BEFORE	Independent Commissioners appointed by Tasman District Council
IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of an application by CJ Industries Ltd for land use consent RM200488 for gravel extraction and associated site rehabilitation and amenity planting and for land use consent RM200489 to establish and use vehicle access on an unformed legal road and erect associated signage

EVIDENCE OF JEFFREY GEORGE BLUETT ON BEHALF OF CJ INDUSTRIES LIMITED
AIR QUALITY

1. INTRODUCTION

1.1 My full name is Jeffrey George Bluett. I am a Technical Director: Air Quality at Pattle Delamore Partners Limited.

1.2 The applicant has applied for resource consents authorising the extraction of gravel, stockpiling of topsoil, and reinstatement of quarried land, with associated amenity planting, signage and access formation at 134 Peach Island Road, Motueka:

(a) RM200488 land use consent for gravel extraction and associated site rehabilitation and amenity planting; and

(b) RM200489 land use consent to establish and use vehicle access on an unformed legal road and erect associated signage

1.3 My evidence addresses the air quality assessment of the activities for which consent is sought.

Qualifications and Experience

1.4 I hold the qualifications of a Bachelor of Science (University of Otago) and a Master of Science degree (First Class Honours) in Environmental Science (Lincoln University), specialising in air pollution modelling. I have been a Clean Air Society of Australia and New Zealand (CASANZ) certified air quality professional since 2020.

1.5 I am employed as a Technical Director: Air Quality by Pattle Delamore Partners Limited (PDP), an engineering and environmental consulting firm. I have been employed by PDP since April 2019 and have over 20 years of experience in the field of air quality matters, which includes Council and Environment Court experience.

1.6 I am a life member of CASANZ. Within CASANZ, I currently hold or have held the following positions: Society Vice President (2019 to present), New Zealand Branch President (2018 to 2019), Society Council Member (2014 to present), New Zealand Branch Secretary (2014-18), and Transport Special Interest Group deputy chair (2009 to 2014). I was awarded CASANZ's distinguished service medal in 2013.

1.7 I have authored, or co-authored, approximately 100 reports and peer reviewed papers in respect of transport, industrial, domestic and agricultural emissions to air. In relation to monitoring and assessing the impacts of dust, my recent projects have included:

(a) Leading the air quality assessment and air quality monitoring programme for a quarry development in Rangiora;

(b) Leading the air quality assessment and air quality monitoring programme for a quarry expansion in Yaldhurst, Christchurch;

(c) Assessing the impacts of dust discharged from two large and adjacent North Island limestone quarries;

(d) Leading a research project for the New Zealand Transport Agency on understanding the effects of dust discharged from un-sealed public roads;

(e) Stakeholder contribution to the development of the Ministry for the Environment's Good Practice Guide for assessing and managing dust;

(f) Assessing the impact of construction dust from the Northern Corridor Improvement Project (northern Motorway in Auckland);

(g) Monitoring dust discharged from a coal stockyard and coal mine haul roads; and

(h) Technical lead - the construction dust section of CASANZ's Good Practice Guide for the Assessment and Management of Air Pollution from Road Transport Projects.

1.8 My technical skills and experience directly relevant to my assessment include:

(a) Quarry operations;

(b) Generation of dust;

(c) Dispersion of dust;

(d) Deposition and impacts of dust;

(e) Mitigating dust emissions; and

(f) Meteorology and dust monitoring.

1.9 I have not visited the site. My evidence is based on a desktop assessment using maps and aerial images and my experience with similar sites as well as considering information from the applicant and submitters about surrounding land uses.

Purpose and Scope of Evidence

1.10 The purpose of my evidence is to provide a summary of PDP's assessment of the effects of the dust discharged from the proposed quarry. The report which presents PDP's assessment of the effects of the dust discharged from the proposed quarry activities is appended to my evidence as Appendix A. I also provide recommendations on how to avoid, remedy or mitigate the adverse effects of dust on the receptors located in the area around the proposed quarry. The scope of my evidence is:

(a) Describe the existing environment (Section 3);

(b) Provide an overview of the proposed quarry operations (Section 4);

(c) Detail the potential sources and impacts of dust (Sections 5 and 6);

(d) Describe the methods used to assess the impacts of dust (Section 7).

(e) Provide recommendations to avoid, remedy or mitigate adverse effects of dust on the receptors located in the area around the proposed quarry (Section 8);

(f) Detail the potential impacts of the dust discharged from the proposed activity (Section 9);

(g) Discuss the permitted baseline for dust emissions (Section 10);

(h) Comment on the consistency of the proposed activity with TDC policy direction (Section 11);

(i) Comment on the dust related matters raised in submissions (Sections 12 and 13); and

(j) Comment on the dust related matters raised in the Tasman District Council Officer's S42A report (Section 14).

Code of Conduct

1.11 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014 and I agree to comply with it. My evidence is within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

2. EXECUTIVE SUMMARY

2.1 My evidence provides a summary of PDP's assessment of the potential effects of dust discharged from the development, operation and closure of the proposed quarry. My evidence also provides recommendations on how to avoid, remedy or mitigate adverse effects on dust. A summary of the key findings of my evidence and my conclusion follow below.

2.2 Dust or total suspended particulate (TSP) (particles >10 μm in diameter) which can generate adverse amenity impacts and inhalable particulate matter (PM_{10}) (particles <10

μm in diameter) which can be inhaled and cause adverse human health impacts may be discharged into the air from the development, operation and closure of the proposed Peach Island Quarry.

2.3 The receiving environment is of generally moderate sensitivity to the impacts of dust, but 14 highly sensitive residential or horticultural receptors have been identified within 250 m of the proposed quarry boundary.

2.4 The potential effects of dust on the receiving environment and highly sensitive receptors include amenity, human health and ecological impacts.

