King's Quarry Limited

Pebble Brook Road
Wainui

Assessment of the discharge of contaminants into air (dust) from the operation of King's Quarry.

Report 24459
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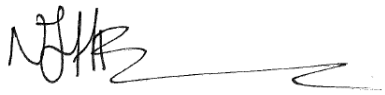

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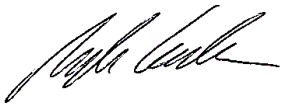

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1. Executive Summary

King's Quarry, along Pebble Brook Road, propose to undertake a Stage 2 extraction of approximately 22 million tonnes of material over 45 years. Stage 2 development is a listed project under the Fast-track Approvals Act 2024 (the Act).

The proposed activity at King's Quarry will include processes that may give rise to dust. King's Quarry will manage effects using a range industry best practise techniques. Table 1-1 below summarises the processes, dust impact and mitigation.

Table 1-1: *Summary of dust generating process, impact from that process and mitigation steps*

Process	Duration of activity	Intensity of dust emissions	Mitigation/Controls
Blasting	Infrequent, one day every so often.	Puffs of dust that will largely remain within the boundary of the site.	• Natural dampness of material • Wind speed/direction monitoring • Dust monitoring
Drying rock	Left for several days after blasting.	Discharge of dust not likely while rock is drying out.	• Wind protection • Natural dampness of material
Excavation	Daily activity.	Puffs of dust possible but minimised through damp nature of rock and large separation distances in most locations across the site.	• Low dust, alluvial (pebble) rock form • Natural dampness of material • Wind protection • Wind speed/direction monitoring • Dust monitoring
Crushing	Infrequent with only ~15% material needing to be passed through a crusher.	Low level discharge and infrequent usage.	• Wind protection • Water suppression • Natural dampness of material • Wind speed monitoring • Dust monitoring
Washing/ Screening	Intermittent with periods of heavy use and periods of no use.	Discharge of dust possible due to intermittent operation.	• Water suppression • Natural dampness of material • Location – centre of site
Storage	Permanent bunkers established at output of wash plant.	Material naturally wet and potential for dust release associated with moving from stockpile to truck/trailer.	• Wind protection • Revegetation • Natural dampness of material • Wind speed/direction monitoring • Dust monitoring
Cartage	Eighteen truck/trailer movements per hour on average.	Infrequent discharges with greatest potential when dry and/or windy.	• Water suppression – roads • Natural dampness of material • Wind speed monitoring • Dust monitoring
Over burden removal and placement	Concentrated timeframe (days – weeks) when new areas are being prepared for quarrying.	Material likely to be damp when removed but once in place may dry out with the potential for windblown dust.	• Wind protection • Revegetation • Water suppression • Wind speed monitoring • Dust monitoring

The FIDOL assessment concludes that the effect on dust emissions from the proposed increased extraction of material will be negligible owing to the suitable separation distances, sensitivity of receiving environment, and implementation of controls at source.

2. Introduction

Kings Quarry Limited (KQL) have engaged Air Matters Limited to assess the dust emissions from activities relating to the proposed extension ('Stage 2') at Kings Quarry, Wainui. A range of resource consents are required for the Stage 2 development. The Stage 2 development is a listed project under the Act.

2.1 Description of activity

Kings Quarry Limited is proposing to expand quarry operations at King's Quarry with a Stage 2 involving the extraction of up to 22 million tonnes of material over 45 years from a defined area of the quarry site. As a peak this equates to around 2,000 tonnes of material extracted per day.

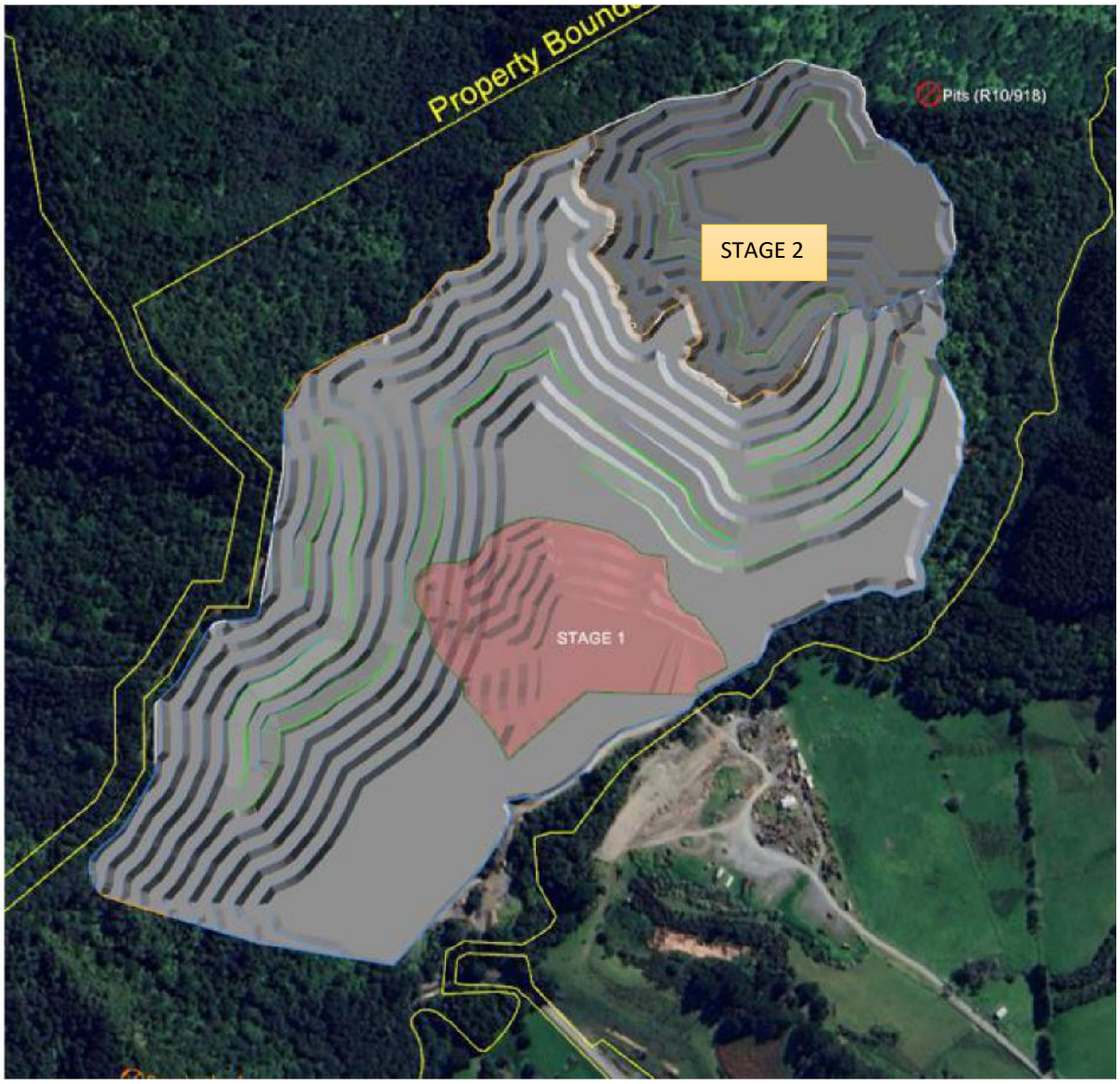
King's Quarry is located along Pebble Brook Road, Wainui. This is midway between Silverdale and Kaukapakapa and about 10km west of State Highway 1. Figure 2-1 below shows the general location of the quarry.

