and Stable); a species most often associated with wetlands, reed beds, and drier areas of bracken and scrub. A single bird was observed on two occasions, once during standardised avifauna investigations (within the Project alignment at in the vicinity of Ngarara Wetland 5M21³²), the other being an incidental observation at the Kakariki Stream in the vicinity of Nga Manu Nature Reserve. It is likely, given the habitat available, that the observed fernbird(s) are resident in the areas they were recorded.

56 The sightings of fernbird is significant as at the time of the avifauna survey, these were presumed to be the most southern observations of fernbird in the North Island, making this population of scientific interest and regionally significant. The presence of fernbird was further confirmed by Kāpiti Coast District Council (KCDC) staff when they were recorded at the Otaihanga oxbow within the Waikanae Estuary in February 2012.³⁴

EFFECTS OF CONSTRUCTION AND OPERATION OF THE PROJECT ON AVIFAUNA

57 The following potential construction and operational phase effects (both direct and indirect) on avifauna have been considered:

57.1 Direct loss of habitat within the Project designation (including that used for breeding, feeding and roosting);

57.2 Impact on food resources within the Waikanae, Wharemauku and Ngarara estuaries as a result of Project earthworks within the catchment area;

57.3 Collision with road barriers, other roading structures and vehicles; and

57.4 Potential disturbance or displacement.

Direct Effects of Habitat Loss

58 Within the 164 ha Project footprint,³⁵ only 5.6 ha of indigenous vegetation requires clearance, of which 3.8 ha is kanuka forest or regenerating broadleaved forest or low scrub. The remaining 1.8 ha is modified indigenous wetland vegetation.

³⁴ 6/2/12 Dominion Post article "Bird believed extinct in region spotted in Waikanae".

³⁵ The Project footprint refers to the earthworks extent for the road including the road surface and associated cuts and fills and permanent stormwater treatment devices, but does not include temporary works such as site offices, laydown and storage areas and construction sediment devices.

- 59 Thus, there will be very little habitat, considered to be important to native avifauna, directly affected by the Project.
- 60 With the exception of a small number of cabbage trees adjacent to El Rancho Wetland (Weggery), no remnant native forest will be affected by the proposed alignment.
- 61 Similarly, only very small areas of highly modified wetland will be affected, and none of these wetland areas contain open water or raupo, thereby restricting their value to waterfowl (divers and dabblers) and to cryptic waders (bittern and crane).
- 62 For example, both bittern and dabchick were recorded within wetland habitats containing open water and raupo near the Project designation. However the designation itself does not contain any of this habitat and so there will be no habitat loss for these species.
- 63 On the Kāpiti Coast pipit utilise open country / pasture and dune habitat. They were seen in pasture at several locations along the alignment. There will therefore be some habitat loss for this species. However, this loss is considered to be minor given the extent of open pasture and dune habitat that is available in the surrounding and wider area.
- 64 All observations of black and pied shag were of birds traversing the Project alignment. This is a reflection of the lack of habitat for these species within the Project designation. Black and pied shag will not be affected by habitat loss.
- 65 For some avifauna species that currently utilise the riparian corridor in the vicinity of the proposed Waikanae bridge crossing, there will be some direct loss of habitat (foraging, roosting and breeding). However, the loss is considered to be small relative to the extent of riparian habitat on the Waikanae River and all of the species potentially affected are common and not threatened.
- 66 I considered whether the removal of riparian habitat along the Waikanae River would potentially disrupt some species' movements (e.g. silvereye, grey warbler, fantail) along the river corridor. I have concluded that the species using this habitat are not adverse to flying across open areas between habitat patches and do so now at other locations along the Waikanae River where there are breaks in the vegetation along the riparian margin (including the existing SH1 bridge and rail corridor).
- 67 For fernbird, however, the two locations in which the species was recorded will be directly impacted by the Project. Thus, fernbird will be directly affected through habitat loss associated with the construction of the Project.

68 Thus, with the exception of fernbird, the potential adverse effects associated with habitat loss through the construction of the Project on avifauna are considered to be **Low** and in my opinion no management or mitigation is necessary.

69 With regard to fernbird, until further research is conducted to determine the distribution and abundance of birds, I believe the risk to this population is potentially **Very High**.

Impact on Estuarine Foraging Habitats

70 Consideration has been given to the potential indirect effect of sedimentation discharge (as a result of Project earthworks within the catchment) on the food supply of coastal shorebirds.

71 Of the five estuaries and stream mouths that lie downstream of the project, only the Waikanae, Wharemauku and Ngarara are considered to contain shorebird food supply that could be potentially affected by sediment discharge from construction.

72 Based on the predicted sediment generated by the Project in each catchment³⁶ and the nature of the respective stream mouths, it was determined that there will be **Negligible** impact on the on the distribution and abundance of marine invertebrates, the primary food supply found within these three estuaries.³⁷

73 Thus, given that the potential impacts on marine invertebrates are considered to be negligible, the potential indirect impact on the foraging of coastal avifauna is also considered to be **Very Low**.

74 However, the Waikanae Estuary is of such value that monitoring of the marine invertebrates (i.e. coastal shorebird food supply) is considered necessary to ensure that the levels of sediment discharge that are predicted occur.

