

**BEFORE THE ENVIRONMENTAL PROTECTION AUTHORITY
AT WELLINGTON**

IN THE MATTER of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (“the Act”)

AND

IN THE MATTER of the applications by Trans-Tasman Resources Limited (TTR) for marine and discharge consents to mine iron sand under sections 20 and 87B of the Act and

BETWEEN **Trans-Tasman Resources Limited**
Applicant

AND **The Environmental Protection Authority**
EPA

AND **Kiwis Against Seabed Mining Incorporated (KASM)**
Submitter

CLOSING SUBMISSIONS FOR KASM AND GREENPEACE
Dated 25 May 2017

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Introduction

1. These closing legal submissions are made on behalf of Kiwis Against Seabed Mining, Inc. (“KASM”) and Greenpeace New Zealand, Inc. (“Greenpeace”). These submissions supplement our opening legal submissions and the submissions of KASM on adaptive management of 10 March. They take into account evidence and matters arising since our opening submissions.
2. The case can be put very simply. An application was put to the DMC for iron ore seabed mining in 2013. It was declined in 2014. Clear directives were given by the 2014 DMC as to the reasons the application failed and the information that should be gathered before a new application was submitted to the EPA. The current application submitted to the EPA in 2016 included new work done with regard to the plume modelling and economics, but the other key areas for work such as marine mammals,

benthic and seabird studies had not been undertaken¹. It just wasn't done. In 2014, adaptive management was only ever available to the Applicant where certainty existed in baseline monitoring, but in this application, adaptive management is not available at all. The revised economic and plume modelling have both been shown to be inadequate. The Applicant faces the same hurdles it did in 2014 but other than the plume modelling, and even that had to be sent back for the 'worst case modeling', has done almost none of the work the Applicant needed to do to overcome them. Even if adaptive management was available, the hurdle would not have been surmounted without adequate baseline information which the Applicant simply has not produced. Furthermore, the work done in economics and plume does not demonstrate that adverse effects to the environment can be avoided, remedied or mitigated nor positive benefits to the extent that the Applicant has claimed can be achieved. The Application must be declined.

3. The South Taranaki Bight ("STB") is an area that has not been the subject of any in - depth scientific or environmental research. What we know has always been limited. The Applicant has attempted to convince us that there is in fact a lack of environmental activity in the area. This thinking underpins the philosophy of the Applicant in approaching this application and sums up how things have gone so wrong for the Applicant. Submitters have not stressed uncertainty without reason: the application was and still is the first of its kind, not just in New Zealand but internationally; its effects are new and unique, and the scale of the proposed application is large and unlike any carried out in New Zealand before. In this context, having baseline information and knowing what exists in the environment is crucial. In the absence of adequate information, submitters have sought out the information that is available in this area: on marine mammals, especially in regard to blue whales; fisheries; benthic species; penguins; abundant reef systems to name a few. What this evidence does represent is that the STB is an environment that hosts an array of marine life, supporting some of the most threatened and rare species in the world and a feeding ground for sea-birds, fish, marine mammals and breeding ground for blue whales. This is only what we have found out so far.

¹ Mr Eggers comments, 17/02/17, at page 141, of the transcript: "*We didnt change the project in terms of its basics and where we'd got to at that point. We merely took the same information and took it further and added to it where there were shortfalls that were identified by teh previous DMC.*"

4. While the burden is for the Applicant to prove their case and not for the submitters, the evidence has gone further than simply identifying the inadequacies of the application that has been presented, but has demonstrated that from what we do know this area may be much more significant than anyone previously thought.

Structure of Submission

5. Like the opening submission, this submission discusses some statutory provisions, international legal provisions, adaptive management, conditions, and then discusses evidential matters. It does not repeat the opening submissions and this submission is intended to be read together with them.

Procedural Matters

6. KASM and Greenpeace have submitted in our opening submissions² that the baseline was not completed:

“.....neither benthic investigations, marine mammal surveys, ambient sound measurements, nor appropriate economic analysis which takes account of environmental and social costs were carried out. The result is the that the voluntary environmental, iwi and local communities have had to go to enormous expense, time and stress to again critique and review what is essentially the same application as that which failed previously.”

7. What has happened since then is in essence that: evidence having been found wanting, the DMC gave the Applicant the opportunity to call fresh evidence and the submitters were called upon to help complete the application, with respect to marine mammals and plume modelling. KASM wrote in a Memorandum on 1 March suggesting that relevant experts be recalled consecutively. DMC in Minute 35 of 15 March, then suggested that the DMC consider whether sediment plume modelling witnesses reconvene expert conferencing to discuss modelling information, or recall any of these witnesses and that the DMC ask relevant expert witnesses to provide comment on any impact arising from further modelling information. In Minute 41 of 10 April, the DMC listed additional information questions and requests. Submitters, including

² KASM and Greenpeace Opening Submissions, para [4].

KASM and Greenpeace Closing Submissions

KASM and Greenpeace in their memorandum of 18 April 2017, had concerns with this, given that some of this evidence should have been included in the original application and it was far too late for the Applicant to be given further opportunity to provide this evidence now.

8. Despite its objections, KASM and Greenpeace have continued to engage in the process and made its experts available for caucusing (which has since been cancelled) and filed further supplementary evidence from experts responding to the further information requested in Minute 41. KASM and Greenpeace consider that this last minute request for information however was contrary to the Act and natural justice principles as set out in our memorandum.³ The EPA is tasked with working with an Applicant **prior** to the hearing stage to ensure the application is complete so it can be tested against the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (“EEZ/CS Act”). In section 61(5), “best available information means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time.” That includes unreasonable cost, effort and time of submitters; not just the Applicant or the DMC.
9. In short, it is abundantly clear that the EPA should have returned the application as incomplete under section 41(1): the application should have “describe[d] “the current state of the area where it is proposed that the activity will be undertaken and the environment surrounding the area;” (s 39(1)(b) and “identif[ied] the effects of the activity on the environment and existing interests (including cumulative effects...) (s 39(1)(c). We detailed in our opening submissions the inadequacies pointed out by the first DMC. These matters should have been addressed. Even the plume model – the ‘flagship’ product, if you will – has been found wanting.
10. KASM and Greenpeace also maintain our objections to the ‘Submission Analysis’ report detailed in our Memorandum of February 28. The DMC should place no reliance on this report as demonstrating an accurate picture of the views of submitters.

³ KASM and Greenpeace Memorandum of 18 April 2017.

Statutory Matters

11. These submissions adopt the statutory framework as set out in opening submissions of KASM and Greenpeace. A number of points have arisen through the hearing that need to be touched on further, these include:
 - a. Consultation
 - b. The conflict between management regimes under s 51 EEZ
 - c. Conditions, and
 - d. International law

12. The legislative framework has been well canvassed in our opening submissions but it is necessary to draw the DMCs attention back to the key points when assessing effects on the environment under s 59 against the purpose of the Act in s 10. The purpose of this Act is to promote the sustainable management of the natural resources of the EEZ⁴. Sustainable management means “managing the use, development and protection of natural resources in a way, or at a rate, that enables people to provide for their economic well-being while”.....”(c) avoiding remedying or mitigating any adverse effects of activities on the environment”⁵. The question for the DMC is not whether adverse effects to the environment can be mitigated or not but whether or not effects are avoided, remedied or mitigated.⁶

Consultation

13. The decision of *Wellington International Airport Ltd v Air New Zealand* [1993] 1 NZLR 671⁷ is recognised as the leading authority that outlines the general principles relating to consultation. McKay J applied the *Port Louis Corporation v Attorney-General of Mauritius* decision which stated that⁸:

⁴ S 10(1) EEZ Act.

⁵ S 10(2)(c) EEZ Act. The Act also imposes a general duty on those operating in the EEZ to avoid, remedy or mitigate the adverse effects of the activity on the environment, s 25(2)(a) EEZ Act

⁶ *Trio Holding v Marlborough District Council* 2 ELRNZ 353 at 355 (PT).

⁷ Confirmed in *NZ Pork Industry Board v DG for Primary Industries* [2013] NZSC 154.

⁸ *Port Louis Corporation v Attorney-General of Mauritius* [1965] AC 1111, page 675.

*Consultation must be allowed sufficient time, and genuine effort must be made. **It is to be a reality, not a charade.** The concept is grasped most clearly by an approach in principle. To —consult is not merely to tell or present. Nor, at the other extreme, is it to agree. **Consultation does not necessarily involve negotiation toward an agreement,** although the latter not uncommonly can follow, as the tendency in consultation is to seek at least consensus. Consultation is an intermediate situation involving meaningful discussion. Despite its somewhat impromptu nature, I cannot improve on the attempt at description, which I made in *West Coast United Council v Prebble*, *supra*, 405*

“Consulting involves the statement of a proposal not yet finally decided upon, listening to what others have to say, considering their responses and then deciding what will be done”.

