Before Independent Hearings Commissioners Appointed by Canterbury Regional Council and Selwyn District Council

In the Matter of	the Resource Management Act 1991
And	
In the Matter of	Applications by Fulton Hogan Limited for all resource consents necessary to establish, operate, maintain and close an aggregate quarry (Roydon Quarry) between Curraghs, Dawsons, Maddisons and Jones Roads, Templeton

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Evidence of Charles Alexander Kirkby on behalf of the Templeton Residents' Association

Air Quality

Dated: 14 October 2019

Introduction and qualifications

1. My full name is Charles Alexander Kirkby and I reside in the North Shore of Auckland.

2. I have over twenty five years' professional experience in the investigation and assessment of the effects of discharges of contaminants into air on air quality, human health and the environment.

3. I hold the degrees of Bachelor of Science (Hons) in biochemistry from the University of York, United Kingdom, and Master of Resource and Environmental Planning (Hons) from Massey University. My background includes 12 years as an air quality specialist with a local authority in the United Kingdom, four years in a senior role with the Air Consents and Compliance team at the former Auckland Regional Council and six years as an air quality specialist at Beca Limited. Since June 2014 I have worked as an independent air quality practitioner with my own company, The Air We Breathe Limited.

4. Key experience relevant to the matters addressed in my evidence includes:

    4.1. The investigation of numerous complaints regarding dust across the Auckland region, mostly related to industrial or infrastructure sources.

    4.2. Assessment of effects for air discharges from a wide range of dust generating activities, including quarries, concrete batching plant, and major construction projects.

    4.3. Development of management plans for the control of construction dust from quarries and major infrastructure projects.

    4.4. Application of meteorological data, particularly wind speed and direction, to dust management.

    4.5. Some specific project examples include:

        4.5.1. Air quality assessment for the construction and operation of Stages 2 and 3 of the Christchurch Southern Motorway.

        4.5.2. Air quality assessment for the construction and operation of the MacKays to Peka Peka Expressway, including the preparation of a draft Construction Dust Management Plan for the Notice of Requirement and the development of a detailed Construction Dust Management Plan for the project.

        4.5.3. Assessment of construction related air quality effects of the Waterview Connection, including preparation of a draft Construction Dust Management Plan.

        4.5.4. Development of a Dust Management Plant for the Hoporata Quarry on Waiheke.

5. I have been engaged by the Templeton Residents' Association ('TRA') to provide advice and evidence, within my field of expertise, in relation to the TRA's submission on the proposed Roydon Quarry ('the Proposal').

6. Whilst this is a Council Hearing, I acknowledge that I have read and am familiar with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2014, and agree to comply with it. My qualifications and experience are set out above. I confirm that the matters discussed in this statement are, except where stated otherwise, within my area of expertise.

7. In preparing my evidence I have reviewed:

    7.1. Resource Consent Application to Establish 'Roydon Quarry', Templeton (November 2018);

    7.2. Appendix D Air Quality Assessment (and Draft Dust Management Plan), Fulton Hogan Limited, Assessment of Air Quality Effects - Proposed 'Roydon Quarry', Templeton, Golder Associates (NZ) Limited (November 2018);

    7.3. Roydon Quarry Proposal (Reference CRC192408-192414, RC185627) – Response to Request for Further Information, Golder Associates (NZ) Limited (March 2019);

    7.4. Roydon Quarry Proposal (Reference CRC192408-192414, RC185627) – Response to additional Request for Further Information Golder Associates (NZ) Limited (August 2019);

    7.5. The Canterbury Regional Council (CRC) reporting officer's s42A report, including Appendices 1 (Report of Deborah Ryan), 5 (Yaldhurst Air Quality Monitoring Programme), and 7 (reporting officers' comments on suggested conditions of consent.

    7.6. Evidence of:

        7.6.1. Mr Kevin Michael Bligh (Golders – Planning); and

        7.6.2. Mr Roger Cudmore (Golders – Air Quality).

Scope of Evidence

8. My evidence will address the following:

    8.1. Compliance with the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 ('NESAQ Regulations');

    8.2. Comment on the evidence of Mr Cudmore; and

    8.3. Comment on the proposed conditions of consent, as they currently stand, including any amendments made post the release of the s42A reports (as recorded in the evidence of Mr Bligh).