Collision with vehicles and road structures

75 Consideration has been given to the potential impact of collisions on the species of concern listed in paragraph 55 of my evidence. Overall, I conclude that the impact will be **Low** due to the following factors:

75.1 There will be no severance of wetlands which would force bittern or dabchick to cross the road to utilise their full habitat range. This conclusion also applies to spotless crane if they are found to be present.

75.2 There will be no severance of large areas of forest which species such as tui and kereru may fly between.

³⁶ Refer to Table 37 in Technical Report 26.

³⁷ Refer to the Evidence in Chief of **Dr De Luca**.

- 75.3 Native avifauna (including shags) currently utilise the Waikanae River corridor in the presence of the existing SH1 bridge and rail corridor and as such I expect there to be a degree of habituation to bridge structures.
- 75.4 There are a number of current existing roads in closer proximity to wetlands and forest habitats than the Project alignment, which will also have resident species which are habituated to traffic activity.
- 75.5 There are no current proposals to use transparent noise barriers on the M2PP alignment, a type of structure known to place some species at risk of collision.³⁸
- 76 However in the case of fernbird, current and potential habitat will be located in close proximity and on both sides of the Project alignment. This is likely to result in traverses of the road by resident birds. This species prefers to make short low flights just above the ground. Thus, there is a risk of collision, which if realised would result in **Very High** adverse effects on the very small local population of this subspecies.

Disturbance and Displacement

- 77 I am unaware of any research undertaken in New Zealand investigating the impact of construction or traffic noise on native avifauna. A study of grey fantail (*Rhipidura fuliginosa*³⁹) in Australia found that this species did not appear to change its song in the presence of traffic noise, however the probability of detecting the species declined substantially with increasing traffic noise and volume⁴⁰. The authors of this study concluded that the way in which birds of roadside habitats respond to disturbance by vehicles is uncertain.
- 78 The majority of habitat and landcover through which the Project alignment passes is pasture, residential gardens, and exotic vegetation such as plantation pine⁴¹, environments already subject to rural and urban noise of varying types. Species found in these habitats are unlikely to be affected by an additional road.
- 79 There are several areas of wetland and regenerating native vegetation (e.g. El rancho, Nga Manu, Te Harakeke) within close proximity (e.g. 100-200 m) to the Project alignment; in these environments, several key species may be exposed to increased

³⁸ City of Toronto Green Development Standard, Bird Friendly Development Guidelines (March 2007) http://www.toronto.ca/lightsout/pdf/development_guidelines.pdf.

³⁹ The same species found in New Zealand.

⁴⁰ Parris, K.M. & Schneider, A. (2009). Impacts of traffic noise and traffic volume on birds of roadside habitats. *Ecology and Society* 14(1).

⁴¹ Refer to Map 1 in Technical Report 29 for current vegetation / landcover along the Project alignment.

levels of noise, including dabchick, bittern and fernbird as well as more common species.

- 80 Currently, there are existing roads within 500 m of all the locations in which these species were recorded along the alignment. It could be considered that these resident birds are already habituated to road noise and will not be further affected, or that the Project will exacerbate the current noise disturbance experienced by these birds.
- 81 In reaching a conclusion on the potential impact of traffic noise and disturbance, I have also considered that the proposed Project will result in a redistribution of traffic from the existing SH1, this will result in a decrease in noise disturbance to species inhabiting areas of high ecological value adjacent to that current road.⁴²
- 82 With regard to the potential disturbance and displacement of fernbird, my survey along the Northern Gateway road has shown that this species is capable of co-existing in very close proximity to a high-volume operating motorway.⁴³
- 83 Overall, it is my opinion that while the effect of disturbance (including noise) is uncertain, there will be some increases in some areas, decreases in others, and that overall the net effect is likely to be neutral or minor.

PROPOSED MITIGATION AND MONITORING

Avoidance and Minimisation

- 84 The Project shaping process⁴⁴ succeeded in influencing a number of aspects of the proposed Expressway design to avoid or minimise adverse effects on ecological systems. The most significant changes were the avoidance of a number of statutorily recognised wetlands along the length of the Expressway.⁴⁵
- 85 Consequently, as explained above, with the exception of the fernbird, no other avifauna species are considered to be at risk of adverse effects to the extent that mitigation and monitoring is required.

Fernbird

- 86 The AEE summarises the various mitigation measures recommended to address the potential loss of fernbird habitat during construction

⁴² Refer to Map 1 in Technical Report 29 for current vegetation / landcover along the existing SH1.

⁴³ Refer to paragraphs 27 and 28 of my evidence.

⁴⁴ Described in the evidence of **Mr Park**.

