**Appendix 6a: Air Quality technical expert advice - rock armouring**

# Fast Track Approvals Act 2024 (FTAA) Technical Advice

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| Date | 12/11/2025 |
| To | Jeremy Ecker, Consent Planner, Environment Canterbury |
| From | Suzanne Cawood, Senior Environmental Scientist, Beca Limited<br>Mathew Noonan, Senior Associate – Environmental, Beca Limited |
| Project advice provided for | RMA253705 - Meridian Energy Limited - Lake Pūkaki Hydrostorage and Dam Resilience Works |
| Documents referred to | Draft Air Quality Assessment<br><br>Lake Pukaki Hydro Storage and Dam Resilience Works Air Quality Assessment – Rip-rap Placement prepared by GHD Limited October 2025, for Meridian Energy (**Draft AQA Report**).<br><br>Substantive Application<br><br>Lake Pukaki Hydro Storage and Dam Resilience Works Air Quality Assessment – Rip-rap Placement, prepared by GHD Limited, 5 November 2025 for Meridian Energy (**AQA Report**).<br>Ministry for the Environment, 2016, Good Practice Guide for Assessing and Managing Dust (**GPG Dust**).<br>Lake Pukaki Hydro Storage and Dam Resilience Works – Substantive Application under the Fast Track Approvals Act, prepared by GHD Limited, 5 November 2025 for Meridian Energy (**Application Report**).<br><br>Appendix R – Environment Canterbury Feedback Table |
| Qualifications and Experience | Matthew Noonan – BSc Pure Mathematics, BE (1st Class) Mechanical Engineering, MSc (1st Class) Environmental Science, University of Auckland, Post Graduate Certificate in Biostatistics, University of Sydney. 26 years of experience in Air quality<br><br>Suzanne Cawood – BSc (Hons) and MSc geography, University of the Witwatersrand. 12 years of experience in Air quality. |
| Code of Conduct | Each expert confirms that they have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical report has been prepared in accordance with that Code. In particular, unless they state otherwise, the opinions they express are within each of their area of expertise, and have not omitted to consider material facts that might alter or detract from the opinions that they express. |

## Overview of this review

Separate air quality assessments have been prepared for the proposed rip-rap placement construction activities (Substantive Application - Appendix G) and for the lowering of the lake level below 518m RL (Substantive Application - Appendix F). This review only considers the air quality impact assessment for the proposed rip-rap placement construction activities (Appendix G).

Beca has reviewed the draft air quality assessment (**Draft AQA Report'**) on behalf Environment Canterbury (ECan) and provided feedback to the applicant. It is noted that there have been changes made to **AQA Report** in alignment with these discussions.

## Executive summary/overview

1. Meridian is seeking approvals under the Fast Track Approvals Act (FTAA) to enable access to water stored in Lake Pūkaki below 518m RL, without a Security of Supply Alert or Official Conservation Campaign being initiated by the System Operator, for a period of three years. Meridian is seeking to access water up to 513m RL during this period and in doing so, will require to do some dam resilience work to protect the dam infrastructure due to wave action at the lower water level.
2. The rock armouring construction works are expected to take 12-18 weeks to complete in multiple stages over several years. Construction work may extend beyond the three-year lake lowering period (beyond 2028).
3. Meridian has indicated, in the Application Report, that Gate 18 rip-rap will be inspected only and have not included any works on this gate in their substantive application.
4. The dam resilience work and the infrastructure to support this work is expected to be a source of dust. The dust emitted from these construction activities can have potential health and amenity effects.
5. The level at which the lake will be lowered below 518m RL and the duration of this lowering, will depend on hydrological and meteorological factors. These factors will, in turn, influence the potential for construction work to be undertaken for the dam resilience work (which will influence the dust generation).
6. The Application Report indicates that there is an approximate 3% probability of the lake falling below 518m RL any week in the first year (2026) and this increases to 4% in the third year (2028).
7. The results of modelling provided by Meridian in the Application Report, states there is a 5% probability of the lake remaining below 518m RL for a period exceeding 12 weeks in any one year.
8. The worst-case scenario for lake lowering, stated in the Application Report, is the lake level falls below 518m RL in September and does not return above 518m RL until December. However, it is stated that there is an extremely low (less than 1% probability) likelihood of this occurring.
9. An assessment of air quality effects of the proposed works has been prepared by GHD for the application. The assessment has used the CALPUFF air dispersion model, to assess the impact that the emission of total suspended particulates (TSP) and fine particulate matter ($PM_{10}$ and $PM_{2.5}$) may have on the ambient air quality. The modelling has assumed that the

