Before a panel appointed under the Fast-track Approvals Act 2024 **FTAA-2504-1046**

UNDER	the Fast-track Approvals Act 2024 (**Act**)
IN THE MATTER	an application for approvals for the Waihi North Project (**WNP**) – a listed project described in Schedule 2 of the Act
BY	**OCEANA GOLD (NEW ZEALAND) LIMITED Applicant**

STATEMENT OF EVIDENCE BY KATHERINE MUCHNA ON BEHALF OF OCEANA GOLD (NEW ZEALAND) LIMITED

Terrestrial Ecology of WUG

Dated 1 September 2025

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Introduction

1. My full name is Katherine Julie Muchna. My qualifications and experience, and my role in the Waihi North Project (**WNP**), are set out in my statement of evidence dated 7 February 2025 included in Part G of the substantive application document for the WNP.

2. I have been asked by OceanaGold (New Zealand) Limited to provide a response to the specific matters contained in written comments on the WNP application from persons invited by the Panel to comment under section 53 of the Act:

    a. Department of Conservation: Section 51 FTAA report Appendix C Concession Report;

    b. Department of Conservation: Section 51 FTAA report Appendix D Wildlife Approval;

    c. Department of Conservation: Section 51 FTAA report Appendix F Access Arrangement report;

    d. Department of Conservation: Section 53 Comments on a Project under the Fast-Track Approvals Act;

    e. Hauraki District Council Feedback Waihi North Fast-Track Application;

    f. Royal Forest and Bird Protection Society of New Zealand Incorporated; and

    g. Coromandel Watchdog of Hauraki Comment: Oceana Gold Waihi North Fast-track Approvals Application Coromandel Watchdog and specifically Professor Walden.

3. I have prepared this statement within the limited time available to me. Consequently, it is necessarily at a high level. I am able to provide a more

fulsome response to the issues covered in this statement if the Panel requires further assistance from me.

4. For the purposes of brevity, this statement generally excludes the following topics, raised in written comments, as they are responded to in detail by other experts as noted below:

   a. Brian Lloyd: Frog population estimates, and frog monitoring statistical analysis and design;

   b. Dr Helen Blackie: Pest animal management;

   c. Dr Graham Ussher: Biodiversity offset modelling; and

   d. Dylan van Winkel: Effects of vibration and dewatering on native frog species.

Code of conduct

5. I confirm that I have read the code of conduct for expert witnesses contained in section 9 of the Environment Court Practice Note 2023 and have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are within my area of expertise, and I have not omitted material facts known to me that might alter or detract from my evidence.

Department of Conservation: Section 51 FTAA report Appendix C Concessions Report, Appendix D Wildilfe Approval and Section 53 Comments on a Project under the Fast-Track Approvals Act

6. I have grouped the comments from the Department of Conservation (**DOC**) into themes in my response below, as the matters were generally raised across several reports and in comments on conditions.

Site selection / Multi Criteria Analysis process

DOC Wildlife Approval report paragraph 77: Lizards are not included in the MCA site selection process.

7. There appear to be some inconsistencies in this matter. Nevertheless, lizard habitat of generally high quality is available throughout the Wharekirauponga forest and the addition of criteria specific to lizards does not inform the multi-criteria analysis (**MCA**) process any further. I understood the MCA objectives and criteria included 'At Risk' and 'Threatened' herpetofauna (i.e., including lizards and frogs).

DOC Concessions report paragraphs 86 - 87: Man-portable sites do not require surveys. DOC prefer that they were surveyed.

8. I agree with this comment. The approach to surveys of man-portable sites has now been changed (refer to the proposed conditions on the Access Agreement) and the ELMP-WUG includes a one-night survey of proposed man-portable drill sites to search for frogs and lizards before the site is fenced. These details are also noted in the DOC Wildlife Approval report, paragraph 103.

DOC Concessions report paragraphs 88-90: The DOC report states that the MCA and the stated MCA objectives are inconsistent. The current MCA criteria relating to frogs will not result in the avoidance of effects and will create adverse impacts on frogs within the "low" and "moderate" categories – this is not acceptable for Threatened or At Risk frog species. Also does not sufficiently protect lizards.

