BEFORE THE INDEPENDENT HEARING PANEL
APPOINTED BY THE WEST COAST REGIONAL COUNCIL AND THE GREY DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by TIGa Minerals and Metals Ltd for resource consents to establish and operate a mineral sand mine on Barrytown Flats. Reference WCRC: RC-2023-0046 and GDC: LUN-315/23.

STATEMENT OF EVIDENCE OF KATE SIMISTER FOR THE DIRECTOR-GENERAL OF CONSERVATION
26 January 2023

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STATEMENT OF EVIDENCE OF KATE SIMISTER

Introduction

1. My full name is Kate Loren Janet Simister.

2. I have been asked by the Director-General of Conservation ("DG") to provide ecological evidence on the potential effects on avifauna of the proposal by TIGa Minerals and Metals Limited to establish and operate a mineral sand mine on Barrytown Flats.

Qualifications and Experience

3. I am employed by the Department of Conservation Te Papa Atawhai ("DOC") as Project Lead Biodiversity for the Buller District, where I am responsible for the monitoring and management of fauna and flora. I began working for DOC in 2014 and have been employed in my current position for six years.

4. I have a Bachelor of Science in Zoology, and a Postgraduate Diploma and Master of Wildlife Management, from the University of Otago.

5. In respect to Westland petrel, Procellaria westlandica or Tāiko, I manage the only monitoring programme for the species in New Zealand, lead several National Scientific Research Priorities, and manage the recovery response and rehabilitation of grounded individuals in Western South Island. In 2019, I co-authored a paper of the current population estimate and trends in the international scientific journal, *Marine Ornithology*.

6. In 2021, I gave expert evidence in relation to a previous application by Barrytown JV Ltd New Zealand (now TIGa Minerals and Metals Limited) for resource consent to operate a mineral sand mine on the same site.

Code of conduct

7. I confirm that I have read the code of conduct for expert witnesses as contained in clause 9 of the Environment Court's Practice Note 2023 ("the Code"). I have complied with the Code when preparing my written statement of evidence.

8. For the avoidance of doubt, in providing this evidence as an expert witness in accordance with the Code, I acknowledge that I have an overriding duty to impartially assist the Panel on matters within my area of expertise. The views expressed are my own expert views, and I do not speak on the DG's behalf.

9. The data, information, facts and assumptions I have considered in forming my opinions are set out in my evidence to follow. The reasons for the opinions expressed are also set out in the evidence to follow. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of evidence

10. My evidence will cover:
    - Overview of the significance and populations status of Westland Petrel, Procellaria westlandica;
    - Threat of artificial lighting to Westland Petrel, Procellaria westlandica in general;
    - Risk of night-time activities requiring artificial lighting in the Mining Pit;
    - Risk of night-time activities requiring artificial lighting at the Processing Plant and Loading Site;
    - Risk of increased night-time heavy and light vehicle movements on SH6 in front of the breeding colony;
    - Additional comments on the Draft Avifauna Management Plan.

11. In preparing my evidence, I have read relevant documents provided as part of the Applicant's resource consent application, including in particular:
    - Resource Consent Application filed with Greymouth District Council
    - TiGa RC Application AEE FINAL
    - Attachment B - TiGa Site Plan
    - Attachment F - Processing Plant Building Plans
    - Attachment G - Barrytown Mine Transport Assessment
    - Attachment M - Barrytown EcIA – Final
    - Attachment M2 - Avian Management Plan FINAL
    - Attachment P - Proposed Conditions of Consent FINAL.

Overview of the significance and populations status of Westland Petrel, Procellaria westlandica

12. The Westland Petrel, *Procellaria westlandica* or Tāiko is a naturally rare, endangered seabird species, endemic to New Zealand. The species is known to breed at only one location in the world - in the foothills behind Barrytown flats on the West Coast of the South Island of New Zealand (Birdlife International, 2018). Scientists hypothesise

that the colony may have existed in this location for c. 5000 years (Jackson, 1958). The current colony is sparsely spread across approximately 8 kms of the foothills.

13. The Westland petrel is a relatively recent discovery - the species was formally described in 1946. The species was listed on the IUCN Red List of Threatened Species as “endangered” in 2018 (IUCN, 2023). The New Zealand Threat Classification Systems most recent assessment (2021) classified Westland petrel as “At Risk, Naturally Uncommon” (“naturally uncommon” means that the species is already naturally rare), with the qualifiers “Conservation Dependant, Conservation Research Needed, Data Poor Trend and Range Restricted” (DOC 2021b), reflecting that the species would be considered at greater risk of extinction if current conservation management was to cease. Research published by the Ministry for Primary Industries in October 2023 shows that the current level of Westland petrel mortality (as by-catch in fisheries) is already above the threshold of population sustainability (Fisheries NZ, 2023).