⁴⁵ Refer to Section 7 in Technical Report 26 for specific details of areas avoided.

and/or the potential displacement or mortality of fernbird during construction and operation.⁴⁶

- 87 I note that the draft Ecological Management Plan (EMP)⁴⁷ needs to be updated to reflect those recommendations as there had been further development of potential mitigation options following initial completion of the draft EMP.
- 88 Thus, my current recommendations for pre-construction research and mitigation options are as follows:
- 88.1 Undertake a pre-construction research programme to determine distribution and utilisation of fernbird habitat within the proposed alignment between the Waikanae River and Kakariki Stream;
 - 88.2 Undertake a research programme at an existing motorway⁴⁸ within known fernbird habitat to determine the operational effects on the ability of a fernbird population to continue to utilise adjacent habitat;
 - 88.3 Pending the research outcomes, consider whether the Project provides the opportunity to allow for fernbird to move through the restored Kakariki Stream enhancement surrounding the proposed Expressway bridge structure (so as to encourage birds to cross under the roadway). I note that this has not been trialled elsewhere and the success of such a proposal is not known;
 - 88.4 Pending the research outcomes, investigate the potential to maintain a mown grass buffer along key sections of fernbird habitat adjacent to the proposed alignment (so as to not encourage birds to the road edge). Again, I note that this has not been trialled elsewhere and the success of such a proposal is not known;
 - 88.5 Discuss with DOC the results of the research proposed above to determine if further monitoring or mitigation is required;
 - 88.6 Any clearance of vegetation within identified fernbird territories should only occur outside of the breeding season (between August to February).⁴⁹

⁴⁶ AEE, Chapter 31 (Environmental Management and Monitoring), pp 638-639. See also Technical Report 26, para 11.6.2.

⁴⁷ Refer Section 3.3.5 of the EMP, being Appendix M to the CEMP.

⁴⁸ This survey has now been completed (refer to paragraphs 27 and 28 of my evidence)

⁴⁹ See Table 7 (pgs 28-30) of the draft EMP.

- 89 In my opinion the draft EMP should be updated to reflect the above points. I have set out the changes I propose to the EMP in **Annexure B**.

Coastal Avifauna

- 90 The potential indirect effect on the food supply of coastal avifauna in the Waikanae Estuary will be monitored via the proposed routine and trigger monitoring of the marine ecological values (including marine invertebrate community composition, sediment grain size and sediment quality).⁵⁰

General Habitat Mitigation

- 91 **Mr Park**, in his evidence in chief, provides the details regarding the extent and location of habitat mitigation associated with the Project. In summary, 7.6 ha of re-vegetation is required to compensate for the 3.8 ha of dryland vegetation that will be lost within the Project footprint,⁵¹ and 5.4 ha of wetland restoration is required to compensate for the loss of 1.8 ha of wetland vegetation within the Project footprint.
- 92 With regard to the wetland restoration, the areas of focus will include the Raumati manuka wetland, Otaihanga wetlands, El Rancho (Weggery) wetland and Ngarara Wetland.⁵²
- 93 In addition there will be areas of wetland formed through the creation of flood storage areas and stormwater treatment ponds, and areas of dry forest and scrub formed as a result of landscape planting. Together these will provide habitat for a range of native species including fernbird, waterfowl, and bush birds.
- 94 It is my opinion that the all freshwater avifauna species of concern will benefit from mitigation works associated with these habitats and will mitigate for the habitat loss that will be experienced by fernbird.

RESPONSE TO SUBMISSIONS

- 95 I have read all the submissions lodged on the Project relevant to my area of expertise. To the extent not already addressed in my evidence, I will respond to submissions that raised avifauna issues or concerns.
- 96 I note that **Nga Manu Nature Reserve's** [Submitter 0090] submission is in support of the Project and does not raise any issues with regard to potential impacts on avifauna.

⁵⁰ Refer to Appendix M of the CEMP and proposed resource consent conditions G.38 to G.40. Those conditions are addressed in the evidence of Dr De Luca.

⁵¹ Refer Table 45 in Technical Report 26 (page 134).

⁵² The mitigation treatments proposed for each wetland are described in Section 11.2.4 of Technical Report 26; Tables 5, 7 and 8 of the EMP (Appendix M to the CEMP and in Condition G.34 (Ecological Management Plan).

- 97 I note that **Department of Conservation's** [Submitter 0468] submission is neutral and does not raise any issues with regard to potential impacts on avifauna.
- 98 **Greater Wellington Regional Council's** [Submitter 0684] submission supports the Project application in part, and raises no specific issues with regard to the potential impact on avifauna.
- 99 **Kāpiti Coast District Council's** [Submitter 0682] submission supports the Project application in part. While in agreement with the risk identified in regards to fernbird, the submission raises concerns that the impacts on other wetland birds, such as bittern and spotless crack, have not been adequately considered and need to be addressed.⁵³
- 100 In response, I have addressed the potential impact on all wetland At Risk and Threatened avifauna species (including bittern and spotless crake) throughout my evidence in terms of habitat loss (refer to paragraphs 58 to 69), disturbance (refer to paragraphs 77 to 83) and potential collisions (refer to paragraphs 75 to 76).
- 101 A number of submitters have opposed the Project on general environmental grounds, citing adverse impacts on avifauna and their habitat.⁵⁴ In general, the main issues raised by submitters relating to avifauna included:
- 101.1 Potential impact on wildlife / flight corridors;
 - 101.2 Potential impact through loss of habitat;
 - 101.3 Potential impact through disturbance and displacement;
 - 101.4 Potential impact on Nationally Threatened and At Risk species (including fernbird).
- 102 I will address each in turn below.
- Wildlife / Flight Corridors**
- 103 A number of submitters raise the issue of the impact on the wildlife / flight corridors used by avifauna, particularly in association with flights to and from Kāpiti Island, and along the Waikanae River.⁵⁵
- 104 I have addressed this issue in paragraphs 52, 65, 66 and 75.3 of my evidence.