2.5 A comprehensive programme of dust mitigation and monitoring has been developed to ensure the dust emissions from the proposed quarry site are minimised.

2.6 When combining the influences of the scale of the activity, the sensitivity of the receiving environment, the proposed mitigation measures and dust travel distance, the potential impact of dust discharged from the proposed activity has been assessed as less than minor.

2.7 I consider the proposal to be consistent with TDC's policy direction on the impacts and management of dust.

2.8 The applicant is able to comply with the consent conditions proposed and/or provide the relief sought by the 57 submitters who raised dust and or air pollution as an issue in their submissions (except where they seek that consent is declined).

2.9 The information provided in the PDP dust assessment report, and dust management and monitoring plan, either directly or indirectly addresses all the dust related issues raised in the Officer's S42a report.

3. EXISTING ENVIRONMENT

3.1 The Site is located on Rural 1 zoned land (Tasman District Council, 2022) near Motueka. The site is currently in pasture (running beef cattle). The site is approximately 4 km from the township of Motueka and is currently surrounded by the Motueka River to the east, apple and kiwifruit orchards (both highly sensitive) to the north and northwest as well as bushland forest and agricultural land to the west and south (both low to moderate sensitivity).

3.2 Residential and ecological receptors and rivers are considered to have a high sensitivity to dust impacts. Eight sensitive receptor dwellings and six horticultural areas have been identified within 250 m of the site boundary. There are numerous sensitive receptors beyond 250 m of the site boundary. The impacts of dust discharged from the proposed quarry on these more distant receptors have not been considered in detail as any dust impact on these receptors which may occur will be lower than the impacts experienced by the receptors located within 250 m of the site boundary. The proposed site and location of each of the sensitive receptors is shown in Figure 1.

3.3 A short reach of the Motueka River runs thought the area within 250 of the proposed site. The potential impacts of dust on the ecology of the Motueka River are described in the evidence of Mr Tony Payne (terrestrial ecology) and Mr McNeil (aquatic ecology).

3.4 Meteorological data has been obtained from the Motueka, Riwaka Weather Station (EWS) (12429) for the years 2018 to 2021. This station is situated 3.5 km northeast of the proposed quarry site and will provide data that is representative of the wind conditions experienced at the site. Average annual wind speed and direction from 2018 to 2021 is shown as a windrose in Figure 2.

3.5 The windrose shows winds from the south-westerly direction are predominant, with winds from the north-easterly direction occurring relatively frequently compared to other wind directions. Lower wind speeds are more common in the winter months. The windspeeds recorded at the Riwaka Weather Station are lower than I had anticipated for the area, when compared to the data collected at Nelson Airport. To ensure that windspeeds were not under-represented in the dust impact assessment I used the wind data from Nelson airport which showed a very similar pattern of wind directions but at higher windspeeds. The Nelson airport data also shows a low frequency (<1%) of high-risk dust conditions (dry days with windspeeds >7.5 m/s).

3.6 Existing air quality is expected to be good, with no significant sources of dust nearby except the existing riverbed which will contribute some natural particulate. Agricultural activities in the area also have potential to cause small quantities of dust.