construction work will be undertaken continuous over an 18 week period (between 15 July and 17 November) over a one-year period. However, the proposed works could be undertaken in series of shorter non-continuous periods over the three-year consent period.

10. Our review of the air quality assessment report has identified several concerns where further clarification is required. An overview of our main concerns is provided in Table 1:

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| **Draft Application – Draft AQA Review** | | | |
| The potential for the proposal to have dust nuisance effects has not been fully assessed in the proposal. | Dust nuisance effects are expected to be the primary air quality issue of concern. These effects have not been assessed fully, which is considered to be a significant omission of the assessment. | An assessment of potential dust nuisance effects should be undertaken. The assessment should be consistent with Schedule 2 of the Canterbury Air Regional Plan (CARP) and the MfE's '*Good Practice Guide for Assessing and Managing Dust*' (GPG Dust). Both guidance documents recommend dust effects are considered in terms of the FIDOL factors and include dust mitigation procedures, if appropriate. | **Resolved.**<br><br>**A FIDOL assessment has been provided in the AQA Report submitted with the Substantive Application. There are concerns with the FIDOL assessment, however these have been addressed later in this table.** |
| The potential air quality effect associated with armouring works of Gate 18 has not been assessed. While it has been stated that these works may not be needed, the applicant has included these works in the application should the need arise. Therefore, an assessment of the armouring of Gate 18 should be included in the assessment. This work | The Gate 18 armouring works is located closer to some of the identified sensitive receptors and therefore, they could be affected more than currently has been assessed. | The assessment should be updated to include the construction works for the Gate 18 armouring works. | **Resolved.**<br><br>**The Application Report indicates while inspections of Gate 18 will be undertaken, no armouring works will be undertaken on Gate 18 under this application.** |

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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| would include the construction of the two access tracks. | | | |
| While usage of the haul roads has been included in the assessment, their construction effects (specifically the right abutment and main dam access ramps mentioned in Section 9.5.2 of the GHD Rip-rap Design and Construction Methodology (GHD DCM)) have not been assessed. The GHD DCM has indicated that these access ramps might require reinstatement works prior to each construction event to restore access affected by wave action. | The construction of these haul roads could be potential sources of dust and should be included in the assessment with proposed mitigation measures. | The effects assessment should be updated to include the construction of the haul roads. | **Unresolved.** Mitigation measures for the construction of haul roads need to be included in the management plan.<br><br>**The applicant has replied that the construction of the haul roads is implicit in the report. While this may be true, no mitigation measures have been mentioned in the draft management plan regarding the construction of any haul roads (i.e. drop height of fine material should be less than 1m to reduce dust generation etc).** |