Figure 2-1: King's Quarry location in the Auckland Region

The area on site where extraction of material will take place is shown in Figure 1-2 below with the Stage 1 (currently consented) area also marked on this map. The darker highlighted area to the top right of the map is where the first 5 years of extraction will take place. This equates to 1.6 million tonnes of product.

The remainder of the quarry will involve the removal of 20.4 million tonnes of product from years 6 to 45.

Figure 2-2: Stage 1 and 2 areas of extraction at King's Quarry.



The proposed Stage 2 quarry operations presented in Figure 2-2 remain within the Special Purpose – Quarry Zone as defined in the Auckland Unitary Plan (AUP).

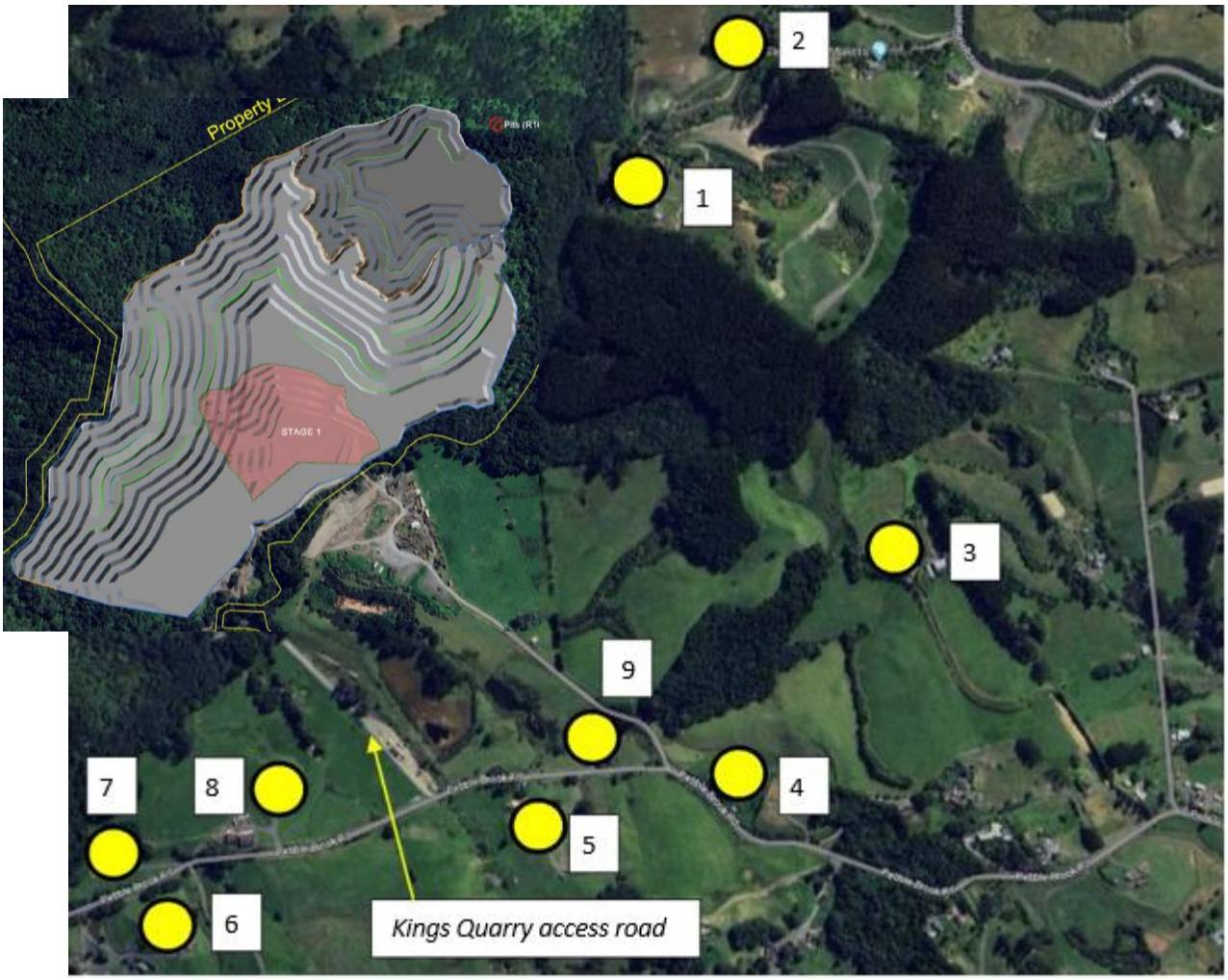
2.2 Receiving environment

As with the application for Stage 1, the closest dwellings to the proposed areas of extraction are identified in Figure 2-3 below. The closest dwelling is located just over 200m to the east of the boundary of the Stage 2 development and annotated with a '1' on Figure 2-3. Another dwelling is in the same vicinity (marked as '2') but ~400m away from the Stage 2 boundary.

The other sensitive receptors (being residential dwellings marked '3' to '9') on Figure 2-3 are all approximately 500 metres away from proposed Stage 2 area.

The access road for Kings Quarry has also been identified in Figure 2-3.

Figure 2-3: Location of nearest dwellings to the proposed quarry operations.



A summary of the sensitive receptors is provided in Table 2-1 below.