*Implicit in the concept is a requirement that the party consulted will be (or will be made) adequately informed so as to be able to make intelligent and useful responses. **It is also implicit that the party obliged to consult, while quite entitled to have a working plan already in mind, must keep its mind open and be ready to change and even start afresh.** Beyond that, there are no universal requirements as to form. Any manner or oral or written interchange, which allows adequate expression and consideration of views will suffice. Nor is there any universal requirement as to duration. In some situations adequate consultation could take place in one telephone call. In other contexts it might require years of formal meetings. Generalities are not helpful.*

(Emphasis added)

14. Where TTR engaged in a process of consultation with parties, it must have done so on an even footing with all parties, TTR should have provided relevant information in a reasonable timeframe to enable informed consultation and TTR should have reported the outcome of consultation that either supports or objects to the proposed activity and why as part of its application. TTR did not.⁹ It was disingenuous of TTR to report on some consultation and not give a full explanation of why consultation was not followed through with other parties. KASM, while having objected to the proposal in 2013, but nonetheless engaged extensively, was prepared to engage with TTR and requested for this to occur, an offer that was not taken up.¹⁰

⁹ Transcript, day 10, Graham Young at 5, page 1122: “The effort to extract information became the focus of the engagement rather than understanding and building trust and relationship; I believe the very opposite to what TTR was trying to achieve.” Transcript day 17, 20/03/17, page 2092-2093.

¹⁰ *Ibid.*

NZCPS

15. The DMC must consider the impact of the activity on other marine management regimes¹¹ including the Crown Minerals Act and the management regime under the Resource Management Act 1991 (“RMA”) including the New Zealand Coastal Policy Statement (“NZCPS”).
16. The northern boundary of the proposed mining area sits on the edge of the 12 nautical mile coastal marine area (“CMA”). The activity is therefore rightly assessed under the EEZ Act and not the RMA. The effects of the activity, however, are keenly felt in the CMA with the plume models demonstrating that the predicted direction of the plume is north east and towards the coast of Taranaki. The majority of the effects are felt not in the EEZ but in the CMA.
17. Integrated management is a key principle of environmental management in New Zealand. The RMA seeks to integrate the management of air, land, freshwater and marine areas (inside of the 12 mile limit of New Zealand’s territorial sea) into one piece of legislation. Integrated management of these areas is sought to be achieved via a hierarchy of policies and plans prepared at the national, regional and district levels. Policy 4 of the NZCPS provides a general policy of integration:
Provide for the integrated management of natural and physical resources in the coastal environment, and activities that affect the coastal environment. This requires:
 - a. ***co-ordinated management*** or control of activities within the coastal environment, and which could cross administrative boundaries, particularly:
 - i. *the local authority boundary between the coastal marine area and land;*
 - ii. *local authority boundaries within the coastal environment, both within the coastal marine area and on land; and*
 - iii. *where hapū or iwi boundaries or rohe cross local authority boundaries;*
 - b. *working collaboratively with other bodies and agencies with responsibilities and functions relevant to resource management, such as where land or waters are held or managed for conservation purposes; and*
18. What we can draw from the RMA and NZCPS is that where you have management regimes that sit side by side, integrated management encourages consistency and co-ordination between regulators as much as possible.

¹¹ S 59(2)(h) EEZ Act.

19. While it is not the case here, the EEZ/CS Act also provides for a joint application process for cross-boundary activities which are managed both under the RMA and the EEZ Act.¹² Where consents are applied for separately, the EPA may decide that the marine consent application ought to be processed and heard with an application for a resource consent.¹³
20. Legal advice to the DMC¹⁴ given in this hearing agreed with the advice given to the previous DMC¹⁵ which noted that the NZCPS might be relevant “to the assessment of marine consent activities under the EEZ Act (...) as information about the policy framework applying within proximate parts of the CMA”.
21. Integrated management is a key principle underpinning parallel regulatory regimes to ensure fluidity between regulatory boundaries, acknowledging that boundaries are arbitrary when it comes to environmental processes and functions. Where applications are not processed under both regimes but effects of an activity impact both regimes, an integrated management approach between the two regimes must follow.
22. Policies of the NZCPS that are relevant to this application include the avoid policy in Policy 11 of the NZCPS with particular regard to effects to species that are listed as threatened or rare. There are a number of species that are found within the coastal area in the STB which are captured by Policy 1, including:
 - a. the little penguin, which is rare and threatened in New Zealand;
 - b. the Maui dolphin;
 - c. benthic; although we do not know enough about the species that exist in the area, some benthic species in New Zealand are threatened or rare;
 - d. the importance of this area as a habitat for migratory species; and
 - e. the rocky reefs which are rare and unique in the STB¹⁶.

¹² Section 90, EEZ Act.

¹³ Section 93, EEZ Act.

¹⁴ Memorandum of Counsel Assisting the DMC- Further Response to Minute 40, 17 May 2017.

¹⁵ Memorandum of counsel in response to questions from the decision-making committee, 1 April 2014, page 17.

¹⁶ Duty on regional council to monitor effects to reefs in area- find this.

23. While other effects, including sediment outwash from rivers, may be able to be improved or further regulated by the Regional Council, regulating the significant effects from sediment in the EEZ is outside of the Regional Council's jurisdiction. The proposed activity therefore undermines the ability of the NZCPS¹⁷ as a management regime to protect, to enhance and to maintain the environmental bottom-lines of the Coastal Marine Area. This is a relevant consideration in your deliberations.
24. The Applicant should have made an application to the Regional Council under the Resource Management Act 1991 (RMA). Where sediment may settle partly within the CMA, then a resource consent is required under section 12(1)(d)¹⁸ of the RMA. The situation facing the DMC is that described by section 92(b): Subpart 2 applies to an application for a marine consent if a person (b) applies for a marine consent in relation to a cross-boundary activity and does not apply for a resource consent for the activity. If the Applicant had applied for a consent under the RMA, which it should have done, then the DMC could have elected to hold a joint hearing. It did not, and this is at the risk of the Applicant.

International Law

25. On international law, relevant through s 11 of the EEZ/CS Act, we will not repeat our opening submissions, but will firstly recall that we are here because of international law: we are not discussing a proposal in New Zealand's territory, but on its continental shelf and inside its exclusive economic zone. We recall that obligations include:
- the obligation to protect and preserve the marine environment;
 - the obligation not to cause transboundary harm; and
 - the obligation to take a precautionary approach.

¹⁷ Policy 21 NZCPS refers to enhancement of water quality.

¹⁸ No person may, in the coastal marine area (d) deposit in, on, or under any foreshore or seabed any substance in a manner that has or is likely to have an adverse effect on the foreshore or seabed.

26. These obligations are reinforced in the context of mining by article 208 of UNCLOS, which provides that:

UNCLOS art. 208

Coastal States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with seabed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction, pursuant to articles 60 and 80.

2. States shall take other **measures** as may be necessary to prevent, reduce and control such pollution.

3. Such laws, regulations **and measures** shall be no less effective than international rules, standards and recommended practices and procedures.

This provision, in including ‘measures’, includes decisions made by this Committee.

27. The international rules, standards and recommended practices and procedures include the International Seabed Authority Environmental Management Plan for the Clarion Clipperton Zone, which includes as its Guiding Principles the precautionary approach, protection and preservation of the marine environment, prior environmental impact assessments, the conservation and sustainable use of biodiversity and transparency. Operational objectives include to establish periodically updated environmental baseline data for the region, undertake cumulative environmental impact assessments as necessary based on exploitation proposals, and consider the environmental risks (to the Clarion-Clipperton Zone) posed by technological developments in mining technologies.
28. The ICJ in *Gabčíkovo-Nagymaros* observed that “The Court is mindful that, in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage.” (140)

Adaptive Management

29. We observed in our adaptive management submissions of 10 March, that the bright line has to be: “any [other] approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects” (s 64(2)(b) is prohibited.

30. As to the question “what is the adaptive management approach” the Supreme Court in *Sustain Our Sounds* referred to the IUCN Guidelines¹⁹ which they summarised as:

[109] In 2007, the International Union for Conservation of Nature (IUCN) approved a set of guidelines on the application of the precautionary principle. These included a guideline on using an adaptive management approach, which it is said should be used unless strict prohibitions are required. Any such approach should include the following core elements:

- (a) monitoring of impacts of management or decisions based on agreed indicators;
- (b) promoting research, to reduce key uncertainties;
- (c) ensuring periodic evaluation of the outcomes of implementation, drawing of lessons and review and **adjustment, as necessary, of the measures or decisions adopted;** and
- (d) establishing an efficient and effective compliance system.

31. It appears from the Applicant’s Memorandum of 15 March this position was accepted- they, it seems, attempted to remove all adaptive management provisions from their conditions. But nevertheless we submit that they have not succeeded. The end result is that the Applicant, in essence, is now submitting – or must submit – that all the deleted adaptive management provisions are now, and were always, unnecessary and that the baseline is complete. That is clear as the word ‘baseline’ changed in the March conditions to ‘pre-commencement’. That is, and cannot be, the case.

Mr Holm said in his opening submissions:²⁰

While some submitters still maintain that not enough has been done and that the baseline monitoring proposed should have been undertaken pre-lodgement, TTR disagrees. The purpose of a baseline environmental monitoring plan is not to establish the existing environment or the level of predicted effects. That work has been done. Instead, the purpose of such monitoring is to establish proper baseline data at particular sites, against which effects will be measured. In other words, the monitoring is not being used to establish these levels but to ground-truth them. While more monitoring can always be done, the key issue is whether there is adequate information in order to be able to accurately predict the likely effects. The expert evidence of TTR confirms that there is adequate information to make an informed assessment about potential effects. Accordingly, in our

¹⁹ International Union for Conservation of Nature “Guidelines for applying the precautionary principle to biodiversity conservation and natural resource management” (as approved by the 67th meeting of the IUCN Council 14–16 May 2007) [IUCN Report].