9. Lizards are at very low densities in the forest, and in over 100 drill sites surveyed previously have not been detected at a drill site. Nevertheless, the MCA evaluation is only the first step in the proposed management. Other management includes surveys and very thorough salvage over several days to capture fauna remaining within the site before and during vegetation clearance.

DOC Concessions report paragraph 91: The MCA process does not exclude sites with 'high' ranking.

10. This comment is correct, the MCA process is only a tool to rank sites relative to each other. The MCA process was based on experience in Wharekirauponga between 2017 - 2024, and recognition of sites that are more likely to be occupied by frogs based on the available habitat types and extent. Sites will still be surveyed prior to vegetation clearance to reduce and where possible, avoid impacts on native lizards and frogs.

Impacts of vegetation clearance

DOC Concessions report paragraph 92, and Wildlife Approval report paragraph 123 and Access Arrangement condition 2.4.7: DOC supports ecological surveys prior to vegetation clearance but proposes a 6 m buffer, rather than 3m. Or identifying night retreat sites and buffer includes night retreat. DOC also recommend undertaking an annual survey to assess if frogs maintain a territory.

11. I understand that imposing a 3 m buffer was an operational decision, made in response to concerns about the initial proposal to salvage frogs from all sites, rather than undertake pre-clearance surveys. To my knowledge, there is no established methodology to identify night retreats. On balance, I consider the layers of management, including: avoiding sites with high habitat values (MCA process – vent sites and man-portable drill sites); undertaking nocturnal surveys (drill sites and man-portable drill sites); applying a 3m buffer to all observed frogs; fencing the site to prevent frogs moving into it; careful clearance of the forest floor; and capture and translocation of frogs to a prepared, intensively pest controlled site provide an appropriate level of protection for frogs within 24 drill and vent sites.

DOC Wildlife Approval report paragraph 107: The most recent conditions provided by OGNZL omitted timing for when vegetation clearance can occur.

12. I understand that removing the restrictions around timing of vegetation clearance was an operational decision reflecting the changed approach to frog survey / salvage discussed in paragraph 15 of this statement. Conditions 2.44-2.46 of the Access Arrangement conditions detail the approach to pre-clearance surveys and site fencing to prevent frogs moving into the site after the survey, and is consistent with the previous Access Arrangement conditions. Male Archey's frogs brood eggs and froglets between October and February and do not emerge from refuges in this period. If surveys are carried out between October and February, an additional night of survey must be carried out between March and May to ensure male frogs that may have been brooding young are available for survey. In my opinion, once surveys have been completed, including those when males are emerged, the site is thought the be free of frogs and restricting the timing of vegetation clearance is not required.

Frog translocation (salvage and release)

DOC Concessions report paragraph 92 & 93, 120, DOC Wildlife Approval report paragraph 110-112: Frog salvage and release details are insufficient

13. The ELMP-WUG (Section 4.2.7) / Native Frog Salvage Release Plan has been updated to address the points DOC has made with respect to frog salvage and release, and the release site.

DOC Concessions report paragraph 96: Frog salvage has a poor success rate, and aspects of the proposed translocation are experimental.

14. I acknowledge the poor historical success of frog translocations, both in the NZ context (which is limited) and internationally. I further acknowledge the experimental nature of soft-release pens (although their use has been promising for lizards in NZ). However, a review of frog translocations (Wren at al 2023, but also Cisternas 2019 and Cisternas et al 2021) has identified the following causes of failure in previous translocation projects:

a. invasive predators at the release site;

b. small founder numbers;

c. homing; and

d. poor habitat quality.

15. The frog translocation proposal for the WNP includes management of these variables through comprehensive predator control, using a release site with resident frogs, releasing frogs into pens for up to five-year post-translocation to reduce homing; and using habitat known to be occupied by Archey's frog and supplemented with materials from the translocated frogs' home site.