Table 2-1: Summary of sensitive receptors and distance of dwelling to Stage 2 quarry boundary.

ID	Address	Distance (m) – dwelling to quarry
1	782 Haruru Road, Wainui	>200
2	778 Haruru Road, Wainui	~430
3	70 Pebble Brook Road, Wainui	>900
4	144 Pebble Brook Road, Wainui	>800
5	175 Pebble Brook Road, Wainui	>600
6	251 Pebble Brook Road, Wainui	~500
7	306 Pebble Brook Road, Wainui	>700
8	220 Pebble Brook Road, Wainui	>300
9	162 Pebble Brook Road, Wainui	>600

The access road into King's Quarry is largely sealed to minimise dust generation. Figure 2-4 below shows this access road near the site entrance and weighbridge.

Figure 2-4: Access Road into King's Quarry from Pebble Brook Road

Pebble Brook Road itself is unsealed so effects from traffic generated road dust is something that exists in the current environment. In the Stage 1 application a request for further information was issued by the Duty Commissioner in respect of traffic generated dust from within the site and through use of the public road.

The responses to potential dust nuisance from traffic on Pebble Brook Road (PBR) are summarised as follows:

- PBR is a local access road and not a through road. It provides access for only 35 properties.
- PBR is 2.8km long with 1.9km within the Special Purpose – Quarry Zone, which has the intent of avoiding reverse sensitivity effects on quarry operations.
- Existing dwellings are suitably situated at a distance from PBR with a majority being screened by vegetation.
- Road safety issues were raised by Auckland Transport and Auckland Council traffic engineering specialist if PBR was sealed due to increased vehicle speeds.
- Trucks will be covered when leaving the site to avoid loss of load.

Review conditions (accepted by the applicant) allow for the assessment of future unanticipated issues associated with dust emissions from PBR.

In Stage Two there will be a change in truck movements, which is summarised below.

- Approximately 500,000 tonnes per year exported from the site.
- Average of 27 tonnes per truck and trailer.
- This equates to 18,518 truck and trailer movements per year.
- Assuming an operation of 275 days per year (6 days per week) this equates to 94 truck and trailer units per day at its peak.

- Assuming a 10-hour window for truck and trailer movements to/from the site this averages at 9 trucks per hour.

This has been used to inform the nature and extent of road dust generation from Stage 2 of King's Quarry which feeds into the assessment of dust effects.

3. Process Description

3.1 Quarry operations

The quarry operations will be from 05:00 to 19:00 with truck access between 06:30 and 17:30. The rock being extracted is alluvial and hence is composed of various sized pebbles held together with sand like fines. As a result, quarry operations differ from a typical quarry in the Auckland region due to the need to crush only a small proportion of the extracted rock (~15%). Figure 3-1 provides an indication of the typical makeup of the material at Kings Quarry with pebbles (of variable sizes) being bound together with a sandy/silty conglomerate.

Figure 3-1: King's Quarry material.

The quarry process is summarised in the table below (Table 3-1) with descriptions added around the duration and intensity of dust emissions from each activity. This information is then linked through to the FIDOL assessment in Section 5.

Table 3-1: Summary of quarry process including duration and intensity of dust emissions.

Process	Duration of activity	Intensity of dust emissions
Blasting	Infrequent and will occur during a day when required.	Puffs of dust that will largely remain within the boundary of the site. Near to site boundaries (specifically in NE of site) may result in short duration discharge beyond site boundary.
Seasoning of rock (drying out)	Left out for several days once blasted.	Discharge of dust not likely while rock is drying out.
Excavation	Likely to be a daily activity.	Puffs of dust possible but minimised through damp nature of rock and large separation distances in most locations across the site.
Crushing	Infrequent with only ~15% material needing to be passed through a crusher.	Low level discharge due to controls (including active water suppression) and infrequent usage.
Washing/Screening	All material is passed through this process, but operation will be intermittent with periods of days of continual operation and then nothing until more material is carted from excavations.	Discharge of dust possible from this operation. Managed through damp material and water added in process.
Storage	Permanent bunkers established at output of wash plant.	Material naturally wet and potential for airborne impact associated with moving from stockpile to truck/trailer. Natural dampness minimises effect to only immediate area onsite.
Cartage	Eighteen truck/trailer movements per hour on average.	Trucks are covered and speed limits minimised onsite. Gravel roads will remain damp. Infrequent discharges with greatest potential when dry and/or windy.
Over burden removal and placement	Concentrated timeframe (days – weeks) when new areas are being prepared for quarrying.	Material likely to be damp when removed but once in place may dry out with the potential for wind-blown dust. Controlled through water suppression if required and covering / revegetation.

The image below (Figure 3-2) shows the wash plant on the quarry floor with sorted material in the bunkers in the foreground. The wash plant will remain in a similar location and design over the life of the Stage 2 development.

Figure 3-2: King's Quarry crushing, screening and washing operations

The excavation of rock in the quarry will be via drilling, blasting and removing with excavators into dump trucks down to the crushing, screening and washing plant (as can be observed in Figure 3-2). The crusher can also be relocated nearer to the point of excavation in the quarry.

The material onsite is naturally damp with water seeping out of the rock and down onto the existing quarry floor. This is advantageous in terms of dust emission control that will be discussed in Section 4.

Figure 3.3 below shows the material produced from blasting. Most of it is smaller sized that can be passed straight through for screening. The large boulders in this image will be passed through a crusher to enable them to be screened. Most of the material can be easily processed for on selling with minimal need for usage of additional dust generating processes.

Figure 3-3: Blasted King's Quarry material awaiting screening and washing

4. Assessment Criteria

The AUP has Objectives (E14.2.1 to E14.2.4) and Policies (E14.3.1, E14.3.5, E14.3.6, E14.3.8 & E14.3.9) that are relevant to this application. The detail provided in Section 4 and 5 below describes how these objectives and policies will be met by describing how adverse effects will be limited through separation distances and active controls. Management of discharges will ensure that the Auckland Ambient Air Quality targets will be met.

The relevant rule in the AUP (updated 13 October 2023) is E14.4.1(A90). This rule states the following.

Activity		Activity Status				
		High air quality – dust and odour area	Medium air quality – dust and odour rural area (Rural)	Medium air quality – dust and odour area (Industry)	Low air quality – dust and odour area (Industry)	Low air quality – dust and odour area (Quarry)
(A90)	Mineral extraction activities at a rate of between five and 200 tonnes/hour.	NC	RD	RD	RD	C

The King's Quarry is zoned Special Purpose – Quarry Zone (Low air quality area) and therefore the activity is a controlled activity.