14. The New Zealand government has entered into various international agreements to protect the species. Westland petrel are included in the *Convention on the Conservation of Migratory Species of Wild Animals* (hereafter referred to as “CMSWA” (CMSWA 2021)) and listed as having an “unfavourable” conservation status, and also included in Annex 1 of the *Agreement of the Conservation of Albatrosses and Petrels* (ACAP 2021). As a party to that Agreement, New Zealand has a duty to “develop and implement measures to prevent, remove, minimize or mitigate the adverse effects of activities that may influence the conservation status of albatrosses and petrels” (para 1(c)) ACAP (2018)). Accordingly, as it is a species documented to be susceptible to artificial light disorientation (Waugh & Wilson 2017; DOCa 2021) and the breeding colony meets the definition of “important habitat”, any artificial lighting associated with the mining proposal must follow the *National Light Pollution Guidelines for Wildlife* (Commonwealth of Australia, 2023). The *Guideline*s work on the basis that artificial lighting within 20kms of an important habitat can impact the protected species.

15. At a national level, the species is absolutely protected under the *Wildlife Act 1953* and was identified as taonga in the *Ngāi Tahu Claims Settlement Act 1998*. In 1999, the breeding colony was designated as a scientific reserve - the Westland Petrel Specially Protected Area - so prohibiting public access to the area, and the airspace above the colony has been gazetted as a restricted fly zone under the *Civil Aviation Act 1990*.

16. The species is highly valued by many in the local community, which has undertaken various activities to protect the birds including organising regular patrols to look for grounded birds; running and / or attending information events and the Tāiko festival; advocacy (particularly by Paparora Nature Tours); and the re-planting of Te Ara Tāiko Nature Reserve (by Conservation Volunteers New Zealand). Powerlines in front of the main fly way have been buried and the New Zealand Transport Agency

and Buller District Council began turning off Punakaiki townships highway and streetlights each year in 2020, to reduce attraction and subsequent grounding of fledging birds.

17. In 2018, the population of Westland petrel was estimated as having 6,200 breeding pairs and, at the time, thought to be relatively stable (Waugh et al 2019). However, there is significant uncertainty surrounding that population number, as well as the resilience of the population to current threats. Over the last three years, research into the species has been funded by the New Zealand Conservation Services Programme. The research shows that the number of Westland petrel occupying burrows and breeding has declined since 2020 (see Appendix 3, Figure 1). Chick weights have also declined over the last three breeding seasons (see Appendix 3, Figure 2). Low weights make chicks much more vulnerable to mortality. We do not know the exact cause of this decline, but it may be linked to the impacts of climate change and the abnormally high sea surface temperatures and marine heatwaves recorded by NIWA on the West Coast in recent years (NIWA 2022). The species ability to persist with future predictions of rises in sea surface temperature, and altering prey resource distribution and availability, is unclear (Waugh et al. 2018).

18. The species is under pressure from other threats. Westland petrel are highly vulnerable to fisheries bycatch in both New Zealand and international waters. The Westland Petrel is ranked in first place in the updated fisheries risk assessment framework and accordingly it is the seabird at highest risk from fisheries bycatch in the Southern Hemisphere (Fisheries NZ, 2023). As indicated above, the current level of Westland petrel mortality as bycatch in fisheries is calculated as above the threshold of population sustainability (Fisheries NZ, 2023) meaning that any additional loss (from whatever cause) is considered a population level effect.

19. Other current threats include the increased frequency and ongoing loss of breeding areas to landslides following extreme weather events, with the last significant landslide being noted on 4th November 2022 (Simister KLJ, 2023, per obs). The species is also susceptible to the risks from new disease outbreaks, such as Highly Pathogenic Avian Influenza or HPAI H5N1 (Wilson 2016) which is currently having significant impacts on wild populations of birds and marine mammals in other nations around the world.

20. In relation to the current application, the proposed mining site is 3.6km south of the breeding colony and directly adjacent to the Tasman Sea, which is an essential flight path for the birds as they travel to and from the colony. Westland petrel are nocturnal on land, and do not fly between the sea and colony during daylight hours. They congregate in large groups before sunset, ready to take flight. They do not always fly in a direct path between the sea and colony and tend to follow the coastline when flying to and from the colony depending on the wind direction. The main feeding grounds for Westland Petrel lie south-west of the colony along the continental shelf,

Hokitika and Haast trenches and so the mine site lies in the flight path of birds moving between their feeding grounds and the colony (see Photographs in Appendix 4. Photographs were taken at lower altitudes (90-100m) than commonly flown by petrels ~150m due to the drone's operational restrictions but the photographs attempt to demonstrate the broad range of view and downward view that birds have in flight. At higher elevation this range is more pronounced. Also, note that Westland petrel have wider peripheral vision than the drone's camera lens is capable of).

Threat of artificial lighting to Westland Petrel, Procellaria westlandica in general

21. Westland petrel are threatened by increasing development and artificial lighting, particularly on the West Coast of the South Island due to the location of the only know breeding colony in the foothills behind Barrytown flats. Light pollution caused by artificial lighting is known to have negative impacts on wildlife globally. Disorientation caused by attraction to artificial lights is the key impact on burrow-nesting seabirds such as those from the Procellariiformes order, forcing them to land as they fly to and from their breeding colonies - a phenomena called 'fallout' or 'grounding' (Telfter et al. 1987, Wilson 2016). Behavioural studies and the examination of the eye development have found multiple factors influence bird behaviour, including the duration and intensity of light, the age and associated level of eye development, moon phase, weather patterns, and a greater sensitivity to short wavelengths (i.e. blue-green light) (Hart 2004, Syposzet et al 2021).