16. In my opinion, the extent of planning and preparation for this translocation, based on the learning of previous translocations in New Zealand and elsewhere is more robust and exceeds the effort of most of the studies cited in the literature, and thus a higher success rate is expected. I note that under the previous Access Arrangement (Condition 91)[1], there was a provision for frogs detected during site clearance to be translocated 100 m away. As such, I consider the proposed translocation approach an improvement.

DOC Wildlife Approval report paragraph 126: The use of release pens for frogs does not give DOC any improved confidence in success

17. Further information about the proposed release pens, and the release site features are provided in the updated ELMP-WUG (Section 4.2.7) / Native Frog Salvage Release Plan. I acknowledge that soft-release pens are unproven tool for native frog translocations, but they have been shown to reduce post-translocation dispersal of green geckos (*Naultinus* spp., e.g. Monks et al 2017) in New Zealand and in my assessment, the method looks very promising. Soft-release pens were incorporated into the frog

[1] Reference 48614-AA-V1 Access Arrangement Variation/Consolidation: If 4 or fewer frogs were detected immediately prior to, or during site clearance, Condition 91 of the AA required that they be captured and relocated at least 100 m away[1] (i.e. translocation was a possible outcome of the site clearance – and was undertaken 3 times).

management for this project to increase site fidelity because post-release dispersal was a concern that Archey's frogs are "highly site faithful" (DOC Section 53 report, paragraph 16); and to ensure frogs stayed within the intensive pest control area surrounding the Fauna Release Site. The use of soft-release pens provides an opportunity to assess the success, or otherwise of soft release methods for native frogs.

DOC Wildlife Approval report paragraph 127: Compensation may be warranted to account for the risks posed to frogs from translocating them

18. In my opinion the proposed compensation, as well as mitigation / management measures which are being conducted with a high level of care, are a fair and proportionate response to the potential need to salvage a small number of frogs.

DOC Wildlife Approval report paragraph 128 and 129: There is a risk of disease, competition, and lack of space, and the plan should include contingency for a higher than expected number of frogs to be translocated

19. I acknowledge the potential for disease transmission between resident and translocated frogs. However, I consider this risk is low because the frogs are a meta-population within contiguous forest, and disease transmission could be through other vectors (e.g. pigs).

20. The rationale for the release site was that frogs are under significant predation pressure in Wharekirauponga Forest (as described in report B40). As such, habitats within Wharekirauponga are unlikely to be at carrying capacity. Population modelling has been undertaken to derive a population density within Wharekirauponga based on extensive survey data and using data collected by an MSc student.

21. I acknowledge the difficulties in comparing data gathered using different methods, with varying numbers of replicates (described in B.41).[2] However, it is apparent that when compared to other long term monitoring sites, Wharekirauponga has a lower density frog population (see Table 19 in B.40,[3] and Section 5.1.2 of B.37).[4] With the pest control proposed for the release site, I am confident that a higher density frog population could be supported.

22. For this reason, I do not consider there is significant risk of competition or lack space. The ELMP-WUG / Native Frog Salvage Release Plan proposes that up to 30 frogs are released per pen (of which there are six). That allows for 180 frogs to be translocated, many more than anticipated will be found. Each pen is expected to have a resident frog population of 5-10 frogs. The soft-release pens are proposed to be removed when the number of frogs (accounting for detection probability) reaches 80 / pen, or at 5 years, whichever is sooner. These targets and triggers were calculated based on Wharekirauponga frog density data and can be expanded upon further if required.

DOC Wildlife Approval report paragraph 122 and 130, 147: DOC states that there is no evidence that salvage translocations will benefit or have a neutral outcome for frogs. Salvage translocations are not recommended, unless there is evidence of individual survival. Further, paragraph 130 notes that with the proposed pest management, there would be no additional benefit to frogs resulting from translocation and the release site may be at carrying capacity

23. The pest control package was designed to address residual adverse impacts on Archey's and Hochstetter's frogs (Section 8.5.4. of B37).[5] However, I consider that the salvage translocation of frogs would provide

2 B.41 *Estimating the Proportion of Coromandel's Archey's Frog Population in the Area Affected by Vibrations from the Proposed Wharekirauponga Underground Mine*.
3 B. 40 *Pest Animal Management Plan*.
4 B. 37 *Terrestrial Ecology Values and Effects of the WUG*.
5 B. 37 *Terrestrial Ecology Values and Effects of the WUG*.