²⁰ Transcript, Day 1, February 16, page 16.

submission, there is no uncertainty, there is no inadequacy, in the information before the DMC.

32. In our strong submission, this is not the case. The baseline must be established to establish the existing environment and the level of predicted effects. While the word ‘baseline’ does not appear in the Act, section 39 (1) requires that an impact assessment must “(b) describe the current state of the area where it is proposed that the activity will be undertaken and the environment surrounding the area; and (c) identify the effects of the activity on the environment and existing interests (including cumulative effects and effects that may occur in New Zealand or in the sea above or beyond the continental shelf beyond the outer limits of the EEZ.) In simple terms, establish the baseline and describe the effects against the baseline. Mr Holm initiated his statement above by saying that “While some submitters still maintain that not enough has been done and that the baseline monitoring proposed should have been undertaken pre-lodgement, TTR disagrees.” If by baseline “monitoring” he means establish a baseline then they have not done that, even by the Applicant’s admission noted above.
33. Whether we look at birds, marine mammals, the plume, benthic or ecotoxicology, the evidence has shown that there is uncertainty and there is inadequacy. That is again shown by the fact that the revised conditions now call the monitoring “Pre-commencement” instead of “Baseline” environmental monitoring. The change is an implicit acknowledgement that the baseline cannot be established after the consent is issued: it implies that it has already been established. But it also shows clearly that the monitoring is purporting to establish data – the baseline- which should have been established before the application was made.
34. In relation to the size, composition or effects of the plume, if the uncertainty means that the information available is uncertain or inadequate, the EPA must favour caution and environmental protection, and refuse the consent, consistent with s 64(2)(c), as adaptive management is not available. Granting consent on the basis of ongoing monitoring, which is exactly the approach of the currently proposed conditions, is simply not an option available to the DMC. What the amended conditions have done is remove the mechanism for addressing uncertainty without reducing the uncertainty. It speaks for itself that what is left is uncertainty.

35. The fact that the “PCEMP” will be developed over two years before the commencement of any sand mining shows that it is purporting to provide the baseline data that this DMC should have had. The Applicant has, it seems, abandoned the adaptive management approach, but is trying to dress up the new conditions as non-adaptive management. The purposes condition 43 should have been achieved before the application:

a. Establish a set of environmental data that identifies natural background levels while taking into account spatial and temporal variation;

This should have been done. The deletion of the word ‘baseline’ does not change the fact that it is baseline data they are looking to establish.

b. Confirm the current understanding of the seasonality and natural variability of environmental parameters that will be monitored during iron sand extraction activities;

This should have been done.

c. Provide data to validate the background data used in the Operational Sediment Plume Model, which predicts the sediment transportation processes in the South Taranaki Bight;

This should have been done.

d. Provide data to verify that the 'SSC Limit' values in Schedule 2 are appropriate following the validation of the Operational Sediment Plume Model (Condition 47);

This should have been done. It cannot be done and validated retrospectively after the consent has been granted – that would both be an invalid condition and be adaptive management.

36. The Environmental Monitoring and Management Plan (EMMP) which would follow the PCEMP provides that: “*the Consent Holder may amend the EMMP at any time*”. (condition 51) which makes it “any other approach that allows an activity to be undertaken so that its effects can be assessed and the activity discontinued, or continued with or without amendment, on the basis of those effects” and thus adaptive management. To name but two examples: it must in condition 50 “*d. Identify the limits contained in the ISQG-High values*” - limits which may be changed and “g.

Identify the operational responses to be undertaken if unanticipated adverse effects are identified;” These are classic adaptive management.

37. These core elements are seen in the May 24 conditions: particularly monitoring of impacts based on agreed indicators, periodic evaluation of the outcomes of implementation, adjustment, as necessary, of the measures or decisions adopted; and establishing a compliance system. This is what the Applicant is trying to do, whether called pre-commencement or baseline. It is the same thing with a different name.

38. But there is a more fundamental objection. It is clear from section 61(3) and from *Sustain Our Sounds* that favouring caution and environmental protection means that an activity is likely to be refused, the EPA must first consider whether taking an adaptive management approach would allow the activity to be undertaken. The Supreme Court said that “[125] *As to the threshold question of whether an adaptive management regime can even be considered, there must be an adequate evidential foundation to have reasonable assurance that the adaptive management approach will achieve its goals of sufficiently reducing uncertainty and adequately managing any remaining risk. The threshold question is an important step and must always be considered.*”

And the Supreme Court held at [129] that “the overall question is whether any adaptive management regime can be considered consistent with a precautionary approach” and “The secondary question of whether the precautionary approach requires an activity to be prohibited until further information is available, rather than an adaptive management or other approach, will depend on an assessment of a combination of factors” (then the four factors follow).

“[133] The vital part of the test is contained within [129](d) above. This part of the test deals with the risk and uncertainty and the ability of an adaptive management regime to deal with that risk and uncertainty.” (d) read: “the extent to which an adaptive management approach will sufficiently diminish the risk and the uncertainty.”

39. This makes the result, in our submission, inevitable: there is uncertainty, adaptive management is not available to cure that uncertainty, and so the activity should be prohibited – consent should not be granted - until further information is available.

40. The Applicant has brought this upon themselves. They were put on notice by the first DMC. Yet did not undertake benthic studies. The (already inadequate) benthic studies done for the first application were not part of the evidence here, and so even they cannot be relied upon. They did not undertake marine mammal studies. They did not undertake ambient noise tests. They did not make any effort to establish the sound their proposed equipment would make. They did not – until specifically requested - submit models of noise profiles complete with frequencies. They could have done all these things. But they did not. They relied, almost entirely, on the HR Wallingford modelling. But that modelling, even if 100% accurate, which it is obviously not, cannot cure the above uncertainties. And they were put on notice. We observed in our opening submissions that the first DMC²¹ said that comprehensive and longer-term baseline studies of the presence of marine mammals would have assisted them and the absence of the information left them uncertain as to the significance of the proposed mining area and the wider area of the STB affected by the mining operation to cetaceans. More generally, the first DMC were not convinced there is sufficient ‘baseline’ understanding on which to base the Environmental Performance Objectives as the basis of the overall adaptive management approach and to be able to meet the purpose of the Act²² and there were uncertainties in relation to the plume effects on the benthic environment and the potential for the plume to impact on the rocky reef environments down current from the mining area and on biogenic habitats adjacent to the mining area.²³

Conditions

41. Adaptive management apart, a review of the consent conditions is set out below. It is valuable to touch briefly on the law around drafting of consent conditions, S 61 of the EEZ/CS Act:

²¹ We consider comprehensive and longer-term baseline studies of the presence of marine mammals in the STB would have assisted us to understand the importance of the STB to various species and what they use this area for (e.g foraging, breeding, calving, migrating etc.). The absence of this information leaves us uncertain as to the significance of the proposed mining area and the wider area of the STB affected by the mining operation to cetaceans. First DMC para 351.

²² First DMC para 837.

²³ First DMC para 290.

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61 (1) When considering an application for a marine consent, the Environmental Protection Authority must—

- (a) make full use of its powers to request information from the Applicant, obtain advice, and commission a review or a report; and
- (b) base decisions on the best available information; and
- (c) take into account any uncertainty or inadequacy in the information available.

(2) If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the EPA must favour caution and environmental protection.

(3) If favouring caution and environmental protection means that an activity is likely to be refused, the EPA must first consider whether taking an adaptive management approach would allow the activity to be undertaken.

- 42. We have italicised (3) as it clearly is not longer applicable because section 87F(4) prohibits the application of conditions that together amount or contribute to an adaptive management approach. That is important, as it means that the Applicant cannot follow up a finding under (2): (the information available is uncertain or inadequate, the EPA must favour caution and environmental protection) with adaptive management.
- 43. Section 63 on Conditions of Marine Consents supports this: it provides in subsection (2) that “The conditions that the EPA may impose include, but are not limited to, conditions—“(a) requiring the consent holder to—(iii) monitor, and report on, the exercise of the consent and the effects of the activity it authorises”. But it also provides in (b) for conditions “that together amount or contribute to an adaptive management approach.” That would of course follow on the monitoring provisions. But again, they cannot be applied due to the section 87F(4) prohibition.
- 44. In addition, marine consent conditions under the EEZ/CS Act need to satisfy the *Newbury* principles (which apply to resource consent conditions) to be valid

conditions.²⁴ In addition to the above, we submit that as with RMA conditions, marine consent conditions are invalid if they are not certain and enforceable and within the consent authorities power to impose.²⁵ Conditions need to have an evidential basis and be able to be reasonably achieved and imposed.