⁵³ Refer to paragraph 37 of Submission 0682.

⁵⁴ For example, Submitter 0217 [Karen Anderson], Submitter 0245 [Gareth Griffis], Submitter 0267 [Daniel Waterson], Submitter 0270 [Bob Gregory], Submitter 0337 [Elizabeth Laing].

⁵⁵ For example, Submitter 0346 [John Downie], Submitter 0429 [Bill & Jane Inge], Submitter 0459 [Sylvia Madden], Submitter 0481 [Jonathan Gradwell].

- 105 In addition, several submitters⁵⁶ raised concerns with regards to the Expressway acting as a barrier to avifauna movements.
- 106 In response, with the exception of fernbird, I do not believe that the Expressway will act as a barrier, particularly given that the existing SH1 already bisects areas of vegetation on either side which avifauna are utilising as stepping stones over the wider landscape.

Habitat loss

- 107 A number of submitters raise the issue of habitat loss within the designation⁵⁷.
- 108 I have addressed this issue in paragraphs 58 to 69 of my evidence, which identified that within the 164 ha Project footprint only 5.6 ha of indigenous vegetation requires clearance. While this vegetation may provide habitat for common native and introduced exotic species, with the exception of fernbird, the potential adverse effects associated with habitat loss through the construction of the Project on avifauna are considered to be **Low**.
- 109 With regard to fernbird, until further research⁵⁸ is conducted to determine the distribution and abundance of bird, I believe the risk to this population is potentially **Very High**.
- 110 Several submitters⁵⁹ made specific reference to the impact of the removal of mature exotic trees.
- 111 In response, it is my opinion that the removal of these trees will not result in significant adverse effects on the avifauna communities, with sufficient roosting, feeding and nesting habitat being available.

Disturbance or Displacement

- 112 A number of submitters raise the issue of disturbance to avifauna through the construction and operation of the Expressway.⁶⁰
- 113 I have addressed this issue in paragraphs 77 to 83 of my evidence.

Threatened and At Risk Avifauna

- 114 A number of submitters raise the issue of the potential impact on fernbird and nationally threatened birds (including bittern and spotless crane).⁶¹

⁵⁶ For example, Submitter 0713 [Mark & Julia Harris] and Submitter 0492 [Brent Cherry].

⁵⁷ For example, Submitter 0630 [Adele Cherrill], Submitter 0622 [Beth Lindsay], Submitter 0676 [Roger Brittain].

⁵⁸ As outlined in paragraph 88 in my evidence.

⁵⁹ For example, Submitter 0437 [Andrew & Lynnette Pritchard], Submitter 609 [Diane Benge], Submitter 659 [Christopher Benge].

⁶⁰ For example, Submitter 0608 [Metlife Care Kāpiti Limited], Submitter 0505 [Save Kāpiti Incorporated].

- 115 I have addressed the potential impact on all such birds and my assessment of these impact throughout my evidence in terms of habitat loss (refer to paragraphs 58 to 69), disturbance (refer to paragraphs 77 to 83) and potential collisions (refer to paragraphs 75 to 76).
- 116 For the reasons contained within my evidence, it is my opinion that, with the exception of fernbird, the impact on other Threatened and At Risk avifauna species recorded along and adjacent to the alignment will be **Low**.
- 117 With regard to fernbird, until further research is conducted to determine the distribution and abundance of bird, I believe the risk to this population is potentially **Very High**. However, as stated earlier in my evidence (executive summary), I believe that these potential adverse affects can be reduced and mitigated provided the recommendations I have put forward are followed.

Additional Issues

- 118 Several submitters⁶² raised concerns with regards to the impact of the Project on the birdlife in Waikanae Estuary.
- 119 I have addressed the potential indirect effect of sedimentation discharge (as a result of Project earthworks within the catchment) on the food supply of coastal shorebirds in paragraphs 70 to 74 of my evidence.
- 120 Several submitters⁶³ raised concerns with regards to the impact of lighting on avifauna.
- 121 Lighting will only be provided at interchanges and beneath expressway bridges, except at Otaihanga Road, Waikanae River, Ngarara Road and Smithfield overbridges which will not have lighting⁶⁴. With the exception of the Peka Peka interchange, all other interchanges lie within well-lit urban environments where birds currently exist. The Peka Peka interchange is located immediately south of the existing Peka Peka Road intersection, which is currently lit.
- 122 As such, I do not believe that the lighting that is proposed for the Project will impact on any At Risk or Threatened species recorded along the Expressway.

⁶¹ For example, Submitter 0707 [Raumati South Residents Association Inc.], Submitter 0404 [Rachel Mackay], Submitter 0631 [Guinevere Cherrill], Submitter 0715 [Gina Woodward].

⁶² For example, Submitter 0380 [Jackie Cumming] and Submitter 0357 [Catherine Keno].