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| There are numerous concerns with the dispersion modelling assessment.<br><br>These concerns include the suitability of dispersion modelling as an assessment method in this case; the validity of the input parameters used in the model and the modelling methodology. | The assessment has relied primarily on air dispersion modelling to assess the air quality effects of the proposal. Currently, we have a low confidence in the model predictions and the conclusions which can be validly drawn from them.<br>It should be noted that the MfE GPG Dust does not recommend the use of dispersion modelling to assess the impact of dust emission sources, when there is a high level of uncertainty or variability in source emission rates, such as that associated with dust generated by wind erosion. | We recommend that the suitability of dispersion modelling as an assessment method is reconsidered given the level of uncertainty in the predictions. If modelling is to be used for the assessment, then the model inputs and assumptions should be reassessed. The modelling should be undertaken in accordance with dispersion modelling guidelines provided by the NZ Ministry for the Environment.<br><br>. | **Unresolved.** Our concerns with the accuracy of the modelling results and use of the model remains.<br><br>**The modelling presented in the AQA Report remains unchanged from that of the Draft AQA Report. Therefore, our low level of confidence in the modelling based assessment remains.**<br>**While a FIDOL assessment has also undertaken , the inclusion of the dispersion modelling continues to bring uncertainty to the impact of the proposed activities** |
| Insufficient information is provided regarding the results of the dispersion model predictions. The maximum $PM_{10}$ and $PM_{2.5}$ concentrations predicted at sensitive receptors have not been provided in the report. | As the predicted dust concentrations at nearby sensitive receptors has not been provided, we are unable to assess the predicted impacts that the proposal will have at these locations. It is at these locations where people would be most likely | The results of the model predictions at the surrounding sensitive receptors should be summarised in a table.<br><br>Such information would be expected in a resource consent application assessed under the conventional RMA process. | **Unresolved.** Our concerns with the accuracy of the modelling results remains.<br><br>**The AQA Report included the ground level model concentrations (GLC) in Appendix F. However, we continue to have concerns over the modelling assessment as there are clear errors** |

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| | to be exposed to any dust emissions.<br><br>The report indicates that the National Environmental Standard for Air Quality (NESAQ) for $PM_{10}$ is predicted to be exceeded at some locations. These results suggest the effect may not be negligible. | | **in the ground level concentration tables.**<br>**i.e. Table F.4 is labelled maximum $PM_{10}$ 24-hour, however the GLC are being compared against the $PM_{10}$ 1-hour trigger level values.**<br><br>**Table F4 and Table F5 are both presented as maximum $PM_{10}$ 24-hour concentrations. However, the GLC for the receptors change between the sites, with the values presented in Table F5 higher than those in Table F4.** |
| We disagree with some of the conclusions represented on p66, Section 12 of the AQA report including the following:<br><br>*"The amenity value impacts, namely deposited dust, were not modelled in this assessment. However, the modelled impacts of dust on air quality provide a good indication that the nuisance effects of dust from the works are likely to be largely contained to within the site* | Based on the information provided, the modelling results indicate that $PM_{10}$ and $PM_{2.5}$ concentrations would exceed NESAQ and CARP ambient criteria concentrations up to 500m from the works.<br>The modelling results would therefore suggest that the proposal could have an adverse effect on sensitive receptors. | It is recommended that the assessment conclusions are reconsidered and further analysis provided if required. | **Unresolved.** The dispersion modelling assessment results continue to suggest that the 'overall dust' is not minimised as the report has stated.<br><br>**Our concerns remain regarding the level of effect of the proposed construction activities. The predicted GLC with the proposed mitigation controls are predicted to exceed the GPG Dust recommended TSP trigger level up to 640m away, indicating the amenity values and overall effect of the dust is not minimised as stated in the AQA Report**. |

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| *area and in close proximity to the actual works. Hence, the amenity impacts are considered to be addressed implicitly when overall dust is minimised."* | | | **Additionally, the NESAQ criteria levels are still being exceeded with the proposed mitigation measures. This indicates that the proposed mitigation measures are not sufficient to manage dust from the proposed activities.**<br>**We also have concerns for the control factors applied for the haul roads watering. This is discussed in further detail below.** |
| The assessment has not included the cumulative effect of the proposed construction works and the lower lake level (below 518m). | The lowering of the lake and the construction activities will occur at the same time and therefore, cumulative effects should be included in the assessment. | Assess the potential cumulative impacts of the lake lowering and the construction works to determine the full impact of these activities on the air quality of the surrounding environment. | Resolved. However, there are concerns on the proposed mitigation measures proposed in the Management Plan that are addressed below.<br><br>**Section 10.8.2 of the AQA Report indicated there are possibilities for there to be cumulative impacts from the lake lowering and the construction works.**<br>**However, it is stated that it is not feasible to mitigate the dust effects from the lake lowering due to the sheer scale of the exposed area (in kilometres). Additionally, it is stated that construction activities can be minimised or reduced when high wind speeds are forecast or observed (over 5m/s).** |

