IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application for resource consents by **TIGA MINERALS AND METALS LTD**

AND

IN THE MATTER of a submission by the

of a submission by the **COAST ROAD RESILIENCE GROUP INC**

Statement of evidence of Dr Susan Waugh

For COAST ROAD RESILIENCE GROUP INC

Topic seabird population ecology and conservation management

Dated: 25 January 2024

Coast Road Resilience Group Inc
Email: coastroadrg@gmail.com

INTRODUCTION

1. My full name is Susan Mary Waugh. I work for the international environmental NGO BirdLife International, based in UK.

2. I hold a degree in Zoology from the University of Canterbury, awarded in 1991, a Master in Philosophy from Cambridge University, awarded in 1993, and a Doctorate in Biology from the University of Rennes I, awarded in 1998.

3. I have the following relevant experience:

    a. I have scientific qualifications in population ecology of seabirds, their behaviours, the conservation management and reduction of threats facing seabird populations.

    b. I have published over 60 peer reviewed scientific papers on seabird population ecology and risk assessment.

    c. I worked for 5 years as Senior / Principal Scientist at the Ministry of Fisheries during 2002 – 2007 managing the portfolio of research on protected species – fisheries interactions, including managing a large programme of work on estimating species population sizes and trends. I represented New Zealand on working groups and at the Advisory Committee of the Agreement on the Conservation of Albatrosses and Petrels, which includes Westland Petrel as one of its listed species.

    d. I worked as part of the BirdLife International partnership during 2007 – 2010, including providing advice on marine Important Bird Areas (IBAs), seabird conservation and fisheries interactions in Regional Fishery Management Organizations for the Pacific region.

    e. I held positions of Senior Curator Natural Environment (later with job title change to Head of Natural History) at the Museum of New Zealand Te Papa Tongarewa during 2011 – 2019 where I led the science programme with their work on describing the status and conservation biology of fauna and flora of New Zealand. During this time I led research programmes on Westland Petrel conservation biology, the foraging ecology of marine birds in central and southern New Zealand including blue penguins, Buller's Albatross and Fiordland penguin. These topics followed on from research work conducted during my PhD and post-doctoral programmes (1995 – 2001) where I studied Campbell, Royal and Grey-headed albatross and Westland petrel ecology, population dynamics and conservation management.

    f. I held the position Chief Advisor Programmes for the Office of the Parliamentary Commissioner for the Environment (2019 – 2021) where I participated in providing

advice to Parliament on funding environmental research, taxonomic research collections, marine species management, estuarine management, among other things.

g. My present role (starting 1 Feb 2024) is Senior Manager Preventing Extinctions Programme. Prior to this, I held the role of Senior Policy Manager, Marine at BirdLife International.

4. I have been asked by the Coast Road Resilience Group Inc to provide expert evidence in relation to seabird conservation biology, adverse effects on their populations relating to human activities, monitoring and management of these. I present my evidence as an expert on these topics, and feel that I have inputs to the process that will assist the panel in making their decisions. Therefore I submit as an expert on seabird population ecology and conservation biology.

5. I am familiar with the TIGA application site having viewed the maps on which it is described in the application. I have visited the Barrytown flats on numerous occasions to carry out ecological and demographic research on Westland petrels between 2001 and 2019.

6. In preparing this statement of evidence, I have reviewed the following documents: Publications on New Zealand native species, and scientific papers relating to the application, news items and blogs about scientific research (all cited) including:

    a. EcoLogical Solutions Avian Management Plan,

    b. EcoLogical Solution's Ecological Effects Assessment dated April 2023,

    c. Final Terrestrial Ecology Peer Review.

    d. EcoLogical Solutions v3 draft Avian Management Plan supplied by Gary Bramley after an email exchange, 18 Jan 2024.

7. I have prepared this evidence in accordance with the Environment Court's Code of Conduct for Expert Witnesses 2023. I confirm that my evidence is within my area of expertise, except where I state I am relying on the evidence of another person. I have acknowledged the material and expertise relied on in the preparation of this evidence and in forming my opinions. To my knowledge I have not omitted to consider any material facts known to me that alter or detract from the opinions I express in this evidence.

8. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

9. I wish to acknowledge that I lodged a personal submission in relation to the TIGA Minerals and Metals Ltd application. In providing this expert evidence statement, I recognise that my personal opinion regarding the TIGA application must be put to one side, and my obligation is to impartially assist the hearing panel in relation to the matters which are within my expertise.

SCOPE OF EVIDENCE

10. This evidence covers the following matters – seabird conservation biology, threats to their population status, demographic characteristics and behaviour, and matters relating to seabird population monitoring, disturbance, light attraction and seabird conservation biology and potential for adverse effects of the proposed activities on seabird populations.

SUMMARY

11. The mine site should be recognised as an important one for native bird populations, holding a high diversity of species, when considered at a national scale, and several species that are recognised under New Zealand and international systems as threatened or at risk of extinction.

12. Measures to avoid mortality to seabirds, and to reduce interactions between threatened or at risk seabirds (in particular Westland petrels and blue penguins) and the proposed activity should be strengthened, taking into account the particularly sensitive conservation status of these two species, and the need under New Zealand's environmental commitments, both nationally and internationally to maintain its biodiversity.

13. I detail aspects of the blue penguins, and Westland petrel's biology that are relevant to the application and to ensuring their populations are safe-guarded.

14. In particular the threats to these species such as predation by dogs or other introduced mammals, and mortality through grounding, roadkill and fallout should be mitigated by appropriate actions. Monitoring should be independent and robust and include monitoring the species populations affected by the planned activity. Monitoring should include monitoring the population status, and behaviours of Westland petrels, blue penguins, and other native fauna as sub-lethal effects can cause mortalities of nestlings or failure to nest by birds affected by activities that disrupt their natural behaviours. This would ensure that mine operations could be adaptively managed, should the proposed mitigation measures prove insufficient to avoid

any mortalities of these species associated with the increased traffic, mining activity, or attraction of the mine site to native species.

Importance of the mine site for New Zealand native bird species:

15. The mine site contains 72 species[1] identified on the online bird sightings database e-Bird as listed by EcoLogical Solutions[2] on page 24 of their ecological effects assessment. They rightly identify the site as an important are for native New Zealand bird fauna.

16. It should be noted that only 215 bird species are native to New Zealand (Department of Conservation 2021)[3], and 93 of these species are endemic to New Zealand –i.e. breeding only there.[4] 82 % of New Zealand's native avifauna are assessed as Threatened (80 species) or At Risk (98 species). It is therefore useful to note that an important proportion of these species occur at the site. Also, as identified by the Parliamentary Commissioner for the Environment in 2017,[5] New Zealand's native avifauna is doing very poorly in conservation terms, and recommended that increased efforts be undertaken to avoid its continuing decline. The Barrytown Flats area is far from "ordinary" and such a high concentration of species in one area needs special consideration. The Barrytown flats should not be taken for granted as a locality where birds are abundant, and this richness is due to the mix of relatively undisturbed wetland, coastal, forest, and marine habitats occurring within a small area, as well as the open-fields and low-intensity nature of the farming activity in the area. Its not an industrial setting, and activity that is intensive and disrupts the ecosystems could well engender a disproportionate loss of native fauna habitat and local population declines. The 215 native New Zealand species identified by Department of Conservation are spread across many ecological and geographical zones, from the tropical Kermadec Islands to Sub-Antarctic sites. Therefore having 26 species of conservation concern, as listed in Table 7 of EcoLogical Solutions Ecological Assessment report on the proposed mine site highlights the importance of this area for avifauna.

