

**UNDER THE** Resource Management Act 1991  
**IN THE MATTER OF** A Joint Application by Hirock Limited to  
Palmerston North City Council LU 6962 and  
Manawatu - Whanganui Regional Council  
APP-2022203991.00 to Expand Linton  
Quarry

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**STATEMENT OF EVIDENCE OF STUART KEER-KEER**

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**INTRODUCTION**

- 1 My full name is Stuart Frank Keer-Keer. I am the Managing Director of K2 Environmental Limited. I hold a Master of Science (Chemistry) from the University of Auckland. I am a member of the Clean Air Society, Association of Independent Chemists, Source Evaluation Society. I have over 30 years of experience in air quality testing and assessments.
- 2 The roles I have held are: -
  - (a) 1.5 years as a Consulting Chemist, at Flinders Cook (Technical Services).
  - (b) 10 years as an Environmental Chemist working for New Zealand Aluminium Smelters. The role involved workplace testing, ambient air testing, stack testing and technical leadership.
  - (c) 26 years at K2 Environmental. The role involves (not a comprehensive list):
    - (i) workplace risk assessments and workplace air quality testing
    - (ii) air discharge testing
    - (iii) ambient air testing
    - (iv) training, technical leadership and method development in air quality assessments
    - (v) resource consent applications
    - (vi) laboratory analysis of air quality samples
    - (vii) Quality management and management of K2 quality systems

- 3 I have been engaged by Hirock Limited (the Applicant) to provide advice on air quality, in relation to the application for consent to expand Linton Quarry (the Proposal).
- 4 I have co-authored the draft Dust Management and Monitoring Plan and the Dust Monitoring Report with one of my peers, Cameron Keer-Keer.
- 5 I have visited the quarry and two neighbouring properties on Kendalls Line. I spoke with the Quarry Manager.

### **CODE OF CONDUCT FOR EXPERT WITNESSES**

- 6 I confirm I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

### **SCOPE OF EVIDENCE**

- 7 I have reviewed the s42A RMA report and the appendices.
- 8 I have read Appendix M Air Quality Memorandum – prepared by Andrew Curtis.
- 9 My evidence addresses:
  - The existing ambient air environment;
  - Key findings of my assessment of effects;
  - Matters raised in the Air Quality Memorandum;
  - Matters raised by submitters to the application;
  - The s42A RMA report including the recommended conditions of consent should consent be granted.

### **PROJECT DESCRIPTION**

- 10 Hirock are looking to expand their quarry which will increase more activity onsite as well activity from the road use. This may increase the effects of dust on the environment.

## RECOMMENDATIONS

- 11 I recommend that the consent application be approved on the basis that particulate from the quarry is not expected to affect nearby properties. This is if the actions to keep the road clean and maintained are implemented.
- 12 I recommend that further air quality testing is performed at a time of the year where climate conditions are more likely to give rise to dust.
- 13 Any dust on nearby properties should be analysed to determine the source of this dust. This can be done by performing and x ray diffraction and x ray fluorescence analysis.
- 14 A one-off dust assessment close to the quarry to verify that the quarry is complying with the requirements of the National Environmental Standard for Air Quality (NESAQ). To show that the quarry does not cause the standard to be exceeded (50 µg/m<sup>3</sup> particulate over a 24-hour period.).
- 15 A one-off dust assessment along Kendalls Line complying with the requirements of the National Environmental Standard for Air Quality (NESAQ). To show that quarry traffic does not cause the standard to be exceeded (50 µg/m<sup>3</sup> particulate over a 24-hour period.).

## AMBIENT AIR QUALITY ENVIRONMENT

- 16 The council's air quality expert (Andrew Curtis) makes comments "*Low quantities of PM10*" and "*low risk of dust nuisance*" "*fine particulate negligible*". I concur with his assessment. The factors the considered to enable me to arrive at this assessment are: -
  - (i) Dust control measures- employed by the site.
  - (ii) Nature of the material being extracted from the quarry.
  - (iii) Low levels of dust were measured at the sampling site.
  - (iv) Feedback from neighbours, site personnel suggests that quarry is not a direct source of dust at the neighbours. Wind between the north and east is expected to affect the sensitive receivers the most. There is a low component of wind in this direction.
- 17 There are other activities in the area that can affect ambient air quality.
  - (i) While on site a fertiliser truck was observed spreading particulate on a nearby paddock. The dust from this truck blew down the road in the direction of the prevailing wind.