⁶³ For example, Submitter 0223 [Wendy Batterbee], Submitter 0713 [M and J Harris], Submitter 0398 [M Cooke-Willis].

⁶⁴ Refer to Section 2.3 of Technical Report 7.

- 123 The issue of vehicle strike was raised by several submitters.⁶⁵ I have addressed this issue in paragraphs 75 and 76 of my evidence, in which I identified fernbird as being the only At Risk or Threatened avifauna species which may be significantly affected by vehicle strike.
- 124 Submitter 0718 [**Derek Schulz**] raises specific concerns regarding Kiwi Pond⁶⁶, which was assigned a Low ecological value,⁶⁷ stating that *"The ecologists however, despite having photographed and sampled the Wharemauku where it flows beside it, appear not to have visited the lake in making this observation"*.
- 125 In response to this claim, I can confirm that Kiwi Pond was in fact one of the waterbird count sites (WB01⁶⁸), of which special mention was made regarding the fact that a summer count could not be undertaken on account of there being no water in the pond.⁶⁹ While I acknowledge that a number of avifauna species (predominantly introduced species) utilise this pond, it is my opinion that the wetland which may be created at this site in association with proposed stormwater flood storage⁷⁰ will provide improved habitat opportunities for these species.
- 126 Mr Schulz also states that the AEE gave *"the impression that the wetlands and waterways of Kapiti are not important food sources for shags"*. I disagree with this statement. While shags were recorded traversing the survey locations at the time the surveys, the **High** value attributed to the freshwater habitats in the wider area were acknowledged and identified both in Technical Report 29⁷¹ and paragraphs 50 and 53 of my evidence.

RESPONSE TO SECTION 149G REPORTS

- 127 I have reviewed the Key Issues Reports prepared by KCDC (dated 8 June 2012) and GWRC (dated 11 June 2012) pursuant to section 149G(3) of the RMA.
- 128 The GWRC Report raised no issues pertinent to my evidence.
- 129 The KCDC Report raised the issue of the level of impact of the Expressway proposal on ecological sites, ecological/bird corridors, wetlands, streams and waterbodies, in particular to the Waikanae

⁶⁵ For example, Submitter 0608 [Metlife Care Kāpiti Limited].

⁶⁶ Referred to in Submission 0718 as 'Raumati Beach Dune Lake'.

⁶⁷ Refer to Table 10 in Technical Report 26, and **Mr Park's** evidence.

⁶⁸ Refer to Map 4 in Technical Report 29.

⁶⁹ Refer to Section 5.2.3 and Appendix 29.C (photos) of Technical Report 29.

⁷⁰ Refer to evidence of **Mr Levy and Mr Evan**.

⁷¹ Refer to Section 6.2 of Technical Report 29.

River, Wharemauku and Ngarara Streams, Waimeha and Te Harakeke/Kawakahia Wetlands and remnant native bush.⁷²

- 130 I have addressed the issue of bird corridors earlier in my evidence. Given the extent and quality of habitat that is being lost under the Project footprint, the fragmented nature of the existing "corridors", and the presence of the existing SH1 road and rail bridge over the Waikanae River, it is my opinion that fernbird are the only species of concern (without further research) in this regard given that they are reluctant to fly over any distance that is not vegetated.
- 131 Thus, with the exception of fernbird, it is my conclusion all other species that currently exist in the fragmented landscape found on the Kāpiti Coast and within the designation will benefit in the long term from the proposed habitat restoration proposed as mitigation for habitat loss and as mitigation for landscape effects.

PROPOSED CONDITIONS

- 132 I support the proposed resource consent conditions G.34 to G.40⁷³ in relation to the requirement for an EMP and associated ecological monitoring.
- 133 The need to implement a finalised EMP is set out in proposed conditions G.34 to G.37, which require (amongst other things) that the EMP shall:
- 133.1 "Detail the monitoring to be undertaken pre-construction, during construction and post-construction as outlined below in condition G.34-40."⁷⁴
- 133.2 Provide information on how the following outcome will be achieved: "Minimise disturbance of nationally threatened or at-risk birds ... during breeding periods".⁷⁵
- 134 With regard to fernbird, the methods proposed in the draft EMP to monitor this species have been developed further since lodgement. As such, the finalised EMP should include those recommendations outlined earlier in my evidence, and as set out in **Annexure B**. This may be best achieved through the inclusion of a specific sub-section in Section 4 (Monitoring) of the EMP which outlines the new proposed methods.
- 135 In developing this evidence I have identified that the potential effect on fernbird is not specifically addressed in proposed consent

⁷² See pages 8-9 of S149(G)3 Key Issues Report – Kāpiti Coast District Council (dated 8 June 2012).

⁷³ See Chapter 33, pages 685-687 of the AEE.

⁷⁴ Proposed condition G.34(b).

⁷⁵ Proposed condition G.34(c)(v).

conditions which were lodged. I recommend several amendments to the proposed conditions to make specific mention of fernbird, as set out in **Annexure D** of my evidence.