22. Formal records of grounded birds that are reported to DOC have been kept since 2007 (DOC unpublished data). Westland petrel are heavy birds with large wingspans (adults can weigh 1200-1400 g, with wingspans of c.140 cm). Once artificially grounded, they struggle to re-establish flight because they are unable to take off from a flat surface. A reasonable percentage of birds grounded each year are found dead or die later from injuries caused by colliding with the ground, buildings or cars and /or exhaustion (c. 40-50% of grounded birds die), with the remainder requiring assistance to re-take flight (Waugh and Wilson, 2017; DOC unpublished data).

23. From my own personal experience, grounded birds are typically reported to DOC prior to 2300 and following 0600 hours. I believe this is simply because most people are at home asleep during the hours in between and therefore do not encounter birds, rather than birds not becoming grounded during these hours.

24. In the last 16 years, groundings have been recorded in all eleven months of the breeding season and fledging period (mid-March to mid-January), with the majority of grounded birds being fledging juveniles, found between November and January (Wilson 2016; DOC 2021a).

25. While fledging juveniles are the most susceptible to light attraction, adults are also found grounded throughout the year after becoming disorientated due to artificial lighting. The loss of individual breeding adults from the population is of more significance than would typically be expected, as breeding pairs form monogamous bonds and lay one egg per year, it is estimated that in any one year on average 54% of the breeding age population do not breed, and most birds do not begin breeding until after 7.5 years of age (Waugh et al. 2015). Accordingly, Westland petrel have an unusually low breeding cycle and the loss of any breeding adult is of consequence to the population.

26. Overall, the actual number of grounded birds on the Western South Island each year is assumed to be much higher than the number reported. This is due to downed birds seeking cover during the day (usually under vegetation, in the absence of a burrow, as they are nocturnal on land), making them difficult to discover. Grounded or injured birds may also be scavenged by predators before they can be discovered.

27. The greatest number of *adult* movements into and out of the colony occur within the first 2 hours after sunset and 2 hours before dawn throughout the year (I include a table that lists the specific times for sunset and sunrise in Greymouth in Appendix 1). However, a significant proportion of landings and departures may occur throughout any night, particularly during chick rearing when adults often enter their burrow, feed their chick, and depart within the hour (Best & Owen 1976).

28. There are no specific timeframes during which *fledging* juvenile birds leave the colony. Fledglings leave throughout all hours of darkness and may stay close to shore for several days. The timing of bird movement to and from the colony is likely to be influenced by moon phase. Their vulnerability to lighting attraction also appears to be influenced by moon phase and weather conditions, particularly drizzle, fog and/or low cloud (Monterecchi 2006).

29. The flight path of birds leaving and entering the colony is relatively direct (Best & Owen 1976), with birds following the coastline. However, each year birds are found grounded in the townships of Punakaiki, Greymouth, Hokitika and Westport (Wilson 2016; DOC 2021a), which indicates birds are attracted back to land by lights (a phenomenon also found in other seabird species: Troy et al. 2013). Most grounded adults tend to be found in and around the Punakaiki area whereas juveniles can also commonly be found in locations spread further along the coast. Research shows that young burrow-nesting seabirds do not have fully developed retina when fledging from the nest, this coupled with an innate instinct to use the light from the moon and stars to navigate makes them more vulnerable to attraction (Atchoi et al 2020, Mithus et al 2018). Avoidance of artificial light appears to develop with age with adult birds being less vulnerable but still impacted.

30. Each year, adult and juvenile birds are also found grounded on the section of State Highway 6 that runs directly in front of the colony's flightpath to the sea (Wilson 2016). This section of road has no fixed lighting and the continued groundings highlights the ability of vehicle lights to bring down birds in flight. High mortality rates occur here due to motor vehicle strike (Wilson 2016, DOC 2021a).

31. In the following paragraphs, I provide comments on the specific risks to Westland petrel from the proposal.

Risk of night-time activities requiring artificial lighting in the mining pit

32. The TiGa RC Application AEE FINAL, Hours of Operation 3.31 (p 20) states:

    "The proposed mining operation will occur during the hours of 0700 – 2200 7 days a week, while the Processing Plant has an operational requirement to run 24 hours a day, 7 days a week. During the period 01 December to 31 January, the mining may commence at 0630 and finish at 2130 which is the peak fledgling period for the Westland Petrel when birds are said to be at most risk of being disoriented by lighting. Starting 30 minutes earlier and finishing 30 minutes earlier ensures all mining occurs during the daytime during this elevated risk period for the Westland Petrel."

    My comments in response are as follows:

33. Birds enter and leave the colony and may be close to shore at any time in the hours of darkness. Operating until 2200 has a high level of risk to adult birds for many months of the year.

34. The proposed hours of mining operation would operate for over ~840 hours of risk throughout the breeding season (see Appendix 1, Table 1 - I note there are two time changes due to daylight savings during this period and hours in the Table are approximated for each month, therefore it does not accurately calculate the hours and only provides a guide, however the number of hours remain high in my opinion).