National Environmental Standards

9. The proposed quarry is located immediately adjacent to the Christchurch Air Zone, which is classified as a 'polluted airshed' under the NESAQ Regulations.

10. I concur with the view expressed by the CRC's reporting officer that the applicant had not demonstrated that discharges of PM_{10} from the proposed quarry will not increase ground level concentrations of PM_{10} within the Air Zone by more than 2.5 µg/m³ as a 24-hour average on any occasion during the period of consent.

11. Although this has been addressed in the evidence of Mr Cudmore, I do not agree with some of the assumptions he has used to conclude that the Proposal will comply with this requirement, and therefore do not consider that this has been demonstrated. I will explain my reasoning when addressing Mr Cudmore's evidence.

12. If the applicant cannot either demonstrate this to the satisfaction of the Commissioners, or reduce emissions of PM_{10} from other source(s) within the Air Zone by same or a greater amount than the amount likely to be discharged by the quarry into the Air Zone, I consider that the commissioners must decline the consent, in accordance with Regulation 17 of the NESAQ Regulations.

Evidence of Mr Cudmore

13. I have read Mr Cudmore's brief of evidence and (with the proviso indicated above) largely agree with his conclusions regarding the likelihood of adverse effects on human health and amenity values arising from the discharges of particulate matter into air from the operation of the proposed quarry. My main focus in commenting on his evidence relates to mitigation.

14. I specifically note that Mr Cudmore identifies the need for additional mitigation and/or increased setback distances to avoid adverse effects on the residential dwellings at 319 Maddison Road, 153 Curraghs Road, and 5 Dawsons Road.

15. While I concur with his recommendation for a 100m setback around 319 Maddison Road and 153 Curraghs Road, I consider that this setback should apply to the perimeter bund as well as to quarrying activities – i.e. the bund should be set back 100m from each of these dwellings. The earthworks required to construct the bund are themselves a potential source of dust emissions, especially because they are undertaken at or above ground level.

16. At paragraph 47, Mr Cudmore notes that the ring road around the central processing area and the entire access road is to be sealed. This is then used as the basis for some of the mitigation that is discussed later in Mr Cudmore's evidence. I fully support this, along with the regular vacuum sweeping of these sealed roads (which has not been proposed by the applicant).

17. I also agree with Mr Cudmore that covering inactive areas and unsealed site haul roads with coarse gravel, and applying fresh layers of coarse gravel if the road surface becomes dusty, should be an effective means of avoiding significant dust emissions from these sources.

18. I support the use of fixed spray or fogging systems as additional mitigation wherever it is practicable to install them, such as on processing plant, stockpiles, and the cleanfill area.

19. In paragraphs 118-119 and 122 of his evidence, Mr Cudmore discusses the likely contribution that discharges of particulate matter from the quarry will make to ground

level concentrations of PM_{10} in the Christchurch Airshed. I understand that these were based on the differences between concentrations of PM_{10} recorded as part of the Yaldhurst air quality monitoring project, upwind and downwind of the Yaldhurst quarries.

20. I do not disagree with the use of a scaling factor to convert those results to values more appropriate for the smaller active area of the proposed quarry compared to the combined areas of the Yaldhurst quarries. However, although the planned open area of the proposed quarry is about 10% of that of the Yaldhurst quarries, I consider that the using this simple ratio to derive a scaling factor of 0.1 is somewhat arbitrary and may be insufficiently conservative. Additionally, the use of this scaling factor does not take into account the fact that the various monitoring sites around the Yaldhurst quarries were over one hundred metres from the quarries, whereas the assessment against the NESAQ threshold of 2.5 µg/m³ applies within 10 of the boundary of the proposed quarry, and within 30m of active quarrying areas.

21. The estimated contributions from the proposed quarry to peak 24-hour PM_{10} concentrations listed in Table 4 of Mr Cudmore's evidence suggest that these will vary depending on the wind direction, again based on the results of the Yaldhurst air quality monitoring project. While the use of wind direction in these circumstances can be appropriate for estimating background concentrations, I do not consider this appropriate for assessing contributions from a another site. There are a range of factors that can affect the contribution from a site to concentrations measured at a specific location, including, for example, distance from the site and the relative orientation of the site with respect to wind directions. Given the limited data availability for these upwind and downwind comparisons, I consider that inferring different contributions for different wind directions is not appropriate.