- 136 These amendments address the outcomes sought through the EMP (condition G34.c) with regard to fernbird, as well as the general monitoring (G.38 a-c) and adaptive management requirements (G.40) for this population.
- 137 In relation to marine invertebrates, I support the proposed NZTA conditions G.38 to G.40 which include the routine monitoring of marine ecological values prior to construction, during construction and post construction as outlined in the draft EMP. The monitoring of marine invertebrates is included in this programme. In my opinion, this monitoring is appropriate as it will enable the detection of significant changes in the food supply available for foraging coastal birds.

CONCLUSIONS

- 138 The avifauna along and adjacent to the Project were found to be dominated by introduced passerines; a reflection of urban and open country occurring along the route. These habitat types are considered to be of low ecological value.
- 139 Native avifauna associated primarily with freshwater habitats (i.e. wetlands and waterways) were recorded in low numbers, though both Threatened (pied shag, bittern and dabchick) and At Risk (black shag and fernbird) species were recorded along or adjacent to the alignment.
- 140 With regard to the pied and black shags, birds were recorded traversing the site rather than utilising the waterbodies. However, the bittern, dabchick and fernbird were associated with wetland habitats and are likely to be resident in the area. Therefore, from an avifauna perspective, a number of the wetlands occurring along the alignment and within the wider area are considered to be of high ecological value (particularly Te Harakeke/Kawakahia Wetland, Ti Kouka Wetland, Ngarara Wetland and Nga Manu Nature Reserve).
- 141 The fragmented native forest habitats along and adjacent to the alignment provide an important habitat for a number of native species through the provision of feeding resources and nesting sites. These fragments also provide a series of forested areas that serve as a corridor to encourage the dispersal of avifauna across the wider area. Consequently, these forested areas are also considered to be of high ecological value for avifauna.
- 142 Generally the impacts of the Project on avifauna are considered to be **Low**; largely due to the avoidance of a number of statutorily recognised wetlands along the length of the Expressway. However

the potential adverse effects associated with the construction and operation of the Project on the fernbird population cannot be determined without further study, but is potentially **Very High** and depending on the results of proposed research may require additional mitigation. I support the proposed resource consent conditions G.34-G.40⁷⁶ in relation to the requirement for an EMP and associated ecological monitoring.

- 143 As noted above, I have suggested amendments to the draft EMP for pre-construction research and mitigation options for the potential loss of fernbird habitat during construction and/or the potential displacement or mortality of fernbird during construction and operation of the Project. In addition, I have suggested amendments to the proposed consent conditions as lodged to specifically address the monitoring requirements of the fernbird population.



Dr Leigh Sandra Bull
31 August 2012

⁷⁶ See Section 33, pages 685-687 of the AEE.

ANNEXURE A: AVIFAUNA SPECIES RECORDED DURING 2010-11 SURVEYS AND THE HABITAT TYPES THEY ARE KNOWN TO OCCUR IN (DARKER GREEN CELLS INDICATE PRIMARY HABITAT)

SPECIES	CONSERVATION STATUS ⁷⁷		HABITAT								
			Native forest	Exotic Forest	Scrub / Shrubland	Farmland / Open country	Freshwater / Wetland	Coastal / Estuary	Urban / Residential		
Fantail	Endemic	Not Threatened									
Kereru	Endemic	Not Threatened ^{CD Inc}									
Shining cuckoo	Native	Not Threatened ^{DP}									
Tui	Endemic	Not Threatened St									
Blackbird	Introduced	Introduced & Naturalised ^{SO}									
Californian quail	Introduced	Introduced & Naturalised ^{SO}									
Common pheasant	Introduced	Introduced & Naturalised ^{SO}									
Crimson rosella	Introduced	Introduced & Naturalised ^{SO RR}									
Eastern rosella	Introduced	Introduced & Naturalised ^{SO}									
Grey warbler	Endemic	Not Threatened									
Silver-eye	Native	Not Threatened ^{SO}									
Canada goose	Introduced	Introduced & Naturalised ^{SO}									
Chaffinch	Introduced	Introduced & Naturalised ^{SO}									
Dunnock	Introduced	Introduced & Naturalised ^{SO}									
Gold finch	Introduced	Introduced & Naturalised ^{SO}									
Green finch	Introduced	Introduced & Naturalised ^{SO}									
House sparrow	Introduced	Introduced & Naturalised ^{SO}									
Magpie	Introduced	Introduced & Naturalised ^{SO}									
Pipit	Endemic	Declining									
Redpoll	Introduced	Introduced & Naturalised ^{SO}									
Skylark	Introduced	Introduced & Naturalised ^{SO}									
Song thrush	Introduced	Introduced & Naturalised ^{SO}									
Spur-winged plover	Naturalised	Not Threatened ^{SO}									
Starling	Introduced	Introduced & Naturalised ^{SO}									
Swamp harrier	Native	Not Threatened ^{SO}									
Welcome swallow	Native	Not Threatened ^{Inc SO}									
Yellow hammer	Introduced	Introduced & Naturalised ^{SO}									
Australasian bittern	Native	Nationally Endangered ^{Sp TO}									
Black shag	Native	Naturally Uncommon ^{SO Sp}									
Black swan	Native	Not Threatened ^{SO}									
Dabchick	Endemic	Nationally Vulnerable									
Grey teal	Native	Not Threatened ^{Inc SO}									
Kingfisher	Native	Not Threatened									
Mallard	Introduced	Introduced & Naturalised ^{SO}									
NI fernbird	Endemic	Declining ^{RR St}									
NZ shoveler	Native	Not Threatened									
Paradise shelduck	Endemic	Not Threatened									
Pied shag	Native	Nationally Vulnerable									
Pukeko	Native	Not Threatened ^{Inc SO}									
Scaup	Native	Not Threatened ^{Inc}									
Black-backed gull	Native	Not Threatened ^{SO}									
Rock pigeon	Introduced	Introduced & Naturalised ^{SO}									