35. The period stated as the peak fledging period in this statement is incorrect. As stated previously, it begins two weeks prior in mid-November (as the Applicant has correctly noted in Attachment M2 – Avian Management Plan FINAL).

36. The agreement not to mine during the hours of darkness during December to January is helpful but the proposal does not attempt to mitigate or reduce the

likelihood of attracting and disorientating birds during the rest of the year. Rather, the hours of operation for most months directly overlap with the periods of highest movements. Accordingly, there is a high risk of groundings and consequent death or injury to Westland petrel from these hours of operation.

37. The TiGa RC Application AEE FINAL: Plant and Machinery; 3.19 (p 17) displays the type and number of machines to be used in the mining pit in Table 1. According to the table, there will be 13 mobile machines working in the mining pit at night.

38. Effective mitigation for mobile lighting cannot be robustly managed in comparison to fixed lighting. It is important to note the *National Light Pollution Guidelines for Wildlife* (Commonwealth of Australia 2023) apply to fixed lighting only, not mobile lighting. The applicant offers no explanation as to how mobile lighting at night will be managed, and / or any evidence that measures can be implemented to manage this lighting to reduce the risk to the birds. It is also not clear what other lighting if any will be used in the pit, i.e. not attached to movable machinery.

39. The TiGa RC Application AEE FINAL: Plant and Machinery; 3.22 (p 17) states that,

> "[a]dditional mining equipment and vehicles will be used on site, including a variety of pumps (including land based, floating and submersible) and light 4-wheel drive vehicles for the transport of mining personnel."

It is not clear where these may be located and what lighting may be required for their operation at night-time.

40. Based on information provided by the Applicant,[1] the mining pit area may be between 0.2-9m in depth and up to 3ha in size on sloping seaward terrain. As stated above,

[1] Attachment M2 Avian management plan FINAL 4.1.3 Pit lighting (p 12) states that, "[mi]ning will take place between 0700 and 2200 hrs between 01 February and 30 November and between 0630 hrs and 2130 hrs between 01 December and 31 January. Lighting will be required at the pit at certain times of the year to achieve these hours, which have been modified to reduce the need for lighting in December and January since these are peak months for tāiko groundings. The excavator, and any lighting, would be located below ground level because removal of topsoil and overburden is restricted to daylight hours by Condition 12.2. This is expected to reduce light spill." According to TiGa RC Application AEE FINAL: Mining sequence; 3.14(a) (p 15), "[t]opsoil, approximately 0.2- 0.6m thick, and overburden will be removed and preserved (stockpiled) for rehabilitation using a 85 tonne excavator, and 40 tonne articulated trucks." According to TiGa RC Application AEE FINAL: The proposal 3.4 (p 13) "The mine pit area will be 3ha, including 0.5ha of stripping occurring ahead of the mine pit and 0.5ha of active rehabilitation occurring behind the mine pit. The processing plant area will be 3.5ha in area including the mine access road and all settling pond infrastructure. The total disturbed area of the mine is approximately 6.5 ha in area, however a total disturbed area of 8ha is sought to allow for a contingency area for progressive rehabilitation following mining to take into account weather and seasonal impacts on vegetation establishment. The maximum mining depth will be 9m." In reference to TiGa RC Application AEE FINAL Rehabilitation 3.74 Figure 7 (p 28), the broad topography of the site landform slopes downhill to the Tasman Sea.

13 machines will be working in the mining pit at night. The colour and temperature of the lighting fitted to or required for the use of the machinery is not stated. Nevertheless, it is highly likely that the machinery (and other pit) lights will be visible to birds in flight, due to the movement and rotation of machinery, the slope of the terrain, and the size and shallowness of the pit. Light travels until it is reflected or absorbed by matter and can be seen for kilometres, as evident by birds landing on illuminated boats at sea and records of Westland petrel grounding as far south as Kaniere and north as Westport township (DOC 2021a).

41. In respect of TiGa RC Application AEE FINAL: Lighting; 3.28, 3.29. 3.30 (pp 19-20), the document does not separate out fixed and mobile lighting types. It does state

> "All lighting on site will adhere to the Australian Government's National Light Pollution Guidelines for Wildlife January 2020 (or subsequent revision), including but not limited to …".

As stated above, this adherence is not possible as the *National Light Pollution Guidelines for Wildlife* (Commonwealth of Australia 2023) only relate to fixed lighting. The Avian Management Plan correctly makes this demarcation (see section 4.1.2 and 4.1.3, pp 11-12). The Applicant offers no explanation as to how mobile lighting at night will be managed, and / or any evidence that measures can be implemented to manage this lighting to reduce the risk to the birds, in any of the documents I have read.

42. I believe the risk remains high that Westland petrel will be grounded by lighting in the pit. It is not possible to state with any certainty how many birds may be affected. This is because there has never been an open cast mine operating at night within such a short distance from the colony The Holcim Cement Works at Cape Foulwind, approximately 50km north of the colony, did operate an open cast limestone quarry during the hours of darkness until its closure in 2016. From discussions with ex-Holcim miners and DOC staff employed at the time, Westland petrel were regularly picked up from the site during the fledging period. This impact occurred, despite the fact that the Holcim mining pit was much further away and had a pit depth several orders of magnitude deeper than that proposed by the applicant (i.e. below sea level).