Processing (crushing/screening/washing) of product will occur for up to 40h per week with extraction and overburden removal occurring for up to approximately 60h per week.

The proposed total amount extracted over 45 years is 23 million tonnes (at 2.5 tonne/m^3) with 2,000 tonnes per day. This equates to 167 tonnes per hour of extraction (2,000 tonnes per 12 hours of extraction).

This places this proposed activity well within the controlled activity limits of 200 tonnes per hour as detailed in Rule A90 above. The controlled activity standard (E14.6.2.2) that applies to this rule requires a separation distance of 200m between crushing activities and dwellings located outside the Special Purpose – Quarry zone:

> (1) *The crushing of minerals and aggregates associated with a mineral extraction activity must be located at least 200m from any dwelling located outside the site zoned Special Purpose – Quarry zone that is not under the control of the quarry operator.*

As noted in the previous section there will be limited amounts of crushing required at the quarry and this process will primarily remain in the quarry pit. However, the crusher may move across the site and be used close to the extracted material. The closest dwelling (marked as 1 in Figure 2-3) is just over 200 meters from an area of mineral extraction in the north-east region of the site (refer Figure 2-3, dark grey area). The crusher may be situated in this area at times. Based on this the quarrying can meet the controlled standard and therefore is a **Controlled** activity.

5. Assessment of Environmental Effects

The footprint presented in grey in Figure 5-1 below is the section of the quarry that will be excavated in the first five years so that overburden from the rest of the site can be placed back into the excavation created. The closest edge of this initial extracted area is just over 200m from the nearest dwelling with the potential for the crusher to be in this quarry zone at times.

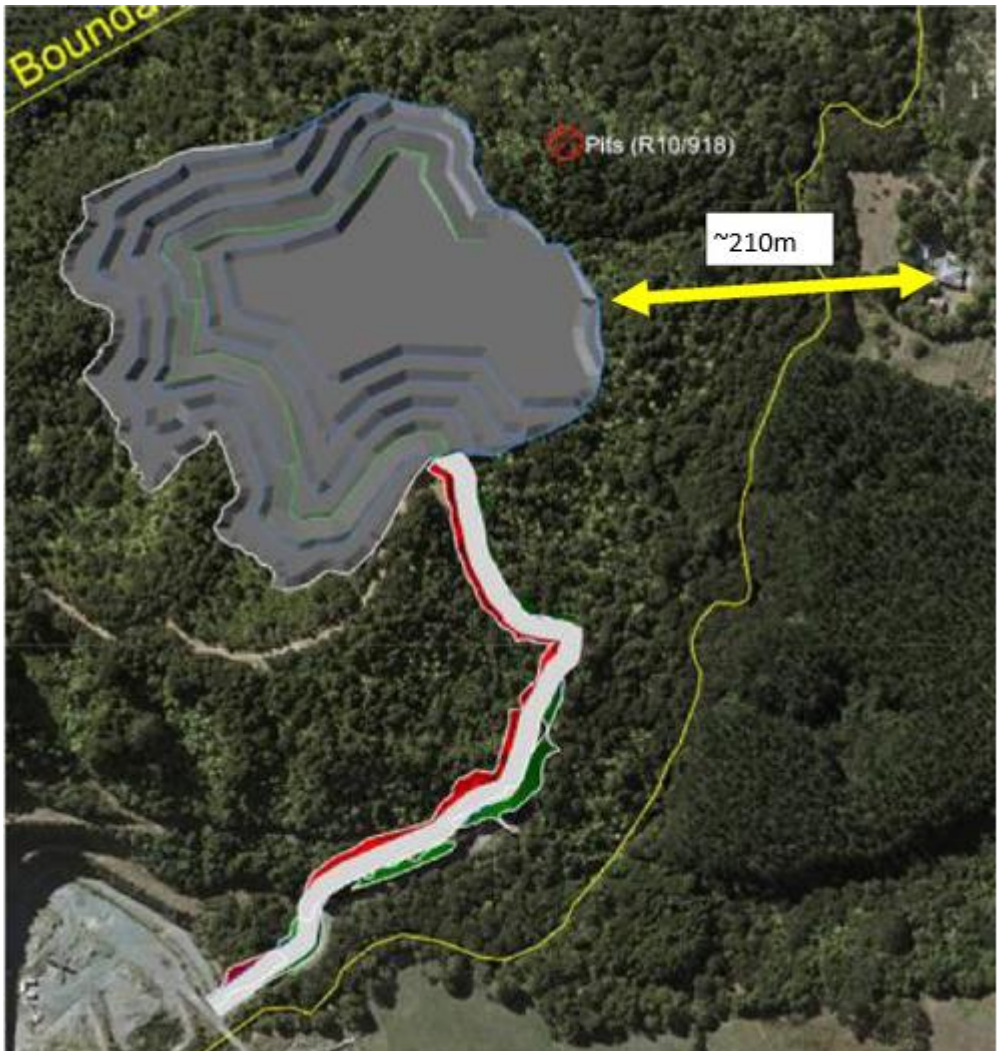


Figure 5-1: King's Quarry Stage 2 - distance from quarry zone to nearest dwelling (782 Haruru Road).

Most of the dust generated on site is larger than PM_{10} (particulate less than 10 microns in diameter) and considered total suspended particulate (TSP), which primarily has the effect of nuisance rather than chronic adverse health effects associated with the smaller particulate sizes. Regardless, implementing appropriate controls will avoid and minimise the release of both fine (PM_{10}) and coarser dust.

Quarried rock can contain crystalline silica, which can lead to silicosis if it is inhaled in the respirable range (<4µm). However, this will primarily be a concern for workers in the quarry site rather than at neighbouring properties due to the dispersion and resulting dilution of any dust released into the atmosphere. Respirable crystalline silica is a workplace hazard that needs to be controlled but is not considered an environmental hazard from quarry sites with good dust management practices.

To qualitatively assess the effects from dust generated from the quarry site the FIDOL factors should be used to provide a framework for the assessments (MfE, 2016).