⁷⁷ Miskelly *et al.* (2008) threat classification with qualifiers: CD=Conservation Dependent; DP=Data Poor; Inc=Increasing; RR=Range Restricted; SO=Secure Overseas; Sp=Sparse; St=Stable; TO=Threatened Overseas.

ANNEXURE B: PROPOSED AMENDMENTS TO THE DRAFT ECOLOGICAL MANAGEMENT PLAN (EMP) FOR FERNBIRD MONITORING

Section 3.3.5 of the draft EMP as lodged states (in relevant part):

“Specific habitats areas of importance for birds are as follows:

- *An ‘at risk’ bird species, North Island fernbird, has been identified in the farmland and riparian vegetation between Nga Manu Nature Reserve and Ngarara Wetland. Fernbird habitat surveys must be undertaken prior to any construction-related vegetation clearance or activities in this area.”*

I recommend that an additional subsection be added to Section 4 (Monitoring) of the EMP so as to include a more detailed methodology of the proposed monitoring for fernbird.

A draft of the proposed fernbird monitoring subsection for the EMP is provided below. This updated methodology should be included in the EMP to provide guidance on the location, scale and timing of monitoring required.

Additional subsection under Section 4 (Monitoring) of the EMP

4.XX Fernbird Monitoring

Introduction

Since 2002, there have been several records of North Island fernbird within the Te Harekeke / Kawakahia Wetland / Nga Manu Nature Reserve, along the riparian edge of the Kakariki Stream, and at the Otaihangā Oxbow, Waikanae Estuary. The cryptic nature of fernbird and their reluctance to fly (usually <50m bursts) makes obtaining population estimates difficult, though it is likely that the Kāpiti Coast population is small. These birds represent the southern-most population of the North Island fernbird, and as such monitoring of this population is required, pre, during and post-construction of the M2PP Expressway.

The previous fernbird records obtained in the Kāpiti area provide point locations of where the birds are known to occur. However, small populations such as that on the Kāpiti Coast are likely to have relatively large territories, all of which may not be utilised in any one day. As such, mapping of territory boundaries of this population is likely to be very labour intensive with a high potential possibility of not detecting birds.

In addition, Parker (2002)⁷⁸ noted that over time fernbird became habituated to lure calls and did not respond to playbacks. As such, the

⁷⁸ Parker, K.A. (2002). Ecology and management of North Island fernbird (*Bowdleria punctata vealeae*). Unpub. MSc, University of Auckland, Auckland.

proposed monitoring of fernbird along the M2PP alignment will primarily be undertaken through the collection of data via a passive method using acoustic monitoring devices.

Pre-construction Methodology

In order to determine the presence and distribution of fernbird along the M2PP alignment, DOC acoustic monitors will be deployed north of the Waikanae River near areas where previous records have been obtained. Fernbird habitat includes low, dense ground vegetation interspersed with dense shrubs in drier swamps, low manuka scrub, freshwater and tidal wetlands with emergent scrub, as well as drier sparse scrub and bracken (Heather & Robertson 2000).⁷⁹ Thus, the areas to be targeted will include El Rancho wetlands and appropriate habitat in the Te Harekeke / Kawakahia Wetland / Nga Manu Nature Reserve area that occur within the proposed alignment footprint.

Twelve acoustic devices will be deployed in appropriate habitat over the spring period (September to November). This period will coincide with the time when fernbird territorial disputes occur and call rates increase.

Following the 3 month monitoring period and the retrieval of the devices, a follow-up playback survey will be conducted at each of the habitats where the devices had been deployed. This will serve to further increase the likelihood of detecting the species should they occur there. The data collected from the acoustic monitoring devices will be analysed and the location and number of fernbird recordings at each of the deployment sites be determined. Should frequent recordings of fernbird in certain locations be obtained, this may indicate the relative importance or utilisation of that area.

During Construction and Post-construction Methodology

Given that fernbird pairs generally occupy territories for successive seasons, the acoustic monitoring could be repeated during and post-construction to determine if fernbird are still present in areas outside of the Expressway alignment.

⁷⁹ Heather, B., & Robertson, H. (2000). *The Field Guide to the Birds of New Zealand*. Viking, New Zealand.

