

Appendix 12: Air Quality Assessment

Technical Report

Winstone
Aggregates
Whitehall Quarry
Proposed Pit
Expansion

Air Quality Assessment

Prepared for Winstone
Aggregates Limited



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Glossary of Abbreviations

AEE	Assessment of Environmental Effects
AQCNZ	Air Quality Consulting NZ Limited
AQNES	National Environmental Standards for Air Quality
AWS	Automatic weather station
DMP	Dust Management Plan
E	East
FIDOL	Frequency, Intensity, Duration, Offensiveness and Location
GPG	Good Practice Guide
GPG Dust	Good Practice Guide for Assessing and Managing Dust
IAQM	Institute of Air Quality Management
km	Unit of distance: kilometre
kph	Unit of speed: kilometres per hour
MfE	Ministry for the Environment
m/s	Unit of speed: metres per second
N	North
NES	National Environmental Standard
NZAAQG	New Zealand Ambient Air Quality Guidelines
PM_{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 µm
PM₁₀	Particulate matter with an aerodynamic diameter of less than 10 µm
UTM	Universal Transverse Mercator
US EPA	United States Environmental Protection Agency
RCS	Respirable Crystalline Silica
RMA	Resource Management Act 1991
S	South
SMEZ	Significant Mineral Extraction Zone
TSP	Total Suspended Particulate
EPA	Victoria Environment Protection Authority
WDP	Waipa District Plan
WRC	Waikato Regional Council
WRP	Waikato Regional Plan
W	West
Winstones	Winstone Aggregates
µg/m³	Unit of Concentration: micrograms per cubic metre
%	Percentage
m	Unit of distance: metre

1 Introduction

Winstone Aggregates (**Winstones**) owns and operates the Whitehall Quarry, located on Whitehall Road, Karapiro, near the township of Cambridge. Quarry activities have been ongoing since the 1940s, originally as a farm quarry, before expanding in the 1950s to produce aggregate for the local market, albeit on a much smaller scale compared to current operations. The quarry now produces a wide variety of aggregates, including basecourse, concrete aggregates, and sealing chip, which are used in a large range of applications, predominantly in civil infrastructure projects in Waikato and the Bay of Plenty.

Based on the remaining resource in the current pit and in response to continued high demand for greywacke rock products, Winstones is proposing to expand its quarry operations by extending the existing pit.

The proposed pit expansion will be undertaken in stages, beginning with the removal of overburden to access the underlying resource. Overburden will be stripped in a series of campaigns, allowing the pit to extend west and south over a period of 35 years. This application will not alter the already consented operations, with activities such as the extraction rate, overburden disposal area (**OBDA**), processing plant, and stockpile areas remaining the same.

Air Quality Consulting NZ Limited (**AQCNZ**) has been engaged to assess the air quality aspects, particularly dust effects, related to the Whitehall Quarry pit expansion. AQCNZ has observed the current operations at the Whitehall Quarry and prepared a FIDOL (Frequency, Intensity, Duration, Offensiveness, and Location) assessment for the proposed expansion. This assessment is based on observations of the current operations, as well as experiences from similar sites. The purpose of the assessment is to support resource consent applications to the Waikato Regional Council (**WRC**) for an air discharge permit and to the Waipa District Council (**WDC**) for a land use consent.

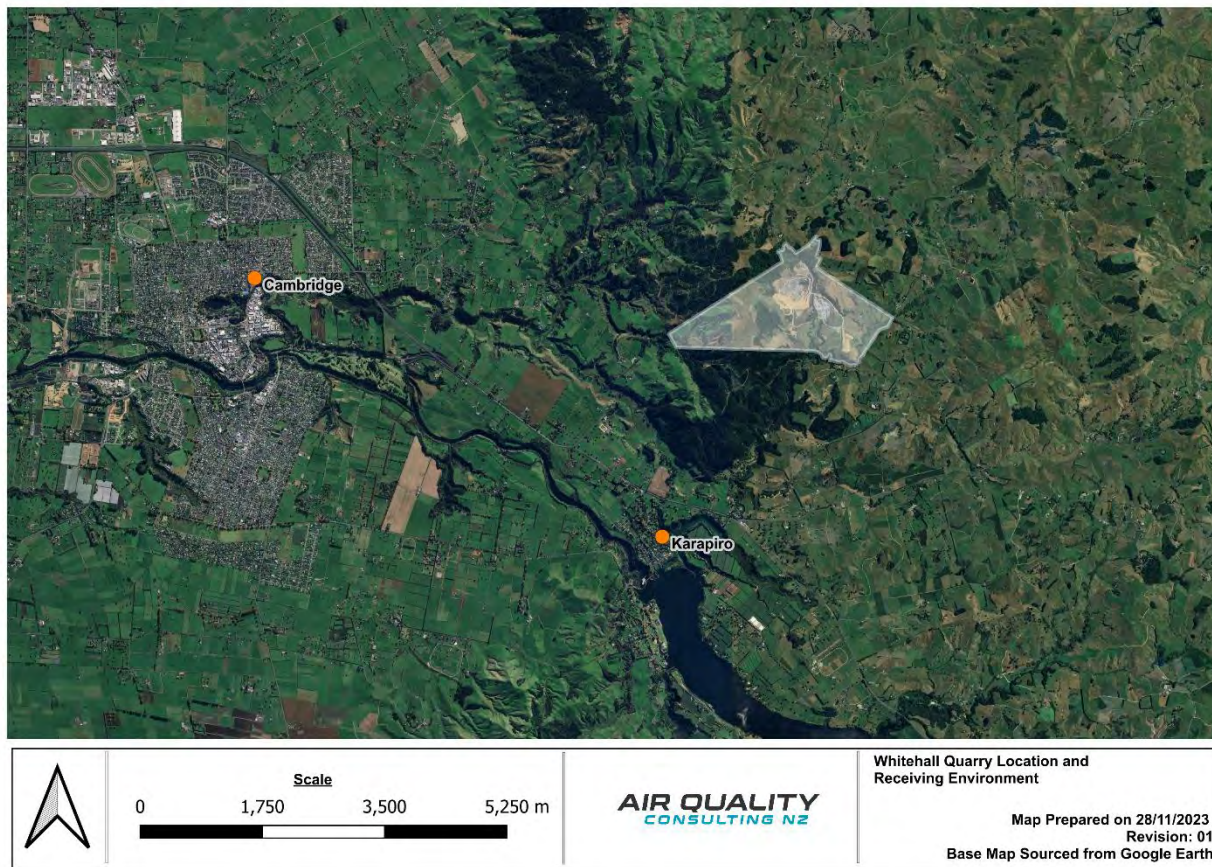
This report should be read in conjunction with the Assessment of Environmental Effects (**AEE**) Report and resource consent application prepared by Boffa Miskell Limited.

2 Background Information

2.1 Site Location

The Whitehall Quarry is located on Whitehall Road, approximately 7.5 km east of Cambridge and 4 km northeast of Karapiro. The coordinates for the centre of the Site are approximately Universal Transverse Mercator (**UTM**) 373,965 m E, 5,805,697 m N, Zone 60S. The Site's location relative to the surrounding area is shown in Figure 1.