17. From my perspective as a marine bird expert, the two populations of birds that warrant special mention are the Westland petrel and the blue penguin. Both have unfavourable conservation status under various threat ranking systems.

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[1] Based on e-Bird sightings, which may include vagrant and migrant species – part of the set of 212 excluded from the DoC conservation status report.

[2] EcoLogical Solutions Barrytown Ecological Effects Assessment. April 2023.

[3] Department of Conservation 2021. Conservation status of birds in Aotearoa New Zealand, 2021. New Zealand Treat Classification Series 36.

[4] Parliamentary Commissioner for the Environment 2017.

[5] Parliamentary Commissioner for the Environment 2017.

Blue penguin population biology.

18. The blue penguin was assessed as "At Risk, with a Declining population" by the Department of Conservation (2021). They cite poor information on population size and trend as contributing to the conservation concern for this species. This species is listed as "Least Concern" by the IUCN,[6] which uses taxonomy which considers only one taxon of *Eudyptula minor*, shared between Australia and New Zealand. Blue penguins are also called little penguins, fairly penguins, little blue penguins, karorā and other names.

19. The species has a relatively strong population in Westland and Buller, but it is one that needs safeguarding and reinforcing, but as noted by local experts who monitor the various populations on the West Coast - all populations in this area a subject to threats and many are declining. Depredations and roadkill can quickly erode the capital of any small population and they can become locally extinct over the period of a few years or decades, as described by the West Coast Penguin Trusts reports over time, where several monitored colonies suffered dog depredation. Dog predation, along with roadkill was identified as the main threat to penguin in the Buller and Westland areas surveyed. See for example the West Coast Penguin Trust report from 2016-17.[7]

20. Further, blue penguins are very thinly spread all over New Zealand. However, in no area are their populations particularly strong. They are an example of a common species that is not doing well in New Zealand and risks rapid reduction in range (local extinction) or sudden population reduction if factors affecting their survival change by a small amount. While the West Coast could seem like one of the strongholds for the species, this is a perception that may be rosier than the reality.

21. The blue penguin is nocturnally active on land. They nest in similar areas to where they nested in previous attempts. They raise up to 2 chicks per year, which they feed regularly (every 1 to 2 days) through their breeding season. They also use their nest-sites and adjacent areas to moult, a period in which they are very vulnerable to disturbance.

Threats to blue penguins.

22. Blue penguins are susceptible to multiple threats, such as road-collisions, habitat degradation and predation by introduced predators such as stoats, weasels, dogs, and cats. They lack safe habitat throughout most of New Zealand due to coastal development, hard infrastructure (eg

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[6] IUCN 2024 https://www.iucnredlist.org/species/22697805/202126091

[7] West Coast Penguin Trust annual report 2016-17.

railways, roads, ports, cities) throughout large sections of their range. Penguins and their young can also be depredated by native New Zealand species such as gulls and birds of prey.

23. An example in the 2000s of a whole nesting population of blue penguins killed by one or more dogs at Cape Foulwind in 2012[8] highlights how vulnerable these populations are to disturbance.

24. This destruction of small local populations can take a long time for the penguins to recover from, across years or decades, as new penguins need to find and settle in the area, having been hatched and raised in nearby areas. This creates a sink in the source population and is overall detrimental to the penguin's regional population outputs.

Figure 1. Citing the Stuff.co.nz caption: *PREDATOR STRIKE: West Coast Blue Penguin Trust ranger Reuben Lane, left, and Scott Freeman of the Conservation Department with 15 penguins killed by dogs at Cape Foulwind on the West Coast.* ***Source: Stuff 2012.***

Monitoring and management implications for penguins

25. Actions proposed in the Avian Management Plan do not detail how the penguin population would be safeguarded or restored. They cite efforts to remove penguins from their natural range, to impede potential nesting, and reduce penguin habitat in the vicinity of the mine site by dissuasion. Alternative measures, such as providing safe and predator free alternative nesting areas within the close vicinity the current nesting areas would be preferable. In

[8] Stuff 2024. https://www.stuff.co.nz/environment/7183183/Dogs-savage-precious-blue-penguin-colony Accessed 8 Jan 2024.

addition, dogs should be explicitly excluded from the activities on the mine site, to ensure they don't put penguins, petrels or other native wildlife at risk.

26. It may be that the proposed activities designed to disturb penguin nesting and other use of their natural habitat contravenes the Wildlife Act 1953[9] which states in s63 (1) "No person, without lawful authority…c) may rob, disturb, or destroy or have in his or her possession the nest of any absolutely protect or partially protected wildlife…. ". If the proposed activity is not actually unlawful, it certainly goes against the intent of this Act, which could be interpreted as allowing to enable wildlife to use natural habitats for their activities without disturbance or risk of mortality. The Wildlife Act 1953 and many other biodiversity protection measures in New Zealand apply on public as well as private land.

Westland petrel population biology:

27. The Westland petrel nests only in the Punakaiki area. Its population of approximately 6200 breeding pairs[10] is assessed as At-Risk (Naturally Uncommon) by Department of Conservation in 2021, with qualifiers Conservation Dependent (CD), Conservation Research Needed (CR), One Location (OL), and Stable population trend.

28. At the international level, the species is listed as Endangered by the IUCN, due to its restricted range, and threats operating at the breeding sites and within its range at sea and on land, such as habitat damage from intensive storms and fishery bycatch.[11]

29. The Westland Petrel is listed under the Agreement for the Conservation of Albatrosses and Petrels (ACAP), an international agreement under the Convention of Migratory Species (CMS) that works to mitigate threats to species listed, and to engage in collaborative work between countries to improve the conservation status of these migratory species. New Zealand is a party to the CMS and to ACAP.

30. Their habitat requirements are very particular – and they are restricted to a very small patch of undisturbed dense forest inland from the Barrytown Flats. They require deep soils for burrowing, steep terrain to enable them to take off from the ground by climbing trees, and proximity to the sea. As with most species in this family (Procellariidae), their range is historic,

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[9] New Zealand government 2024. The Widlife Act 1952. https://www.legislation.govt.nz/act/public/1953/0031/latest/whole.html

[10] Waugh et al. 2020. Trends in density, abundance, and response to storm damage for Westland Petrels *Procellaria westlandica*, 2007–2019. Marine Ornithology 48: 273–281

[11] https://www.iucnredlist.org/ja/species/22698155/132629809

and unchanging over time – this is because they are highly philopatric, meaning that young birds return to breed where their parents bred.

31. They may once have bred right at the shoreline – when the shoreline was further inland than it is nowadays. They have nested at this breeding site in Punakaiki over millennia. There are no tested conservation actions specific to Westland petrels known that would allow them to be moved by management intervention to another breeding site.

32. Westland Petrels are restricted to areas where there is very little human activity, and the Westland Petrel Specially Protected Area designated around their breeding site is designed to keep disturbance to a minimum. These protections require specific permits to enter the Protected Area and to handle the species. Otherwise said, the petrels and their nesting area are among the highest order of protected biota in New Zealand, and equivalent to the global IUCN rated Category Ia Protected Area – the highest ranking.

33. The area where they nest is designated as the Punakaiki Important Bird Area by BirdLife International in 2010 on the basis that it contains significant numbers of a globally threatened species (A1 criterion for the Westland petrel) as well as containing greater than 1% of a species global population on a regular basis (A4 criterion for Westland petrel and spotted shags). [12]

Threats to Westland petrels

34. Threats to Westland petrels include predators (dogs, and pigs are the principal species of great concern); habitat degradation, such as through storm damage from intense weather events and habitat destruction from goats and other browsing animals, mortality of birds in fishing from New Zealand and overseas fishing vessels. With the late Kerry-Jayne Wilson, I published a paper detailing the threats to Westland petrels in 2017.[13]

35. Further, due to their nests being in proximity to scattered habitations, they suffer mortality through attraction to lights, and subsequent death of birds if they become grounded away from their nesting areas. This is termed "fallout" in the scientific literature.