22. On this basis, I do not consider that the applicant has demonstrated that the Proposal will comply with the requirements of Regulation 17(1) of the NESAQ.

Proposed Conditions of Consent

23. Notwithstanding my conclusion above, in the event that the Commissioners decide that consent should be granted, I have included commentary on the conditions of consent set out in Annexure B to Mr Bligh's brief of evidence. My comments are largely based on the consolidated conditions set out there, and utilise that numbering.

24. CRC land use consent CRC192408 & CRC192409:

    24.1. Conditions 12 and 13 – staging. Although these are not strictly within my area of expertise, they do directly relate to the need to mitigate discharges of dust from the site, as acknowledged by the applicant. My comments on these conditions are as follows:

        24.1.1. I agree with the recommendation by the reporting officer that the staging plan should clearly indicate the 100m setbacks required around 319 Maddison Road and 153 Curraghs Road, so as to mitigate adverse effects on those dwellings.

24.1.2. I consider that the applicant should demonstrate, on a regular basis, compliance with the limits on activity areas. This could be included in the surveys required by proposed condition 11.

25. Air discharge consent CRC192410:

25.1. Condition 4. I generally agree with the proposed requirements and specifications for meteorological monitoring. However, this monitoring should commence prior to commencement of any earthmoving activities on the site, rather than just quarrying – i.e. to ensure that monitoring commences before construction of the perimeter bund.

25.2. The specifications for wind speed and direction should include the stall speed – the minimum wind speed that the instruments will measure – and wind direction should be recorded as vector averages rather than scalar.

25.3. Conditions 6-10 – Dust Management Plan (DMP). I agree that a comprehensive DMP is an essential tool in the management of dust emissions from this type of activity, and support the use of standard operating procedures (SOPs) for specific aspects of the Proposal. I also agree that the DMP should be regularly updated, and subject to peer review to confirm that the appropriate measured are proposed. This review should include a review of the SOPs, since these are the instructions that most staff will actually use.

25.4. I note that condition 6(x) requires a maintenance schedule for meteorological monitoring instruments and PM_{10} monitoring. I consider that this should refer to particulate monitoring, rather than PM_{10}, so as to include the TSP monitoring instrument. A similar change should also be made to the list of SOPs required by proposed condition 7, except that conditions 7(f) should refer to the location and calibration of meteorological monitoring equipment, as well as particulate.

25.5. I consider that the consent must include the ability for the CRC, as the regulatory agency, to review the DMP (and any subsequent amendments to the DMP), and that the report of any independent reviewer should be provided to the CRC before the DMP becomes operative. The scope of that review should be broadened from that proposed in condition 8, to an assessment that the DMP will enable compliance with all the conditions of the consent.

25.6. Condition 11 – perimeter bund. I agree with the amended wording proposed by the applicant.

25.7. Condition 17 – dust mitigation. I consider that, once the central processing area has been established, all stockpiles of processed and unprocessed aggregate should be stored within the quarry floor area. I understand the applicant's concern that the intent of this provision is that it not apply to stockpiles of overburden, but consider that this can be addressed be means of an explanatory advice note.

25.8. Condition 18 – specific mitigation measures

25.8.1. I note that proposed condition 18(a) requires sealing of the site access/exit ring road. Assuming that this means the entire site access

road and the ring road within the central processing area, I fully support this.

25.8.2. I note that proposed condition 18(k) requires 'measures will be taken to ensure' that control measures are applied to trucks leaving the site. I consider that this is loose and potentially unenforceable, and that this sub-condition should, for example, require trucks leaving the site that contain fine material to be covered. In this context, I agree with Mr Cudmore that merely dampening such loads is unlikely to be sufficient to mitigate dust from loads in transit.

25.8.3. Proposed condition 18(w) should require the use of washing or vacuum sweeping to keep paved areas free of dust. Mechanical sweeping alone can, itself, generate significant dust emissions.

25.8.4. I consider that there is a conflict between proposed conditions 18(a) and 18(x). 18(x) requires that sections of the internal site access road will be sealed. My understanding of Mr Cudmore's evidence, and condition 18(a), is that the entire site access road will be sealed. Good practice in relation to avoiding trackout of material onto public roads includes utilising the maximum practicable length of sealed access road before the site exit.