45. The EPA report drafted by Rob Lieffering reviewed the conditions of 2 May and identifies a number of key issues which KASM and Greenpeace submit the Applicant cannot overcome. The EPA report seems to imply that there are ways to “fix” the conditions. The “fix” however relies on the availability of the PCEMP to establish baseline information and the EMMP to be adapted and changed as the consent progresses. This is adaptive management and is not available. Secondly the report ignores the wide discretion given to the EPA to authorise key parameters once baseline is established, such parameters should be known from the outset, conditions that require population controls and monitoring of significant adverse changes without establishing what the population of a species is or what significant means are unable to applied unless the EPA steps far outside of its role as a regulator and becomes a decision maker of those parts of the consent which will have been left undecided. During the hearing on 24 May, Dr Mitchell set out that there remained 8 areas of disagreement and stressed that there are many areas of agreement. The 8 areas are however significant and cannot be overcome. The issues identified by the EPA report with the conditions can be summarised as follows and which KASM submit the revised conditions of 24 May have set aside:
- a. A number of conditions result in the EPA fulfilling the role of an arbitrator and such conditions should not be imposed. Proposed conditions 6(c), 8 and 9 all used the words ‘...as determined by the following advice from the TRG...’ in respect of making a decision on whether a ‘significant change in the SSC statistics or species diversity and abundance has occurred and whether the macroinfauna

²⁴ *Newbury DC v Secretary of State for the Environment* [1981] AC 578 and *Housing NZ Ltd v Waitakere City Council* [2001] NZRMA 202 (CA). The principles as set out in *Newbury* require that a condition: be for a resource management purpose, not an ulterior one; Fairly and reasonably relate to the development authorised by the consent to which the condition is attached; and Not be so unreasonable that a reasonable planning authority, duly appreciating its statutory duties, could not have approved it.

²⁵ *Mount Field Ltd v Queenstown Lakes DC* [2012] NZEnvC 262 at [77].

benthic community has recovered.²⁶ The EPA report goes on to set out that what constitutes a significant change needs to be determined. This fails to acknowledge that what is “significant” cannot be determined without baseline knowledge of what already exists. There is no way to fix these conditions.

- b. Effects to Seabirds and Marine Mammals have set bottomlines which are not achievable and which have not been demonstrated in the evidence. Both consents require “no adverse effect at a population level”. How is this to be applied when firstly the current population levels are not known and secondly where it is argued that these species will move out of the area where effects are felt? Conditions 61 (b) and 62 (c) set out in regard to seabird and marine mammals that mitigation and management plans will set out indicators of adverse effects. Essentially what are adverse effects, how they will be identified and how they will be monitored is still to be determined and authorised.
- c. The EPA report then discusses the conditions which require management plans to be prepared,²⁷ but that these management plans need to be ‘hard coded’ conditions rather than embedded in the respective plan. The management plans cannot be developed as the consent progresses: this is a key part of adaptive management as is not available here, but even if adaptive management was available, this condition would still fail for uncertainty.
- d. TTRLs proposed conditions allow locations, frequency and duration to be amended through the conditions. These are parameters that need to be established at the forefront. Essentially, many or even a majority of the conditions are subject to change.

Further to those issues identified in the EPA report, the following issues also apply:

- e. The EPA report approves the latest set of conditions including both discharge limits and receiving limits. However, the evidence has not established firstly how the discharge limit is to be controlled, and secondly how the EPA can determine

²⁶ EPA Analysis of Conditions Report, 17 May 2017 at [10].

²⁷ Ibid at [11] and [12].

an appropriate receiving environment limit when it have inadequate information of what exists in the receiving environment.

46. Due the failing of the Applicant to provide front-end information, these conditions put a huge burden on the EPA to help TTR make their application work. Along with this burden, the EPA starts to fulfil two roles, as an assistant to TTR and drafter/adjudicator and as the compliance officer. All of the modelling has been carried out on a two year basis, yet these conditions are drafted to apply for a 35 year period. The conditions are subject to adaptation and change throughout this period to allow for what was not predicted by the Applicant, not only is this adaptive management but it also means that conditions are not known, reliable or predictable. In addition to the above, marine consent conditions are invalid if they are not certain and enforceable and within the consent authorities power to impose.²⁸
47. The conditions must be based on evidence as produced during this hearing. Condition 6, for example allows for a 10% increase in the plume. So the DMC should at the very least increase all evidence – on optical quality, primary productivity, benthic effects etc – by 10%. But worse, condition 46 allows for those SSC levels to be increased - beyond that which was assessed at the hearing.

The Evidence

48. In brief, the data does not exist, the experiments were not done, the baselines were not satisfactorily obtained, the plume model is only a model.
49. If full-scale mining was to commence at the scale laid before the DMC, it would be very difficult to know the effects, due to time lags, and again, the lack of a baseline means that ascertaining the effects would be impossible.

²⁸ *Mount Field Ltd v Queenstown Lakes DC* [2012] NZEnvC 262 at [77]

50. The DMC should apply s 63(2) to refuse an application for a consent since it considers that it does not have adequate information to determine the application and thus apply the precautionary approach.

The Plume

51. The plume is fundamental to how this entire application holds together. In our submission the plume modelling does not support the conclusion drawn and the application should fail.
52. KASM's primary evidence on plume related to the original plume modelling which these submissions will refer to as the "original plume model". As with other submitters; we raised a number of issues canvassed below. A primary concern also held by a majority of experts²⁹ concerned the reliance TTR placed on a model which it stated reflected the extent of effects that would be seen in the South Taranaki Bight ("STB") but which in fact more accurately should be described as an averaging of effects influencing the expected plume. As with any models the reliance that can be placed on the model extends only as far as one can rely on the data which is fed into the model and whether all the relevant data has been included. The DMC requested that a second plume model be prepared which would reflect the worst case scenario. These submissions refer to this model as the "Worse Case Plume Model".
53. The Worse Case Plume Model also failed to provide adequate information on which the DMC is able to rely for the following reasons:
- a. The Worse Case Plume Model does not represent the worst case scenario or the potential outcome at a receptor or for a particular marine species.³⁰ This is a problem for two reasons. Firstly, it gives the DMC very restricted information on the actual effects of the worst case plume and secondly because of the ban on adaptive management, it cannot be remedied by conditions. As with other matters, the baseline just is not there.

²⁹ Joint Witness Statement on Sediment Plume Modelling, 13 February 2017, para[9, 25, 29, 32].

³⁰ Worst Case JWS para 6.

- b. Secondly, the independent experts were not given full analysis of the sediment samples and cannot verify the validity of the sediment fractions that have been used in the modelling.³¹ We addressed this problem in our opening submissions. The Applicant witnesses said that what HR Wallingford had was not reflective of the particle size distribution (PSD) of the run of mines. It's reflective of the fines content because they wanted to test how that material behaves in terms of flocculation, settling and resuspension in terms of that very fine content.³² Mr Dearnaley said that it's representative of the fines in the final discharge, but none of the single samples that they've tested will have been an example of that discharge.³³

This was compounded by the problem referred to by the independent experts: the information regarding the mining process and the inter-relation with the ROM was not concisely collated for this application; in effect it was 'drip fed'.

- c. Thirdly, None of the independent experts have had the opportunity to confirm the values on the highest ultra fines content that they could operate at.³⁴ Nor could they confirm the process for calculation of the fine fractions < 38 microns from the TTR production model for a series of ROM with different ultra-fines content.³⁵ Therefore the three independent experts were not prepared to sign off on the values presented in the table (from paragraph 15) until they have had the opportunity to review TTR's source data on PSD analysis, sediment core logs and complete laboratory reports on the PSD. "Based on the lack the evidence it is not possible to accurately define the worst case parameters for fines discharge."³⁶ TTR experts set an upper limit of 2.25% ultra fines that could be mined. Mr Dearnaley argued that TTR would not consider mining material that contained more than 2.25% ultra fines for more than a week and mud

³¹ Worst Case JWS para 8.

³² Mr Brown. Transcript Day 2 17/2/17 page 178

³³ Mr Dearnaley Transcript Day 3 20/2 page 264

³⁴ Worst Case JWS para 11.

³⁵ Worst Case JWS para 15.

³⁶ Worst Case JWS para 16.

lenses would not be mined. “This mine process information has not, however, been validated through an independent review.”³⁷

- d. Even now following the Worse Case Plume Model, TTR has not provided bore hole logs and verified laboratory reports for the PSD analysis upon which the second modelling was based. “*What was presented to the experts during the conferencing session were a number of tables extracted from the excel spreadsheets with averages of PSD and pooled data, along with a word document that summarized the data but did not tell the methods.*”³⁸ At the close of the hearing it is still not possible to determine the worst case percentage from the PSD data.
- e. Fourthly, Dougal Greer considers that effect of higher period waves on retention of the 0.1 mm/s material in the mining pit has not been thoroughly explored and that the use of a 2.5 m wave as a cut off does not represent a worst case scenario.³⁹
- f. Fifthly, it is considered by some of the independent experts that the erosion threshold for the fines released by the mining activity will vary throughout the mining area, but in the absence of measured data a worst case scenario for this parameter cannot be established. There is some uncertainty around the erosion rate in the model, but as with the erosion threshold, a worst case scenario cannot be established.⁴⁰

54. The above five problems cannot be brushed over. They mean that the worst case scenario presented will not in fact be reliable as a worst case scenario, it is a worse case scenario only. This is a severe and a very real uncertainty.
55. The first Joint Witness Statement detailed similar uncertainties. No data is provided on the geotechnical investigations undertaken by TTR to assess the particle size distribution of the bed material and the mining tailings,⁴¹ the predicted discharge rates have been provided by TTR and are dependent on the adopted mining and processing

³⁷ Supplementary Evidence of G barbara (10April 2017), at para 18.