36. There have previously been measures introduced to reduce strikes of birds on powerlines by burying overhead wires near petrel colonies, and the reduction of lighting around the village and adjacent lands at Punakaiki to avoid fallout. However, in spite of these measures, some Westland petrel fallout continues to occur, suggesting that it is a difficult factor to eliminate.

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[12] https://datazone.birdlife.org/site/factsheet/punakaiki-iba-new-zealand/details

[13] Waugh, S.M. & Wilson, K-J. 2017. Threats and threat status of the Westland Petrel Procellaria westlandica. Marine Ornithology 45: 195–203. http://www.marineornithology.org/PDF/45_2/45_2_195-203.pdf

37. Its important to note that threats occurring on Westland petrels (as for other species) are cumulative - they don't compensate for one another. Adding additional sources of stress and/or mortality is likely to have an important, and potentially significant adverse effect on the population stability.

Specific vulnerabilities of Westland petrels and related management implications.

38. The Westland petrel has some particularities – in common with all birds in the order Procellariiformes, they breed at a relatively mature age – on average 6.5 years old and lay only one egg per year with no replacement laying. They are long-lived, and adult birds return to the same nesting areas year after year. They are monogamous, and maintain one partner for many years, if not for life. In addition, the Westland petrels have been shown to have very low breeding outputs – specifically the number adult birds breeding each year in the population is low. They frequently skip breeding, and its unknown why this is, but it's an enduring feature of their biology that has been described over several decades. These characteristics have implications for the management of any threats:

39. They are highly susceptible to any increases in adult mortality, and additional human-induced deaths in the population are likely to lead to population declines. In terms of the application, this could be due to lights attracting birds that die due to being run over, dehydrated or starved. Once grounded on open land or in dense bush, petrels can't take off, unlike most other birds. Their wings are designed for gliding, not for hovering or powered upward flight.

40. Petrels are defenceless and not very mobile on the ground. Dogs and other feral species (eg pigs) could be introduced to the breeding site and cause significant mortality. Indeed one or more individuals of either of these two species could cause extinction risk to the species if mortality was significant. These are related threats to the proposed activity because increased human activity in the area could lead to the potential re-introduction of pigs by people and any dogs present at the mine site could wander into the penguin and petrel breeding habitat and cause mortalities.

41. They are currently subject to fishing mortality, and any additional mortality relating to human activity will have a CUMULATIVE effect on the population and place a significant burden on it.

42. Threat mitigation and management options are very limited for seabirds. For example, adult Westland Petrels can't be translocated or kept in captivity to improve their breeding outcomes in the same way land-bird species like Black Robins or Kakapo have been. Intensive management of this kind for petrels has been trialled at the Chatham Islands to avoid predation of nesting Chatham Island Taiko (an unrelated species, *Pterodroma magentae*). This very intensive conservation programme occurs, however, in an area that is within the natural breeding range of the Chatham Island Taiko at the Chatham Islands. Although there are some

fossil records scattered within the Westland/Buller area, its occurrence outside of the current breeding area has not been recorded in historical times. In other words, the natural range of the Westland Petrel is where it occurs today between the Punakaiki River and the Barrytown Flats.

43. While 60-70% of breeding attempts lead to a successful fledgling each year for the monitored nests, at a population level they breed at a very low rate due to the frequent skipping of breeding attempts. This is a specific feature of Westland petrels and documented in the various demographic modelling papers published on them. In effect any mature adult has a less than 50% probability of breeding in a given year. As a result, few chicks are produced every year across the population. Petrels have among the lowest fecundity of any birds (i.e. have the slowest breeding), and Westland petrels among lowest fecundity of any petrels. Currently the monitored reproductive output appears to be sufficient to maintain the population, as evidenced by slowly increasing or stable nest density and colony sub-population sizes, but any additional fledgling or chick mortality could quickly lead to a population decline.

44. A note on the terminology of "colonies" or "sub-colonies". A colony is a loosely defined concept in seabird biology. Wikipedia states that a bird colony is "a large congregation of individuals of one or more species of bird that nest or roost in proximity at a particular location.14"

45. For the Westland petrel, scientists working on the species tend to use "colony" to define a distinct area of nests and nesting activity, spatially separate from other nesting areas, of which there are around 25. In Waugh et al. 2015 we discussed sub-colonies, as some of the spatial zones for which repeated counts of burrows were conducted were discrete parts of larger colonies, eg the sub-colonies within the Rowe Colony denoted as R1, R2, R3 and R4. For my purposes, the terms colony or sub-colony are interchangeable, meaning a discrete nesting area, that contains a number of breeding birds and nests, between which some inter-change may occur. I include a map of the Westland petrel colonies and sub-colonies defined in the 2020 publication on their evolution and trends.

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[14] https://en.wikipedia.org/wiki/Bird_colony

[15] Waugh, S.M, Barbraud, C., Delord, K., Simister, K.L.J., Baker, G.B., Hedley, G.K., Wilson, K.-J. & Rands, D.R.D. 2020. Trends in density, abundance, and response to storm damage for Westland Petrels *Procellaria westlandica*, 2007–2019. Marine Ornithology 48: 273–281. http://www.marineornithology.org/PDF/48_2/48_2_273-281.pdf