43. Due to the close proximity of the proposed TiGa mine to the colony, it appears to me certain that birds will be attracted to night-time operational activity, particularly as the main feeding grounds for Westland Petrel lie south-west of the colony along the continental shelf, Hokitika and Haast trenches, and so the pit would be in their direct flight path.

Risk of night-time activities requiring artificial lighting at the Processing Plant and Loading Site

44. The TiGa RC Application AEE FINAL: Plant and Machinery; 3.19, Table 1 (p 17) states that there will be two mobile machines working outside and around the processing plant and loading site, with an additional machine on-site from 2200. These machines will presumably have lights, hence there will be lights moving around the processing plant site at night, acting as an attraction to birds. As stated above, effective mitigation for mobile lighting cannot be robustly managed in comparison to fixed lighting.

45. I agree that if the stationary lighting at the Processing Plant and Loading Site is implemented appropriately, it is likely to reduce the risk to Westland petrel from that stationary lighting. However, the fixed lighting proposed for the processing plant, including the number and position of lights, is not detailed sufficiently in the application to make any categoric assessment.

46. It is also important to note that the *National Light Pollution Guidelines for Wildlife* (Commonwealth of Australia 2023) are drafted broadly, due to the large number of applications they may be used for. They do not contain researched or proven methods to mitigate the risk to Westland petrel specifically. Given the documented sensitivity of Westland petrel to artificial light and the lack of published research around its mitigation requirements, a detailed plan should be provided to the Panel and experts so that they can properly assess the risks before any consent is granted.

47. Further, I note that the applicant proposes to cease nighttime operations if two grounded Westland petrel are found at the site within four weeks of each other (see Attachment M2 - Avian Management Plan FINAL, 4.3.3),

> "[i]f, after any necessary amendments to site management and this management plan are implemented, a second bird (alive or dead) is found within 50m of the pit or processing and load out area within four weeks of the first finding, operations and use of external lights at the pit and processing plant will cease between 4 am and dawn. Interior lighting and operations can continue during the hours of darkness, provided any lights are not visible from the exterior."

48. In my opinion, this approach to managing the risks to Westland petrel from nighttime operations is inappropriate. As stated above, it is highly likely that birds will become grounded by the lighting at the pit, moving lights at the processing plant, and increased nighttime traffic. However, there is a high risk that grounded birds may not be discovered (for the reasons explained above) and / or this proposal places employees in the invidious position of reporting grounded birds that would lead to the curtailment of mining activity. Accordingly, there is a real risk that grounded birds will not be reported. Given that it appears certain that birds will be attracted to night-time

operational activity, in my opinion these risks should be eliminated at the outset and not left to the miner to self-manage them once groundings have occurred.

Risk of increased night-time heavy and light vehicle movements on site and on State Highway 6.

49. The TiGa RC Application AEE FINAL: Traffic 3.36 (p 21) states that,

> "[th]e site will be accessed by light vehicles for 49 staff daily plus occasional visitors and service vehicles. Heavy vehicles will be used during the construction and establishment of the site. Once the plant has been commissioned, the site will generate approximately 50 heavy vehicle movements a day, and up to 140 light vehicle movements. This equates to 390 equivalent car movements (ECM) per day. The applicant intends to run passenger vans to provide transport to the mine, which will mean that actual light vehicle movements will be less, however the exact nature of the impact on vehicle movements isn't known at this time because it is not clear where workers will be driving to/from, so this has not been taken into account when assessing vehicle movements."

This statement highlights several unknown factors that prevent the ability to evaluate the risk of any potential increase in light vehicle movements during the hours of darkness.

50. Attachment G Barrytown Mine Transport Assessment, [12] (p 3) states there will be,

> "a peak hour traffic generation of 19 vehicles per hour occurring at 06:00 to 07:00 and 18:00 to 19:00."

Accordingly, the peak periods of the greatest vehicle movements from the site are within 30 minutes of sunrise or sunset for several months of the breeding season, i.e. the highest risk period for grounding adults in winter months. I acknowledge that the application proposes no northbound heavy vehicle movements 30 minutes after sunset or 30 minutes prior to sunrise, but light vehicles are of no lower risk in disorienting birds.

51. Further, while the Applicant's traffic assessment states that (at the highest count) 1,156 cars use the SH6 per day (see p 2), this assessment does not separate existing nighttime versus daytime traffic. The accompanying table in that report however, shows low existing traffic activity during darkness (see p 2, Figure 2). In Appendix 2, Table 1 attached to this statement, I list the existing number of vehicle movements during the hours of darkness (30 minutes after sunset to 30 prior to sunrise), from data provided by New Zealand Transport Agency Autumn averages a total of 95-114 movements during darkness, winter 70-108 movements, spring 48-70, and summer 36-41. This table is intended as a guide only but shows the small number of existing movements on the state highway during darkness and

demonstrates that even if only a small percentage (10%) of the 390 ECM occur during this period, this will create a statistically significant increase in traffic and therefore risk of groundings.