³⁸ Supplementary Evidence for G Barbara (10 April 2017), at 22.

³⁹ Worst Case JWS para 23.

⁴⁰ Worst Case JWS para 29.

⁴¹ Sediment Plume Modelling Joint Witness Statement para 9.

methodology,⁴² and there is insufficient information regarding the proposed mining and processing methodology to assess whether or not the predicted discharge rates provide a reliable estimate of the discharge rates resulting from the mining activity.⁴³ Crucially – and a lot turns on this - If the mined material contains a higher proportion of fine sediment fractions, the sediment plume will increase in size.⁴⁴ If the discharged material contains a higher proportion of fine sediment fractions than the ratio of ~3.4% adopted in the modelling the predicted suspended sediment concentration in the plume (SSC) may be increased by a similar ratio of x/3.4 times e.g. approximately 2 times, 3 times, 4 times greater...⁴⁵ Mr Greer in particular has a concern with the wave height (2 metre) and 7 second period used and whether they are representative,⁴⁶ yet it was agreed that potential variability in wave and current conditions- will have an effect on the plume.⁴⁷ Mr Greer, we note, still did not consider that a 2.5 m wave is worst case scenario.⁴⁸ Mr Greer explained⁴⁹ that the size and period of the wave was under estimated, together with the assumptions of constant waves and currents, and the wave energy at the sea floor is underestimated. Analysis of wave data should have been undertaken.⁵⁰ Another uncertainty is flow data from the rivers, as well as whether they are cleaned up so less sediment is being contributed.⁵¹ We want to add here that the proposed mining would be a cumulative impact,⁵² so the DMC should take into account the extent to which the plume would make things worse: in other words, the Applicant cannot rely on an argument that the STB is already compromised.⁵³ Mr Greer also underlined the need for sensitivity

⁴² Sediment Plume Modelling Joint Witness Statement para 10.

⁴³ Sediment Plume Modelling Joint Witness Statement para 11.

⁴⁴ Sediment Plume Modelling Joint Witness Statement para 12.

⁴⁵ Sediment Plume Modelling Joint Witness Statement para 16.

⁴⁶ Sediment Plume Modelling Joint Witness Statement para 25.

⁴⁷ Sediment Plume Modelling Joint Witness Statement para 34.

⁴⁸ Worst Case JWS para 23.

⁴⁹ Transcript Day 3 20/2/2017 page 353.

⁵⁰ Transcript Day 3 20/2/2017 page 360.

⁵¹ Transcript Day 3 20/2/2017 page 356.

⁵² Act section 6(d) any cumulative effect that arises over time or in combination with other effects and Act section 59 (2) The EPA must take into account—(a) any effects on the environment or existing interests of allowing the activity, including—(i) cumulative effects.

⁵³ It has been acknowledged that the use of the term ‘natural’ was incorrect. Benthic Joint Witness Statement. Note questions from Mr Thompson to Mr Greer, Transcript Day 3 20/2/2017 page 363. “Mr Greer, I just want to go back to the issue of background suspended solid concentration. It's now starting to worry me a little. Are you saying it is often used as a licence to pollute more? That if an area has a higher level of sediment even 5 though it's delivered by human activity then that sets the benchmark and we can build on that and say it's only a small amount but the other way looking at it is an environment can only take so much and the environment isn't concerned about where it came from. So when you're looking at a 10 condition you are saying the condition is

analysis,⁵⁴ as well as that the model of the plume itself can't be groundtruthed yet because it hasn't been mined yet.⁵⁵

56. With a focus being placed on the worst case scenario, the attention given to flocculation in the evidence has been less. The Worse case Plume Model assumed flocculation rates within the mining area would be high due to the results from HR Wallingford.⁵⁶ The Applicant however, has failed to answer the issue of why only three samples of sediment characteristics were supplied into this assessment, three samples is simply insufficient⁵⁷. No re-suspension effects were included in the flocculation tests,⁵⁸ and we still do not have a satisfactory answer to the submission of Dr Jacque Malpas of Raglan, a sedimentologist Submitter, who said that only clay particles flocculate and that muds and clays are not synonymous.

Benthic Effects

57. Benthic ecology is a problem, for the simple reason that the evidence from the first application is not evidence in this application, no further information on benthic communities has been gathered since the time of the last application⁵⁹ and the evidence which has been provided has not been tested and the witnesses have not caucused on the evidence provided. The Joint Witness Statement must be viewed in this light. Dr Mead considered that increased understanding of the benthic communities in the mining area and in close proximity (i.e. within 5 km from the operation) would increase the confidence in the predicted impacts.⁶⁰ He said that there was insufficient information upon which to judge whether or not the impact assessment was based upon 'best', 'worst' or 'realistic case' conditions and

bad and no matter what generated it although you could say, it could be relieved somewhat if some remediation was undertaken. So is it possible for the purpose of establishing what is natural to then calculate the human intervention and treat that as, if you like, that's the benchmark for looking at a cumulative effect and what is permissible but hoping that in fact you can in time deal to the noise."

⁵⁴ Transcript Day 3 20/2/2017 page 362. Mr Greer said "But models also have errors associated with them.

There's that famous quote that, "All the models are wrong but some are useful". But you do need to consider the error around your model. Statisticians are very good at this and it's very easy for them to do because statistical models use statistical distributions. The American models can be more powerful but it's harder to determine the error and so you have to estimate it and you have to look at things like sensitivity analysis and conservatism in the model in order to get a feel for the kind of error levels that you have." Page 367.

⁵⁵ Transcript Day 3 20/2/2017 page 366.

⁵⁶ HRW, 2014.

⁵⁷ Supplementary Evidence for G Barbara (10 April 2017), at 21.

⁵⁸ Supplementary Evidence for G Barbara (10 April 2017), at 21.

⁵⁹ Benthic Joint Witness Statement.

⁶⁰ Benthic Joint Witness Statement.

considered that the impacts were under-predicted (in part due to large under-predictions in the model outputs versus the measured data at the seabed) and there would be the potential for permanent changes in benthos to occur.⁶¹ Dr Mead also said that since the background levels at the proposed mining site have never previously been anywhere near as high as will occur if mining was taking place; the offshore waters will be subject to annual discharge rates that are higher than many of the rivers at the coast.⁶²

58. What was agreed was that in the event that the project is approved, it will be highly important that a robust environmental monitoring and management programme be implemented to confirm predictions and mitigate the risk of significant impacts upon benthic communities.⁶³ This has been produced in the form of the PCEMP and EEMP both of which do not provide any certainty of how the latter will be achieved, especially where predictions are shown to be incorrect.
59. There was disagreement as to recovery: Dr Mead and Baxter said that a different progression of species may become established due to changes in substrate, therefore there will be no ‘recovery’.⁶⁴ It was agreed that it was uncertain whether the benthic communities that would develop in the mining area post-mining would be the same as those that existed pre-mining and whether they would serve the same ecosystem function.⁶⁵ Despite assurances from Dr James that recovery of the ecology in the area could be in the order of weeks or months⁶⁶ and Ms MacDiarmid who said “recovery of most species is likely to be rapid and complete within a year of mining elsewhere within the mining area⁶⁷, the conditions imply something else. Proposed condition 9 requires that after 5 years following the completion of all mining activities within 2 km of where the extraction first occurred TTR shall demonstrate that communities at specified locations are within 15% of the average pre-mining abundance. 15 % is a low bar for the assurances that were put forward in evidence. We would be 10 years

⁶¹ Benthic Joint Witness Statement.

⁶² Benthic Joint Witness Statement.

⁶³ Benthic Joint Witness Statement.

⁶⁴ Benthic Joint Witness Statement.

⁶⁵ Benthic Joint Witness Statement 17.

⁶⁶ Transcript, day 4, 21/02/17 page 403.

⁶⁷ Transcript, day 4, 21/02/17 page 441.

down the track from commencement and TTR would have destroyed a massive area before we even get an indication of poor recolonization levels.

60. Another key agreed uncertainty is whether the new species found in and around the Project area are also present in other shelf areas due to the paucity of research data on benthic species in other shelf areas.⁶⁸ Other uncertainties concerned release of toxicants and nutrients to the water column, whether re-colonisation following mining will be more closely linked to sediment PSD than to sediment iron concentrations and whether experimentally derived tolerance limits and sensitivities to suspended sediments of similar species to those in the vicinity of the mining operation are applicable to the species actually present.⁶⁹
61. One area of disagreement was Dr Mead's view is that the often large model under-estimations at the seabed and the unknowns with regard to un-surveyed reefs in close proximity to the operation means that it is difficult to have certainty about the importance of potential impacts to these benthic communities.⁷⁰
62. Following the outcome of the second plume modelling the original issues that arose with the application of this model to effects on benthos remained. The chronic impacts of the plume generated by the mining operation is simply not considered.⁷¹ Dr Cahoon draws a conclusion that the worst case scenario would not create conditions at all close to those already occurring at event time scales in this continental shelf ecosystems, a conclusion which Mr Mead finds "is incorrect."⁷² "The benthic ecology within the proposed mining area, or close to the plume (which includes a range of habitat types), is not adapted to almost permanent low light conditions and suspended sediment, the press impact of the mining activity. They are adapted to pulse events and likely require the intervening calm/increased light periods to maintain the existing community structures."⁷³ In addition, the effects on benthos were averaged over the

⁶⁸ Benthic Joint Witness Statement 17.