Figure 1: Site location



2.2 Surrounding Environment

Under the Waipa District Plan (**WDP**), the area of land that is currently quarried, including the majority of the 'long-term expansion footprint', is zoned as a Significant Mineral Extraction Zone (**SMEZ**). The remainder of the Site and the surrounding area are zoned Rural, with the surrounding land being predominantly used for livestock grazing.

There are nine existing residences (excluding properties owned by Winstones) within 500 m of the Site boundary, and only three of these residences are within 500 m of current or proposed quarrying activities, with the closest dwelling being approximately 280 m to the south of the existing overburden disposal area (**OBDA**).

As discussed in further detail in Section 0 of this report, the primary air pollutant that has the potential to be discharged from the Whitehall Quarry is nuisance dust. AQCENZ has reviewed surrounding activities and identified the only activity that has the potential for discharges and therefore potentially contribute to nuisance dust effects are agriculture operations such as working of the land i.e. ploughing and cultivation.

2.3 Airshed

The Whitehall Quarry is not within an airshed, with the closest gazetted airshed being the Cambridge Airshed approximately 5 km from the site. This airshed is not deemed polluted and therefore Regulation 17 of the National Environmental Standard for Air Quality Regulations, 2004 (AQNES)¹ is not applicable.

2.4 Meteorology and Topography

Wind can significantly impact the potential for air quality effects; generally, strong, dry winds intensify dust emissions. It is, therefore, important to understand the local meteorology to assess the likelihood of air quality effects.

The topography of the area heavily influences wind speed and direction, making it an important factor in determining the potential for dust to be transported off-site. The quarry itself is situated on the side of a hill, with steep northern faces. To the east and west of the quarry, the land undulates with some steeper slopes, while to the south, the terrain flattens towards the Waiarumu Stream before becoming hilly again.

The site operates its own Automatic Weather Station (**AWS**), and AQCENZ has assessed the data collected from it. The results indicate a significant proportion of low wind speeds, which AQCENZ attributes to the placement of the sensors, positioned approximately two metres above ground. Given this, AQCENZ does not believe the data accurately represents conditions in the surrounding area. As a result, AQCENZ also examined data from the nearest AWS at Karapiro. However, after reviewing this data, it was found that local terrain features significantly affect wind direction, making it unlikely to accurately represent the wind conditions at Whitehall Quarry.

Given the limitations of the local source of meteorological data, AQCENZ reviewed the meteorological data used in recent applications. These assessments utilised 'The Air Pollution Model' (**TAPM**) to predict the required meteorological parameters for Whitehall Quarry. The data was then refined using CALMET, CALPUFF's meteorological pre-processing module, which accounts for the influence of local terrain and land use. The wind rose extracted from the CALMET meteorological dataset (centred on the Site) for the period 1 January 2017 to 31 December 2019 is presented in Figure 2. The distribution frequency of wind speeds is shown in Table 1.

¹ Ministry for the Environment, Resource Management (National Environmental Standards for Air Quality), Regulations 2004

Figure 2: Whitehall Quarry - Windrose (01 Jan 2017 to 31 Dec 2019)

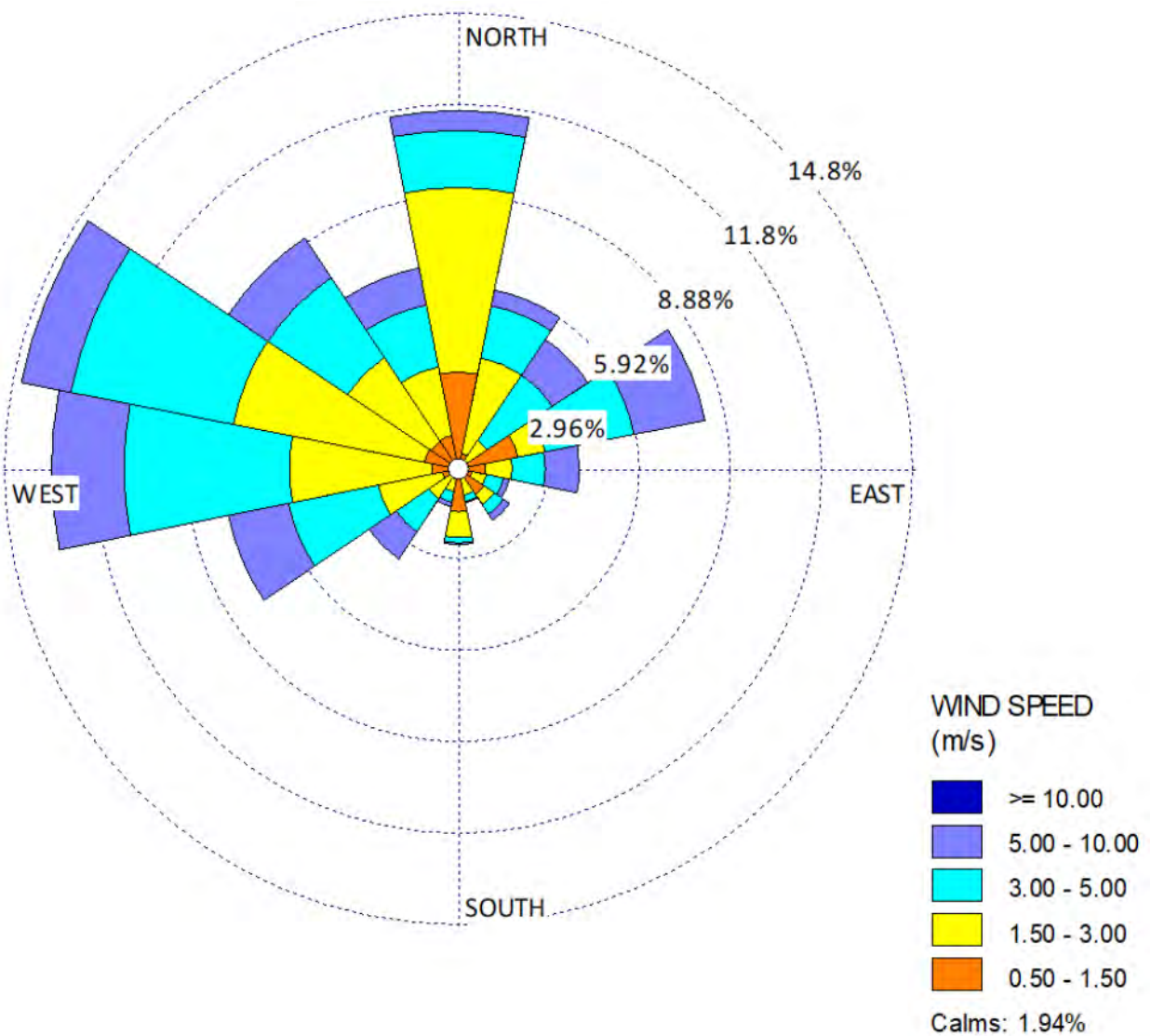


Table 1: Whitehall Quarry - Average Wind Speed Distribution (%) 01 Jan 2017 to 31 Dec 2019