Additional comments on the Draft Avifauna Management Plan

52. I have read the evaluation of other threatened and at-risk avifauna that have been recorded within 10kms of the site in Attachment M Barrytown EcIA FINAL, Avifauna 4.2 (pp 24-27) ('AMP'). I note that six of those species have a classification status of Threatened species under the New Zealand Threat Classification System, and 20 are classified as At-risk. The pair of Pacific Reef Herons that were observed by the applicant's ecologist on a site visit are Threatened - nationally endangered, with an estimated population of 300-400 birds (NZ Birds Online, 2023). The cryptic Australasian bittern, observed in the Canoe Creek Lagoon, are Threatened – nationally critical, and there are thought to be only 250-1000 birds left after a significant population decline in the last three decades (NZ Birds Online, 2023). The White Heron observed on the site by the s42A report writer is Threatened – nationally critical, with c. 150-200 birds left in New Zealand (NZ Birds Online, 2023). I note also that Little Penguin, kororā (At-risk, declining) are recorded as breeding in the Barrytown flats area.[2]

53. Land disturbance of the kind associated with the mining, i.e. digging up and turning over soil and the subsequent creation of bare unvegetated areas is likely to attract some endemic birds, such as Banded dotterel (At-risk - declining), South Island pied oystercatcher (At-risk - declining) and Black-billed gull (At-risk - declining) to feed on the exposed invertebrates and may create more attractive nest sites than the current pastureland provides.

54. The AMP suggests various management processes to reduce the risk of Threated and At-risk species from breeding and nesting on site (AMP 3.1, 3.2 Detecting and Discouraging Nesting, p 9). In particular, the AMP proposes that certain "disturbance" activities are undertaken by TIGa employees. I do not agree that these measures constitute good conservation management actions, and, in my opinion, they carry an inherent risk of harm to Threatened and At-risk species.

55. Some species, such as Little Penguin (At-risk, declining), will be difficult to deter from a chosen nesting site. They are likely to keep returning to a selected site, and the proposed disturbance activities are likely to cause stress to the birds and result in nest failures. Further, different birds also respond in different ways to the threat of humans approaching an established nest. Some birds, such as Banded dotterel may run away and ultimately abandon the nest if approached. Others, such as South

[2] S42A Officer's Report Addendum 3.3 terrestrial Ecology Peer Review, at [109].

Island pied oyster catcher may try to distract and lead the observer away from the nest, by calling and moving around rapidly causing stress to the bird and risking nest failure.

56. Further, and although I do not agree with these management approaches, unless the person employed to undertake the proposed walk-throughs is an appropriately qualified and experienced ecologist, it may be challenging to manage avifauna in an appropriate way because of these different behaviours. The surveyor would have to be able to identify different bird species, to know what behaviour to look for, and be able to adapt their management approach accordingly.

Addendum

57. I have read the statements from Gary Bramley and Kate Mackenzie dated 19th January 2024 and have the following comments to make:

58. While the applicant now proposes that,

> "Trucking, mining, overburden and topsoil stripping, bund development and any related activities shall not operate during the hours of darkness. For the purpose of this condition, hours of darkness are considered to be between 30 minutes after sunset to 30 minutes before sunrise" (Kate Mackenzie, Proposed Conditions of Consent, 12),

no hours of operation are provided for in the conditions.

59. It is also clear that there will be lighting in the mine throughout the night (see Gary Bramley para [124]). I repeat my comments in paragraphs [39-43] above about the shallowness of the pit and that, in my opinion, lighting in the pit will almost certainly attract Westland petrel. The evidence also states that lights will be limited to those necessary for health and safety, however there is no description of what criteria is required for a light to be deemed essential to health and safety. This is very permissive and could justify any number of lights being used.

60. Gary Bramley refers to a Lighting Management Plan (see paras [124-125]) but I cannot find a copy of this plan. No information is provided on the number, placement, type, covering, colour or temperature of any lights that will be on site or in the mine. Given how critical this information is, any such Plan should be before the Panel and experts should be able to comment on it, rather than a lighting plan being written after consent is granted.

61. I disagree with Gary Bramley's statement that,

> "there would not be lighting effects from machinery and vehicles operating at night at the load out area, driving around the site or driving to and along the highway after leaving the site" (Gary Bramley, para [126])."

62. Gary Bramley details the number and timing of shift changes in paragraph [126]. I am surprised there has been no change to these since the initial application given the change to proposed operating for mining activity hours. The applicant still intends to have 12 mining contractor staff arriving at 14:00 to work until 22:00, this contradicts their statement there will be no mining at night. Further, there will still be three machines working outside at night around the processing plant, as I understand it (see paragraph [44] above). I was expecting to see changes to shift time and staff numbers as a result of the reduced operating hours.

63. As stated earlier, clarification of year-round operating hours needs to be provided for the risk of this application to be assessed. It appears the applicant has not fully worked out the implications of this new proposal.