the following conservation and research benefits, over and above the benefits associated with pest control:

a. Protecting individual animals that occur within the footprint of proposed drill sites, that otherwise would likely be killed during vegetation / habitat clearance (i.e. translocations are consistent with the purpose of the Wildlife Act);

b. Documenting all stages of the translocation(s) and monitoring outcomes to assess success / failure / areas for improvement. A lack of transparency and long-term monitoring is a key critique of mitigation driven translocations (e.g. Germano et al 2015);[6]

c. The opportunity to monitor the behaviour of translocated and resident Archey's frogs in a soft release pen, including movements, reproductive behaviour, and small-scale distribution of frogs relative to each other. This is a new research field; and

d. Development of a photo ID dataset, and long-term population monitoring dataset for another Coromandel Archey's frog population. Population monitoring would track the population response to pest control and pest exclusion.

DOC Wildlife Approval report paragraph 131: DOC has questioned the suitability of the release site for Hochstetter's frogs in the event they are detected during site clearance.

24. Proposed drill and vent sites are unlikely to be in habitats associated with Hochstetter's frogs because of the practicality of managing water inflows and sediment. However, I acknowledge that there is potential for Hochstetter's frogs to be present in proposed drill site areas and agree that details of a release site are required. These will be added to the updated ELMP-WUG / Native Frog Salvage Release Plan. The proposed Fauna

[6] Germano, J. M., Field, K. J., Griffiths, R. A., Clulow, S., Foster, J., Harding, G., & Swaisgood, R. R. (2015). Mitigation-driven translocations: are we moving wildlife in the right direction?. Frontiers in Ecology and the Environment, 13(2), 100-105.

Release Site does incorporate streams or rivers because it is difficult to exclude pest animals from waterways.

DOC Wildlife Approval report paragraph 134: Inconsistency about descriptions of where lizards, frogs and At Risk invertebrates will be released

25. The translocated fauna will be released into the Fauna Release Site. Alternative phrasing will be corrected in conditions and management plans.

DOC Wildlife Approval report paragraph 144: Best practise methods for handling and holding frogs have not been included in the conditions

26. The ELMP-WUG (Section 4.2.7) / Native Frog Salvage Release Plan has been updated to include these matters.

Translocation monitoring & contingency

DOC Wildlife Approval report paragraph 138: Frog translocation monitoring will take many years to measure outcomes

27. I agree with this comment. Monitoring is proposed to begin prior to translocation (baseline resident population monitoring) and extend for the life of the mine, with timing to coincide with the conclusion of pest control described in report B40.

DOC Wildlife Approval report paragraph 140: Further detail is required to define objectives, progress and success measures

28. Further information about these matters is provided in the updated ELMP-WUG (Section 4.2.7) / Native Frog Salvage Release Plan, but I agree that measurable, statistically robust targets should be developed. As noted above, it is likely to take many years to assess success, or otherwise. Dr Ussher in his statement (paragraph 13) has proposed a new condition to

set the target for population increase at 3 times the current population abundance after 15 years. I agree with this target and his rationale.

DOC Wildlife Approval report paragraph 142: A contingency needs to be developed in the event that the salvage translocation is unsuccessful

29. In my view, it is unclear how contingency actions would be undertaken given the time lags in measuring response to translocation noted above (paragraph 41). Translocation methodology and activities will be documented with a high level of detail as each translocation is undertaken, allowing for modifications to technique etc. Conditions 2.95 of the Wharekirauponga Access Arrangement allow for responsive management changes, and for these to be communicated to DOC.

Lizard salvage and release

DOC Wildlife Approval report paragraph 87: DOC recommends greater management if lizards with a higher threat status than 'At Risk' are detected, and monitoring triggers should be established if high numbers of lizards are detected

30. I agree that a trigger for lizard monitoring should be included in the updated management plan in the event a high number of lizards are detected and translocated.