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| There are inconsistencies in the dust emission rates used throughout the report. These discrepancies suggest the $PM_{10}$ emissions have been underestimated by up to 35%. | The assumptions listed in Section 1.3 of the assessment report state "*the particle size distribution is as defined in Section 5.5, consisting of 57 percent $PM_{10}$ and 23 percent $PM_{2.5}$"*.<br><br>While Table 1 in Section 5.5 of the report notes the fraction of total dust as 34 % for $PM_{10}$ and 23% for $PM_{2.5}$ & $PM_{10}$ (total of 57% of $PM_{10}$).<br><br>Table 9 in Section 9.5 of the report indicates the effective fraction of TSP for $PM_{10}$ is 0.38 and 0.22 for $PM_{2.5}$.<br><br>Table C.1 in Appendix C mentions that the $PM_{10}$/TSP ratio is 0.57 and 0.23 for $PM_{2.5}$/TSP ratio.<br><br>Table C.4 presents the TSP emission rate for construction activity emissions (uncontrolled) to be 31.230 kg/hr. The $PM_{10}$ emission rate is presented as 11.588 kg/hr. This is 37% of the TSP, not the 57% mentioned in Table C.1. | Ensure that there is consistency within the report. Update the assessment should an error have occurred. | Unresolved.<br><br>**This issue remains unresolved, In Appendix R of the Application Report, the applicant's response to this question was that the '*Haul road dust emissions have been based on a ratio of about 35%, not 57%*." While Table 11 of the AQA Report mentions 38% effective fraction of TSP. While the $PM_{10}$/TSP ratio for empty truck haulage in Table 12 of the AQA Report is at 34%.**<br><br>**There continue to be discrepancies in the report.** |

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| | Similarly, the $PM_{2.5}$ emission rate is 6.861 kg/hr which equates to 21.96% and not the 23% mentioned in Table C.1. A similar discrepancy is presented in the modelled construction source emission rates in Table C.5, whereby, the modelled $PM_{10}$ emission rate is only 37% of the TSP. This is 35% less $PM_{10}$ than should be modelled.<br><br>Table C.8 for the activity emissions (uncontrolled) has a $PM_{10}$ emission rate of 2.65 kg/hr, which equates to 35.7% of the TSP. Similarly seen in Table C.9. This indicates that approximately 37% less $PM_{10}$ than should be modelled. | | |
| The MfE's GPG Dust has TSP and $PM_{10}$ trigger levels. The assessment has only mentioned the impact of $PM_{10}$ and $PM_{2.5}$ but not TSP and has not included the TSP trigger levels in its assessment. | The assessment should include a TSP trigger level as well as a $PM_{10}$ trigger level. Dust nuisance effects will primarily be associated with TSP concentrations rather than $PM_{10}$ concentrations. | Figure 16 should be updated to include a 200 and 250 µg/$m^3$ TSP 1-hour trigger level for high and moderate sensitivity areas, as per MfE's GPG Dust. The assessment should update any proposed mitigation measures to include the impact of these trigger levels. | **Resolved.**<br><br>**The modelled GLC were compared against the relevant trigger levels. While these were compared, concerns remain to the effectiveness of the proposed mitigation measures as the trigger levels are predicted to be exceeded up to 640m from the site.** |

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| No justification or evidence has been given that the background ambient dust concentrations used in this assessment are representative of the area. The New Zealand Transport Authority's background concentration map indicates background levels of 18.4 and 7 µg/$m^3$ for 24-hour and annual $PM_{10}$ and 8.8 and 1.9 µg/$m^3$ for $PM_{2.5}$ concentrations respectively for the Mackenzie Census Area Unit (CAU) and even higher background levels for the Mt Cook CAU. | The report has mentioned the dust storms that are known to occur in the area. | Provide justification/evidence that the background dust levels used in this report are representative of ambient air quality in the area. | **Resolved.**<br><br>**Justification was provided in Appendix R of the Application Report.** |
| No dust management plan has been submitted with the application. | Without a draft dust management plan, we have concerns with the adequacy of the proposed mitigation measures and how they plan to be implemented. | At a minimum, a draft dust management plan should be supplied to confirm that mitigation measures are being proposed and will be appropriately implemented. | Resolved.<br><br>**A Draft Management Plan was submitted as Appendix G of the AQA report. While we have concerns with the level of the detail in the draft Management Plan (these concerns are raised in more detail below), this issue is considered resolved.** |