64. To avoid adverse effects on Westland petrel, operations should be finished for the day, with all lights turned off, and staff should have left the site by sunset not when birds begin flying 30 minutes later, otherwise the birds are exposed to higher levels of traffic as they begin to enter or leave the colony. Likewise, staff should not return until after sunrise, i.e. after the birds have returned to the colony.

65. In relation to the information provided about Westland petrel in paragraph 136 of his statement, Gary Bramley uses two population estimates that are not comparable to conclude that the population has increased by 30-50% over the decade prior. As an author of the latest estimate, I can state that these two estimates are not comparable due to differences in the methods of data collection and calculation. The latest population estimate (Waugh et al 2020) states the annual population growth rate between 2007-2019 was 1.022% per annum. Newer research into the population's sustainability casts doubt on whether even this estimate was accurate and / or could be sustained, given current mortality in fisheries by-catch and our research into burrow occupancy and chick weights (see para [17] above and Appendix 3). Further, I am uncertain what is meant by the term 'productivity' in paragraph 136 of Gary Bramley's statement. It is correct to say that 70% percent of eggs produce chicks but that does not reflect a 70% productivity across the population for the reasons explained in paragraph [25] above.

66. The statements that Gary Bramley makes in paragraphs [147-148] also need explaining. The Department of Conservation provided the records published by Waugh and Wilson, 2016 / 2017. Prior to 2017, the comprehensive recording of grounded birds was not standard practice, and so the data used by Waugh and

Wilson had limitations. The DOC records show that birds are affected by attraction to artificial lighting, they do not support the calculation that Gary Bramley has attempted in paragraph 147. Further, while Waugh and Wilson assessed the risk at the time - based on the data they had- compared to other risks, they did not attempt to assess future risk such as those posed by this proposal.

Conclusion

67. In my opinion, the proposed mining and associated activities pose a significant risk to the Westland petrel and are likely to create an adverse effect on the population.

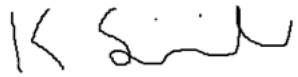
68. In accordance with the latest research published by the Ministry for Primary Industries, Westland petrel mortality from bycatch is already above the threshold of population sustainability (Fisheries NZ, 2023) meaning that any additional loss from the mine proposal can be considered an adverse population level effect.

69. The assessment of the adverse effects and the 'application of the effects management' in the TiGa RC Application AEE FINAL: 5.88 (p 54) does not consider the wider lighting effects of the mining activity including mobile lighting in the mining pit, processing sheds, and loading site; fixed lighting in the pit at night; and increased light vehicle traffic, which are just as likely as heavy vehicles to disorientate and ground petrels.

70. The proposed conditions of consent aim to reduce, but do not attempt to eliminate or adequately mitigate the risk of attracting and grounding birds, causing distress, and/or injuring and/or causing death, for a species of bird documented to be vulnerable.

71. If the mine was to proceed, conditions to prevent harm to Westland petrel should prohibit all mining activity including vehicle movements during the hours of darkness (with all lighting on site and in the mine being turned off before sunset) for the entire calendar year.

72. In relation to the management of other avifauna species, the breeding detection and disturbance activities proposed in the AMP create an inherent risk of harm to Threatened and At-risk species.



Kate Simister

Appendix 1:

	March	April	May	June	July	August	September	October	November	December	January
Sunset and sunrise times on the final day of each month	1928-0749	1741-0743	1742-0722	1743-0733	1806-0716	1836-0634	1902-0551	2047-0550	2128-0519	2149-0525	2145-0542
Approximate mining operation overlap with minutes of darkness per day	120	224	255	255	240	210	180	135	30	0	0
Number of days per month	31	30	31	30	31	31	30	31	30	31	31
Approximate mining operation overlap with minutes of darkness, per month	3720	6720	7905	7650	7440	6510	5400	4185	900	0	0
Minutes of risk posed by mining pit operation per annum	50430										
Hours of risk posed by mining pit operation per annum	**840.5**										

Table 1: Calculated time of risk posed by nighttime pit mining.

Risk time frame considered as 30 minutes after sunset to 30 minutes, prior to sunrise (the hours of darkness). Hours of operation sourced from TiGa RC Application AEE FINAL: Hours of operation section 3.31. Time and date data sourced from https://www.timeanddate.com/sun/new-zealand/greymouth,.

Appendix 2:

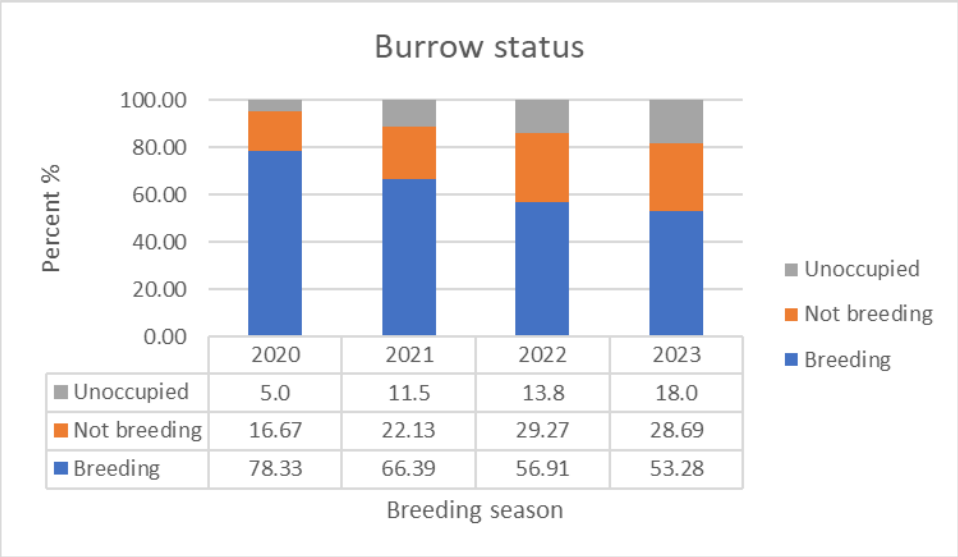
	March	April	May	June	July	August	September	October	November	December	January
2011-12	99	109	116	118	97	77	74	50	30	36	39
2012-13	88	89	123	111	103	78	64	49	35	38	42
2013-14	93	93	117	98	86	73	64	47	33	36	42
2014-15	97	98	109	105	93	69	71	51	32	37	41
2015-16	92	154	*	134	110	68	70	49	31	39	44
2016-17	115	108	103	110	87	70	68	49	33	41	47
2017-18	101	127	117	111	94	74	71	51	35	39	46
2018-19	93	119	121	104	85	69	66	46	30	34	38
2019-20	78	118	111	98	85	64	63	45	30	31	38
2020-21	*	*	*	90	84	65	59	46	28	29	34
Average current vehicle movements (ACVM), during hours of darkness	95.1	112.7	114.6	107.9	92.4	70.7	67	48.3	31.7	36	41.1

Table 1:

Average current vehicle movements during the hours of darkness, 2011-2021. Data NZ Transport Authority, Waka Kotahi. *Data removed due to National NZ covid19 lockdown event. Time and date data in respect of Greymouth darkness hours, sourced from https://www.timeanddate.com/sun/new-zealand/greymouth

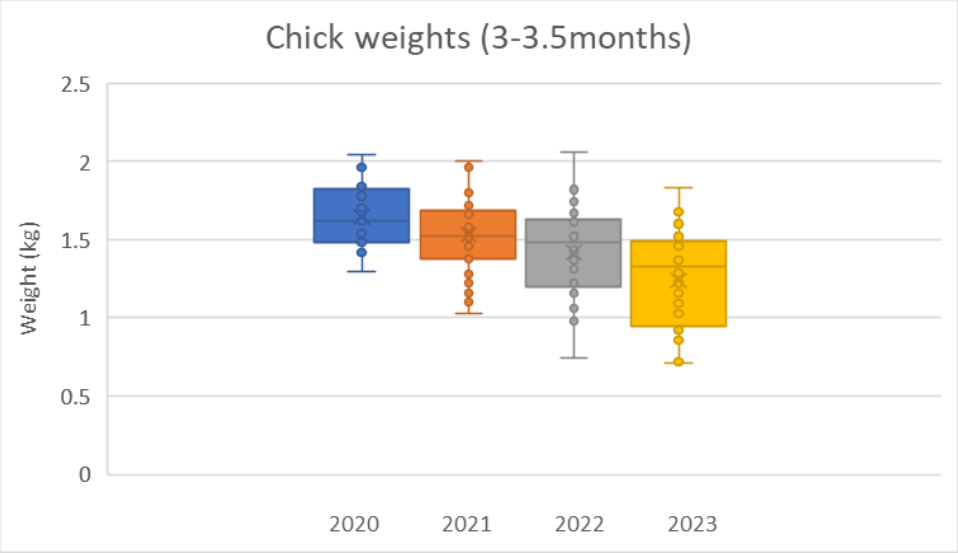
Appendix 3:

Figure 1: Department of Conservation Unpublished data. Monitored burrow status for Westland petrel breeding seasons 2020-2023. Monitored burrows categorised as: Unoccupied burrows (no bird found resident), Not breeding burrows (a single or multiple birds found resident, without an egg or chick) or Breeding burrows (an egg or chick found with at least one resident adult). Sample sizes 2020 = 60*, 2021 = 122, 2022 = 123, 2023 = 122. * The breeding percentage in 2020 should be considered an overestimate, due to bias in the sampling.



	2020	2021	2022	2023
Unoccupied	5.0	11.5	13.8	18.0
Not breeding	16.67	22.13	29.27	28.69
Breeding	78.33	66.39	56.91	53.28

Figure 2: Department of Conservation Unpublished data. Chick weights for Westland petrel breeding seasons 2020-2023. Chick weights are recorded in the first week of November of each year at 3-3.5 months of age. Sample size 2020 = 29, 2021 = 50, 2022 = 43, 2023 = 37.



Appendix 4 – Photographs of flight paths from colony

View from southern colony flightpath looking south at 100m elevation. The mining area is indicated in pink.

View flying south along coastline at 100m elevation. The proposed mining area is indicated in pink.

View flying north along the coastline at 90m elevation. The proposed mining area is indicated in pink.

Appendix 5 – References

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