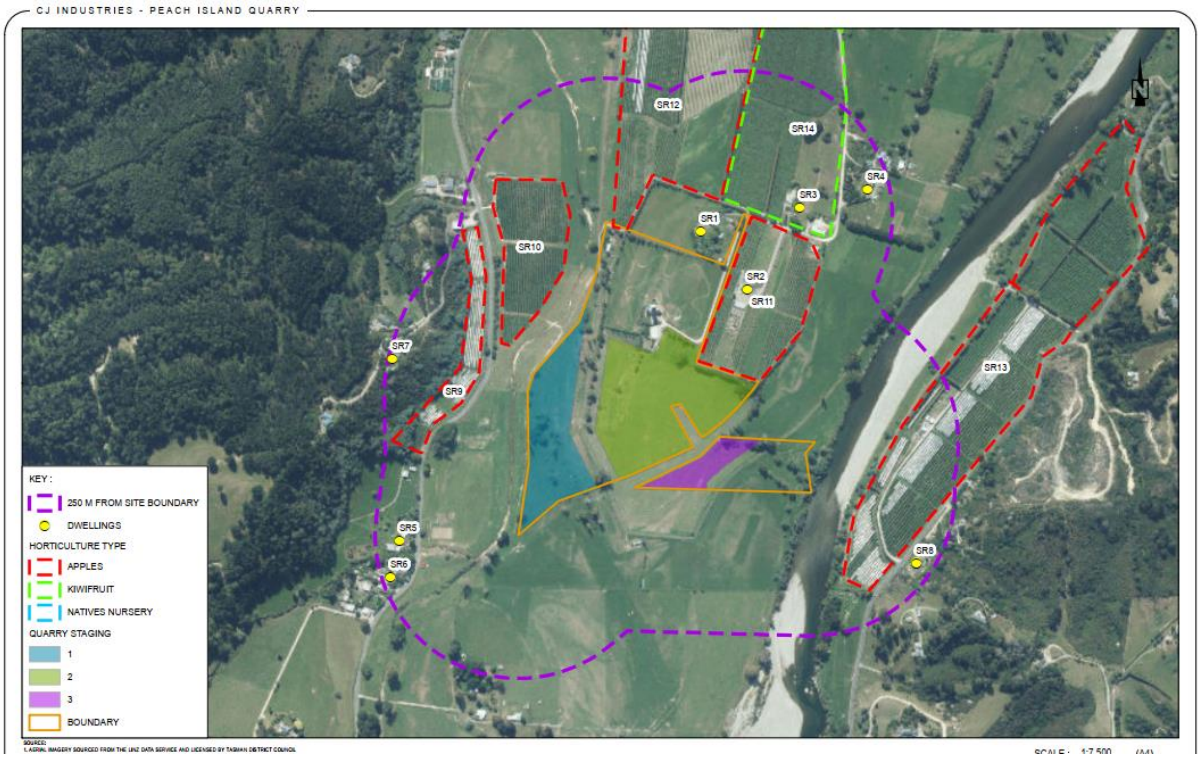

Figure 1. Peach Island Quarry – Existing Environment

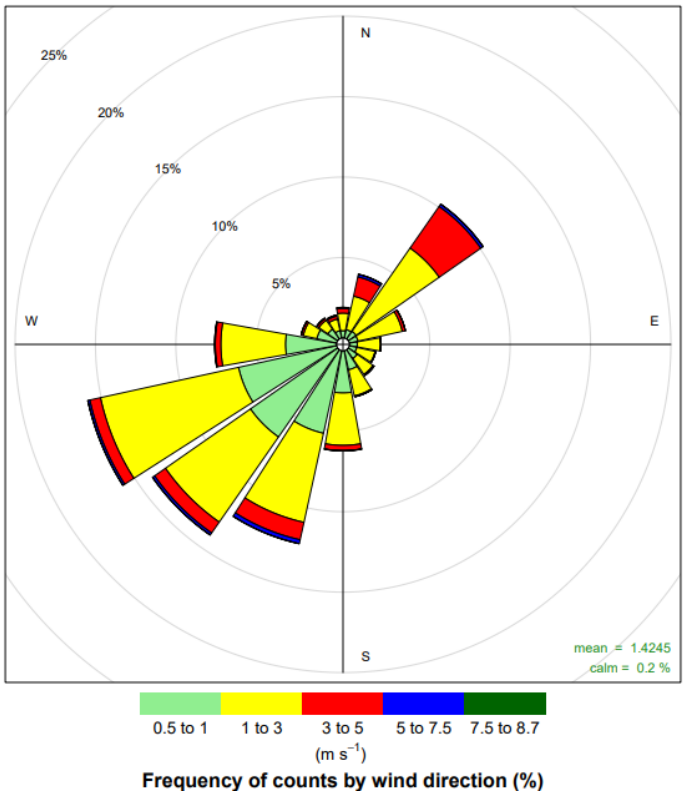

Figure 2. Windrose Motueka, Riwaka Weather Station (EWS) (12429) 2018 to 2021

4. THE PROPOSAL

4.1 CJ Industries proposes to undertake gravel extraction up to approximately 4-5 m in depth in three stages (Figure 3), within an area of approximately 73,500 m^2, over a period of 15 years. The active quarrying area will be limited to a maximum area of 80 m x 20 m (1,600 m^2) at any one time. The total active area of the proposed quarry is approximately equivalent to two Olympic sized swimming pools. No processing, crushing or screening of materials will occur on the site. Hours of operation will be limited to 7 am to 5 pm Monday to Friday, with no work during weekends or on public holidays. Excavation will not be continuous – it is anticipated that excavation will occur for around one week per month on average, with vehicle movements occurring over most of the month.

4.2 Removal of topsoil and overburden will be undertaken incrementally, and these materials will be stockpiled for site rehabilitation. Backfilling will be undertaken at every possible opportunity even when no new excavation is occurring. No excavated piece of ground will remain open for longer than 6 months on completion of excavation from any individual trench.

Figure 3. Proposed extraction area and staging.

4.3 Topsoil and subsoil will be stockpiled for reuse. Extracted aggregate and cleanfill (to be used for site reinstatement) will be stockpiled in a Stockpile and Service Area within the stopbanks. The highest point of any stockpile will be 3 m above ground level.

4.4 Up to 15 truck and trailer units will enter and exit the site each day (a total of 30 truck and trailer movements). Trucks or truck-and-trailer units will carry up to 38 tonnes of material each, with a maximum of 570 tonnes of gravel transported each day. Returning trucks will carry back fill material as often as possible, in order to keep traffic down (unless the supply of cleanfill at the site is at capacity). The existing paper road is currently in pasture and will be formed into a sealed road. The marginal strip will also be formed, subject to approval from the Department of Conservation.

5. SOURCES OF DUST

5.1 A description of the site's key dust sources of particulate matter, the size fraction of dust discharged (TSP or PM_{10}), and the relative size of the dust source are detailed in Table 5-1.

Table 5-1 Sources and characteristics of dust

Source	Description	Dust type
Development of site	Removal and stockpiling of overburden	Soil dust Mainly deposited dust or TSP with a small component of PM_{10}.
Excavation of gravel	Disturbance of material being extracted from the ground will generate dust.	Grey gravel dust. Mainly deposited dust or TSP with a small component of PM_{10}.
Site access road and other unsealed surfaces.	Dust generated by vehicles traversing Site access road and moving over other unsealed surfaces. On an average working day, there will be approximately 30 truck and trailer movements on site.	Gray road dust. Mainly deposited dust or TSP with a small component of PM_{10}.
Stockpiles	Higher speed winds passing over stockpiles can generate dust.	**Aggregate:** Grey dust, mainly deposited dust or TSP. **Soil:** Brown dust Mainly deposited dust or TSP with a small component of PM_{10}. **Clean fill:** combination of Aggregate and soil type dust.

Disturbing stockpiles	The deposit and removal of materials from stockpiles will generate dust.	Grey gravel dust. Mainly deposited dust or TSP with a small component of PM_{10}.

6. IMPACTS OF DUST

6.1 TSP emissions have the potential to cause nuisance beyond the site boundary. Dust nuisance is caused where dust has impacts on amenity values. Annoyance to neighbours may occur from soiling of property such as windows, houses, cars, and washing hung out to dry. The degree of amenity effects tends to increase with darker colours of dust. For example, coal dust is considered more offensive than grey aggregate dust. For most people, the major effect of nuisance dust is the increased requirement for cleaning.