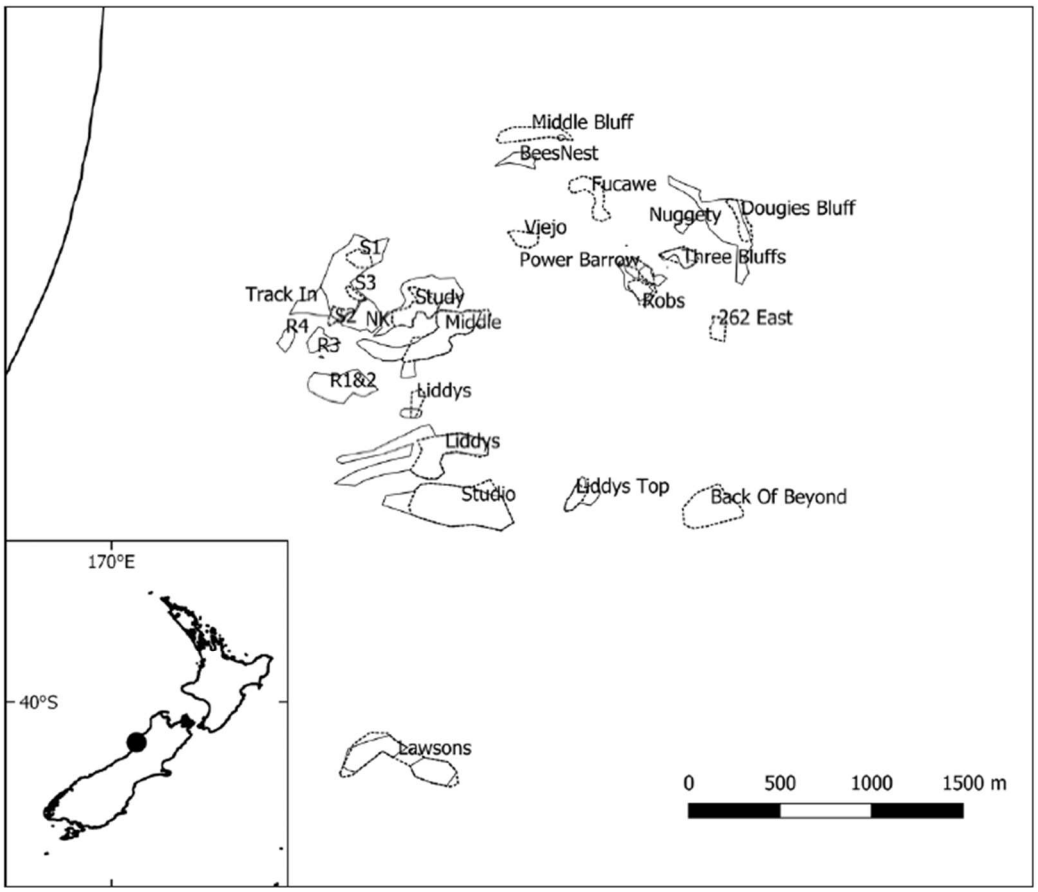

Fig. 1. Westland Petrel sub-colonies surveyed in 2007–2011 (dashed outlines) and 2019 (black outlines) on the mainland of the South Island of New Zealand at Punakaiki (black circle, inset). Sub-colony code names are S1–S3 for Solomon's 1–3, R1–4 for Rowe 1–4, NK for Noisy Knob. Areas with dashed outlines only were not surveyed in 2019.

Figure 2. ***Westland petrel sub-colonies from Waugh et al. 2020. This map shows the locations of all known colonies and sub-colonies of the species.***

46. Chicks or adults killed due to the mining operations due to fallout or because their nesting and feeding behaviour has been disrupted could come for any of 27 sub-colonies, or could be concentrated at one of them. Monitoring to detect the effects of these mortalities or sub-lethal effects would need to be extensive. The 14 areas closest to the western edge of the breeding are, (from Lawsons in the south to Solomon's 1 (S1 on the map) in the north) are those most likely to have birds fly over the Barrytown flats to reach the sea and are the most accessible in terms of monitoring. Current monitoring measures proposed in the application are inadequate to enable detection of the effects of removals of some or many petrels on the population or behavioural sub-lethal effects.

47. Sub-lethal effects can cause disruption of a breeding pair. For example, the death of one of the partners leads to a delay in breeding by the remaining bird or birds, further reducing the already low breeding output for the species. While habitat damage to the breeding colonies is unlikely to be caused by the proposed mine activity - aside from its possible contribution to

climate change - we were able to measure the impact of landslides and treefall in 2014 as the result of intense storms, which caused 30% of birds to move to new nests, which could account for some of the observed low breeding probability of the Westland petrels. Behavioural disturbance that might be caused by light attraction, or noise could also prevent birds following their normal routine of attendance at the breeding colony. These effects have potential to cause birds to change nest, find a new partner, or feed their chicks less frequently than normal.

48. It should be noted that there is no other "reservoir" of Westland petrels globally to draw from, and the population that nests at Punakaiki is the global sum of birds alive – along with those that migrate from Punakaiki to South America ever year. Within a 2-year period, all Westland petrels are likely to be found in the Punakaiki area, and thus be subject to whatever threats are occurring in this locality. This population needs to be safeguarded from further extinction risk. New Zealanders, and particularly those living and working on the West Coast, and specifically on the Barrytown Flats have a unique responsibility to reduce threats to this species, and to ensure it thrives into the future.

49. Westland Petrels have a proven attraction and mortality related to lights, and associated vehicle related deaths. DoC records show this is a major issue that requires careful attention to manage. Indeed, despite strict lighting requirements at Punakaiki and areas adjacent to the petrel breeding areas, birds continue to be attracted to lights with resulting mortalities. As a source of mortality, this is avoidable, and every effort should be made to ensure it doesn't occur. Additional mortalities of either juveniles or adults, through light attraction are likely to increase the extinction risk of the species.

50. Westland petrels come into land in the early evening, and generally fly out to sea before dawn. They don't fly in a direct line from the sea to the colonies, and they spend up to 1 hr circling above the land/sea and colony boundaries before landing. They're visible over the land and the breeding colonies from around the time of civil twilight. They don't follow nicely defined flyways laid out by planners on maps. Their flight paths can vary depending on the wind and other weather conditions. They are therefore susceptible to light attraction over a wide area of the Barrytown flats and surrounding areas. They've been using these flyways since time immemorial.

51. It should be noted that grounding of petrels (generally, not Westland petrels, specifically) can occur more frequently in some weather conditions, for example on foggy nights. There is considerable experience in managing these events at Kaikoura, where Hutton's shearwater (*Puffinus huttoni*) fledglings and adults are frequently grounded.[16] Over 10 years, several

[16] Deppe et al. 2017. *Investigation of fallout events in Hutton's shearwaters (Puffinus huttoni) associated with artificial lighting*" Notornis, 2017, Vol. 64: 181-191.

hundred shearwaters grounded in Kaikoura area, and new moon periods were the highest risk times.

52. Rodriguez et al (2017)[17] reviewed information about seabird mortality related to light attraction, and concluded that there were many individual species responses to situations, and greater detail as needed to understand and prevent this mortality occurring. In short, there is no simple answer, and its not always related to weather or time of year, although some factors such as the attraction of fledglings to lights is a common across many petrel and shearwater species.

53. The Westland petrel breeding area is identified as an Important Bird Area by BirdLife International. An Important Bird Area is assessed according to internationally recognised criteria. To achieve this status, an area is proposed and assessed against criteria by a review committee, and subsequently listed if it meets the criteria. IBAs are a subset of the Key Biodiversity Areas identified for a wider set of fauna and flora and are used by the Convention on Biological Diversity and other international agreements as indicators.

54. IBA status is recognised globally as a rigorous and objective system for classifying area of high biological significance and allows comparison between areas which may have very different national legislation and definitions for protected or other areas managed for biodiversity.

55. The IBA designation also enables the locality to be assessed using the IBAT system (Integrated Biodiversity Assessment Tool).[18] I have provided the IBAT Proximity Report and appendices for the Barrytown flats and set a buffer of 50km around the zone of the Barrytown Flats in line with recommended levels when dealing with threatened and at-risk species.

56. This assessment results in listings of a) threatened species potentially within this area, on which the effects of any industrial activity on the Barrytown Flats would need to be managed; b) Protected Areas that occur within the area; c) Key Biodiversity Areas (internationally recognised critical areas for the persistence of biodiversity) found in the area.

57. The IBAT Proximity Report (Appendix 1) shows that this area included in the 50 km buffer around Barrytown Flats contains 71 species classified as globally threatened (critically endangered, endangered or vulnerable), and four areas that are protected at the level of IUCN category Ia or Ib (the strictest protection accorded globally). IBAT reports are used by industries globally, including mining industries, to identify suitable sites for their activities. The IBAT report could be interpreted as indicating that the Barrytown Flats is not a suitable for activities that disrupt natural systems, due to its proximity to a high number of globally threatened

[17] Rodriguez et al 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology 31: 986-1001.

[18] https://www.ibat-alliance.org/

species populations, including the breeding colonies Westland petrels, but also very many others including marine species. This area, including the Paparoa National Park, the Westland Petrel Specially Protected Area, the Marine Protected Areas are recognised as key localities for the conservation of globally threatened species.