Wind Direction	Wind Classes (m/s)		Total (%)
	0.5 – 5.0	>5	
N	11.0	0.6	5.9
NNE	5.4	0.5	5.1
NE	3.7	1.4	8.2
ENE	5.8	2.4	4
E	2.9	1.1	1.7
ESE	1.5	0.2	2
SE	1.8	0.2	1.2
SSE	1.1	0.1	2.6
S	2.5	0.1	1.3
SSW	1.2	0.1	3.6
SW	2.5	1.1	7.7
WSW	5.7	2.0	13.2
W	10.9	2.3	14.4
WNW	12.8	1.6	9
NW	7.5	1.5	6.6
NNW	5.4	1.2	5.9
Calms			1.9

Based on the CALMET data for Whitehall Quarry, the area is generally dominated by low wind speeds (< 5 m/s) due to stable weather conditions, which are common in Waikato, especially during winter. There is a relatively high frequency of winds from the west-southwest and west. Strong winds (> 5 m/s), which can exacerbate dust emissions, follow a similar pattern, predominantly coming from the east-northeast, west-southwest, and west. Strong winds also occur from the northwest, though less frequently. Winds from the east to south-southwest are very infrequent.

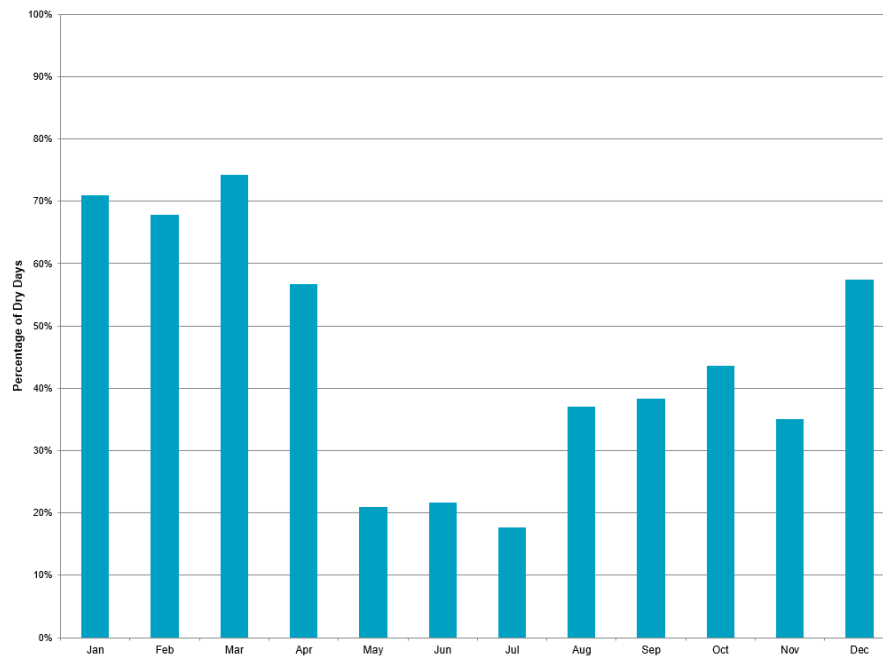
2.5 Rainfall

Rainfall acts as a natural dust suppressant and reduces the potential for dust generation. Therefore, a key consideration in assessing the potential for dust emissions is identifying when the ground surface is likely to be wet or dry, i.e. when the evaporation rate exceeds the rainfall rate.

The percentage of dry days² by month has been calculated based on the AWS monitoring data for the years 2022 to 2023 and is presented in Figure 3. The driest months of the year are generally mid to late summer, therefore greater emphasis on the management of dust should be given during these drier months. Over the two-year period, the number of days where there was no rainfall over a 24-hour period (or 'dry days') was 328 days, which corresponds to 45 percent of the time.

² Days without any measurable rainfall.

Figure 3: Percentage of dry days by month



2.6 Complaint History

AQCNZ has approached the WRC for information on whether there have been any air quality complaints related to this site. WRC records state there are no instances of any air quality related complaints for at least the last five years for Whitehall Quarry. This suggests that the current site mitigation measures are effective.

2.7 Sensitive Receptors

A sensitive receptor is defined as a location where people or surroundings may be susceptible to the effects of air pollution. These locations include:

- residential dwellings;
- retirement villages;
- aged care facilities;
- hospitals;
- public recreation areas;
- schools;
- early childhood education centres;
- marae;
- other cultural facilities; and
- sensitive ecosystems.

Based on this definition of a sensitive receptor and the separation distance guidance published by the Victoria Environment Protection Authority³ (EPA) (recommend separation of 500 m),

³ Victoria Environmental Authority, Separation distance guideline. August 2024.

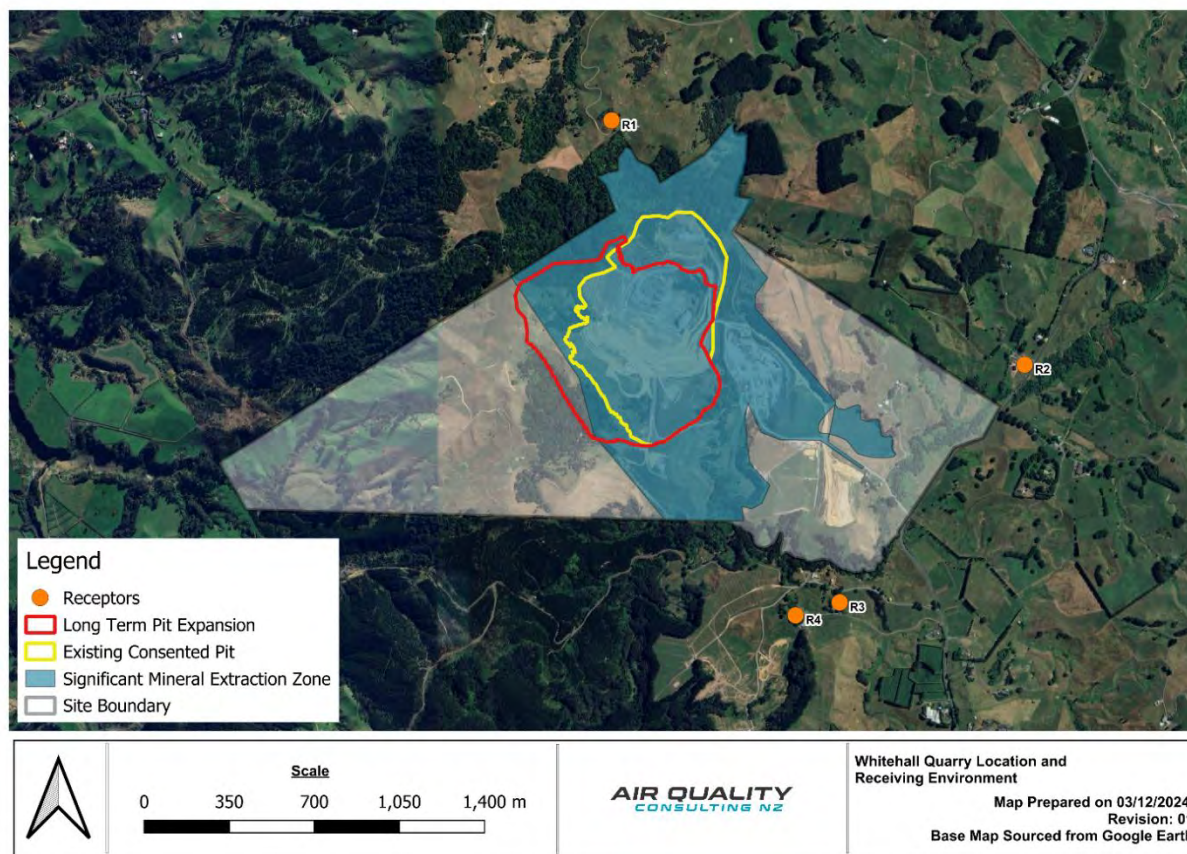
AQCNZ has identified one sensitive receptor within 500 m of the proposed pit expansion. However, to provide a more conservative assessment, AQCNZ has also identified a number of sensitive receptors within 1,250 m of proposed pit expansion. All the receptors are located in Rural zone land and based on guidance from the Ministry for the Environment (MfE) Good Practice Guide for Assessing and Managing Dust⁴, the rural land would be considered as having a low sensitivity to dust, while the dwellings are considered to have a moderate sensitivity to dust.