6.2 Dusty conditions can adversely affect people's ability to enjoy an outdoor environment. Airborne dust can cause effects on visibility and are largely considered a matter of aesthetics. Visibility effects are usually only a concern in the immediate vicinity of the source. Extreme loss of visibility can also be a safety concern for road traffic and aircraft. Section 9.0 of this evidence provides an assessment of the amenity impact of dust on the nearest sensitive receptors to the site.

6.3 With particular regard to the surrounding apple and kiwifruit orchards, nuisance dust settlement around the orchard has the potential to impact the quality of apple growth or quality of fruit produced by the orchard.

6.4 Human health effects can occur from exposure to particulate matter with a diameter of less than 10 micrometres (PM_{10}) and smaller size fractions. Section 9.0 of this evidence provides an assessment of the potential human health impacts of dust on the nearest sensitive receptors to the site.

7. METHOD USED TO ASSESS THE IMPACT OF DUST

7.1 The nuisance effects of dust emissions are influenced by the nature of the source, sensitivity of the receiving environmental and on individual perception. For example, the level of tolerance to dust deposition can vary significantly between individuals. Individual responses can also be affected by the perceived value of the activity producing the dust.

7.2 The Ministry for the Environment's (MfE) Good Practice Guide to Assessing and Managing the Impacts of Dust (Ministry for the Environment, 2016) recommends that

the nuisance effect of dust emissions may be assessed by using frequency, intensity, duration, offensiveness and location (FIDOL) factors to take into account the nature of the source in the context of receiving environment. Different combinations of these factors can result in adverse effects. Location is particularly important as this relates to sensitivity of the receiving environment.

7.3 Depending on the severity of the dust event, one single occurrence may be sufficient to consider that a significant adverse effect has occurred. In other situations, however, the event may be short enough, and the impact on neighbours sufficiently minor, that the events would need to be happening more frequently for an adverse effect to be deemed to have occurred.

7.4 The FIDOL assessment method considers each of these factors in a qualitative manner.

7.5 The Institute of Air Quality Management (IAQM) based in the UK produced a document providing 'Guidance on the Assessment of Mineral Dust Impacts for Planning' (IAQM, 2016). This describes a source-pathway-receptor (S-P-R) model for the assessment of mineral dust impacts. The S-P-R concept presents the hypothetical relationship between the source(s) of the dust, the pathway (P) by which exposure might occur and the receptor (R) that could be adversely affected. The IAQM S-P-R approach provides a series of assessment matrices which are used to estimate the dust impact risk, the pathway effectiveness and the likely magnitude of amenity effects (e.g. loss of amenity due to dust deposition or visible dust plumes, including nuisance, annoyance or dust complaints) at each sensitive receptor location.

7.6 I have integrated the S-P-R method presented by IAQM with the FIDOL assessment method from the MfE Good Practice Guide to provide a comprehensive qualitative assessment of likely dust impacts from activity of quarry activities at Peach Island.

8. RECOMMENDATIONS TO AVOID, REMEDY, OR MITIGATE EFFECTS

Dust Mitigation

8.1 Table 8-1 summarises the Site's dust sources and proposed mitigation measures.

Table 8-1 Sources and mitigation of dust

Source	Mitigation
On site vehicle movements	Gravel the internal haul roads. A speed limit of 15 km/hr is enforced around the gravel pit.
Unsealed surfaces	Trafficked and unsealed working surfaces will be watered on a regular basis during periods of high dust risk using a water cart or sprinkler system.
Gravel extraction in active area.	Excavation and loading will cease if winds above 7.5 m/s occur and if the wind direction is toward a sensitive receptor that is located within 250 m of the active quarry area. Dust suppression will be undertaken through water application on dry days where winds are above 5 m/s. Limit the area of active quarry to a maximum of 1,600 m². 3 m high bund on the northern boundary of Stage 2, some of which is backed by mature trees. The exaction of aggregate from the northern part of Stage 2 will only occur over the months June to November.
Disturbing materials	Good practice machine operation will be implemented including minimizing drop heights and wetting dusty materials when needed. The loading on to, or removal of, material from stockpiles will only be undertaken during when wind speeds are less than 5 m/s.
Stockpiles	The size and location and surface condition of stockpiles is constructed and maintained in such a way as to minimise any dust emissions. Stockpiles will be located away from sensitive receptors.
Gravel Processing	No gravel crushing or screening will be undertaken on site.

Gravel transportation	Deep sided trucks filled to the appropriate level are used.
Tracking dust onto sealed road	Road wash or wheel wash (only if required).

8.2 As a benchmark for dust suppression the Ministry for the Environment Good practice guide on assessing and managing dust recommends a water application rate of 1 mm/hour (or 1 litre/m^2) per hour. The active quarry area will be limited to 1,600 m^2 but other site related activities such as haul roads and stockpiles may also require water for dust suppression. For this reason, a total quarry area of 3,000 m^2 has been assumed to potentially need water for dust suppression purposes.

8.3 Using 1 mm per hour over 3,000 m^2 requires 3 m^3 of water per hour. Over a 10-hour working day the total volume of water required could be 30 m^3. However, it is unlikely that dust suppression would be required over a full day.

8.4 CJ Industries will ensure that 30 m^3 of water is available daily for potential dust suppression purposes. There will be one 15 m^3 dust suppression cart on site which can provide water for dust suppression. Use of this cart rather than fixed sprinkler lines allows dust suppression target areas to move around with staging of gravel extraction. The intention is that the dust cart would be refilled from the site's water supply which is supplied by water permit RM171337. This permit allows Tim Corrie-Johnstone (Site Manager for CJ Industries) to take up to 2,625 m^3 a week for irrigation, and an application has been lodged to vary the permit to include use for dust suppression at the quarry.

8.5 Should the need be identified by visual dust monitoring, fixed sprinklers, a mobile k-line sprinkler system, or a water truck with cannon may also be opted for instalment along haul roads and active quarry areas in addition to the water cart for dust suppression.