58. The Westland Petrel breeding area is also identified by the Agreement for the Conservation of Albatrosses and Petrels as the sole nesting site for Westland Petrels.[19]

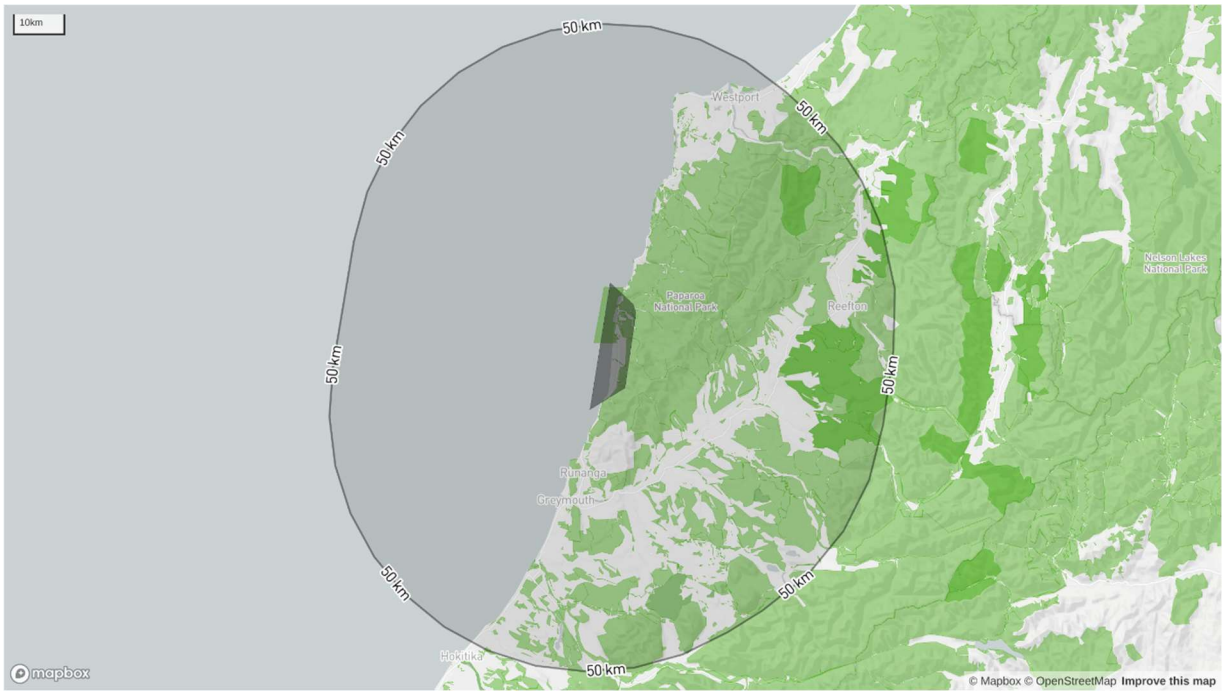

Figure 3. IBAT Proximity Report map showing the 50 km polygon around the area of the Barrytown flats which provides an indication of the areas within which species might suffer adverse effects and might need to be assessed by industrial or extractive industries occurring within this area.

[19] ACAP 2024. https://www.acap.aq/news/news-archive/2013-news-archive/acap-breeding-sites-no-48-punakaiki-south-island-new-zealand-forest-home-of-the-westland-petrel

New Zealand's commitments as a party to the CBD and Global Biodiversity Framework

59. In addition to the New Zealand Coastal Policy Statement 2010 and other domestic legalisation and policy, New Zealand committed to implementing the Kunming-Montreal Global Biodiversity Framework (GBF) in December 2022, as part its engagement under of the Convention on Biological Diversity (CBD 2024).[20] This framework requires signatories to, *inter alia*:

    a. Plan and manage all areas to reduce biodiversity loss (Target 1);

    b. Halt species extinction, protect genetic diversity and manage human-wildlife conflicts (Target 4),

    c. Integrate biodiversity into decision making at every level (Target 14).

60. It should be noted that it is at the level of these RMA decisions that the impacts of human activities on biodiversity are managed in the New Zealand planning and development context. Decisions at RMA level need to be consistent with New Zealand's commitments under its over-arching policies and frameworks, including international agreements.

Threats operating on Westland petrels and their habitat

61. The storm damage resulting in major landslips in 2014 and 2016 was documented in the scientific literature as well as on social media – for example in blogs, where some images of the landslips and mapping of the eroded areas are documented.[21] Having surveyed all accessible colonies up to 2019, Waugh et al (2020) estimated that 13 of 27 Westland petrel sub-colonies had suffered erosion and tree-fall impacts, affecting between 1 and 50% of their area. These events were likely to lead to further erosion, treefall and resulting loss of nesting areas.

[20] Convention on Biological Diversity (CBD) 2024.

[21] Te Papa 2024. https://blog.tepapa.govt.nz/2014/12/04/westland-petrels-weathering-the-storm-mostly/

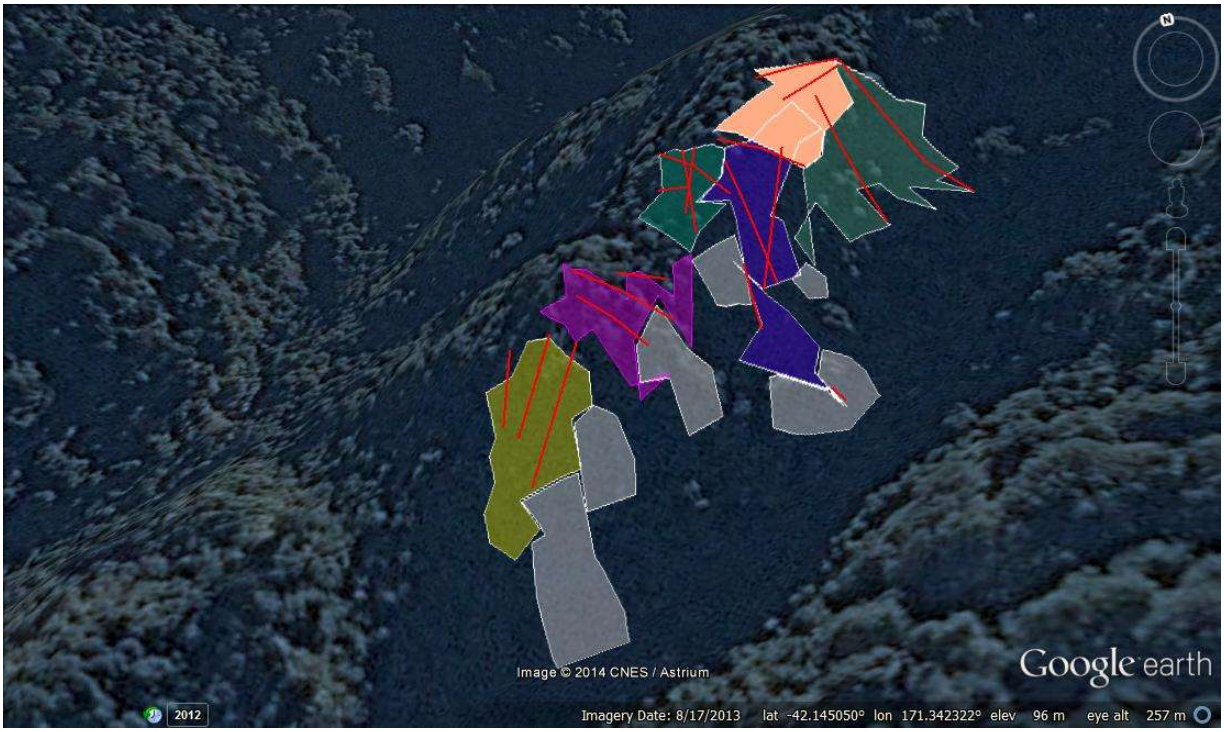

Figure 4. Estimated areas of landslips in 2014 (shown in white) affecting the Study colony (nest areas shown in coloured polygons with transect lines for bird monitoring in red.