Other matters

DOC Wildlife Approval report paragraph 189: Stag beetles are not included in the list of invertebrates to be salvaged during site clearance

31. Stag beetles have not been recorded at clearance or survey sites previously; however, the intention is to capture and relocate all stag beetles to the Fauna Release Site if detected.

Hauraki District Council Feedback Waihi North Fast-Track Application

32. In my view, the report provided by Alliance Ecology and Bluewattle Ecology did not contain substantive technical matters to respond to in this statement. I have briefly addressed some of the recommendations made in that report regarding conditions, noting that other specialists have done likewise.

Condition 111 and 112: Fauna Release Area.

33. The translocated fauna will be released into the Fauna Release Site and alternative phrasing will be corrected. Further information will be provided in an updated ELMP-WUG / Native Frog Salvage Release Plan to address Hochstetter's frog translocation.

34. I agree with the suggested changes made in the Hauraki District Council regarding conditions 134, 175, 176, 185, 195, 197, and 205, and to the Waikato Regional Council / Hauraki District Council common conditions C47A, C47B, C49, and C52.

Royal Forest and Bird Protection Society of New Zealand Incorporated (Forest & Bird)

Forest & Bird report, at paragraph 88a – i: identifies potential adverse effects and raises concerns about the uncertainty regarding how many frogs and to what magnitude they might be affected

35. I acknowledge this uncertainty, but in my view, these matters are described and quantified to the extent possible in my report (B.37),[7] and those of other specialists (e.g. B.38[8] and B.39[9]). Uncertainty is inherent in ecological systems, and I consider that that the level of effect (with management) summarised in Table 10 of my report (B.37, pages 86 - 87), and described in the report sections prior to that, is an accurate assessment of the

7 B.37 *Terrestrial Ecology Values and Effects of the WUG*.
8 B.38 *OGNZL Wharekirauponga Mine: Assessment of effects on native frogs*.
9 B.39 *Proposed Wharekirauponga Underground Mine Native Frog Effects Assessment*.

likelihood of those effects and the level of risk they present to native frogs, and other fauna.

Forest & Bird report, at paragraph 88 e: describes their concern about post-translocation survival of Archey's frogs

36. This matter is addressed in paragraph 24 of this statement.

Forest & Bird report, at paragraph 88 f: describes their concerns about the MCA process and potential residual effects on native fauna.

37. These matters are broadly addressed in paragraphs 7, 9 and 10 above.

Forest & Bird report, at paragraph 88 h: identifies a lack of information about Hochstetter's frog translocation.

38. This matter is addressed in paragraph 25 above.

Forest & Bird report, at paragraphs 106 and 107: suggest that the impacts of habitat loss and vegetation clearance have been "downplayed".

39. I firmly disagree with this representation. The local effects are very high for the immediate footprint, but are highly localised and temporary. The Vegetation Management Plan (ELMP-WUG, Part 5) describes how the vegetation and habitats will regenerate to be virtually indistinguishable from the surrounding forest in time. In my experience undertaking fauna salvage at several drill sites in Wharekirauponga, vegetation communities are common assemblages of regenerating forest.

Forest & Bird report, at paragraph 109 addresses potential effects to native lizards

40. I note that DOC has assessed lizard management within Coromandel Forest Park to be "appropriate" (paragraph 87 of the Wildlife Approval report). Lizard surveys in Wharekirauponga have only detected two species of lizards, both of which are 'At Risk - Declining' and have been recorded in

very low (single digit) numbers. It is incorrect to say a range of species are affected if they have not been detected in that part of the forest. With respect to Northern striped gecko (*Toropuku inexpectatus*), their southern distributional limit is unknown, but the furthest south they have been recorded is Te Puru (>35 km northwest of Wharekirauponga).

Coromandel Watchdog of Hauraki Comment

41. Several of the factual and substantive matters raised by Coromandel Watchdog have been addressed in this statement above (e.g. translocation success).