⁶⁹ Benthic Joint Witness Statement 17.

⁷⁰ Benthic Joint Witness Statement.

⁷¹ Supplementary evidence of Shaw Mead, 18 May 2017, at [14].

⁷² Supplementary evidence of Shaw Mead, 18 May 2017, at [14].

⁷³ Ibid.

13000 sq km SMD, and that approach is highly flawed as it portrays a much lesser effect than the real effect on areas much closer to the mining site.⁷⁴

Reefs located within 20km of the site

63. It was also agreed that it was uncertain whether and how many sub-tidal reefs are in closer proximity to the Project area than those that have been surveyed.⁷⁵ That could have been remedied with an oceanographic survey. Instead submitters were asked to identify those reefs that were not included in the AEE, once again getting submitters to fill out the application. Since, the time of the expert caucusing, substantial evidence has been presented to the DMC that there are in fact a number of sub-tidal reefs and coral reefs such as the “Crack” which are located within 20km of the mining site.⁷⁶

Primary Productivity

64. It was agreed that effects of light attenuation on primary production are predictions that, predevelopment, are necessarily based upon assumptions derived from factual observations made elsewhere.⁷⁷ The effects on primary productivity have substantially altered following completion of further optical modelling. Pinkerton’s worst case scenario indicates that the optical effects are significantly greater than the results of previous optical effects modelling. Averaged across the sediment model domain optical effects that are relevant to estimating effects on primary productivity were 44% greater in the new simulations than estimated using the models summarised in Pinkerton and Gall (2015).⁷⁸ The application of these results have once again been averaged over the entire sediment model domain which has meant that the results are greatly reduced and are unreliable.⁷⁹ The sediment model domain is an arbitrary area and instead effects showed be average over the area of concentrated effect as shown in the plume modelling.
65. Figure 2-12 of the Pinkerton report shows the estimated average reduction in light intensity in the seabed. “This figure shows that the average area in which light intensity at the seabed would be reduced would be many hundreds of square

⁷⁴ Ibid.

⁷⁵ Benthic Joint Witness Statement 17.

⁷⁶ Transcript, Day 11, 07/03/17, page 1291, 1292, 1224.

⁷⁷ Benthic Joint Witness Statement.

⁷⁸ Supplementary evidence of Shaw Mead, 18 May 2017, at [7].

⁷⁹ Ibid at [14].

kilometres in size and would extend from the mining site along the coast of the North Island south towards Kapiti Island. It is important to note that this figure shows an average, and on some days much larger areas of seabed would be affected stretching to the south and to the south-east or to the east of the sand mining site.”⁸⁰

66. TTR’s impact assessment relies on the assumption that suspended sediment will be low; if this is wrong even to a minor extent this throws out the rest of the predictions. As we saw in regard to optical effects, the second plume model saw a 44% increase in effects in the optical modelling. Slight changes in the plume can have significant and potentially irreversible effects elsewhere.

Ecotoxicology

67. Dr Ngairé Phillips⁸¹ said that there should be a condition that requires inclusion of mercury in the monitoring programme, both the baseline monitoring programme and the ongoing monitoring programme; during the baseline monitoring programme there should be some toxicity tests undertaken on a range of metals to confirm sensitivity of locally relevant species and also that there was a condition that if during the post-baseline phase monitoring indicated levels that exceeded the Anzac Guidelines then there would be further toxicity tests undertaken during that phase as well; as well as a one-off study to look at this issue of the toxicity of nickel and copper to locally relevant species and to develop some site-specific guidelines.⁸² However, there are two important legal considerations to add to this: this confirms that the baseline is inadequate, and since adaptive management is not available, the condition to develop the baseline is *a priori* not available. She also said that we don't know how heterogeneous the area is and, therefore, how representative the samples are would hopefully be addressed through the baseline monitoring.⁸³ Again, as a matter of law, this shows deficiencies in the baseline which cannot be remedied by adaptive management conditions. She also had a concern that if the sediment plume contains metals bound to sediment and the mining is continuous, so these things are being re-suspended and the metals are staying in sediment “is it going to result in an elevation, an increase of the natural -- if you like, natural as in the mining phase. Is that going to

⁸⁰ Second Supplementary Evidence of John Cockrem, 18 May 2017 at [5].

⁸¹ Transcript Day 8 2/3/2017 page 1000.

⁸² Ibid.

⁸³ Transcript Day 8 2/3/2017 page 1001.

increase the background concentrations so that the level of dilution required to avoid a toxic effect is greater?”⁸⁴ While the Benthic Joint Witness Statement recommended ecotoxicity testing as part of the Baseline Environmental Monitoring Plan (BEMP) to establish tolerance levels (to nickel and copper) of larval stages of benthic species that are similar to species occurring in the vicinity of the Project and water and sediment quality monitoring as part of the BEMP and the EEMP, undertaken to determine whether metal concentrations are below the 95% protection level in the ANZECC & ARMCANZ (2000) levels, this is evidence of insufficient information, which cannot be remedied by adaptive management.

Marine Mammals

68. The Joint Expert Witness Statement records both that “Childerhouse noted that he had not been asked by TTR to undertake any additional surveys and directed the question to TTR”⁸⁵ and that “All the experts agreed that additional marine mammal surveys would have provided valuable information for the DMC on marine mammals in the area affected by noise and ecological impacts from the proposed mining operation.”⁸⁶ In a sense that is all that needs to be said. The first DMC said both that comprehensive and longer-term baseline studies of the presence of marine mammals would have assisted them and that the absence of the information left them uncertain as to the significance of the proposed mining area and the wider area of the STB affected by the mining operation to cetaceans.⁸⁷ The work should have been done; it was not. The Joint Witness Statement goes on to record that Drs Slooten, Barbara and Mr Van Helden considered that there are “severe deficiencies” in the design of the existing information and surveys.⁸⁸ The further evidence provided by Dr Childerhouse⁸⁹ does not answer this, the list of sightings provided in Appendix 1 to his evidence “is misleading and inappropriate”⁹⁰, the data is presented in such a way as to imply

⁸⁴ Transcript Day 8 2/3/2017 page 1007.

⁸⁵ Joint Witness Statement Marine Mammals SC2. Childerhouse was not asked to undertake any field studies by TTR. The baseline survey was undertaken by Martin Cawthorn Associates and Childerhouse was only asked to review it by TTR and directed the question to TTR. SC5.

⁸⁶ Joint Witness Statement Marine Mammals SC2

⁸⁷ First DMC para. 351.

⁸⁸ Joint Witness Statement Marine Mammals SC3

⁸⁹ Second Expert Supplementary Statement of Evidence of Simon John childerhouse, 1 May 2017.

⁹⁰ Second Supplementary Evidence of Anton van Helden, 19 May 2017, at [23].

absence of species when in fact the data shows presence.⁹¹ “The lack of new sightings data for the region is not an indication of the absence of animals and is only consistent with the ongoing lack of effort, particularly a lack of systematic survey effort to collect such data.”⁹² That should have been done prior to lodgment. On May 22, Dr Childerhouse re-confirmed that the aerial surveys did not go past the outer boundary of the permit area but went toward shore and along shore. Clearly the likelihood of MMs would be greater further out from the site than further in from the site. Why did they cut off the surveying at that point? Unlike the prevailing influence of the plume, the “area of influence” of noise on Marine Mammals spreads from the source in all directions, not just towards and along the shore. MM Surveys should have been carried out well beyond the permit area.

69. The evidence of blue whales in the STB was accepted by all experts.⁹³ Dr Torres clarified that 10 sightings of 24 blue whales have been recorded within 50 km of the proposed mining site and another 5 sightings of 7 blue whales have been recorded within 60 km of the site.⁹⁴
70. And all the experts agreed that additional marine mammal surveys would have provided valuable information for the DMC on marine mammals in the area affected by noise and ecological impacts from the proposed mining operation. On noise, all the experts agreed that there are no actual measurements of the noise likely to be produced from the mining operation nor of baseline ambient noise for the proposed PPA,⁹⁵ that the noise levels and frequencies from the proposed mining operation are currently unknown and that relevant data need to be gathered. There is no reason the Applicant could have even made an attempt to measure similar activities in Africa or elsewhere. Mr Humpherson’s evidence is frankly all one big guess, relies on hearsay from the 2014 hearing which was not part of the evidence of this hearing,⁹⁶ and which is also based on guesswork, and we submit that no weight would be placed on it.

⁹¹ Second Supplementary Evidence of Anton van Helden, 19 May 2017, at [24].

⁹² Second Supplementary Evidence of Anton van Helden, 19 May 2017, at [27].