25.9. Condition 19 – setback around 319 Maddison Road and 153 Curraghs Road. I consider that this setback should be absolute, as long as those houses are being used as dwellings i.e. there should be no extraction within 100m of any dwelling existing at the date of consent being granted.

25.10. It is unclear whether proposed conditions 20 and 21 identify two or three particulate monitoring units. The applicant has previously proposed installing three units: a permanent PM_{10} monitor on the eastern boundary, northeast of the working face; a mobile unit (presumably TSP), also on the eastern boundary downwind of the processing plant; and a second mobile unit (also presumably TSP) between the working face and receptors within 500m of the active area. In any case, these conditions no longer appear to require a unit downwind of the processing plant.

25.11. Given that the fixed processing plant will be more than 500m from any site boundary, I can understand why a monitoring unit on the downwind boundary may no longer be required, but the applicant has not provided any reasoning for this change.

25.12. Condition 22 – trigger values. While I would prefer to see the trigger values for particulate matter set out in the applicant's original assessment (i.e. 60 µg/m³ as a 1-hour average to trigger investigation, and 70 µg/m³ as a 1-hour average to cease activities), I recognise that the revised values proposed in condition 22 are recommended in the MfE Good Practice Guide, and I consider that they should be appropriate for this Proposal, at least as a starting point.

25.13. However, I consider that the proposed wording is confusing. For example, the core condition refers to PM_{10} monitoring, whereas some of the trigger values relate to total suspended particulate (TSP), and there appears to be uncertainty around averaging periods. I suggest that proposed condition 22 should be reworded as follows:

> *When quarrying and/or clean filling operations cause continuously recorded ~~PM_{10}~~ particulate concentrations at the site boundary, to reach or exceed the trigger levels listed below, then additional dust control measures shall be implemented:*
>
> *a) ~~Ten-minute rolling~~ PM_{10} concentration of 150 micrograms per cubic metre as a ~~(~~1-hour rolling average~~)~~ updated every 10-minutes;*
>
> *b) ~~Ten-minute rolling~~ TSP concentration of 200 micrograms per cubic metre as a ~~(~~1-hour rolling average~~)~~ updated every 10-minutes;*
>
> *c) ~~One hour rolling~~ TSP concentration of 60 micrograms per cubic metre as a ~~(~~24-hour rolling average~~)~~ updated every hour.*

25.14. The MfE Good Practice Guide recommends that these values should be used as a starting point, and revised in light of actual effects at each specific site. This is something that can (and should in my view) be addressed via the DMP, although any trigger values used in the DMP should be no less restrictive than those in the consent.

25.15. Conditions 23 and 24 – response to trigger values. The applicant proposes that the responses required by proposed condition 23 should not apply if, for example, there is no evidence of visible dust. I consider that this exception should apply only to the response to adverse meteorological conditions (condition 23(b)).

25.16. Condition 25 – additional water suppression. One of the triggers listed in proposed condition 25 is to prevent '*visible dusty plumes more than 30m beyond the site boundary*.' I consider that this trigger should apply at, rather than beyond, the site boundary, to avoid adverse effects on, for example, 319 Maddison Road. I note that this is the intent of proposed condition 29.

26. SDC Land Use consent RC185627:

26.1. Several of the conditions of the air discharge consent are also reflected in the proposed conditions of the SDC land use consent. My comments apply equally to the corresponding proposed conditions in that consent.

26.2. Given that amenity effects arising from dust emissions are also a relevant matter for the territorial local authority (i.e. the SDC) as well as for the CRC, it would also be appropriate for the DMP to also be provided to the SDC for review prior to becoming operational. This could be achieved, for example, by including the DMP in a suite of management plans under an overall Quarry Management Plan.

26.3. Condition 79 – Community Liaison Group (CLG). I support the creation of a CLG as an aid to compliance with conditions. Had this not been included as part of the

SDC Land Use consent, I would have recommended a similar requirement within the CRC air discharge consent.

26.4. However, based on my previous experience as a compliance officer, I am aware that community representatives on CLGs tend to be volunteers, often with little specialist knowledge. Therefore, valuable assistance can be provided to the CLG by the provision, at the operator's expense, of an independent review of any technical information to be brought to the meeting.

Date 14 October 2019

Charles Kirkby
Director and Air Quality Specialist, The Air We Breathe Limited