8.6 In summary, the site provides access to ample water for typical and for high demand dust suppression. All mitigation installed will be designed to ensure 1 mm water per hour over 3,000 m^2 can be achieved by the quarry operations on dry days at any stage. Details on how mitigation will be installed and managed on site are provided in the Dust Management and Monitoring Plan (DMMP, Appendix B).

Meteorological Monitoring

8.7 A meteorological station that will measure wind direction, wind speed, temperature and relative humidity will be set up on site. The location of the equipment and location of the meteorological station location will, as far as practical, be consistent with AS/NZS 3580.1.1:2016 Methods for sampling and analysis of ambient air. Part 1.1 Guide to siting air monitoring equipment.

8.8 The meteorological station will provide real time data to the site staff. This information will be used to assist with the dust management of the site. The meteorological system will be set up to send email and SMS text alerts to site staff. An alert will be sent when 1-hour average windspeeds exceed 5 m/s and will be used to prompt site staff to carefully monitor dust sources and implement additional mitigation measures if required. An alert will be sent when 1-hour average windspeeds exceed 7.5 m/s (27 km/h) which will be used to prompt site staff to stop work on dust generating activities. The DMMP details the monitoring station to be installed and the response procedures to wind trigger alarms.

Dust Monitoring

8.9 Given the size of the site I consider it appropriate and cost effective to monitor any off-site impacts of dust using both scheduled and reactive visual monitoring. CJ Industries will implement the following visual dust monitoring programme:

- Undertake daily onsite and offsite visual inspections to monitor deposited dust and visible dust plumes, record inspection results, and make the log available to TDC when requested;

- Carry out regular site inspections to monitor compliance with the DMMP and resource consent conditions, record inspection results, and make an inspection log available to TDC when asked; and

- Increase the frequency of site inspections by the person accountable for air quality and dust issues onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions (e.g. spring and summer).

8.10 Consideration will be given to undertaking dust deposition monitoring or continuous real-time monitoring around the site (as a dust management tool) in the unlikely event of dust nuisance complaints or if visible dust plumes are seen beyond the site boundary.

Dust Management and Monitoring Plan

8.11 MfE's good practice guide on assessing and managing the impacts of dust (Ministry for the Environment, 2016) specify the content of DMMPs and such a plan has been developed for the site. The purpose of the DMMP is to provide a framework for the landfill operations and site personnel to:

- Facilitate the avoidance, remediation, and mitigation of any adverse effects of discharges of dust generated from the operation of the quarry;
- Promote proactive solutions to the control of dust discharges from the site; and
- Ensure the effective and targeted use of available mitigation measures so that adverse effects of dust and discharges do not breach the dust limits set by the consent.

8.12 A draft DMMP is provided as Appendix B of the Dust Impact Assessment report. I consider it appropriate that TDC review and approve the DMMP before any work is undertaken on the site.

9. ASSESSMENT OF AMENITY IMPACTS OF TSP DISCHARGES

9.1 This section of my evidence provides a summary of the key findings contained in Section 11 Assessment of Amenity Effects from the Dust Impact Assessment. The assessment results for each of the five FIDOL factors are summarised in the following sections. These are then drawn together in a conclusion which considers the combined influence of all the FIDOL Factors.

Frequency

9.2 All of the 14 identified sensitive receptors (dwellings and horticulture) with the exception of 4 sensitive receptors, SR4, SR5, SR6, and SR13, will be downwind from the dust source (as determined by the impact arc) on dry days with winds above 5 m/s for less than 5% of the time. This is associated with the 'Infrequent' category in the IAQM

guidelines (IAQM, 2016). The 4 sensitive receptors identified above will be downwind from the dust source on dry days with winds above 5 m/s between 5.3% to 8.9% of the time. This is associated with the 'Moderately Frequent' category (between 5% and 12%) in the IAQM guidelines.

9.3 The most conservative estimation of vehicle movements is 4 return trips (8 movements) per hour with additional excavation machinery movement within the quarry pits. Due to the low to moderate frequency of high-risk meteorological conditions and the reasonably low peak traffic volume, the combined frequency of high-risk conditions for dust events is anticipated to be low for sensitive receptors.

Intensity

9.4 Dust plume intensity decreases with distance from the source as particles settle out of suspension. Dust deposition rates calculated using Stokes' law estimate that particles of size 50 μm would be unlikely to travel more than 250 metres. PDP's dust transport modelling aligns with EPA Victoria's recommendation on recommended separation distances for industrial residual air emissions for quarries without blasting.

9.5 Referring to the closest distance between the sensitive receptor and the dust source (active pit) SR1, SR2, SR3 (dwellings) as well as SR10, SR11, SR12, SR13 and SR14 (apple and kiwifruit orchards) are categorised by the IAQM criteria as 'Close'. No sensitive receptors are categorised as 'Intermediate' receptors, whilst all the remaining receptors are categorised as 'Distant' receptors.

9.6 The pathway effectiveness can then be defined by combining the frequency of potentially dusty winds with the receptor distance classification. This results in a categorisation of 'Ineffective' pathway for all of the sensitive receptors considered, except SR11 (apple orchard on the northern boundary of stage 2). An ineffective pathway means the dust is unlikely to remain suspended in an air stream (gravity pulls it out) and therefore the dust is unlikely to reach the receptors.

9.7 Various dust generating activities are outlined for assessment of residual source emission (RSE) magnitude in Appendix 4 of the IAQM guidelines. The proposed quarry with its various stages, sealed access road, total working area of unconsolidated surface of 3,000 m^2, ow extraction rate, and low vehicles movements of 4 trucks per hour with some

excavation machinery in the pit is defined as having 'Small' RSE under IAQM Appendix 4.