The FIDOL factors are detailed as:

Factor	Description
Frequency	How often an individual is exposed to dust
Intensity	The concentration of dust
Duration	The length of exposure
Offensiveness/Character	The type of dust
Location	The type of land use and activity in the vicinity

5.1 FIDOL Assessment

5.1.1 *Frequency*

The local prevailing wind conditions are also an important factor when assessing the effects of dust on the local environment. A wind rose has been created (refer Figure 5-2) from Kumeu meteorological data collected at an Auckland Regional Council monitoring station from 2007 to 2010. This data is used to give an indication of prevailing wind conditions in a location close to the proposed site.

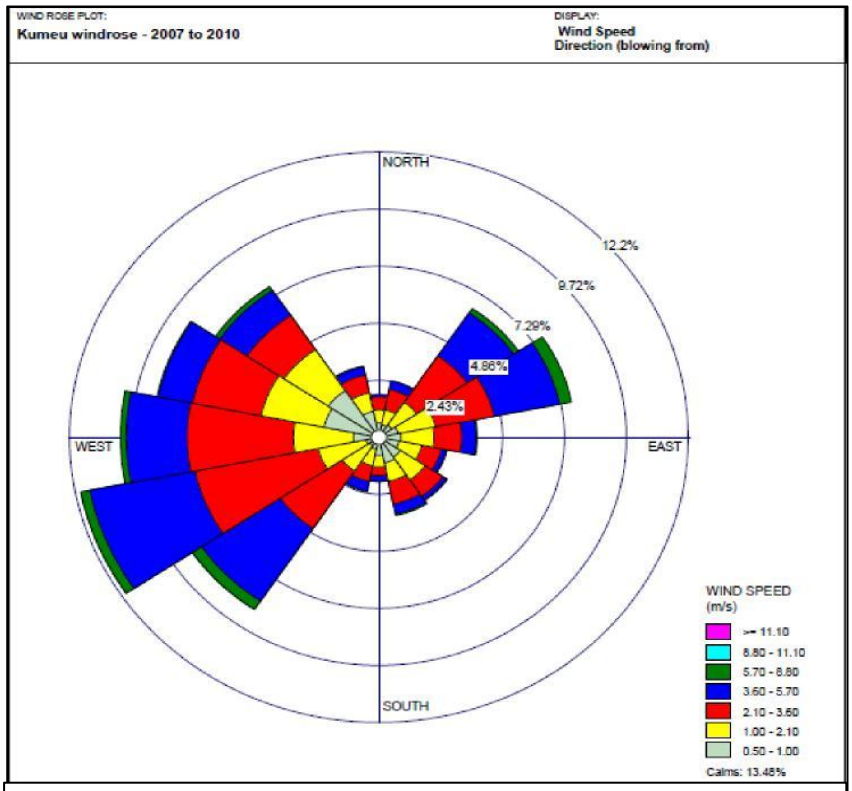


Figure 5-2: Windrose for Kumeu - 2007 to 2010

The windrose above shows that the prevailing wind direction across these three years is generally from the south-west direction, as is typical for Auckland. Other slightly less common wind directions are from the north-east and north-west. This information indicates that the dwellings on Haruru Road to the north-east of the site have greatest likelihood of frequent dust effects due to their proximity to quarrying activities (locations 1 & 2 on Figure 2-3). The dwellings at the end of Pebble Brook Road (locations 6-8 on Figure 2-3) could be impacted less frequently due to the lower proportion of north-east winds and greater distance from quarry activities.

5.1.2 *Intensity*

Regardless of distance and prevailing wind directions, good dust management practices are needed to ensure that the potential for wind driven entrainment of dust is kept to a minimum. Good dust management includes enclosing dust sources as much as is practicable, establishing preventative maintenance, good housekeeping procedures and carrying out particularly dusty operations in favourable weather conditions. The areas of the site that need specific consideration are roadways (paved or unpaved), vehicle movement, material stockpiles, conveyors, crushers and material handling. Section 6 below details the site processes associated with the mitigation of dust emissions.

In addition to the dust management procedures outlined in Section 6, the description in Section 2 indicates that this quarry will not have the same potential intensity of dust generation as other quarries in the Auckland region due to the nature of the alluvial rock. The primary processing required is largely screening and then washing of the quarried product. These processes will produce far less airborne dust versus crushing. The onsite roadways are also wetted naturally from the abundance of moisture in the ground which will assist in the reduction of traffic generated dust.

As a precautionary measure King's Quarry will provide allowance in the dust management plan of real time dust monitoring to be implemented in the driest months when extraction and crushing activities are in the north-east section of the site. The closeness of the dwellings (no. 1, 2, 5, 8, 9 on Fig 2-3) to site mean that this real time dust monitoring will be used as an early warning system that the controls are not working adequately.

A meteorological station will also be installed on site to capture local weather information for dust management purposes. Good management of dust on quarry sites means that wind conditions should be monitored and when speeds are above 5 m/s high risk dust generating processes are closely managed or ceased. Further detail is provided in the Dust Management Plan.

5.1.3 *Duration*

The potential generation of dust from site will occur from normal daily activity, which will occur from 0630 to 1900 on weekdays plus Saturday. These generation activities (mentioned previously) will occur every operational day (6 days per week).

5.1.4 *Offensiveness*

As mentioned previously the type of rock is alluvial in origin with the conglomerate of rock made up of pebbles or stones bound together with silts.

The type of dust produced is not considered particularly offensive in nature.

5.1.5 *Location*

The surrounding environment is zoned as rural with a quarry buffer zone over those rural properties to the south of the site. The buffer zone has the objective of avoiding reverse sensitivity effects as a result of subdivision, use or development.

The rural nature of the surrounding environment means it is considered less affected by discharges of dust with the quarry overlay adding weight to this notion. Regardless, the site does not anticipate any significant environmental effects based on the proposed mitigation controls.

Section 2.2 identified a number of sensitive receptors (dwellings in the rural zone) located a minimum of 200 meters for the nearest boundary of the quarry operation. These separation distances are considered suitable to avoid adverse effects of dust on the identified sensitive receptors.

Overall the quarry is suitably located.