Figure 4 presents the location of these receptors.

Table 2: Sensitive Receptor Locations

Receptor ID	Receptor Name	Distance to Receptor from Proposed Long-Term Pit Expansion	Direction Relative to the Pit Extension	Receptor Type
SR1	4/766 French Pass Road	480 m	North	Dwelling
SR2	331 Whitehall Road	1,250 m	East	Dwelling
SR3	1/207 Whitehall Road	930 m	Southeast	Dwelling
SR4	2/207 Whitehall Road	880 m	South southeast	Dwelling

Figure 4: Map showing Site and nearby receptors



⁴ Ministry for the Environment. 2016. Good Practice Guide for Assessing and Managing Dust. Wellington: Ministry for the Environment

3 Assessment Methodology

The primary concern with dust is its ability to cause an effect that could be considered 'offensive' or 'objectionable'. In order to assess whether a dust event has the potential to be offensive or objectionable, the MfE GPG Dust recommends the FIDOL (frequency, intensity, duration, offensiveness and location) assessment tool. The FIDOL factors concerning dust are summarised in Table 3.

Table 3: FIDOL factors - Dust

FIDOL Factor	Description
Frequency	The frequency of dust discharges is how often an individual is exposed.
Intensity	Intensity relates to the concentration of dust impacts at receptor locations. Intensity is primarily characterised by the distance from the dust source, with dust intensity effects reducing with increasing distance.
Duration	The duration relates to the length of time that receptors are exposed to a potential dust event. Duration depends on wind conditions blowing dust from The Site to the receptor.
Offensiveness	Offensiveness relates to dust from the Site activities will have a character similar to naturally occurring dust in the area.
Location	The sensitivity of locations in the receiving environment is characterised by land uses surrounding the Site.

3.1 Environmental Standards

3.1.1 Waikato Regional Council

The discharge of contaminants to air from quarrying operations is a permitted activity subject to the relevant conditions of Rule 6.1.16.1 of the Waikato Regional Plan (WRP) which states that:

Rule 6.1.16.1 – Implementation Methods – Mineral Extraction, Size Reduction, Screening and Storage

1. *Where the operation occurs within 1000 m of a property boundary and there is a discharge of particulate matter beyond the property boundary the following measures shall be implemented:*
 - a. *the use of water sprays to suppress dust from crushing and screening plants, access ways, haul roads, stockpiles, load-out areas and access roads.*
 - b. *the sealing and maintenance of the access road, when it is within 150 m of a neighbouring residential dwelling.*
2. *As specified in Section 6.1.8 a) to e) of this Plan.*
3. *When seven working days of commencing works at a new site, the operator of the new quarry site shall provide the Waikato Regional Council with written notification of the location of the site.*

4. *Should an emission of particulate matter occur that causes adverse effects of an objectionable nature beyond the property boundary as determined in accordance with the decision making guidelines set out in Section 6.4.2.2, the quarry operator shall provide a written report to the Waikato Regional Council within five days of the incident occurring, which specifies:*
 - a. *the cause or likely cause of the event and any factors that influenced its severity.*
 - b. *the nature and timing of any measures implemented by the quarry operator to avoid, remedy, or mitigate any adverse effects.*
 - c. *The steps to be taken to prevent recurrence of similar events.*
5. *There shall be no discharges of hazardous substances into the air.*

Since the previous application for Whitehall Quarry to the WRC⁵ was considered a Permitted Activity, and Winstones will implement the same mitigation measures to ensure compliance with dust emission standards for this application, AQCNZ considers that the proposal will continue to meet the requirements of the Permitted Activity rule.

3.1.2 Waipa District Council

The Whitehall Quarry and current quarrying activities take place within the SMEZ in the WDP, however a part of the proposed pit expansion will occur within land zoned Rural and not within the SMEZ. The relevant rules in the WDP Plan state:

Section 4A – Significant Mineral Extraction Zone – Rule 4A.4

- (a) *Mineral extraction activities shall only take place in this zone where a resource consent or existing use right is in place or where a Quarry Management Plan as a controlled activity, has been granted by Council. Otherwise the provisions of 4A.4.1.4(b) shall apply.*
- (b) *The rules that apply to activities are contained in:*
 - i. *The activity status tables and the performance standards in this zone; and*
 - ii. *The activity status tables and the performance standards in Parts E District Wide provisions and Part F District Wide Natural and Cultural Heritage of the Plan except that activities within the Significant Mineral Extraction Zone are exempt from Sections 16.4.2.25 -Provision of an Integrated Transport Assessment, Section 20 – Health and General Amenity , Section 24 - Indigenous Biodiversity, Section 25 - Landscapes and Viewshafts and Section 26 - Lakes and Waterbodies).*
- (c) *Taotaoroa and Whitehall quarries have been previously lawfully established and operate under either resource consents and/or existing use rights in accordance with Section 10 of the Resource Management Act 1991. The rules of this section are additional to these existing authorisations, if conflict arises between existing consents and/or existing use rights and the rules of this Plan, the more permissive provision(s) shall apply.*

Since the activities at Whitehall Quarry operate under resource consent and/or existing rights, the performance standards outlined in the applicable rules do not include air quality. Additionally, the site has an approved Quarry Management Plan. Therefore, from an air quality perspective, the current activities at Whitehall Quarry are permitted.

⁵ Whitehall Quarry – Proposed Expansion Air Quality Assessment. Prepared by Pattle Delamore Partners, September 2023.

However, part of the proposed pit expansion would occur on land zoned as Rural. Under the WDP, mineral extraction in a Rural zone is classified as a Discretionary Activity, according to rule 4.4.1.4(h). Section 21.1.4.34 of the plan outlines the assessment criteria for mineral extraction activities in a Rural zone. From an air quality perspective, assessment criterion 21.1.4.34(j) is the most relevant.