**ANNEXURE C: OBSERVATIONS OF THREATENED OR AT RISK
AVIFAUNA SPECIES**



File Ref: W09181E_AVI_Riskspecies_A3.mxd

- + Threatened or At Risk Species
- Designation (Permanent)

DRAFT



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Data Sources:
Projection: NZGD 2000 New Zealand Transverse

MACKAYS TO PEKA PEKA EXPRESSWAY
OBSERVATIONS OF THREATENED OR AT RISK SPECIES
Date: 28 August 2012 | Revision: 0

Author: Dr Leigh Bull

ANNEXURE D: PROPOSED RESOURCE CONSENT CONDITIONS⁸⁰

	Ecological Management Plan
G.34	<p>a) The consent holder shall finalise, submit and implement through the CEMP, the Ecological Management Plan (EMP). The EMP shall be submitted to the Manager for certification at least 15 working days prior to works commencing. The purpose of the Plan is to outline the ecological management programme to protect, reduce and remediate impacts on the environment during the construction phase of the Project. This EMP shall also document the permanent mitigation measures, such as restoration planting, and the mechanisms by which to develop relevant mitigation and restoration plans for terrestrial and freshwater habitat.</p> <p>b) The EMP shall detail the monitoring to be undertaken pre-construction, during construction and post-construction as outlined below in Condition G.38-G.40.</p> <p>c) The EMP shall provide information on how the following outcomes will be achieved:</p> <ul style="list-style-type: none"> i. Minimise loss of valued vegetation and habitats; ii. Minimise construction effects on freshwater and the marine environments; iii. Minimise effects on identified wetlands resulting from hydrological changes to water tables; iv. Minimise effects on fish during stream works; v. Minimise disturbance of nationally threatened or at-risk birds (as listed by the most up to date Department of Conservation threat classification lists) during breeding periods; vi. Re-establish affected lizard habitat and minimise lizard mortality resulting from construction of the Project; vii. Carry out monitoring in a manner that will confirm that adverse effects are as predicted; any exceedance is identified; and appropriate actions are undertaken to rectify; viii. Ensures that mitigation requirements are undertaken and monitored to ensure success is achieved; ix. Carry out monitoring in a manner that confirms that mitigation meets objectives. x. <u>The North Island fernbird population is not adversely affected by construction or operation of the Project.</u>

⁸⁰ Redlining (i.e. ~~striketrough~~ and underlining) shows changes proposed to the conditions as lodged.

G.35	<p>The EMP shall be prepared by suitably qualified and experienced ecologist, and shall implement the principles and outcomes sought by the Ecological Impact Assessments (Technical Reports 26 – 31). The EMP shall be prepared in accordance with:</p> <ul style="list-style-type: none"> a) NZTA’s Environmental Plan; b) The Conservation Management Strategy for the Wellington Conservancy; and c) The Greater Wellington Pest Management Strategy (2009)
G.36	<p>The EMP shall be consistent with the Landscape Management Plan (LMP) that is required to be certified by KCDC under the designation conditions.</p>
G.37	<p>At least 15 working days before submitting the EMP to GWRC for certification the Consent Holder shall submit a copy of the draft EMP required by Condition G.34 to KCDC for comment. Any comments received shall be supplied to the Manager when the EMP is submitted, along with a clear explanation of where any comments have not been incorporated and the reasons why.</p>
Ecological Monitoring – General	
G.38	<p>Monitoring shall be carried out in accordance with the EMP as required by Condition G.34 in order to:</p> <ul style="list-style-type: none"> a) collect baseline information on vegetation, wetlands, freshwater and marine ecology, <u>and fernbird</u> for 1 year prior to construction work starting; b) collect ecological information on vegetation, wetlands, freshwater and marine ecology, <u>and fernbird</u> during construction work; c) collect ecological information on vegetation, wetlands, freshwater and marine ecology, <u>and fernbird for a minimum of 2 years post construction works completion.</u>
G.39	<p>All ecological monitoring required under the EMP shall be managed by a suitably qualified and experienced ecologist.</p> <p>The results of all monitoring carried out pursuant to the EMP shall be:</p> <ul style="list-style-type: none"> a) available for inspection during normal office hours where such data is available; b) submitted to the Manager at quarterly intervals for certification that the appropriate monitoring has been undertaken; c) submitted to the Director-General of Conservation and KCDC for information; and d) summarised and submitted as part of the annual report required under Condition G.14.

<p>G.40</p>	<p>An Adaptive Management approach shall be taken to responding to ecological effects as outlined in the EMP. The Adaptive Management monitoring shall seek to:</p> <ul style="list-style-type: none">a) Provide a level of baseline information of pre-construction vegetation, wetlands, freshwater and marine habitats, <u>and distribution of fernbird</u>, in order to develop 'trigger' levels;b) Undertake monitoring during construction to observe whether 'trigger' levels are exceeded and to determine the effectiveness of the environmental management methods; andc) In the event that trigger levels are exceeded an Adaptive Management approach shall be enlisted that will seek to:<ul style="list-style-type: none">i. Investigate a plausible cause-effect association with the Project; should the event be linked to the project the following steps will be undertaken:<ul style="list-style-type: none">A. Identify the on-site practice that is generating the effect;B. Seek to alter the operational measure in consultation with GWRC;C. Undertake further monitoring to assess the effectiveness of the altered on-site practice.ii. If the trigger level exceedance is not attributable to works associated with the Project, the consent holder shall not be held liable for any remediation or mitigation works;iii. Trigger level exceedances during construction should be treated as management triggers and not compliance triggers in the first instance.
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