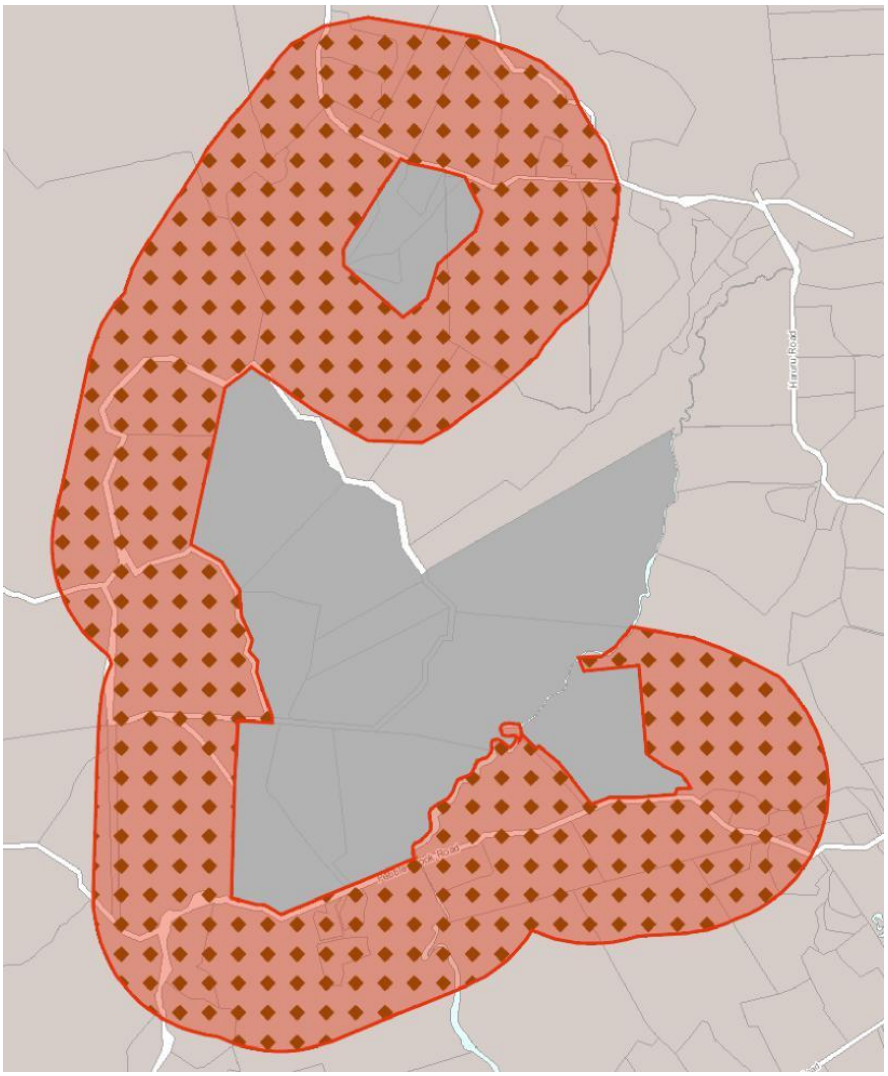


Figure 5-3: Quarry buffer zone around King's Quarry.

5.1.6 *Conclusion*

The FIDOL assessment concludes that the level of effect from dust emissions arising from quarry operations will be negligible owing to the suitable separation distances to sensitive receptors, overall low sensitivity receiving environment, and implementation of the best practice mitigation options proposed in Section 6 below to control emissions at source.

Appendix A provides suggested conditions of consent relating to air quality, and in particular, particulate generated because of this activity. The suggested conditions relay on a detailed Dust Management Plan to finalised and used as the primary document detailing controls and monitoring over the effect from particulate associated with the quarry operation. This approach is deemed to be most appropriate as it allows the consent holder flexibility to adjust as required. For example, this flexibility may come in the form of more (or less) controls depending on season and activity. Monitoring may also need to adjust if actual or perceived issues arise and monitoring resource needs to be shifted or more added.

6. Mitigation of effects

The mitigation of dust effects described in this section are very similar to those described in the application for Stage 1. The larger area encompassed by Stage 2 means that operations are, at times, closer to the site boundary and hence residential dwellings. The mitigation of effects from dust remains the same regardless.

In addition, for Stage 2, active monitoring of dust is proposed. Monitoring will communicate data in real time and will alert onsite staff if an activity or conditions are generating elevated dust levels onsite, so they can immediately respond if issues arise. The details of the exact monitor(s) have not been provided as this is yet to be selected.

King's Quarry operates under a Dust Management Plan (DMP), which has the purpose of facilitating the avoidance, remediation and mitigation of any adverse effects from the discharge of dust from the site. The DMP identifies the source of dust, mitigation methods, monitoring methods, responsible people, complaint management and record keeping. This document is reviewed annually or as required to ensure it is relevant and usable. I recommend that an updated DMP for Stage 2, to be certified by Council, be required through consent conditions (Stage 2 DMP).

6.1.1 *Roadways*

The road surfaces on site will be largely unsealed and will be wetted down with a water truck during dry windy periods (typically November to April). The actual frequency of wetting will be based on daily assessments of the weather conditions at the site by staff. The amount of water applied to the unpaved roads will be ~1 litre per square metre per hour. This detail will be further described in the Stage 2 DMP, which includes confirming access to sufficient water to satisfy dust mitigation requirements.

Given the distance of haul roads within the quarry site from neighbouring residences, it is not considered necessary to seal the haul roads (except for the onsite haul road from near Pebble Brook Road to just past the stream, which has already been sealed).

In addition to the active water application, the natural wetness of the rock will assist in dust suppression. This damp 'normal' state will need to be balanced with active application by water trucks so that access around the site is not compromised.

6.1.2 *Exposed surfaces and stockpiles*

The re-vegetation, or covering with geotextile sheets, of exposed surfaces will occur wherever practical. Exposed ground is another source of wind entrained dust just like unsealed roads and management of these sources are important considerations. However, the likelihood of this being a significant source is limited by the nature of the excavated rock as described earlier in this report.

The fine material stockpiles can be subject to dust re entrainment at wind speeds >5m/s. Any material that is stored on site will be maintained in a visibly wet state during the dry and windy periods from November to April. Any stockpiles that are to be stored for a period of greater than one month will have additional dust

management practices applied to them. These will include the following options and will be detailed further in the final management plan and implemented as required:

- Covering or re-vegetating stockpiles
- Installation of wind breaks
- Limiting the height and slope of stockpiles

6.1.3 *Vehicle movement*

Vehicles travelling over paved or unpaved surfaces tend to pulverise any surface particles and other debris. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents due to turbulent shear between the wheels and the surface. Dust particles are also sucked into the turbulent wake created behind the moving vehicles (MfE, Good Practise Guide for Assessing and Managing Dust, 2016).