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| **Substantive Application – AQA Report Review** | | | |
| **Length of the consent period.**<br><br>**The Substantive Report and AQA Report both state "*Rock armouring will take a total of 12 to 18 weeks to complete but is expected to be done over multiple stages over several years and works may be required to be completed beyond 2028*."**<br><br>**A consent period of 35 years is being applied for. A period of 35 years is not considered to be temporary in nature.** | **If the construction works are proposed beyond the three-year lake lowering period and occur over the 35 years consent period being requested, there is argument to say that these are not 'temporary works' or as infrequent as the FIDOL assessment has claimed in Section 9.1 of the AQA Report.**<br><br>**The proposed dust management plan does not address how mitigation measures will be implemented during the frequent standby modes (i.e., awaiting low lake levels for greater than a six-month period).**<br><br>**If the construction works are to occur over more than the three years of the lake lowering, is Meridian** | **The applicant needs to provide more detail into how they plan to operate the rock armouring activities over the consent period, how mitigation measures are planned to be implemented between construction periods.**<br><br>**An alternative would be a consent period of 4 – 5 years.** | **Unresolved.** |

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| | **proposing to install continuous (all year round) mitigating measures for all the semi-permanent works (stockpiles, access ramps, etc) or only implement the management plan during the weeks when construction activities are occurring?** | | |
| **Water Suppression Rates**<br><br>**The AQA report stated that the MfE's recommended water suppressant rate of 1 L/m$^2$/hr would provide the equivalent control as the Australian NPI's 2 L/m$^2$/hr due to New Zealand conditions. The AQA report states that "*default haul road watering for 50 percent dust suppression in NPI is based on 2 L/m$^2$/h*".**<br><br>**The proceeding section then states "*Haul road watering of greater than 1 L/m$^2$/h is recommended to control dust emissions by 75 percent*."** | **Without providing the calculated application rate in the draft Dust Management Plan, the effectiveness of the proposed water suppressant mitigation measure cannot be supported.**<br><br>**According to the AQA Report, a 1 L/m$^2$/hr application rate would only provide 50% control rate. However, a control rate of 75% has been applied in the assessment.** | **The applicant needs to provide water suppression application rates that can support their 75% effectiveness rate.** | **Unresolved.** |

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| **The Draft Dust Management Plan does not provide the calculated water application required to provide a 75% control rate, which has been applied to the predicted GLC for the haul roads.** | | | |
| **Mitigation Measures effectiveness**<br><br>**The predicted GLC with control factors applied for the proposed mitigation measures indicate that there is still a possibility for adverse dust effects to be experienced, up to 640m downwind.**<br><br>**This indicates that the proposed mitigation measures are insufficient to control the dust impact offsite.** | **While the applicant may argue that the proposed works are infrequent, the consent period of 35 year and the intensity of some of these impacts indicate further dust management controls need to be implemented and these additional measures should be implemented before the construction activities begin.** | **Additional mitigation measures need to be assessed and included in the draft Dust Management Plan.** | **Unresolved.** |