The ability to protect the environment from adverse effects having regard to the technical and operational ability to manage any adverse effects.

Rule 20.4.2.1 in the WDP also states that:

No activity shall produce any objectionable odour, smoke, fumes or dust at or beyond the boundaries of the site from which the nuisance emanates.

This rule aligns with the requirements for the regional air discharge consent. Therefore, as long as the site complies with the regional rules, it complies with Rule 20.4.2.1 of the WDP.

4 Description of the Activity

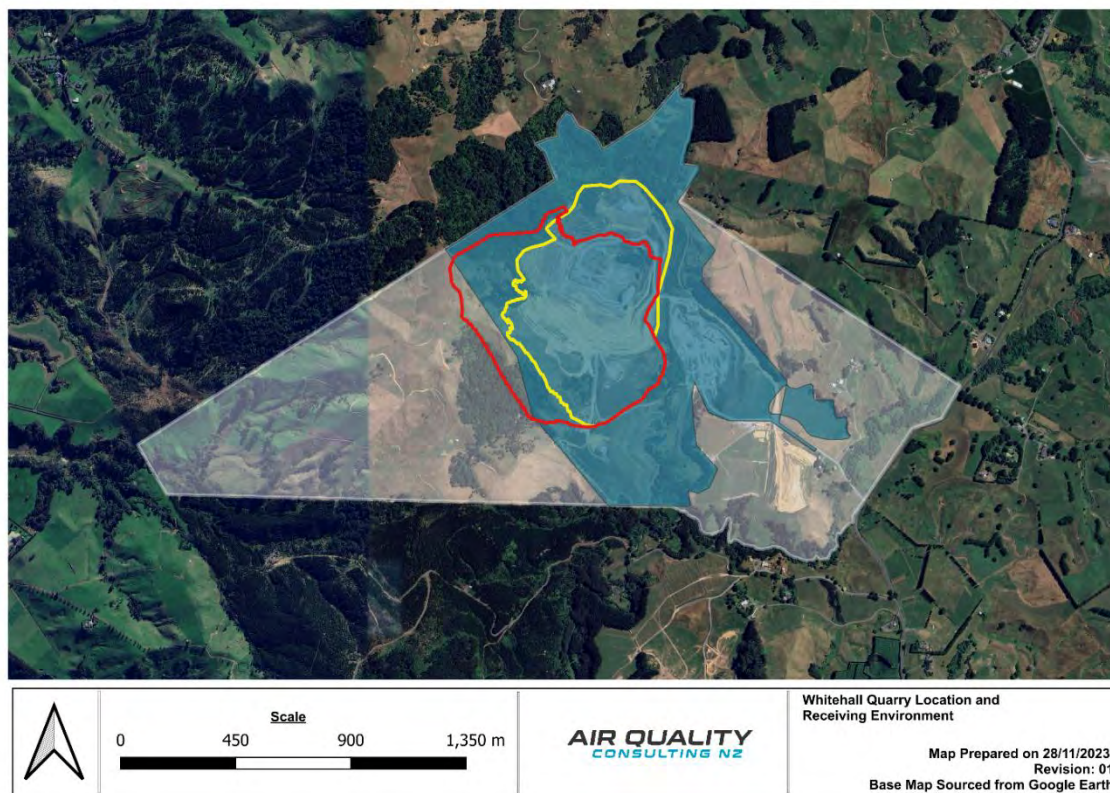
To meet the continued demand for aggregate and allow for the ongoing operation of the quarry, Winstones is proposing to expand the Whitehall Quarry. The proposed expansion aims to extend the current quarry pit towards the west, which will increase the consented pit footprint by 15.5 hectares. Based on the estimated volume of material and the current production rates, it is anticipated that the proposed pit expansion will provide approximately 35 years of material.

This will require the removal of overburden to gain access to the resource. The removal of overburden, including topsoil, clay, and brown rock, will be undertaken over several earthmoving seasons. The material will be immediately deposited into dump trucks for disposal in the consented OBDA to the south of the pit. Once this overburden is removed, the extraction of aggregate will be carried out using standard quarrying machinery, typically involving blasting, with excavators loading the loosened material into dump trucks. Other machinery may be used occasionally to facilitate the efficient extraction of the aggregate resource. Once loaded, these trucks will travel via internal haul roads to the existing processing plant, where the material will be processed, stockpiled, and sold.

There will be no change to the processing plant, OBDA, weigh station, office area, workshop, staff rooms and parking as a result of this proposed expansion.

The proposed location of the pit expansion is shown in Figure 5 as a red polygon. Also, in Figure 4, the yellow polygon indicates the consented pit extent, and the blue polygon indicates the extent of the SMEZ.

Figure 5: Proposed pit expansion



5 Discharges to Air

The following section of this report describes the activities that have the potential to generate air discharges from the extraction of aggregate from the proposed pit expansion at Whitehall Quarry.

AQCNZ has reviewed the proposed onsite activities and considers there is the potential for the following air pollutants to be discharged.

- Nuisance Dust;
- Fine Particulate Matter (PM₁₀ and PM_{2.5});
- Vehicle Emissions;
- Respirable Crystalline Silica;

A range of mitigation measures will be used to minimise discharges. These mitigation measures are set out in the Dust Management Plan (**DMP**) attached in Appendix A and summarised in Section 6.

5.1 Nuisance Dust

The principal air pollutant associated with any quarrying operation is dust, primarily in the coarse size fraction that can generate nuisance effects.

Nuisance dust generally consists of larger particle sizes (generally greater than 30 µm in diameter) which are otherwise known as total suspended particulate (**TSP**).

Individual particles typically become visible at approximately 50 µm, and particulate discharges in this size range (greater than 50 µm) are generally associated with nuisance effects rather than health effects.

Nuisance dust effects often relate to dust clouds obscuring visibility and soiling of clean surfaces such as cars, washing and buildings/windows, etc.

There is also the potential for nuisance dust to lead to the contamination of rainwater collection systems and increased dust deposition inside houses. These effects can lead to additional cleaning requirements, reduced ability to enjoy outdoor living areas, and overall reduced amenity values.

Excessive dust emission can also have adverse effects on plant life due to reduced photosynthesis, increased incidence of plant pests and disease, reduced effectiveness of pesticide sprays, and crop soiling effects can also lead to rejection or downgrading of the quality of some types of horticultural crops.

Generally speaking, TSP does not travel further than 250 m from the source of dust during periods where the wind is less than 10 m/s.

AQCNZ considers that dust could be generated from the following sources/activities:

- Removal of overburden.
- Extraction of aggregate.
- Vehicles operating within the pit.
- Wind erosion of the working area.

5.2 Fine Particulate Matter (PM₁₀ and PM_{2.5})

The potential for health effects associated with dust emissions is determined by a number of factors including particulate size, concentration, and chemical composition.

PM₁₀ has the ability to enter the alveoli in the lungs and cause respiratory health effects. There is significant evidence of the effects of short-term exposure to PM₁₀ on respiratory health; however, elevated particulates with an aerodynamic diameter less than 2.5 µm (**PM_{2.5}**) concentrations have a higher risk factor for long-term exposure and mortality rates.