Impact assessments[1] on the effect that unsealed road dust has on the environment have found that fine particulate (dust in the PM_{10} fraction that can impact the respiratory health of people) hazardous to health is present. Measured concentrations of PM_{10} from vehicle movement can cause exceedances of the National Environmental Standards set down to mitigate the impact on human health. Controls are important so as to mitigate this effect.

The quarry will limit vehicle speeds on internal roads to 15km/h using signage and enforcement. This will be enforced and discussed regularly with site staff and contractors. Trucks taking material on and off site will cover all loads (as is now typical for bulk haulage) to limit the amount of dust re-entrainment.

Another practical mitigation of dust is the application of new aggregate to roadways. This practise reduces the amount of fine particulate available for entrainment into air. The addition of fresh aggregate will happen as required on internal roads and will be dictated through the review of dust mitigation measures and dust concentrations measured across the site. Kings' Quarry, as part of the Stage 1 consent, will apply a layer of fresh aggregate along Pebble Brook Road. This will assist in the mitigation of fine particulate generation from the ~100 truck movements per day.

6.1.4 *Wind protection*

The site will primarily utilise natural land features to mitigate the effect of dust emissions by wind. Where these are insufficient then windbreaks will be employed but their installation will be assessed if activity and stockpile placement warrant them.

6.1.5 *Fixed plant - crusher*

The on-site crusher will be located within the quarry area and bounded by elevations much higher than the crusher itself on the north, east and west sides. The crusher will be shifted around site but will be primarily in the quarry pit towards the centre of the quarried area. It will also have water suppression at hoppers and

[1] Golder Associates (NZ) Limited, Impacts of exposure to dust from unsealed roads, NZ Transport Agency Research Report 590, April 2017 and Emission Impossible Limited, Health Impacts of PM_{10} from unsealed roads in Northland, April 2019.

transfer points, where required. The operation of the crusher will be limited when wind speeds are not conducive to its operation (e.g., >10 m/s) and this will be further detailed in the Stage 2 DMP.

6.1.6 *Meteorological monitoring*

The site will continuously monitor wind conditions. This monitor will be in an area close to the primary source of dust, being the quarry face, where the crusher, stockpile, excavator, drilling/blasting, material transfer and truck movements will take place.

Alarms to alert site staff when winds increase above trigger points will be established in the Stage 2 DMP.

6.1.7 *Dust monitoring*

Boundary dust monitoring will form part of normal site operational practice and will be especially important in the driest months to ensure that the mitigation of dust from site operations are working at minimising effects beyond the boundary. Monitoring will occur on the boundaries between residential properties and activities on site that create dust, such as sections of unsealed haul roads.

A real time alert system will be used to notify site management of elevated dust levels before an issue arises with the trigger values stated within the Ministry for the Environment Good Practise Guide for Managing Dust (2016) used as a starting point. Dust monitoring will be linked in with meteorological monitoring to best understand source and likely impacted areas. Accordingly, the monitor placement will occur near sources of dust, and will be moved to cover multiple areas of concern, taking into account wind conditions. Of particular focus will be the closest sensitive receptor to site, 175 Pebble Brook Road, with a monitor placed in an appropriate location (at least temporarily) to assist site management understand whether dust will likely impact this receptor.

To ensure that dust mitigation measures are working as intended to mitigate effects from dust generating sources, a detailed monitoring regime is proposed to occur across the site to provide certainty to neighbours and the council that dust mitigation is effective in reducing any offsite effects to acceptable levels. This will form part of the final DMP where it will be elaborated on in some detail. However, this will contain at least the following:

- Locations where dust monitors are to be situated, with boundary locations closest to neighbouring residents being preferred. In addition, monitor placement will occur near the sources of dust (quarry operations etc.) to confirm controls are effective. The monitors will be moved to cover multiple areas of concern and take into account wind conditions.
- Confirm the details around how and when dust monitoring is to be undertaken. Such as the type of monitor to be used and the period of time dust monitoring will be focused.
- Determine trigger levels for action by the consent holder and detail written procedures relating to these actions. Trigger values set out in the MfE Good Practice Guide for Managing Dust (2016) will provide the starting point for these trigger levels.
- Detail how wind speed and direction data will be monitored so that the likely source of dust can be identified.

Overall, the intention of any dust monitoring is to confirm that controls are working to mitigate dust concentrations below trigger points that may cause effects if exceeded. If required, the Stage 2 DMP can be updated to provide for a period of baseline dust monitoring.

Table 6-1 summarises the dust-generating activities previously identified (Table 2-1) and the mitigation or control practices that applies to each. These activities (when near site boundaries) will be those that are a focus for dust monitoring.

Table 6-1: Summary of dust generating activity and mitigation applicable to each.

Dust generating activity	Mitigation/Controls
Blasting	• Natural dampness of material • Wind speed monitoring • Dust monitoring
Seasoning of rock (drying out)	• Wind protection • Natural dampness of material
Excavation	• Low dust alluvial (pebble) rock form • Natural dampness of material • Wind protection • Wind speed monitoring • Dust monitoring
Crushing	• Wind protection • Water suppression • Natural dampness of material • Wind speed monitoring • Dust monitoring
Washing/Screening	• Water suppression • Natural dampness of material • Location – centre of site
Storage	• Wind protection • Revegetation • Natural dampness of material • Wind speed monitoring • Dust monitoring
Cartage	• Water suppression – roads • Natural dampness of material • Wind speed monitoring • Dust monitoring
Over burden removal and placement	• Wind protection • Revegetation • Water suppression • Wind speed monitoring • Dust monitoring

7. Conclusion

The proposed operation of King's Quarry at 306 Pebble Brook Road, Wainui and the resulting discharge of dust into the environment will have a negligible effect due to the separation distance to sensitive receptors and the proposed dust mitigations employed on site.

The site is seeking the maximum duration of 35 years for the discharges into air from the operation of King's Quarry or a duration that is consistent with other similar discharge consents with acceptable effects. This duration also aligns with the expected timeframe associated with the extraction of material and other consents required to authorise the Stage 2 development.

Measures to mitigate dust effects are considered to be the best practicable option for the control of dust from this operation. The nature of the rock being quarried means that the potential generation of dust is likely to be less than with other types of rock quarries in Auckland. There are checks and balances proposed through active management of dust emissions detailed in the Stage 2 DMP and the regular monitoring of boundary effects that will warn of potential issues. The air discharge conditions recommended to be included as part of Kings Quarry Limited's application are attached to this assessment at Appendix A.