| Table 1: Outstanding areas of contention | | | |
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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| **Draft Management Plan** | **We do not consider the Draft Management Plan (Appendix G of the AQA Report) to be sufficient for the proposed activities.**<br><br>**The Management Plan contains wording such as "*may wish to consider", "following prevention measures should be taken", "if meteorological conditions deteriorate consider"* while the dispersion modelling assessment shows with the proposed mitigation measures there are still potential for high dust effects up to 640m from the site. The proposed mitigation measures also are deemed to be insufficient to manage the dust effects, and therefore more mitigation measures should be proposed.**<br><br>**Additionally, we consider the proposed additional measures mentioned are the minimum required | **The Draft Management Plan should:**<br>**(1) be more definitive in what is required, leaving no option other than for mitigation measures to be implemented. (i.e. activities should stop if dust is observed to be going beyond the site boundary)**<br>**(2) Provide more thorough detail to how and when mitigation measures should be implemented.**<br>**(3) An ambient monitoring station should be set up during construction periods to guide the on-site teams as to when to restrict dust generating activities.**<br>**(4) Include additional mitigation measures, (low travel speeds on unpaved roads, decrease drop heights of fine material, more frequent wetting of surfaces, more frequent inspections etc).**<br>**(5) Implement mitigation measures on the lake lowering and additional exposed areas of the lakeshore, within close proximity to the construction activities, to further mitigate the potential for cumulative effects.**<br>**(6) Inclusion of dust monitoring to help guide the onsite teams as to if** | **Unresolved.** |

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| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| | **mitigation and not optional extras. As mentioned, the modelling assessment indicates mitigation measures are required to control dust from the proposed construction activities, and these additional measures are paramount to supporting this conclusion.**<br><br>**Furthermore, the level of detail provided for the mitigation measures is insufficient. The Draft Dust Management Plan mentions in the weather forecast section to "*pay particular attention to periods of forecast or observed high winds*" without giving detail as to what is considered high winds and how are the staff on site meant to 'observe' these high winds without monitoring equipment.**<br><br>**The cumulative impact of the lake lowering with the construction activities has** | **additional mitigation measures are required.**<br>**(7) The level of dust being predicted indicates that the Dust Management Plan is critical in managing dust impacts and therefore we recommend the Dust Management Plan is independently verified and provided to Council 30 days before any activities commence.** | |

| Table 1: Outstanding areas of contention | | | |
|---|---|---|---|
| **Outstanding area of contention** | **Reason for significance** | **Solution** | **Issue Resolved?** |
| | **been mentioned very briefly in Section 10.8.2 of the report and no mitigation measures are proposed for the lake lowering activities, due to the scale of the exposed area. We deem this to be an insufficient reasoning. Mitigation measures on the lake lowering (such as wetting the exposed shore before high wind speeds – above 5m/s) in close proximity to the construction activity is a manageable task and should be considered when the current modelling assessment indicates exceedance of ambient standards.**<br>**There has been no mention of dust monitoring against trigger levels, which could guide the onsite teams as to whether additional mitigation measures are required.** | | |

## Agreement with the applicant

11. We have not provided further discussion for where we agree with the conclusions of the applicant.

## Benefits of the project

12. The wider benefits of the projects are outside the scope of this review.

## Outstanding areas of contention and significance of these.

Inconsistencies in the report

There are inconsistencies in the report with regards to the wind speed conditions when dust will be generated, and the dust emission rates.

Assessment air quality criteria

The assessment has made reference to the $PM_{10}$ and $PM_{2.5}$ ambient concentration limits as guideline levels. The 24-hour average $PM_{10}$ concentration limit is not a guideline, but a National Environmental Standard ambient air quality criteria limit with associated regulatory weighting (Resource Management (National Environmental Standards for Air Quality) Regulations 2004).

Dispersion modelling

We have a number of concerns with the modelling assessment which was undertaken and therefore, the conclusions which are drawn from the results. Dispersion modelling has been used as the primary method for assessing dust effects, although only in terms of the health effects of $PM_{10}$ and $PM_{2.5}$ emissions. Our concerns include:

- The applicability of dispersion modelling as an assessment method given the level of uncertainty over effects. The MfE GPG Dust does not recommend the use of dispersion modelling to assess the impact of dust emission sources when there is a high level of uncertainty or variability in source emission rates, such as that associated with dust generated by wind erosion and the proposed construction activities.
- The validity of some of the model input assumptions, including the assumed dust emission rates. There are also queries with regard to the inputs used to run the CALMET meteorological model (the choice of running TAPM at 3km over 1km).
- The modelling simulation of the dam resilience works emissions, as discreet volumetric sources, is considered particularly problematic. This approach does not provide a good representation of the activities, which is effectively a combination of line and area sources and misrepresents the spatial relationships between the activities and sensitive receptors, which will impact on the predicted concentrations at these locations. The discrete nature of the emissions from the volume sources is evident in the concentration contours plots provided by the applicant.