PM₁₀ and PM_{2.5} discharges are normally associated with combustion activities, such as vehicle emissions and domestic home heating, however these size fractions have also been found to be associated with quarrying activities, primarily vehicles travelling on haul roads (through the grinding and pulverising of material as vehicles travel along these surface) and the crushing and screening of aggregates. There will be only minor changes to the haul roads as a result of the pit expansion and no changes in the location or the rate of aggregate processing, therefore, PM₁₀ and PM_{2.5} emissions from this source will be minimal.

Overall, AQCENZ considers the potential for PM₁₀ and PM_{2.5} discharges from the proposed pit expansion to be very low to negligible, providing that the proposed mitigation measures are implemented. Furthermore, off-site concentrations of these air pollutants are likely to be well below the relevant air quality standards and guidelines, namely, the AQNES, MfE Ambient Air Quality Guidelines (**NZAAQG**)⁶ and the World Health Organisation air quality guidelines⁷.

Consequently, PM₁₀ and PM_{2.5} discharges are not considered any further in this assessment.

5.3 Vehicle Emissions

Vehicles (dozers, excavators and dump trucks) operating within the pit expansion will generate combustion-related pollutants such as oxides of nitrogen, carbon monoxide and fine particulate matter (PM₁₀ and PM_{2.5}). These will primarily occur from the engine exhaust pipe(s) and brake and tyre wear.

Discharges from vehicles will be minimised by ensuring that vehicles are appropriately maintained, travel at the posted quarry speed limits (20 kph), and the surface on which they travel is well maintained and watered.

Overall, AQCENZ considers that emissions from vehicles operating within the pit expansion will have a negligible effect on local air quality, given the rural environment will already have low background contributions and assuming that the above mitigation measures are appropriately implemented. Consequently, these discharges are not considered any further in this assessment. Additionally, given that the pit expansion will be a gradual progression of the existing pit, no additional vehicles are required to undertake this expansion, therefore vehicle related emissions will be at the same intensity.

⁶ Ministry for the Environment, Ambient Air Quality Guidelines (2002 update)

⁷ WHO 2006. Air Quality Guidelines Global Update 2005, Particulate matter, ozone, nitrogen dioxide and sulphur dioxide. Copenhagen: WHO Regional Office for Europe. World Health Organisation Regional Office for Europe.

5.4 Respirable Crystalline Silica

Respirable Crystalline Silica (**RCS**) can also be present in the dust generated by quarrying operations, however the risk associated with overburden (soil and weathered rock) removal and aggregate extraction is much lower compared to freshly crushed rock. Given that there will be no processing in the proposed pit expansion, the risk of RCS exposure will be low. AQCNZ also notes that any mitigation used to control dust will also control RCS emissions.

To help understand the potential risk of RCS, AQCNZ has reviewed the monitoring data from Yaldhurst⁸ which was commissioned by Environment Canterbury between 22 December 2017 and 21 April 2018. When comparing the results of this study, out of 20 samples collected for RCS only two samples detected RCS (within 50 m of the quarry), and these were well below the recommended guidelines.

The Yaldhurst Quarry zone represents a large area (approximately 230 ha) containing multiple quarries and numerous large aggregate processing plants. The potential for RCS emissions from the proposed pit expansion from Whitehall Quarry, on its own or cumulatively with the balance of the existing quarrying operations, will be much lower. Consequently, RCS discharges have not been considered any further in this assessment.

⁸ Yaldhurst Air Quality Monitoring – Summary Report: 22 December – 21 April 2018. Prepared by Mote Ltd, 19 June 2018.

6 Mitigation Measures

The Whitehall Quarry is already subject to extensive dust suppression controls, and as such, Winstone's staff are well educated and trained in dust management. These mitigation measures are detailed in the DMP for the Site and will be adopted for any expansion of the pit. The DMP will be reviewed regularly and updated as required to reflect improvements in dust mitigation and to ensure continual improvement in reducing dust nuisance across the site.

Table 4 summarises all the measures that will be adopted on-site to control air discharges from the proposed pit expansion which are based on the proven measures adopted by the existing operations. The table also describes the purpose of each mitigation measure.

Table 4: Mitigation Measures

Potential Dust-Generating Activity	Mitigation
Site Access Road	Sealed road surfaces are generally installed in high risks areas as the potential for dust generation from this source is much lower than unsealed roads. In the case of Whitehall Quarry, the site access road from the site access to the site office, approximately first 500 m of the site access road is sealed. This is regularly vacuum swept to minimise dust from vehicles travelling along this road.
Vehicle Movements	Vehicle movement across unconsolidated surfaces has the potential to result in significant dust emissions. Winstones' control dust emissions from these sources with the following measures: • Applying water through the use of a watercart. Water is applied at the start of each day and then throughout the day to maintain a continually damp surface. • Using bio-degradable dust suppressants during prolonged dry conditions and water restrictions. • Limiting speed of vehicles to no more than 20 km/hr. • Maintaining the surface of roads and applying fresh road metal as required.
Exposed areas not frequently trafficked	Exposed areas that are not frequently trafficked will be covered with pea gravel during periods of dry weather to minimise dust entrainment during strong dry winds. Alternatively, approved bio-degradable soil binding agents can be used to the same effect.
Overburden Removal and Placement	Overburden removal will be scheduled to avoid the dry summer months. If this is unavoidable or the ground is dry, the following mitigation measures will be implemented: • Watering the surface prior to disturbing it during dry conditions. • Minimising the amount of material removed to a practical level.

	• Minimise drop heights off material into trucks. • Limiting vehicle speeds to 20 km/hr on exposed surfaces. • Mulching or grassing of exposed overburden material at the completion of an overburden removal campaign. • Overburden removal will be avoided during unfavourable wind conditions (i.e. strong winds in the direction of nearby receptors) unless it is raining.
Aggregate Extraction	Extraction of the resource will primarily be carried out using a combination of blasting and excavators. During the initial stages of the quarrying process, aggregate will be collected near ground level, where there is a higher risk of dust generation and transport. At this stage, particles are more exposed to wind and can be easily dispersed into the surrounding environment. However, once extraction and truck loading occur below the surrounding ground level, the potential for dust generation and for dust to be transported off-site is significantly reduced due to the sheltering effect of the pit. The following mitigation measures will be implemented: • Winstones employs experienced blast operators to undertake all blasting to reduce dust and vibration. • If required material can be dampened down prior to loading. • Minimise drop heights off aggregate into trucks. • Progressive stabilisation of “open faces” with hydroseeding (on faces where quarrying activity is complete)
Aggregate Processing	The proposed pit expansion will not result in any additional aggregate processing. With the already consent processing plant staying in the same location and processing at the same rate and therefore is not discussed any further, however aggregates are wet processed, which results in minimal potential for dust emissions.
Stockpiles	Stockpiles are located near the processing plant and are covered under the current consented activities. Dust emissions are minimised by typically stockpiling only washed products, reducing the height of the stockpiles as low as practical and dampening down this material as required. There is no proposed stockpiling of material within the proposed pit expansion area.
Material Handling	During the handling of material, the drop height from loaders and excavators into trucks or hoppers will be minimised to the lowest practicable height for the task.