The applicant will also accept a review condition from Auckland Council that can cover changes in best practise regarding dust mitigation from quarry operations.

Overall, the assessment of effects from the discharge of dust into air from King's Quarry are negligible.

8. References

Auckland Unitary Plan Operative in Part (Updated 13 October 2023)

Ministry for the Environment (2004): Good practice guide for assessing and managing dust. Wellington: Ministry for the Environment.

Ministry for the Environment. (2016): Good Practice Guide for Assessing Discharges to Air from Industry. Wellington: Ministry for the Environment.

CliFlo (National Climate Database). for Kumeu windrose data.

Appendices

Appendix A Air Discharge Conditions

GENERAL CONDITIONS

Duration

1. Air discharge permit [insert reference from Council] expires 35 years from the decision unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.

DURING WORKS CONDITIONS

Air Discharge Limits

2. All processes on site must be operated, maintained, supervised, monitored and controlled to ensure that all emissions authorised by this consent are maintained at the minimum practicable level.

3. The discharge must not give rise to dust or the deposition of particulate matter that causes a noxious, dangerous, objectionable or offensive effect beyond the boundary of the site.

4. If at any time, including outside normal operating hours, visible dust is blowing beyond the site boundary the Consent Holder must:

   (a) Cease all quarry activities (including loading of purchasing trucks), except dust suppression measures;

   (b) Continue all dust suppression activities including but not limited to the immediate watering of both active and inactive exposed surfaces;

   (c) Investigate possible sources of the dust;

   (d) Only resume quarry activities (other than dust suppression) once there is no longer visible dust blowing beyond the site boundaries; and

   (e) Document the cause of dust discharges and actions undertaken.

5. Beyond the boundary of the Site there must be no odour caused by discharges from the Site which, in the opinion of an enforcement officer, is the cause of a noxious, dangerous, offensive or objectionable effect.

Air Discharge Processes

6. No part of the process may be operated without the associated dust suppression equipment being fully operational and functioning correctly.

7. All emission control equipment associated with the process must be maintained in good condition and be available for use to minimise the dust emissions as far as practicable.

Air Discharge Reporting

8. The Consent Holder must submit a Dust Management Plan (DMP) to Auckland Council within three months of the granting of this consent for certification that it documents, as a minimum:

   (a) The conditions of consent implemented and how each condition is given effect to;

   (b) Identification of all fugitive and point sources for discharges of dust into air, including a map showing the location of each source;

   (c) A description of the receiving environment and identification of the sensitive receptors;

   (d) Procedures to minimise discharges of dust into air, including details of the inspection, maintenance, monitoring and contingency procedures in place for all emissions control equipment at the Site;

   (e) The frequency and scope of the regular checks to be performed on emissions control equipment and the meteorological station;

   (f) Details of management and monitoring practices in place to minimize the effect of discharges of dust into air;

   (g) Description of the measurement of dust, wind speed and direction, including details of inspection procedures, recording requirements, trigger points for action and contingency measures;

   (h) The identification of staff responsibilities and training on emission control procedures; and

   (i) The procedures for the receipt, recording and handling of air quality complaints received.

   Advice Note:

   Certification of the Dust Management Plan by the council relates only to those aspects of the management plan that are relevant under the RMA. The certification does not amount to an approval or acceptance of suitability by the council of any elements of the management plan that relate to other legislation, for example, but not limited to, the Building Act 2004 or the Health and Safety at Work Act 2015.

9. The DMP must be reviewed on an annual basis and any subsequent changes to the certified DMP must be submitted to the council for certification prior to implementation. The Council will advise the consent holder in writing if any aspects of the DMP are considered to be inconsistent with achieving the provisions of this consent.

10. Details of all inspections, records and monitoring that are required by the conditions of this consent must be kept for a minimum of two years from the date of each entry and must be provided to the Council on request.

11. The Council must be notified as soon as practicable in the event of any significant discharge to air which results, or has the potential to result, in a breach of air quality conditions or cause adverse effects on the environment. The following information must be supplied:

(a) Details of the nature of the discharge;

(b) An explanation of the cause of the incident; and

(c) Details of remediation action taken.

Advice Note: Significant discharges

Significant discharges to be notified to council in accordance with this condition include abnormal odour discharges arising from unexpected issues with the liquid waste building and/or waste receipt. An email to monitoring@aucklandcouncil.govt.nz should be sent detailing the nature of the issue and what contingency measures are to be implemented to minimise potential odour effects.

12. All air quality complaints that are received must be recorded. The complaint details must include:

(a) The date, time, location and nature of the complaint;

(b) The name, phone number and address of the complainant, unless the complainant elects not to supply these details;

(c) Weather conditions, including approximate wind speed and direction, at time of the complaint; and

(d) Any remedial actions undertaken

Details of any complaints received must be provided to the council within one week of the complaint.

FOLLOWING COMPLETION OF WORKS

Air Discharge Review

13. Under section 128 of the RMA, the conditions of this consent may be reviewed by the Council at the consent holder's cost in January 2026 and annually thereafter in order to:

(a) Deal with any significant adverse effects on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which is appropriate to deal with at the time of the review.

(b) Consider the adequacy of conditions which prevent nuisance and adverse effects beyond the boundary of the Site, particularly if regular or frequent complaints have been received and validated by an enforcement officer.

(c) Consider developments in control technology and management practices that would enable practical reductions in the discharge of contaminants to air.

(d) Alter the monitoring requirements, including requiring further monitoring, or increasing or reducing the frequency of monitoring.

(e) Take into account any Act of Parliament, regulation, national policy statement, regional policy statement or relevant regional plan that relates to limiting, recording or mitigating emissions by this consent.

Alternatively, the consent may be reviewed by the Council at any time, if it is found that the information made available to the Council in the application contained inaccuracies which materially influenced the decision and the effects of the exercise of the consent are such that it is necessary to apply more appropriate conditions.

14. Prior to the completion of eight years of extraction from the start date of this consent, the consent holder must conduct a review of the current dust mitigation and its effectiveness using the dust monitoring data and other relevant information. This review will use this information to address whether any additional dust mitigation measures are required to control dust emissions from quarry operations and truck movements when production levels increase from the eleventh year onwards. The review is to be conducted by a suitably qualified air quality professional.