- The modelling would also appear to significantly underestimate total project emissions as no cumulative impacts have been assessed and some potential dust sources (construction of haul roads and Gate 18 armouring activities) have also not been assessed.

Presentation of Model Predictions

The predicted $PM_{10}$ and $PM_{2.5}$ at nearby sensitive receptors has not been provided for review. It is therefore currently uncertain what the predicted impacts of the modelled emissions are at these locations. However, as noted above we have significant concerns with the model predictions.

The summary information presented in the report is not sufficiently detailed for a full review to be undertaken. However, the GHD modelling indicates that $PM_{10}$ concentrations may exceed NESAQ limits up to 500m from the dam resilience work.

Draft Dust Management Plan

The assessment implies that the mitigation measures are sufficient to lower the potential dust risks from the construction activities. We do not consider the Draft Management Plan (Appendix G of the AQA Report) to be sufficient for the proposed activities.

The Management Plan contains wording is not definitive enough for a management plan. Such plans require clear directions to the contractor about what needs to be done in different situations. The proposed mitigation measures also are deemed to be insufficient to manage the dust effects, and therefore more mitigation measures should be proposed. The dispersion modelling assessment shows with the proposed mitigation measures there are still potential for high dust effects up to 640m from the site.

Additionally, we consider the proposed additional measures mentioned are the minimum required mitigation measured to be implemented and not optional extras. As mentioned, the modelling assessment indicates mitigation measures are required to control dust from the proposed construction activities, and these additional measures are paramount to supporting this conclusion.

Furthermore, the level of detail provided for the mitigation measures is insufficient. The Draft Dust Management Plan mentions in the weather forecast section to “pay particular attention to periods of forecast or observed high winds” without giving detail as to what is considered high winds and how are the staff on site meant to ‘observe’ these high winds without monitoring equipment.

The cumulative impact of the lake lowering with the construction activities has been mentioned very briefly in Section 10.8.2 of the report and no mitigation measures are proposed for the lake lowering activities, due to the scale of the exposed area. We deem this to be an insufficient reasoning. Mitigation measures on the lake lowering (such as wetting the exposed shore before

high wind speeds – above 5m/s) in close proximity to the construction activity is a manageable task and should be considered when the current modelling assessment indicates exceedance of ambient standards.

There has been no mention of dust monitoring against trigger levels, which could guide the onsite teams as to whether work should be halted until additional mitigation measures are implemented.

Conclusions

We disagree with some of conclusions presented in Section 12 of the GHD air quality assessment report. This report indicates that concentrations of $PM_{10}$ and $PM_{2.5}$ are predicted to exceed health-based air quality criteria. The results would suggest that there may be an adverse impact at sensitive receptors if the dam resilience work were to go ahead (without mitigation).

## Solutions and/or Conditions sought

13. Currently, we have significant concerns with the assessment presented in the substantive application and therefore, the conclusions which can be reached from the applicant's analysis and supporting information.

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Environment Canterbury 11 March 2026

Via email

**Attention: Jeremy Ecker**

**Lake Pukaki - Dust Management Plan Review**

Environment Canterbury has requested Beca to review the Dust Management Plan[1] (DMP) presented by Meridian for the Rock Armouring works at Lake Pukaki. This document has been read in conjunction with Meridian Energy's Air Quality Assessments (Appendix F[2] and G[3] of their substantive Fast Track Application).