6.1 Visual Monitoring

Table 5 outlines the visual dust monitoring programme that will be implemented while the Site is operating.

Table 5: Visual Monitoring Requirements

Frequency	Visual Monitoring Activities
Daily	Check weather forecasts for strong winds and rainfall to plan appropriate dust management responses.
Daily	Inspect land adjacent to the Site and adjoining roads for the presence of dust deposits from Site operations.
Daily and as conditions change	Inspect all surfaces for dampness and ensure that surface exposure is minimised.
Daily and as conditions change	Inspect stockpiles to ensure enclosure, covering, stabilisation or dampness.
Daily and as new activities are commenced	Inspect dust-generating activities to ensure dust emissions are effectively controlled.
Weekly	Inspect watering systems to ensure equipment is maintained and functioning to effectively dampen exposed areas.
In winds over 5 m/s	Additional monitoring of dust-generating activities and water application.

6.2 Wind Monitoring

As already mentioned, Winstones operates a meteorological monitoring site at Whitehall Quarry. AQCNZ recommends that the alerts are sent to the Winstone management team when wind speeds go above 5 m/s (review activities and increase mitigation measures) and 10 m/s (stop dust generating activities). This will allow management to make operation decisions around where work is undertaken or the use of specific mitigation measures.

7 Assessment of Effects

The following assessment is based on the control measures presented in Section 6 and therefore represents the residual effects of air discharges. AQCNZ has undertaken a FIDOL assessment, as described in Section 3, to assess the potential for dust nuisance effects. This assessment is presented in the following sections.

7.1 Frequency

Frequency relates to how often dust discharges affect sensitive receptors. This is influenced by the frequency of dust discharges and the presence of suitable meteorological conditions. According to the MfE GPG Dust, *"Dust pickup by wind is usually only significant at wind speeds above 5 metres per second."* Based on this information, AQCNZ has adopted the position that when wind speeds exceed 5 m/s, there is a greater potential for dust discharges to result in off-site effects

Given the information provided in Table 1, the predicted frequency of wind speeds greater than 5 m/s occurs 16.4 percent of the time from all directions. Table 6 presents the frequency of high wind speeds in the direction of the nearby receptors. The data indicates that high wind speeds blowing in the direction of all receptors are infrequent. Frequency categories have been adopted from the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning⁹.

To cause a dust nuisance, activities that generate dust must coincide with dry conditions and winds capable of carrying the dust towards a sensitive receptor. When considering the topography of the land, mitigation measures and monitoring, the frequency of any adverse effects associated with the site's operations will be much lower.

Table 6: Frequency of High Wind Speeds Blowing in the Direction of Sensitive Receptors

Receptor ID	Downwind Direction	Percentage of wind above 5 m/s	Frequency of Wind
R1	North	0.1	Infrequent
R2	East	2.3	Infrequent
R3	Southeast	1.5	Infrequent
R4	South southeast	1.2	Infrequent

⁹ IAQM, 2016. *Guidance on the Assessment of Mineral Dust Impacts for Planning*.

7.2 Intensity

Intensity relates to the concentration of dust that is likely to be experienced at any potential receptor. Dust concentration correlates with distance, decreasing as the distance from the source increases. Larger particles will deposit on surfaces close to the source, while finer suspended dust will disperse and dilute with increasing distance from the emission source. Therefore, the intensity at which dust might be experienced is a combination of the mitigation measures used to manage concentration at the source, the location of the dust source relative to the receptors, wind speed, and the pathway between the source and the receptor.

Receptor R1 is the only receptor located within 500 m of the proposed pit expansion; however, this receptor is separated from the site by a ridgeline, reducing the risk of exposure to dust from the quarry. The other identified sensitive locations are more than 500 m away, but AQCNZ notes that the elevation of the proposed pit expansion could increase the potential for dust to travel further, potentially impacting these locations. The greatest risk of dust affecting these receptors would occur during the removal of overburden, as this material consists of soils and clays that are less dense and more susceptible to wind compared to the denser aggregates found deeper in the pit. Furthermore, as extraction activities move below ground level, wind effects are reduced due to the sheltering effect of the pit, significantly lowering the potential for dust impacts. While the increased elevation may allow dust to travel farther, it also aids in its dispersion, and given that these receptors are located between 880 and 1,250 m from the proposed pit expansion, the intensity of dust reaching these locations is expected to be low.

In addition to distance, the pathway that dust must travel between the source and receptor will also affect dust intensity. As previously mentioned, the initial works, such as overburden stripping, will occur at ground level, which when exposed to dust transporting winds has a higher risk of off-site effects. However, once dust generating activities are a few metres below the surrounding ground level, the pathway for dust is less direct and therefore there will be a reduced dust intensity. Additionally, as illustrated in Figure 6, the next closest receptors R3 and R4 are well sheltered, as they are located behind mature trees and elevated terrain, which will further reduce the potential for any dust effects from these activities at this location.

When considering the distance of all the nearby receptors from the site are greater than 480 m from the proposed pit expansion and that a number are beyond 880 m, the potential dust pathways and the level of mitigation, dust intensity at nearby receptors should be low.

Figure 6: Looking towards the nearby receptors from near the pit expansion



7.3 Duration

Dust issues are exacerbated under dry, windy conditions. Based on the data presented in Figure 2, local wind conditions are dominated by low to moderate wind speeds which are unlikely to result in the transportation of dust off-site. Nonetheless, based on AQCNZ's experience, it is primarily the response time of operation staff to significant dust events which has the greatest impact on the duration of off-site dust emissions. In the occurrence of visible dust events, the mitigation measures will be increased (i.e. applying water to dusty surfaces). Therefore, with regular visual monitoring and setting up wind triggers with the on-site weather station to alert staff of high-risk winds so that mitigation can be adopted in a timely manner, it is expected that the duration of any dust event will be short.

7.4 Offensiveness

Dust can lead to issues such as visual amenity (dust clouds) and dust deposition on property, including vehicles, washing lines and rooftops. While these events can lead to nuisance over extended and frequent exposure, the nature of a standalone event is not considered highly offensive. Given the mitigation techniques used to minimise dust effects, it is expected that the offensive nature of dust will remain at acceptable levels for the zone.

In addition, based on the excellent compliance history for Whitehall Quarry with there being no air quality related complaints received in at least the last 5 years. Given that the activities and mitigation associated with the pit expansion will be the same as what is currently taking place,

AQCNZ considers that a good level of compliance will continue to occur as a result of the proposed pit expansion and therefore proposed activities will not result in nuisance off-site dust effects.

7.5 Location

While the majority of the pit expansion will be undertaken in the SMEZ, the location of the receiving environment in which dust effects may occur is within a rural environment, which is mainly comprised of farming activities and some dwellings. These locations (primarily the dwellings) would be considered to have a moderate sensitivity to dust discharges of this nature. Given the level of mitigation that is undertaken and the separation distance between the proposed pit and these locations, it is expected the dust emissions will be controlled to an acceptable level for a moderately sensitive location.