- (ii) Stock movements, cutting grass, ploughing of paddocks, domestic fires as well as other activities.
- 18 Dust can be expected to be low in conditions where there is rain. Rain will suppress dust, restricting it from becoming airborne. A worst-case scenario for dust monitoring would be in dry months.
- 19 Air borne dust can be expected to be greater if conditions advised by the neighbours are present. (i.e., build-up of dust on the road). Monitoring in dry summer months is expected to create a worst-case scenario.
- 20 Particulate is generated from quarry site activities. The quarry site is 950 meters from the submitters. The closest dwelling is 160 metres from the quarry and the owners of this property did not submit. The predominant wind direction is from the quarry to the sampling site.

#### **RESPIRABLE CRYSTALLINE SILICA**

- 21 An estimation of 25% of the crystalline silica content of the PM4 (respirable) fraction from an average of the AQ guard data would be  $1.5 \mu\text{g}/\text{m}^3$ , which would be lower than the guideline of  $3 \mu\text{g}/\text{m}^3$ .
- 22 In my opinion, there is likely not a risk from respirable crystalline silica.

#### **ASSESSMENT OF DUST EFFECTS**

- 23 The dust is deposited on the road from trucks that have travelled along the road. Subsequent trucks travelling along the road disturb the settled dust making it airborne. The receivers report they are affected by this dust.
- 24 Air sampling was performed to assess how much dust is transmitted to the receiver's properties. The sampling is considered a background level of dust as the road and environmental conditions are optimal.
- 25 Air sampling showed that levels of dust were below the ambient air quality guidelines daily average of  $50\mu\text{g}/\text{m}^3$  with two exceptions.
- 26 There were peaks above  $50 \mu\text{g}/\text{m}^3$ . One peak occurred during the night. (23 May 2023), one during the weekend (13 May 2023), it is suspected that domestic fires contributed to the peaks as smoke was seen to be drifting from the house to the analyser.

- 27 Further dust assessment is proposed to determine the effects of the road traffic on the residents of Kendall's line. This should be done under worst case scenario, after the road has been used for at least 3 months and it is dry weather.
- 28 It is expected that an increase in frequency of vehicles will not substantially increase dust measurements. This is predicted from the limited data where there was not an increase in measured particulate on days where there was greater truck activity. Further monitoring advocated will be able to answer this issue definitively.
- 29 There are other sources of dust apart from the road. This is demonstrated on days where there are no truck activities, and the readings were elevated compared to days where there were higher truck movements.
- 30 MFE Good Practice Guide for Assessing and Managing Dust considers rural residents moderate to high sensitivity based on population density "*A low population density means there is a decreased risk of people being adversely affected. People living in and visiting rural areas generally have a high tolerance for rural activities and their associated effects.*" *Although these people can be desensitised to rural activities, they may still be sensitive to other types of activities (e.g., industrial activities).*"

## SUBMISSIONS

- 31 I attended the pre-hearing meeting on 5<sup>th</sup> May 2023. I learnt from the submitters:
- (a) There were issues with dust but were not an issue after the road had been resurfaced and improved.
  - (b) They have no issues with dust from the quarry.
  - (c) They did not think dust monitoring now would represent their concerns due to rain and because the road is in good condition.
- 32 In my opinion, **nuisance dust** is likely to be negligible. The data from the monitoring at 39 Kendall's line showed the majority of the dust is less than 1µm in size. Particles of this size take a long time to settle and can travel over 100km. This particle size is unlikely to settle out and is not visible to the human eye. The assessment was performed during favourable dust conditions. A repeat of this work during unfavourable conditions will fully assess this.
- 33 I concur with Andrew Curtis assessment that if the additional mitigation measure, of managing the dust built up on the berm the effect of **nuisance dust** can be expected to be minimal.