Beca has reviewed the DMP and considers the DMP is not detailed enough to provide assurance that the proposed dust control activities are sufficient to mitigate dust effects off site. Additionally, the actions proposed in the management plan are often discretionary leaving the contractor to decide if dust mitigation measures are required. The Air Quality Assessment has determined that dust does need to be managed and therefore the dust control measures stated in the DMP required to achieve the desired effect of no offensive or objectionable dust beyond the site boundary should be compulsory. The DMP should state which activities are the minimum mitigation measures that must occur on site and which additional dust control activities would be required to manage dust further under specific site activities or environmental conditions.

Some of the main concerns with the DMP include the following:

1. Lake Lowering and wind blown dust: The DMP only addresses the rip-rap placement and no management of the dust emissions from (a) the lowering of the lake and subsequent wind blown dust likely to occur from the additional exposed lake shore and (b) the wind blown dust from the construction site. The applicant needs to provide additional measures for how these emission sources are proposed to be managed/mitigated. Specific dust mitigation measures need to be stated in the DMP to control effects on receptors that are in close proximity to exposed areas of the shore or construction activities.

[1] GHD, 2026, Dust Management Plan (DRAFT) | Lake Pukaki Dam Resilience Work, prepared for Meridian Energy, dated the 27th January 2026.

[2] Appendix F - Lake Pukaki Hydro Storage and Dam Resilience Works | Air Quality Assessment – Lake Shore Wind Erosion, prepared for Meridian Energy, prepared by GHD, dated the 5th November 2025.

[3] Appendix G – Lake Pukaki Hydro Storage and Dam Resilience Works | Air Quality Assessment – Rip-rap Placement, prepared for Meridian Energy, prepared by GHD, dated the 5th November 2025.

2. Construction set up and break down: In the DMP, the list of dust emission sources needs to include the construction set up and break down activities that may cause dust, including the construction of haul roads, work benches etc.
3. Site boundary: there is no defined site boundary that would define where the applicant needs to achieve no offensive or objectionable dust beyond the site boundary.
4. Dust Monitoring: the applicant has only mentioned monitoring will occur "*Should it become evident that continuous monitoring is required at the site*". No additional guidance is provided in the DMP as to how the applicant determines whether it is evident that monitoring should occur. We would recommend that monitoring is conducted at the start of the project, before or when construction activities begin. Beca considers the modelling assessment does not agree with the applicant's predicted impact and therefore monitoring will provide clarity as to the actual site effects and provide feedback to the applicant on the adequacy of the dust mitigation activities undertaken on site. In addition, should the dust monitoring results exceed trigger levels/ambient standards, additional actions may be required such as stopping all dust generating activities until additional mitigation measures have been put in place.
5. Adverse Weather/High Winds: The DMP current mentions that no dust generating activities should occur during '*adverse weather conditions*' but does not provide the contractor/site staff with any guidance as to what these conditions are or how they are to determine these conditions. Additionally, there is reference to high winds but no specification as to what is a high wind speed or how the contractor should determine this. Is this just based on visual inspection, or read from weather sites? Beca recommends a site anemometer be installed to provide accurate information to the contractor on wind conditions.
6. Watering for dust suppression: As with the point above, the DMP states '*Regular watering of access roads will be undertaken if rainfall is insufficient*' however, no guidance is provided as to what is deemed insufficient rainfall. The DMP needs to provide more detail on this matter. Furthermore, the DMP should provide clear instructions on when and how frequently the watering of access roads and other dust emission sources is implemented.
7. Water Storage: The DMP does not provide any information on how much water needs to be stored on site for dust suppression. Calculations need to be undertaken to determine this value, and the water storage requirement should

be stipulated in the DMP. It should be clear to the contractors and individuals on site how much water must be maintained on site.

8. Out of Hours Dust Management: There are no indication in the DMP of how dust emissions will be managed when there is no one on site. The site is located within metres of a main road around the lake that is used at all times. The DMP must propose measures to control dust or respond to complaints out of production hours to ensure that dust beyond the site boundary is not offensive or objectionable, or cause a hazard to drivers on this road.

Yours sincerely

**Suzanne Cawood**

Senior Environmental Scientist

on behalf of

**Beca Limited**