9.8 Combining the 'Ineffective' and 'Moderately Effective' pathway and 'Small' RSE values using gives an overall Dust Impact Risk of 'Negligible Risk' for the proposed operation of Peach Island Quarry on all sensitive receptors considered. This outcome of the risk assessment for this proposed quarry aligns with my observations and experience with other, sometimes much larger quarries.

Duration

9.9 Given the combined effect of low frequency of longer duration (>1 hour) high-risk (>7.5 m/s) wind events, and the short duration of the dust generating events, the duration of any dust impact on sensitive receptors will be low. Considering the seasonal and diurnal variation of windspeeds, the highest risk period for dust events with a duration of longer than 1-hour is late afternoons during summer.

Offensiveness

9.10 The offensiveness of any particular type of dust is driven mainly by colour and amount. The darker the dust the more offensive it tends to be. The dust from this site will be grey to light brown in colour. Given colour of dust discharged from this site, I have assessed the offensiveness of dust discharged from this quarry which is deposited on surfaces as likely to be moderate to low.

Location

9.11 The locations of the sensitive receptors with respect to the dust source are detailed in Figure 4. Peach Island Quarry – Existing Environment. The area around the site is all zoned 'Rural 1' land (Tasman District Council, 2022). Rural zones typically have low sensitivity to the effects from the discharge of dust. Within the Rural zone adjacent to the proposed quarry are two types of highly sensitive receptors occur, residential properties and orchards. There is a minimum of a 125 m buffer distance to the nearest residential property. All but two residential properties have a buffer distance of greater than 200 m. Three orchards (SR09, SR10 and SR12) are within 100 m of the proposed active quarry area. SR11 is on the boundary of the proposed active quarry area, placing a highly sensitive receptor adjacent to the dust source. The dust mitigation plan will require

that a 3 m high bund is constructed and the existing row of mature trees be retained between the dust source and orchard. Together the bund and trees will provide an effective dust screen.

Cumulative effects

9.12 There are no significant sources of dust in the nearby area except for the riverbed and minor agricultural sources. As such the addition of a small-scale quarry in the area is not considered to be a significant risk on cumulative effects.

FIDOL Summary

9.13 I have undertaken an assessment of each of the five FIDOL factors.

9.14 The dwellings considered as sensitive receptors in this assessment are recognised as 'human receptors', the Motueka River and orchards also recognised as 'ecological receptors', in the IAQM guidelines and are classified as 'highly sensitive' due to their use as residential dwellings or use to produce fruit.

9.15 I have combined 'Negligible Risk' Dust Impact Risk value with the 'High' receptor sensitivity classification to assess the Magnitude of Dust Effects. This gives an overall result of 'Negligible Effect' for the proposed operation of Peach Island Quarry on the sensitive receptors considered. I consider the conclusion based on the IAQM assessment method is equivalent to concluding the impact of dust is likely to be a less than minor adverse effect.

9.16 Apples are typically harvested at maturity in New Zealand between January and May. Kiwifruit are harvested from March until May. During these times dust has the biggest potential to reduce fruit attractiveness, and prior to these harvesting periods may hinder formation and growth. The bund and trees will mitigate the impact of dust on the apple orchard located on the northern boundary of the site. In addition to the physical mitigation, any quarrying within 100 m of an orchard will only be undertaken during the times of the year when the material is relatively damp and when the fruit growing cycle determines that the trees and fruit are less sensitive to the impacts of dust.

9.17 The findings of the assessment on frequency and duration respectively, undertaken in accordance with IAQM guidelines estimated dust impact to these orchard areas as 'Negligible risk' due to receptor distance, pathway effectiveness and small residual source

emissions. Because of this, is not considered that dust deposition on nearby fruit orchards is likely to be of any significance that could cause the physical or chemical impacts described above.

9.18 In addition, CJ Industries has the mitigation measures and quarry design in place to ensure effective dust suppression and no objectionable or offensive dust crosses the quarry boundaries.

Assessment of Health Impacts

9.19 To investigate the potential health impacts of quarrying activities, Environment Canterbury undertook a particulate and dust monitoring programme around the Yaldhurst quarry area (a total of 230 ha) within which four crushing and screening plants operate. The key conclusion drawn from the Yaldhurst monitoring data is that PM_{10} concentrations measured at a distance of greater than 160 m from the quarry boundary show very little impact from the quarry compared to data collected at a background site. The respirable crystalline silica (RCS) monitoring at Yaldhurst quarry showed very low concentrations of this contaminant. All but two of the 32 samples taken were below the limit of detection of the method used to measure RCS. Given that the Yaldhurst quarry is significantly larger and PM_{10} and RCS emissions are magnitudes higher than the proposed CJ Industries quarry, I conclude that any potential health impacts of PM_{10} and RCS at the sensitive receptors will be less than minor.

10. EFFECTS PERMITTED BY THE PLAN OR A NES (PERMITTED BASELINE)

10.1 There are a number of land use activities that could take place on the site as permitted activities under the Tasman Resource Management Plan (TRMP). These are:

(a) Recontouring of the land over the entire site; and

(b) Formation of any road or track up to 100m per hectare.

10.2 The effects of the discharge of dust from removing overburden and placing that material in bunds and the formation of roads is considered within the assessment of effects. However, I note that a significant proportion of the dust discharged from the site,

especially during the site development phase, is generated from activities that are permitted under the TRMP.

11. CONSISTENCY WITH POLICY DIRECTION

11.1 **Chapter 5: Site Amenity Effects** of the TRMP identifies issues, objectives and policies in respect of the site amenity effects of land use activities. From Chapter 5 the following Objective and Policies are relevant to this proposal:

(a) **Objective 5.1.2:** Avoidance, remedying or mitigation of adverse effects from the use of land on the use and enjoyment of other land and on the qualities of natural and physical resources.