⁹³ “Do you accept that the STB is an important habitat and foraging area for blue whales?” All the experts agreed with this statement. SC 3, 8.

⁹⁴ Leigh Torres Further Evidence 6 March 2017.

⁹⁵ Joint Witness Statement Marine Mammals SC13

⁹⁶ E.g. 22 May response to Forest and Bird: “The De Beers IMT reports were made available to the experts post discussion of the Hegley report, in which Nevil Hegley converted in air source measurements of dredging noise to underwater noise levels.”

71. The experts all agreed that information on background intensities and frequencies of underwater noise at the mining area should be obtained by TTR over a period of at least 1 year before mining starts, and that the lack of information on the noise signatures (frequency and intensity) of individual operational components and the resultant operational noise profiles at various stages of operations has not been adequately described at this time.⁹⁷ In other words, all experts agreed that an adequate baseline has not been established either on the marine mammals in the area or on the noise that will affect the marine mammals. Even if adaptive management had been available, that would, according to the Supreme Court in *SOS*, not have been applicable, in our submissions, due to the degree of uncertainty (the third test). But in any case, it is not available, so the DMC is left with the uncertainty. Uncertainty which the Applicant could have addressed by undertaking properly designed surveys and providing necessary noise data. On this basis alone, the marine consents should be refused. This matters: all experts agreed that if the mining operation impacts a large proportion or important area of their habitat/foraging range, then it is likely to lead to significant impacts.⁹⁸ All the experts agreed that increases in sound contribute to behavioural and physical consequences for marine mammals, including blue whales, and to the overall cumulative effects of human activities on these species.⁹⁹ All the experts also agreed that the lack of information on the intensity and frequency range of the noise from the proposed mining operation means it is not possible to determine the likely impacts on marine mammals, including physical and behavioural effects.¹⁰⁰
72. Similarly, on the effect of the plume, all the experts agreed that it isn't known if the area impacted by the sediment plume is a preferential area for marine mammal foraging and therefore it would be useful to investigate this. All the experts agreed that the sediment plume is likely to have ecological impacts, some of which will affect marine mammals using the area, but there was no agreement on the impact of the sediment plume on blue whale foraging.¹⁰¹ The difference between the experts was, as with penguins, a matter of degree and related to the significance of the impact

⁹⁷ Joint Witness Statement Marine Mammals SC4.

⁹⁸ Joint Witness Statement Marine Mammals SC9.

⁹⁹ Joint Witness Statement Marine Mammals SC17.

¹⁰⁰ Joint Witness Statement Marine Mammals SC18.

¹⁰¹ Joint Witness Statement Marine Mammals SC19.

of the plume: MacDiarmid and Barbara did not think there would be significant impacts on krill abundance due to the plume.¹⁰² All the experts agreed that impacts on the foraging area of blue whales should be avoided.¹⁰³ With respect to Maui's dolphin, all the experts agreed that the STB is an important area linking Māui and Hector's dolphin habitat, and that any additional impact on Māui dolphins will be unsustainable and therefore should be avoided.¹⁰⁴ The disagreement was on the density and likely abundance of Māui dolphins in the STB.¹⁰⁵ But that is simply a function of the lack of survey work: all experts agreed that there is a very high level of uncertainty about Māui dolphin distribution, due to the very low population size of Māui dolphins and therefore it would be extremely difficult to robustly describe their distribution.¹⁰⁶ All the experts agreed that any additional impact on Māui dolphins will be unsustainable and therefore should be avoided.¹⁰⁷ Condition 12 will not be discussed in detail because adaptive management is not available, but even a 130 dB is a ten-fold increase on 120dB¹⁰⁸ levels used by NOAA and can generate very strong responses,¹⁰⁹ and would provide little if any protection for marine mammals.¹¹⁰

73. Professor Slooten said that “there are already impacts on Māui dolphin in large parts of their habitat and that this activity may add a further impact and therefore a cumulative impact on Māui dolphin will be increased and this may push them past the threshold.”¹¹¹ She said that adequate surveys would require acoustic and visual surveys with much greater area coverage and intensity¹¹² with three years of baseline data:¹¹³ standard marine mammal survey just as you'd see in US waters.¹¹⁴ Dr Torres said that the key ‘drop in the bucket’ in terms of cumulative effects was noise.¹¹⁵

¹⁰² Joint Witness Statement Marine Mammals SC7.

¹⁰³ Joint Witness Statement Marine Mammals SC20.

¹⁰⁴ Joint Witness Statement Marine Mammals SC11.

¹⁰⁵ Joint Witness Statement Marine Mammals SC11.

¹⁰⁶ Joint Witness Statement Marine Mammals SC11.

¹⁰⁷ Joint Witness Statement Marine Mammals SC21.

¹⁰⁸ Joint Witness Statement Marine Mammals SC21.

¹⁰⁹ Prof Slooten Transcript Day 4 21/2/2017 page 531.

¹¹⁰ Prof Slooten Transcript Day 4 21/2/2017 page 532.

¹¹¹ Transcript Day 4 21/2/2017 page 524.

¹¹² Transcript Day 4 21/2/2017 page 530.

¹¹³ Transcript Day 4 21/2/2017 page 529.

¹¹⁴ Prof Slooten Transcript Day 4 21/2/2017 page 532.

¹¹⁵ Dr Torres Transcript Day 4 21/2/2017 page 550.

74. Further evidence and sound evidence was requested by the DMC in minute 41. The report provided by Duncan, McCauley and Erbe from Curtin University confirms the problems raised by marine mammal experts at the 2014 and 2017 hearings, and pre-hearing discussions. The Curtin University report provides an evaluation, by leading acoustic experts, of the key problems with the evidence provided by TTR on noise and the potential impacts of noise on marine mammals. In summary, the underwater noise predictions are inadequate and insufficient as a basis for a biological risk assessment. Insufficient information is available at this time to estimate the noise levels that would be experienced by marine mammals in the area (“received” levels). Noise produced by several components of the mining operation have been underestimated by AECOM (e.g. crawler source levels and frequency spectra) due to a variety of errors that are detailed in the Curtin University report. Taken together, these errors mean that the noise levels experienced by marine mammals will be at least 9 dB higher than predicted by TTR. The proposed condition of 135 dB at 500 m, is likely to be exceeded much of the time except for short periods of time when there is little mining activity.

Seabirds

75. The STB is within the Cook Strait Important Bird and Biodiversity Area and hence is an area of international significance for the conservation of the world’s birds.¹¹⁶
76. The JWC (16 February) agreed that:
- STB is of international significance for the conservation of seabirds. (6 (a))
 - a number of ‘threatened’ and ‘at risk’ taxa occur within the STB (conservatively ten and 24 taxa, respectively) year-round or seasonally (6(b))
 - there are reports of large numbers of seabirds present within the STB, for example 100,000 prions.(6(c))
 - there have been no systematic and quantitative surveys of little penguins and other seabirds within the STB. (6(e))

¹¹⁶ Evidence John Cockrem, 23 January 2017, at [10].

- it is likely that little penguins breed along the STB coastline. (6(e))
- little penguins swim up to 170 km from Motuara Island in the Marlborough Sounds to the STB (6(f))
- the proposed mining of sand would produce sediment that in turn will increase turbidity and reduce light intensity within the water column, and this would affect seabirds. (6(g) and (h))
- the proposed mining area is <100 km from Stephens Island, the most important breeding site for fairy prions in New Zealand (6(k))
- large numbers of seabirds may be present in the STB at night, including the proposed mining area, and that there is potential for significant mortality of seabirds attracted to mining vessel lights. (6(m))
- The disagreements were about scale: Dr David Thomson was of the view that little penguins would be unaffected by relatively small reductions in light intensity and visibility in the water (6(i)); that any effect on penguins would be too small for population declines or extinctions to occur (6(j)); that the foraging range of fairy prions and other is very much larger than any area that would be affected by mining (6(k)) and (l)
- It was clear that information on seabirds is intended to be obtained through future baseline monitoring: (o). The dispute was whether two years is enough. But since adaptive management is not available, the monitoring cannot cure the lack of knowledge about seabirds in the area regardless of the duration. The DMC is left with a lack of information about the seabirds in the area as well as effects.