- 34 I concur with Andrew Curtis that hedges in front of properties will be effective in reducing any **nuisance dust** to the residents. There is published reports that trees/hedges have a positive effect in removing air borne pollutants.
- 35 **Diesel Fumes** -The submitters raised an issue with diesel combustion products. I concur with Andrew Curtis assessment. *"It is unlikely that the volume of traffic proposed will result in any significant change in ambient air quality due to diesel vehicle emissions"*
- 36 The reasons for the above assessment to agree with Andrew Curtis are.
- (i) Diesel particulate is typically black. The dusttrak monitors capture particulate on the internal filters which are changed weekly. These filters were slightly grey. The particulate gathered on them could also be from domestic fires.
  - (ii) At 11 Kendall line the dust monitor was by the roadside. On days where there were higher truck movements the particulate measured was lower. On days with no or low truck movements had dust measurements greater than those with higher truck movements. Further detail is provided in the K2 Dust monitoring report.

#### **S42A RMA REPORT**

- 37 I concur with the assessments made by Andrew Curtis in the appendix M of the S42A RMA report. There is one exception. This is the requirement to ongoing PM10 monitoring. I have proposed an alternative to provide the information that was not in the AEE.
- 38 This requirement stemmed from the concern that the AEE did not provide and information if the National Environmental Standard for Air Quality (NESAQ) of 50 µg/m<sup>3</sup> was complied with. Andrew Curtis stipulated - *"Section 4.27 of the AEE is titled dust, and part of the assessment of effects section of the AEE. Section 4.27 does not contain a detailed assessment of the potential for dust effect but contains an outline of the mitigation measures that are implemented on site to control dust."*
- 39 I propose that a detailed assessment be undertaken to demonstrate that the NESAQ standard has been complied with. This detailed assessment will include the same parameters as determined at the baseline assessment at 39 Kendall's Line.
- 40 The assessment will be for a two-month period to determine the effectiveness of the controls employed by site. The assessment will be conducted at time where dust is expected to be a worse case scenario. (during dry summer with activity on site) Further details to be included in the dust management plan.

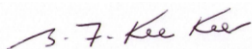
- 41 There is a disconnect between what is proposed by Andrew Curtis and his proposed consent conditions and the consent conditions advocated by Natasha Adsett. I propose two rounds of dust monitoring. Each is proposed as a one off for two months duration.
- (a) One on Kendall's Line as performed by the back ground monitoring. Assess the effect of greater traffic, any build up on the road and dry summer conditions.
  - (b) One at the quarry boundary to determine the effectiveness of the dust control measures.

## **PROPOSED CONDITIONS OF CONSENT**

- 42 I recommend that at Kendall's Line further air quality testing is performed at a time where conditions are more likely to give rise to dust.
- 43 Any dust on nearby properties needs to be analysed to determine the source of this dust. This can be done by performing and x ray diffraction and x ray fluorescence analysis.
- 44 A one-off dust assessment close to the quarry to verify that the quarry is complying with the requirements of the National Environmental Standard for Air Quality (NESAQ). This will confirm that the quarry does not cause the standard to be exceeded (50 µg/m<sup>3</sup> particulate over a 24-hour period).

## **CONCLUSION**

- 45 The dust present at the monitoring site is small and not likely to be visible.
- 46 Background monitoring undertaken by K2 Environmental during May 2023 has shown there are low levels of dust at the sampling sites. This can be considered as a best-case scenario. Further monitoring in a worst-case scenario will demonstrate if the activity is contributing to dust on neighbour properties.
- 47 I concur with Andrew Curtis assessment and recommendations in the S42A RMA report that particulate is not expected to affect nearby properties. This is if the actions to keep the road clean and maintained, with one exception. This is the proposed ongoing PM10 monitoring.



**Stuart Keer-Keer**

**6 June 2023**