(b) **Policy 5.1.3.9**: To avoid, remedy, or mitigate effects of: (b) dust and other particulate emissions

(c) **5.1.3.14:** To provide sufficient flexibility in standards, terms and methods for rural sites to allow for the wide range of effects on amenities which are typically associated with rural activities, and which may vary considerably in the short or long term.

11.2 Section 8 of my evidence provides a detailed description on how the adverse effects of dust and particulate discharged from the proposed activity will be avoided, remedied and mitigated including the development and of a site specific dust mitigation and monitoring plan.

11.3 **Chapter 7: Rural Environmental Effects** addresses the issues, objectives and policies in respect of the fragmentation of rural land, the availability of rural land for non-rural purposes, and the protection of rural character and amenity. From Chapter 7 the following Policy is relevant to this proposal:

(a) **Policy 7.2.3.12:** To ensure that activities which are not involved or associated with plant and animal production do not locate where they may adversely affect or be adversely affected by such activities;

(b) **Policy 7.4.2:** Avoidance, remedying or mitigation of the adverse effects of a wide range of existing and potential future activities, including effects on rural character and amenity values;

(c) **Policy 7.4.3.2**: To provide for rural activities which may involve levels and types of effects, including noise, dust, smoke and odour, that may be permanent, temporary or seasonal, and that may not meet standards typically expected in urban areas; and,

(d) **Policy 7.4.3.4**: To exclude from rural areas, uses or activities (including rural-residential) which would have adverse effects on rural activities, health or amenity values, where those effects cannot be avoided, remedied or mitigated.

11.4 Section 9 of my evidence provides a detailed assessment on the potential adverse effects of dust discharged from the proposed activity. I conclude that dust discharged from the proposed quarry will have less than minor adverse effects on plant and animal production. The key reasons for this are the amount of dust deposited on pasture will be minimal and not noticeable above background levels. Given the proximity of the apple orchard on the north-eastern boundary of the stage 2 development, specific and targeted mitigation measures will be implemented. A 3 m high bund will be built on that boundary and there will be a mature row of trees behind some of the bund. The bund alone will provide an effective dust barrier, when combined the effect of these two physical barriers will be a very effective dust screen between the two properties. In addition to this, the quarrying of any area with 100 m of this boundary will be undertaken in the cooler months of the year when the ground is wetter when the apple orchard's trees and fruit are less susceptible to the impacts of dust.

11.5 **Chapter 12: land disturbance effects** addresses the adverse environmental effects of a range of land use activities that involve disturbance of the land by either vegetation removal or physical ground disturbance, such as cultivation, intensive stocking, excavation, mining, or track construction. From Chapter 12 the following the following objective is relevant to this proposal:

(a) **Objective 12.1.2**: The avoidance, remedying, or mitigation of adverse effects of land disturbance, including: sediment contamination of water and deposition of debris into rivers, streams.

11.6 Section 9.7 of my evidence discusses the travel distance of dust in air. Given the separation distance of more than 100 m between the boundary of the proposed quarry's

Stage 3 boundary and the Motueka River, I conclude that there is a very low potential for any substantive amount of dust landing on the waterway. The dust generated by the exposed material on the riverbanks in this reach of the Motueka River is likely to be a larger source of dust for the river than the proposed quarry. Mr Tony Payne (and Mr McNeil) do not express any concern about the potential impact of dust from the proposed quarry on the Motueka River. My evidence demonstrates than any adverse effect of dust discharged from the proposed quarry on the Motueka River will be less than minor.

11.7 I conclude that the proposed quarry development meets the requirements of the relevant objectives and policies of the TRMP.

12. MATTERS RAISED IN SUBMISSIONS

12.1 I have reviewed a summary of the submissions made on CJ Industries' application. From that summary I understand that a total of 147 submissions were received, of which 56 listed dust or air pollution as an issue of concern. Of these, 55 seek to have the consent declined and 1 supported the granting of the consent. 39 submitters seeking that the consent be declined did not provide any indication of the consent conditions or relief sought were the consent to be granted. 17 of the submitters that raised dust or air quality as a concern provided an indication of the consent conditions or relief they sought.

12.2 I have summarised the consent conditions and the relief sought by the submitters who raised dust or air quality as a concern as:

(a) Bring road up to standard and reduce speed limit, vehicle access to site fully sealed to minimise dust;

(b) Provide effective dust mitigation measures;

(c) Guarantee no crushing plant in future;

(d) Maximum of two items of heavy machinery in operation at any one time

(e) Council hires an independent contractor to monitor noise/ dust/ fill put in pit as well as water quality;

(f) Maximum of 5 trucks/day on the road with onsite cleaning system for dust; and

(g) Truck and trailers to be watered down to reduce dust effects.

13. ADDRESSING DUST MATTERS RAISED IN SUBMISSIONS

13.1 The applicant will fully seal the site access road. The internal haul roads will be well maintained, and dust supressed on this by a sprinkler system or water truck as required. There will be a 15 km/hr speed limit on site to minimise vehicle generated dust emissions. The speed limit on the sealed access road will be 60 km/hr.

13.2 Section 8 of my evidence provides a detailed description on how the adverse effects of TSP and PM_{10} discharged from the proposed activity will be avoided, remedied and mitigated including the development and of a site-specific dust mitigation and monitoring plan.

13.3 The proposed consent conditions for the site will prohibit the crushing and/or screening of quarry material on the site.

13.4 To minimise the amount of dust discharged from the site, a submitter requested that a maximum of two heavy machines be in operation at any one time. To operate the site efficiently a 30-tonne excavator will be used for digging the materials out of the ground. The excavator will load the aggregate onto one of three dump trucks for cartage to the stockpile. From there a loader will be used to load the road trucks. Therefore, CJ's cannot offer the relief sought by this submitter. However, the proposed dust mitigation measures will be effective at ensuring that no offensive or objectional dust will be discharged beyond the boundary of the site.