77. In response to questioning from Ms McGarry, Dr Thomson said that the application site is part of the habitat for those ten endangered species “for sure” and are all potentially affected by lights at night.¹¹⁷ He said that fairly recent tracking information is “extremely interesting and perhaps slightly unexpected.”¹¹⁸

¹¹⁷ Transcript Day 5 22/2 page 593

¹¹⁸ Transcript Day 5 22/2 page 595

78. His disagreement with Mr Cockrem seemed to draw from uncertainty: “ I think you would be drawing a long bow to go from that set of tracking data to say that somehow the South Taranaki Bight is a critical habitat for the ongoing survival or, the flipside of that, a local extinction for that 10 population. I think we don't have enough information to draw that conclusion at this point.”¹¹⁹ Blue penguins could be attracted preferentially to the mining area because of the prevalence of prey.¹²⁰ Dr Thompson was clear that “it's certainly the case that if sediment is put into the water to make it more turbid, at some point it's going to affect birds that forage in the water column.”¹²¹ “We've got at the moment no direct evidence as to how they respond to the relative turbidity of the inshore environment”.¹²² We don't know whether turbidity per se would cause an adverse effect.¹²³ A systematic survey has not been done to determine how blue penguins respond to turbid water and areas of non-turbid water and what the flow-on effects of those responses are.¹²⁴ Mr Thompson said more information needs to be obtained until we know the importance of krill for food, but that he suspects that it is for some smaller species.¹²⁵ Dr Thompson said very clearly that there is still much uncertainty in what we know about the seabirds in the South Taranaki Bight, including their abundance.¹²⁶ Dr Cockrem made it clear that for the birds what counts is visibility, that the two key points are the additional sediment over and above background. How much there is will change all the time. And more sediment will mean reduced visibility.¹²⁷ If the sediment was, for example, being blown onshore from a southerly wind over a number of days and the penguins had to go and forage or try to get much further out than they would otherwise, that would be an effect.¹²⁸ But in trying to answer the question “What limit in terms of turbidity or in terms of suspended solids concentration would make it difficult for prions or penguins to forage?”, there are no published observations to help us answer the

¹¹⁹ Transcript Day 5 22/2 page 597

¹²⁰ Transcript Day 5 22/2 page 597

¹²¹ Transcript Day 5 22/2 page 601

¹²² Transcript Day 5 22/2 page 602

¹²³ Transcript Day 5 22/2 page 603

¹²⁴ Transcript Day 5 22/2 page 603

¹²⁵ Transcript Day 5 22/2 page 606

¹²⁶ Transcript Day 5 22/2 page 607

¹²⁷ Transcript Day 5 22/2 page 620

¹²⁸ Transcript Day 5 22/2 page 620

question.¹²⁹ Policy 11 of the NZ Coastal Policy Statement calls to "avoid adverse effects of activities" (a) avoid adverse effects of activities on indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists.¹³⁰ Yet Dr Cockrem said that "If the area within that distance up to maybe 20 kilometres from the coast that foraging was reduced due to the turbidity in the water, then logically that might in fact lead to a reduction in breeding success which, to me, would be an adverse effect. Similarly, for the fairy prions, if the pattern of krill distribution, the density of krill is high in an area where there is high turbidity and the seabirds have to go somewhere else, if that happened at a particular time in the breeding season maybe that would have an impact. To me - and this is the basis for me saying - we cannot predict the extent of the adverse effects. We just don't know, is my view."¹³¹ He thinks the most important area of consideration is the reduction in foraging.¹³² He also said that a base study should be done: "I believe that if the sand mining were to proceed, we don't know what the consequences would be for seabirds. My understanding is that this would be an activity in which large sums of money were involved. My answer to your question then is that, given the importance of it, then the spending of a significant sum on seabird surveys would be justified."¹³³ And two years would be too short: three years would not be sufficient to give a representation of good and bad years.¹³⁴ Little penguins do feed on krill to some extent.¹³⁵

79. In summary, it is clear that the DMC tried to close the gap between the two witnesses. But sometimes, in our submission, it is the case that the DMC must decide to prefer the evidence of one witness over another. Dr Cockrem's evidence, in our submission, is powerful, clear, cautious and compelling. A systematic seabird survey was not done, it should have been done, it could have been done, sediment does have effects on birds, including penguins, and ship strike is a problem. In conclusion, the effects are too uncertain and the DMC simply does not have the evidence it needs to permit the activity to go ahead. Condition 10(a) for example requires that there shall be no

¹²⁹ Transcript Day 5 22/2 page 622

¹³⁰ Dr Cockrem evidence page 21; transcript Day 5 page 623.

¹³¹ Transcript Day 5 22/2 page 624

¹³² Transcript Day 5 22/2 page 625

¹³³ Transcript Day 5 22/2 page 633

¹³⁴ Transcript Day 5 22/2 page 633

¹³⁵ Transcript Day 5 22/2 page 634

adverse effects at a population level of seabirds of various classifications: how can this be achieved if the population level is not known?

Economics

80. Jim Binney made it very clear that a benefit/cost analysis has not been done but should have been done: “the EIA can provide useful contextual information for decision-makers, but it's not suitable for a tool for measuring the balance of costs and benefits of a decision to society, and that's what you're charged with doing at the end of the day.”¹³⁶ “But in terms of the economic analysis that has been put before you to inform your decision, it's incomplete and it's inconsistent with the scope of the decision that you have to make.”¹³⁷ In answer to the question “Is it correct that your promotion of the benefit cost analysis is simply your personal view of what should be required?” Mr Binney answered: “No. It's outlined in the Treasury guidelines and so forth.”¹³⁸ Mr Leung-Wei said that a reason he thought a BCA was not critical as there won't be any long-term environmental costs associated with the project.¹³⁹ But he also said that a reason he did not carry out a BCA is the risk of double counting:¹⁴⁰ but agreed in the Economics Joint Witness Statement that “Generally the risks of double counting are reduced if the BCA is done correctly.”¹⁴¹ And he also accepted that loss of biodiversity can have an economic value associated with them.¹⁴² He also agreed that “that a full BCA could be a useful analysis to support decision making in that it could capture and reflect all the costs and benefits associated with the project, allowing for a fully informed decision. It would also assess the net benefits of the project, whereas the current analysis is an estimate of economic benefit only.”¹⁴³
81. And in answer to the question “If the DMC is required by the Exclusive Economic Zone Act to simply look at "economic benefit", would you accept that Mr Leung-Wai's approach was in fact consistent with that requirement?” Mr Binney answered “It comes down to how you actually define benefit. When I define benefit, I am

¹³⁶ Transcript Day 6 23/3 page 738.

¹³⁷ Transcript Day 6 23/3 page 754.

¹³⁸ Transcript Day 6 23/3 page 755.

¹³⁹ Transcript Day 6 23/3 page 725.

¹⁴⁰ Transcript Day 6 23/3 page 716.

¹⁴¹ Joint Witness Statement, Economics, para. 21.

¹⁴² Transcript Day 6 23/3 page 730.

¹⁴³ Joint Witness Statement, Economics, para 15.

looking at market and non-market values and so forth consistent with the RMA Act, so the answer would be no.”¹⁴⁴ Mr Binney also noted that “With a project like this, the actual employment per dollar spend is very low. If you compare that to say any tourism, anything in the service sector, you will actually create a lot more jobs for a lot less money. To put this in perspective, the direct jobs that are created by this project are probably the equivalent of two McDonald's restaurants.”¹⁴⁵ Mr Van Lint maintained his stance that the impacts of the NZ economy are likely to be minimal overall.¹⁴⁶

82. In our submission, a BCA analysis would better help assess the purpose of the Act, being (section 10.2) “managing the use, development, and protection of natural resources in a way, or at a rate, that enables people to provide for their economic well-being while—sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and safeguarding the life-supporting capacity of the environment. It would also assist in assessing the section 59(2)(f) consideration of “the economic benefit to New Zealand of allowing the application” since, as Mr Leung-Wai accepted, loss of biodiversity has an economic value.

Conclusion

83. The Applicant should have, at the very least, done the work the first DMC failed it on and said it should have done. It did not. Marine mammals is the most egregious example, but the most fundamental example is the plume: the Applicant knew how central it was, yet this hearing was delayed and thrown out of kilter by the need to run a worst case scenario, which for reasons we have canvassed was clearly not worst case. And the DMC was left without time to hear the follow up evidence on the effects, due to witness unavailability. So enormous uncertainties remain, not only on the worst case plume model but on the effects of the model presented as worst case, on primary productivity, the benthos, marine mammals and seabirds.

¹⁴⁴ Transcript Day 6 23/3 page 756.

¹⁴⁵ Transcript Day 6 23/3 page 756.

¹⁴⁶ Transcript Day 6 23/3 page 761.

84. The Applicant proposes to fill the information gap by the so called PCEMP and then the following EMMP. But this entire approach fails completely. Firstly, it flies in the face of the Information Principles in s 61 as well as the ban on adaptive management. Even if the adaptive management ban had not been enacted, the Supreme Court in *Sustain Our Sounds* makes it very clear that the consent needs to be based on sufficient information before adaptive management can be applied. It is clear that the information must be obtained during the consideration process: not later. The entire approach in the conditions firstly amounts to an admission that the baseline was not properly assessed, and secondly flies in the face of a statutory prohibition.
85. The DMC must, under s 61(1)(c), take into account any uncertainty or inadequacy in the information available. The consequence of this is spelled out in s 61(2): the DMC must favour caution and environmental protection. Since this would mean that the mining is likely to be refused, the EPA cannot under s 61(3) first consider whether taking an adaptive management approach would allow the activity to be undertaken. An adaptive management approach is not available to diminish the risk and the uncertainty. In this case, there is no acceptable baseline – either in benthic, fish, marine mammals, seabirds or economic considerations. The DMC is then left with s 62(2): the DMC may refuse an application for a consent if it considers that it does not have adequate information to grant the application. Finally, to apply the s 10 purpose test, it will not enable people to provide for their economic wellbeing while maintaining the three environmental bottom lines. This application must be declined.

Respectfully submitted

Duncan EJ Currie and Ruby Haazen

25 May 2017