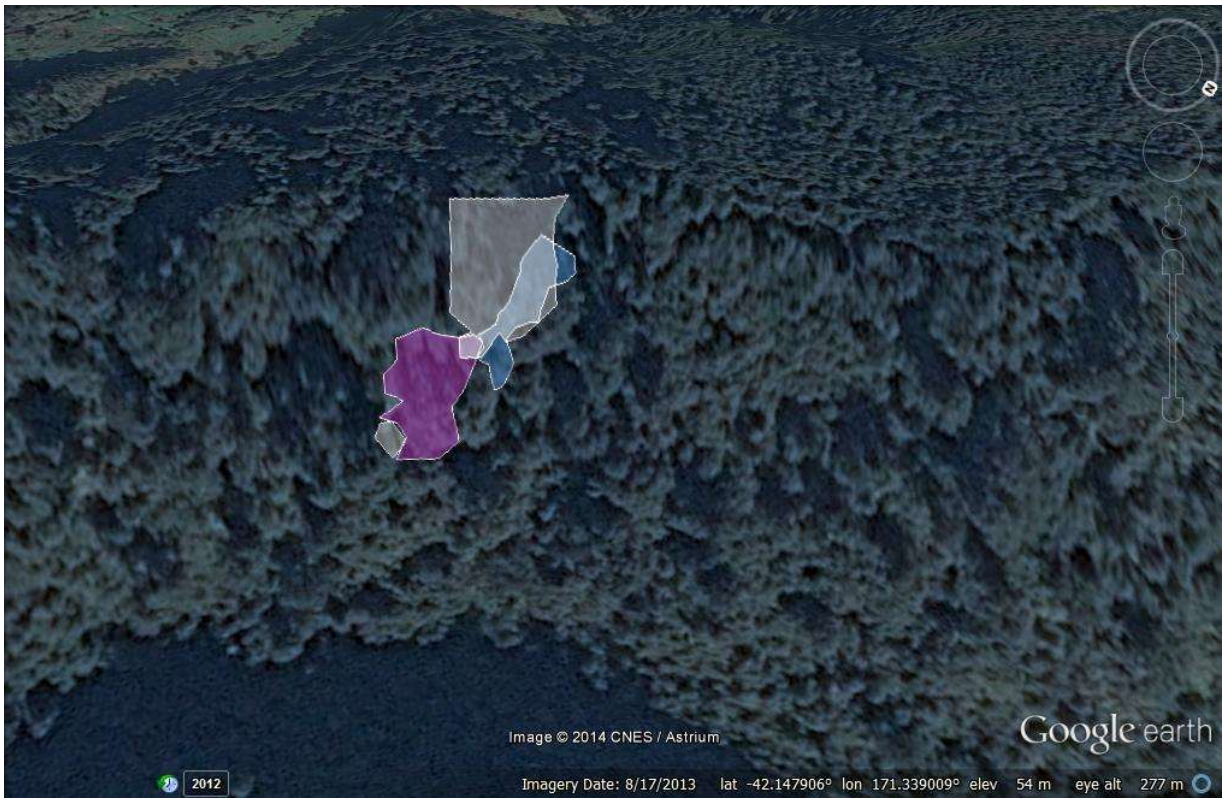

Figure 5. Estimated areas of landslips in 2014 (shown in white), and the areas of the Rowe colony monitored to 2014 shown in coloured polygons.

62. In Waugh et al 2015 which reports on the effects of storm damage on Westland Petrels[22], and in the paper I published in 2017 with Kerry-Jayne Wilson on the threats known to affect the Westland petrels[23], we provided the available information to assess the extent to which multiple-threats were affecting or had potential to affect the population Westland petrels.

63. These threats are mentioned to indicate the level to which the Westland petrel is facing difficulties at multiple levels, which reduces its resilience to any additional pressure. The current population status of stable-to-increasing is precarious. It could very easily be degraded to declining with few additional deaths per year for the population.

64. This degradation could be achieved by additional deaths of adults or chicks, or by an alteration in behaviour such as the regularity of feeding events by adults in the breeding season, or by disruption of their pair bonds or nesting activity due to disturbance of the bird's arrival and departure times at colonies.

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[22] Waugh et al. 2015. Storm damage to Westland petrel colonies in 2014 from cyclone Ita. Notornis 62: 165-168.

[23] Waugh & Wilson. 2017. Threats and threat status of the Westland Petrel *Procellaria westlandica. Marine Ornithology* 45: 195–203.

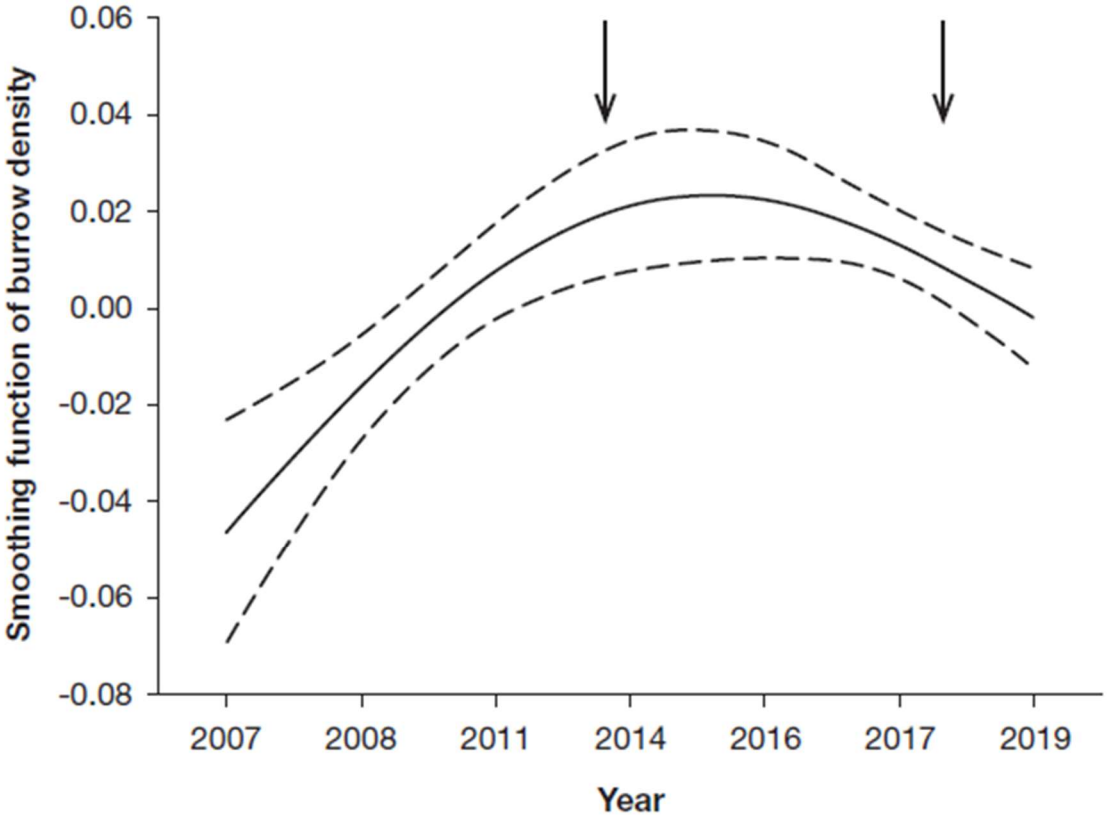

Fig. 2. Westland Petrel burrow density as a function of year. The plot shows the smoothing function of the predicted burrow density (solid line; estimated degrees of freedom of the smoothing function = −1.92) and 95% confidence intervals (dashed lines) from a generalized additive mixed model for the seven years during which data were collected. Arrows indicate approximate timing of storm events.