13.5 The amount of dust discharged from the site is of such a minor scale that I consider that the value that a real-time dust monitor would bring would be minimal. Therefore, I do not recommend, and the applicant does not propose, engaging an independent contractor to install and operate a dust monitoring system. The DMMP will address this issue by requiring CJ Industries to install a real-time dust monitor operated by an independent provider in the unlikely circumstance that frequent dust plume complaints are received and validated by TDC.

13.6 The applicant proposes a maximum of 30 truck movements on the access road per day. Any dust tracked off site by these trucks will be deposited on to the sealed assess road. No dust will be tracked as far as the public road. Should a build-up of dust on the sealed assess road be observed the road will be washed by a CJ Industries water truck. No dust will be tracked as far as the public highway.

13.7 CJ Industries have priced the installation of truck wheel wash system at over $100,000. I consider the proposed dust mitigation measures for reducing the impacts of dust tracked off site will be effective. Therefore, the investment in a wheel wash system is not justified. The DMMP will address this issue by requiring CJ's Industries to install a wheel wash or an alternative method to wash trucks before they left the site in the unlikely circumstance that frequent dust plume complaints relating to dust tracked by trucks on to the sealed road are received and validated by TDC.

13.8 In summary, the applicant is able to comply with all the consent conditions proposed and all but one of the items of relief sought by the 57 submitters who raised dust and or air pollution as an issue in their submissions (except where those submissions seek that consent is declined). The exception on complying with relief sought, is that CJ's Industries cannot meet for the request to operate a maximum of two heavy duty machines at any one time.

14. MATTERS RAISED IN S42A REPORT

14.1 I have reviewed the TDC S42A and identified the officer's comments which relate to the impact of dust from the proposed quarry (Section 8). The key dust issues I identified in the TDC officers report were:

(a) Highlighting of a submitter's concern on the close proximity of the apple orchard to the Stage 2 boundary (Paragraph 8.26);

(b) Highlighting of a submitter's concern on the dust covering very large areas and exposing existing crops and properties to significant contamination (Paragraph 8.27);

(c) Recommendation that the dust control measures listed in the Draft Soil Management Plan are included as conditions of consent (Paragraph 8.28);

(d) Agreement that the sealing of haul road along with other recommended measures for soil transport will adequately mitigate the dust during transport off the site (Paragraph 8.29);

(e) Recommendation that wind speed limits be adopted for the removal of topsoil (Paragraph 8.30);

(f) Opinion that there is a potential for dust to be generated when soil is handled during dry and very dry conditions (Paragraph 8.31);

(g) Opinion that good site management practices and a robust dust control plan can control effects on dust on the wider environment (Paragraph 8.32); and

(h) Dissatisfaction that the applicant has not adequately demonstrated how to prevent the dust effects beyond the boundary of the site, on adjoining activities (Paragraph 8.33); and

(i) Dissatisfaction that the applicant has not adequately demonstrated how to prevent dust effects beyond the site, on adjoining rural activities and thus the proposal may be contrary to relevant TDC policies (Paragraph 8.34).

14.2 In the TDC officer's Summary of Key Issues and Recommendations (Section 18) they conclude that:

(a) They have concerns related to dust effects on neighbouring sensitive receptors which leave them unable to conclude that it is appropriate to support a grant of a resource consent for Stages 2 and 3.

(b) Their opinion is based on information provided to date.

14.3 Subsequent to the to the writing of the TDC's officers S42A report, I have produced a detailed dust assessment report which describes the proposed activities that have potential to discharge dust into the air, details the sensitivity of the receiving environment, outlines the potential impacts of dust and assesses the actual likely impacts of dust. I have also written a DMMP which, if implemented effectively, will ensure the proposed activities will have no more than minor dust impacts on the adjacent properties or the wider receiving environment. Consequently, the dust management measures that

were to be included in the Soil Management Plan have been removed because they will now be covered specifically by the DMMP.

14.4 The information provided in the PDP dust assessment report and DMMP either directly or indirectly address all the dust related issues raised in the Officer's S42a report.

15. SUMMARY AND CONCLUSION

15.1 My evidence provides a summary of PDP's assessment of the potential effects discharged from the development, operation and closure of the proposed quarry. My evidence also provides recommendations on how to avoid, remedy or mitigate adverse effects on dust. A summary of the key findings of my evidence and my conclusion follow below.

15.2 Dust or total suspended particulate (TSP) (particles >10 μm in diameter) which can generate adverse amenity impacts and inhalable particulate matter (PM_{10}) (particles <10 μm in diameter) which can be inhaled and cause adverse human health impacts may be discharged into the air from the development, operation and closure of the proposed Peach Island Quarry.

15.3 The receiving environment is of generally moderate sensitivity to the impacts of dust, but 10 highly sensitive residential or horticultural receptors have been identified within 250 m of the proposed quarry boundary.

15.4 The potential effects of dust on the receiving environment and highly sensitive receptors includes amenity, human health and ecological impacts.

15.5 A comprehensive programme of dust mitigation and monitoring has been developed to ensure the dust emissions from the proposed quarry site are minimised.

15.6 When combining the influences of the scale of the activity, the sensitivity of the receiving environment, the proposed mitigation measures and dust travel distance, I consider the potential effects of dust discharged from the proposed activity are less than minor.

15.7 I consider the proposal to be consistent with TDC's policy direction on the impacts and management of dust.

15.8 The applicant is able to comply with the consent conditions proposed or the relief sought by the 57 submitters who raised dust and or air pollution as an issue in their submissions (except where those submitters sought that consent be declined).

15.9 The information provided in the PDP dust assessment report and dust management and monitoring plan, either directly or indirectly addresses all the dust related issues raised in the Officer's S42a report.

JEFF BLUETT

14 JULY 2022