42. Appendix A from Coromandel Watchdog makes two comments (paragraphs 9 and 10) about the potential impact of subsidence:

> *7. The ELG report referenced in the Assessment of Effects limited comments on subsidence in the WUG project to the impacts that could occur on streams, despite determining that subsidence in the WUG area forest could include "total settlement of up to 300 millimetres up to 1000 millimetre (1metre)". There has been no further consideration of the ecological effects of subsidence on the forest and the ELG assert that monitoring is not required.*

43. My opinion on the impacts of subsidence / settlement above the WUG are informed by report B.13[10] and the evidence of Trevor Matuschka, paragraph 26 onwards, (Appendix S). From his statement, I understand that potential subsidence will not have an effect on streams or forest environments. Specifically, that any subsidence will not impact soil or tree stability within Coromandel Forest Park.

[10] B.13 *Ground settlement report*. EGL

44. With respect to Dr Waldman's statement, I dispute that the proposed activities for which approval is sought "pose a direct and unacceptable risk to the survival of these [native frog] species".

45. The potential impacts of mining would be realised at a local population scale, of which frogs in the footprint of works are only a small proportion of the Wharekirauponga population.

Ngāti Tara Tokanui

46. Ngāti Tara Tokanui has raised concerns about the potential effects of the project, and specifically air discharges on Te Pua o te Rēinga / Te Pua o Marama (*Dactylanthus taylorii*).

47. My report B.37 addresses the potential effects on this taonga.[11] The assessment notes that there are no formal records of *Dactylanthus taylorii* in the Coromandel Ecological Region, and it was not detected during ecological surveys in the Wharekirauponga Catchment. However, Boffa Miskell has subsequently become aware of records of *Dactylanthus taylorii* in Papakai, >40 km north of Wharekirauponga. Nevertheless, an assessment of potential effects, including air quality impacts, concludes that the magnitude of effects on fauna and *Dactylanthus taylorii* is low.

Ngāti Porou ki Hauraki

48. Ngāti Porou ki Hauraki raise concerns regarding how vegetation clearance, and mining activity, reduce the ability for birds to disperse across the landscape for food, shelter and breeding. Further to this, there are concerns raised whether noise is adequately mitigating the noise effects on birds and what potential impacts on birds' behaviour there may be, particularly species which are threatened and require lack of disturbance to breed.

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11 B.37 *Terrestrial Ecology Values and Effects of the WUG* pages 29 and 76.

49. I consider that vegetation clearance within Coromandel Forest Park is small in scale (0.66 ha), and unlikely to impact food, shelter or nesting resources in the context of the wider forest.

50. Drilling and helicopter activities will cause local "noisy environments" for birds. This is discussed in detail in section 6.4.3 of my report B.37,[12] and I broadly expect that sensitive species will be most impacted and will exhibit avoidance or reduced emergence / activity behaviour for the duration of drilling activity.

51. Drilling and helicopter activities are temporary and the post-drilling character of the forest with respect to noise will not be altered as a result of the WNP.

Iwi generally

52. Iwi generally have expressed in their comments significant concerns regarding frogs (Kurī Peke (Archey's Frog) and Pepeketua (Hochstetter's Frog)), including the effects of dewatering, vibration, and the proposed salvage translocation approach. They note that protocols for translocation have not been adequately informed by tikanga and Mātauranga Māori. Ngāti Pū, in particular, are concerned that the proposed translocation site is of lower ecological quality than the existing habitat.

53. Frog translocation protocols are discussed in my statement of evidence, paragraphs 13-27. I acknowledge that tikanga and Mātauranga Māori have not informed the translocation methodology, but I would welcome an opportunity to discuss these matters in detail.

54. Iwi generally have expressed in their comments significant concerns regarding lizards, including how the disturbance and relocation of indigenous fauna may impact this species.

[12] B.37 *Terrestrial Ecology Values and Effects of the WUG* pages 65 to 72.

55. Two species of native lizard have been recorded in low numbers within the Wharekirauponga area during surveys, and none have been detected during previous site clearance. However, we acknowledge that lizard translocation may result in stress to the lizard, which may be ongoing of they have a strong homing instinct. The proposed release site will be prepared for the likely species to be translocated and will have intensive pest control to maximise the likelihood of success (i.e. persistence and breeding at the release site).

Dated: 1 September 2025

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Katherine Julie Muchna