Figure 6. Results of burrow density surveys and the modelled trend in this measure resulting from surveys conducted between 2007 and 2019, from Figure 2 in Waugh et al 2020.

65. Indeed in the most recent publication estimating the population status and trends and associated detail of burrow densities and colony areas (Waugh et al 2020)[24], the density of

[24] Waugh, et al. 2020. Trends in density, abundance, and response to storm damage for Westland Petrels *Procellaria westlandica*, 2007–2019. Marine Ornithology 48: 273–281

burrows was noted to have risen since surveys began in 2007, but to have been decreasing gradually since 2015 (See figure 6).

Monitoring and mitigation proposed in the Avian Management Plan

66. The monitoring outlined in the Avian Management Plan does not appear to be adequate. It does not require any independent assessment of the number and nature of petrel-human interactions around the proposed mine site. This potentially creates perverse incentives for the mine operators to under-report petrel interactions.

67. Monitoring should include means to ensure petrel interactions are able to be independently monitored – eg by cameras or other means.

68. In addition, greater measures need to be taken to ensure that there is a rapid response to any interaction to ensure the survival of any affected birds. The updated version of the Avian Management Plan (draft V3) sets out how birds will be detected, handled, and managed. It should also detail how operations should be stopped or paused until it is managed, and set a threshold for the number of interactions before a halt in activities and review of the management plan can be undertaken with appropriate inputs from Department of Conservation and/or other experts.

69. The management plan should take into account the costs of any need to keep birds in captivity to ensure recovery, handling and examination by vets, and the time for Department of Conservation staff to manage these events.

70. Fallout probability would likely be reduced if there was no activity at the mine site - including no lighting or vehicle movements - outside of daylight hours or in weather conditions that require external lighting. I note that the updated draft Avian Management Plan (v3) proposed that there should be no outdoor work during hours of darkness.

71. Its also important to note that Westland petrels begin to congregate near the colony areas from around the time of civil twilight, and this would be an appropriate time to halt activities at the mine site, throughout the year. Twilight is defined as 30 minutes after sunset and before sunrise. If cloudy conditions exist, almanacs or the online resources can be used to designate the time that activities would start 30 minutes after sunset and 30 minutes before sunrise. I note that this is the timing now defined in V3 of the Avian Management Plan for the cessation of outdoor mining activities.

72. The updated Avian Management Plan sets out the information to be presented in an annual report on the petrel interactions. In my view, this is insufficient to ensure that proper action is

taken to avoid petrel mortality resulting from fallout. Reports on the interactions should be frequent (eg monthly throughout the year, and weekly for the periods of the year when petrel fallout is most likely to occur between November and January for at least the first 5 years of the activity) to ensure that there are no undue petrel interactions and that any that do occur are managed in a timely way. Currently as set out, it would seem that a year could go past before the report were produced and reviewed, by which time many petrel mortalities, penguin disturbance, and other species interactions could have occurred.

73. The applicant should provide financial support for independent monitoring of Westland petrel colonies and ecological research to ensure that their numbers are not reduced, their behaviours are not adversely affected, that mortality does not occur, that survivorship and breeding outputs are maintained at current levels or above.

74. The continuation of the Westland petrel's natural behaviours and population status need to be assured, in order to demonstrate that the proposed activity is not adversely affecting this threatened species. This population monitoring should occur on the majority or all of the 14 colonies (or sub-colonies) along the Barrytown Flats, to ensure that no sub-colonies are being disproportionately affected. This research activity should include annual assessments of the population size through burrow density and occupancy surveys and monitoring of birds' behaviours (eg times and dates of arrival, nesting activity and offspring production, changes of nest between years, partner changes, adult and chick survivorship).

75. The applicant should finance restoration works and provide monitoring to demonstrate whether populations of affected species have been maintained, are continuing to grow and are otherwise being strengthened. This should include penguins and other wildlife nesting at, feeding in and migrating through the mine site and adjacent areas. The conservation status of the blue penguins and Westland petrels is at-risk. Multiple threats are already operating on their populations. The number of deaths of individuals, or breeding attempts that fail, as a result of any adverse effects of the mine would need to be extremely small to avoid worsening their conservation status. Further, neither of these species should be exposed to avoidable deaths (including of eggs or nestlings) as a result of human activity.

Comments on other evidence/submissions

Mr Mike Harding's assessment:

76. I have read the report of Mr Mike Harding entitled "Review – Terrestrial Ecology", and overall I agree with the assessments made by Mr Harding in all sections relating to avifauna and the Avian Management Plan.

77. Mr Harding notes that the applicant and submitters agree that light and vehicle movements will lead to increased risk to the petrels (Para 99). I agree with this point and that these are among the most important risks to the petrels.

78. I agree with Mr Harding's assessment that the proposed actions will reduce but not eliminate the risk of petrel mortality (para 96).

79. I agree with Mike Harding's assessment of the risk to Taiko and to penguins, and that restricting activity to daylight hours would be necessary (Para 59 and 97) and including restricting activity during weather conditions when visibility was poor, so that activities would be undertaken with no artificial lighting (Para 59 and 97).

80. I agree with Mr Harding's assessment that beyond restricting activities to times when no lights are required, there is very little opportunity or possibility of avoiding risk to petrels (Para 98), and should mortalities occur in spite of restrictions, this would have undue adverse effect on the fragile population of Westland petrels (Para 98).

81. Mr Harding notes that the Avian Management Plan does not provide sufficient assurance that adverse effects on species will be avoided, remedied or mitigated, and that the monitoring proposed is insufficient (para 99), I agree with his assessment.

82. Mr Harding notes that the proposed reporting of petrel mortalities is inadequate (Para 99). I agree with this point and that the regime proposed would lead to incentives for under- or mis-reporting and has no means of independent verification. Monitoring should be done more frequently and independently of the mine operator. I agree with the recommendations set out by Mr Harding for more intensive monitoring and stronger limitation of the activities at the mine site, to hours of daylight/natural light conditions to be used throughout the year and with stronger limitations during November to January.

83. In relation to adverse effects of the activity on blue penguins, I agree with Mr Harding's assessment (Para 114) that the proposed activity has significant potential to adversely affect the blue penguin population. The Avian Management Plan gives insufficient detail (Para 115) and it does not identify effective measures for ensuring that the penguin population is safeguarded, its habitat maintained, and its population, mobility from feeding grounds to nest sites are unaffected by the proposed activities.

84. The measures proposed to avoid adverse impacts, such as creating disturbance by machinery parking locations and engine noise to reduce the nesting activity for penguins are not appropriate. I agree with Mr Harding assessment of this proposed mitigation measure (Para 122). Alternative measures should be identified that enable penguins to freely use their natural habitat without disturbance, and their access to breeding sites, to use traverse, nest in, carry

out their natural behaviours within their natural range should be unimpeded. It is important to maintain a healthy, resilient penguin population in this area. They shouldn't be stressed or subject to mortality by machinery or habitat disturbance, as a means of allowing the mine to operate. Indeed, it may be that activities such as those proposed are unlawful under the Wildlife Act 1953, as the disturbance activity proposed would involve disturbing nests or nesting individuals.

85. I agree with the assessment of Mr Harding (Para 126-127) that the disturbance proposed is of unproven effectiveness, is likely to have adverse effects on the species concerned. In particular it should be noted that placing fluttering tapes is unlikely to affect the penguin's behaviour as they are nocturnally active. I agree with Mr Harding (para 127) that these methods will be unlikely to affect the penguin's instinct to nest at nest sites where they have nested for many years, and their instinct to nest at these locations is based on decades or longer association with these localities for the population concerned.

86. Measures to deter nesting gulls (which are only partially protected by the Wildlife Act 1953) explored over several decades at sites such as airports, to avoid planes colliding with birds. They are generally unsuccessful, and culling of individuals or groups of birds is often required. In these cases, this is permitted, as these nuisance effects may endanger human life, and regrettable as this action is, the value of human life in these instances is considered to be more important than that of common wildlife. However, this is not the case for blue penguins. They are not a "nuisance" species, and they are fully protected under New Zealand law.

87. I agree with the assessment of Mr Harding (Para 130), that the monitoring plan as described is inadequate, and would add that independent, verifiable monitoring by a qualified individual or group would be advisable.

Comments relating specifically to V3 of the Avian Management Plan (provided 18/1/24)

88. I reviewed the updated Avian Management Plan provided to me after a brief email correspondence with Dr Gary Bramley on 19/1/24. I noted that there had been improvements to the plan, namely:

a) A clear statement of the goals of the plan, including (my emphasis):
   - i) **To ensure adverse effects on the threatened and at risk birds** present in the vicinity of the site … and any other threatened and at risk species detected by subsequent monitoring **are avoided**;
   - ii) To **ensure adverse effects on…important bird habitats** adjoining the mining site including Canoe Creek Lagoon, Rusty Pond and the coastal margin **are avoided during the breeding season** and **minimised at other times** of the year during mining;
   - iii) To **ensure ongoing use of the site** and its environs **by the birds which currently occur in the area**.

Commentary: I feel the proposed management activities will not fulfil these goals because:

a) as noted by Mr Harding above, the avoidance of effects on Westland petrel will be difficult to assure, and any bird which grounded on the mine site is necessarily affected by the stress, the disturbance to its natural routine, in ways that might adversely affect its survivorship, its pair bond, or its ability to raise progeny or to breed in a future year; b) the adverse effects on penguin habitats are likely to cause desertion of any breeding site located within the proposed mine area, and increase the probability of predation on these displaced birds, specifically as the activities planned are aimed at causing disturbance and avoiding penguins nesting in the mine site; c) ongoing use of the mine site by the full suite of birds, including penguins will be difficult to ensure once disturbance has occurred and the individuals affected are either displaced or suffer stress or mortality due to being displaced.

b) I note that the annual review of management outcomes for birds is proposed (Section 18.3 and 1.4). However, reviewing the information on birds grounded, mortalities and outcomes is insufficient to ensure that all care has been taken or that mine operations are adjusted to ensure that birds don't continue to be attracted to (for petrels) or disturbed at (for penguins) the mine site. Much more frequent monitoring and adaption of the plan is needed, eg. Weekly in the first year in the critical period of November to January, and monthly there-after. Also a threshold of number of birds grounded is required, at which point the activity is halted until an agreed alternative plan can be implemented.

c) In 2.3.3 Dr Bramley notes that penguins use lagoons. They do use lagoons for feeding and have been GPS tracked using river habitats for feeding as well as washing. In research work with the West Coast Penguin Trust we identified penguins feeding in the Nile River via GPS tracking and direct observations. It's worth noting that there are many small fishes in NZ rivers, including whitebait, and when the waters are clear, these are also potential food for penguins. This is an unusual feeding activity for penguins and should be taken into account when considering the effects of the mine on the local waterways, lagoons, and also the access to these feeding areas for penguins.

d) In section 4.1.2, the EcoLogical Solutions v3 Avian Management Plan proposes to avoid or minimize the effects of light on the petrels by having no mining activity in hours of darkness. This would be a possible outcome to reduce interactions with petrels. However, it should be noted that restricting the windows on the buildings to the inland side may not have the benefits expected, as Westland petrels circle around the Barrytown flats for

some time before landing and would be exposed to light from the windows on any side of the building. It is also worth noting that despite strong restrictions on lighting at Punakaiki for many years, petrel groundings still occur. Any additional lighting from windows, vehicles or other external lighting sources at dusk and at night is likely to increase the probability of petrels being grounded.

e) In section 4.3.2 the EcoLogical Solutions v3 Avian Management Plan proposes to respond to a Westland petrel being discovered on the mine. This section does not set out how the operator will respond to repeated groundings and deaths, and there should be a limit to the number of birds that can be recovered, alive or dead during the activity of the mine. The recommendations in the Avian Management Plan state that an autopsy should be completed, seemingly to determine whether the grounding is due to lighting or other causes. I would suggest that it will be very difficult to determine through autopsy whether the mine activities, buildings, traffic or other activities associated with the mine (eg noise) were responsible for the birds grounding or death. The question should not be: *How many, or how severe do the interactions need to be before adverse effect can be determined.* Rather the question should be: *Can the mine operate while ensuring it causes no adverse effects on at-risk or threatened species including Westland Petrels, blue penguins and others.*

f) On Page 12, EcoLogical Solutions helpfully point out the need to take care around penguin breeding and moulting times. This is necessary as penguins and their progeny are particularly vulnerable to disturbance at these times. However, it should be noted that they are vulnerable during these times as well as throughout the year. The energy balance of a penguin is very delicate, and they need to be able to feed well and rest throughout the year to carry out breeding and moulting without undue stress. Reducing their resting times or causing them stress during their time on shore can lead to mortality, as they may not feed effectively or rest sufficiently to survive the rigors of moulting.

g) In section 3.2 the EcoLogical Solutions v3 Avian Management Plan discusses discouraging of nesting. I find it difficult to reconcile the activities described here with our obligations as New Zealanders under the WildLife Act 1953, where nesting activity of protected species are absolutely protected. The actions proposed would reduce blue penguins ability to use their natural habitat, and to carry out their vital functions (mating, raising chicks or eggs, resting). Deliberately disturbing their habitat and using measures that might (or might not) cause them to abandon their habitat does not seem consistent with

the aims of the management plan, nor of our various national policies and legislation.

h) In section 3.3 on Management of nests, 50 m is proposed as a buffer to avoid adverse effects. I would suggest that a larger buffer is necessary to avoid stress of penguins due to noise, vibration, exposure to predators (including gulls and other native predators). A buffer of 1 km would be more suitable.

89. CONCLUSION

90. The proposal does not adequately address the need to avoid adverse effects on at-risk seabird species. I have focussed particularly on Westland petrels and blue penguins, as I know these species best, but my recommendations are probably relevant for other wetland and farmland species.

91. The EcoLogical Solutions v3 Avian Management Plan proposals do not provide sufficient evidence that they will avoid, respond to, closely monitor adverse effects such as grounding of petrels, disturbance of penguins land habitat, and that the responses detailed would meet the stated objective of avoiding adverse effects to threatened and at-risk fauna.

92. Some of the measures proposed – eg disturbance of native wildlife to discourage nesting appear to be misguided, and its not at all certain that they would achieve their desired ends.

93. Greater monitoring across a wider range of measures, including petrel and penguin behaviour, breeding outcomes, frequency of birds' visits to their nests, survivorship, population surveys are needed to ensure that the proposed activity does not affect the populations of these species.

Susan Waugh
25 January 2024

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Appendix 1. IBAT Proximity Report for Barrytown Flats, including 2 maps.