7.6 FIDOL Conclusion

Having assessed the site activities that have the potential to cause dust discharges against the FIDOL factors, AQCNZ considers that it is unlikely that dust from onsite activities will cause dust nuisance effects at sensitive receptor locations. This is based on the following findings:

- Based on the meteorological data for the area, nearby receptors are only downwind of the proposed pit expansion during high-risk wind speeds at a frequency that is considered “infrequent”. As the dust emission rates from works could be quite varied, there is an even lower probability of high emissions rates coinciding with high-speed wind conditions that could carry dust towards receptor locations.
- There is a large separation between sensitive receptors and the proposed pit expansion with the closest being 480 m from the proposed pit and the rest being much further (800 m) away. When considering the changes in elevation there is the potential for some dust to be transported further, however given the height in which it is released and the distance it would have to travel, the dust effects are expected to be minimal. When considering the pathway in which the dust must travel to most of the nearby receptors, with terrain features such as ridgelines and mature vegetation between the source of dust and the receptor, these will also help reduce dust effects.
- Winstones will use a range of proven best practice mitigation measures to control dust.
- Winstones will also undertake visual monitoring alongside continuous monitoring of wind conditions. The weather station is configured to send out alerts if values exceed predefined trigger values. Given these measures, if adverse wind conditions arise, any dust event that occurs is expected to be brief, lasting only as long as it takes to recognise the high-risk conditions and implement the necessary additional mitigation measures.
- The site has an excellent compliance history in terms of controlling dust discharges and no record of complaints over the past 5 years.

7.7 Cumulative Nuisance Dust Effects

For acute cumulative dust effects to occur on any given sensitive receptor, the receptor needs to be downwind of more than one emitter, emissions need to coincide, wind speeds need to be elevated, and the intensity of the emissions needs to be sufficiently great for the dust to reach that receptor.

Therefore, for a receptor to be affected by cumulative dust effects from the existing quarry operations and proposed pit expansion, the receptor must be downwind of both sources at the same time dust emissions are occurring.

Chronic cumulative nuisance dust effects can occur where a receptor is exposed more frequently or for longer durations to dust as a result of dust emissions from multiple dust emitters. However, this is unlikely for the proposed pit expansion given the small number of other dust sources and the relatively short duration that dust discharges from the proposed activities could cause some sort of effect.

AQCNZ considers that given most of the current operations occur at or below ground level the maximum potential distance that unmitigated dust discharges could travel is 300 m. However, as already discussed, certain stages of the pit expansion will occur at exposed elevated locations and therefore AQCNZ considers unmitigated dust discharges from these areas could travel up to 1,000 m.

Given that currently consented activities are unlikely to cause effects beyond 300 m and, therefore, are unlikely to impact nearby receptors, the potential for cumulative effects is limited. Nevertheless, when considering the low frequency of high wind speeds together with the relatively limited area in which both the existing and proposed dust-generating areas will be upwind of a receptor and proposed mitigation measures, there is a low probability of dust discharges from each source cause an effect in terms of increase dust concentrations or more frequent exposure to dust.

Overall, it is considered that the proposed pit expansion will not result in nuisance cumulative effects.

8 Conclusions

Winstones has engaged AQCNZ to undertake an air quality assessment to understand the potential for effects from air discharges from a proposed pit expansion at Whitehall Quarry.

The assessment determined that Site activities can generate the following types of air contaminants:

- Nuisance Dust;
- Fine Particulate Matter (PM₁₀ and PM_{2.5});
- Emissions from vehicles; and,
- Respirable crystalline silica.

To control these air discharges, a range of mitigation measures have been proposed, including applying water, controlling vehicle speeds, adopting specific extractions techniques (extraction from the pit floor, working towards the receptors, limiting drop heights etc.), restricting activities that have a high risk of generating discharges during adverse meteorological conditions and visual monitoring to assess and monitor the effectiveness of mitigation. All these measures are captured in a comprehensive DMP.

AQCNZ identified that the nearest sensitive receptors are at least 480 m from the proposed pit expansion, with the majority being in excess of 880 m from any dust generating activities. Considering this large separation distance, the numerous terrain features that could reduce the impacts of dust, and the low frequency of dust that could cause nuisance effects, provided the proposed mitigation measures are appropriately implemented, there will be limited potential for adverse effects.

Overall, based on the results of AQCNZ's assessment, air discharges from the proposed pit expansion at Whitehall Quarry:

- Will comply with the relevant conditions of Rule 6.1.16.1 of the Waikato Regional Plan
- Will comply with Rule 20.4.2.1 in the WDP which requires that "*No activity shall produce any objectionable odour, smoke, fumes or dust at or beyond the boundaries of the site from which the nuisance emanates*"; and
- Are unlikely to result in any adverse environmental effects beyond the Site boundary and the effects are therefore considered to be less than minor.

9 Limitations

Air Quality Consulting NZ Limited has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Winstone Aggregates, and only those third parties who have been authorised in writing by Air Quality Consulting NZ Limited to rely on this report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where this report indicates that information has been provided to Air Quality Consulting NZ Limited by third parties, Air Quality Consulting NZ Limited has made no independent verification of this information except as expressly stated in the report.

Air Quality Consulting NZ Limited assumes no liability for any inaccuracies in or omissions to that information.

This report was prepared between September to December 2024 and is based on the conditions encountered and information reviewed at the time of preparation. Air Quality Consulting NZ Limited disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Appendix A: Whitehall Quarry Dust Management Plan



WINSTONE
AGGREGATES

Waikato

**Whitehall Quarry
Dust Management Plan**

November 2003

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1. Introduction

A Dust Management Plan is required by condition 8 of the Environment Waikato (EW) Discharge to Air Consent number 108119 granted September 2003. This air discharge consent authorises dust emissions to air as long as these are managed to ensure they do not cause objectionable or offensive off site effects.

The Dust Management Plan will detail measures and procedures that will be put in place to enable the aggregate extraction, processing and ancillary activities to operate in a manner that will result in compliance with dust management conditions of the Air Discharge consent 108119 and to minimise the potential for dust nuisance and adverse effects arising from the Whitehall Quarry operation.

2. Purpose of the Plan

The purpose of this Dust Management Plan is:

- To manage all emissions to air from quarry operations
- To ensure compliance with conditions of the Air Discharge Consent 108119.

3. Resource Consent Requirements

3.1. Requirement to prepare a Dust Management Plan

Condition 8 of the Discharge to Air Consent 108119 requires the following:

“Condition 8: The consent holder shall provide the Waikato Regional council with a Dust Management Plan, which details the measures and procedures that will be put into place to enable the aggregate extraction, processing and ancillary activities to operate in a manner that will result in compliance with the dust management conditions of this consent and to minimise potential for dust nuisance and adverse effects arising from the operation of this activity. The plan shall be lodged with the Waikato Regional Council for review at least one month after the commencement of activities on the site. The Plan shall be reviewed and updated by the consent holder when required, in consultation with the Council. The Plan shall address but not be limited to, the following:

- i) Specific locations and specifications for fixed and mobile sprinklers for the control of dust from stockpiles.*
- ii) Specific management procedures for the use of the water cart for control of dust from internal access roads and working areas.*
- iii) Specific management procedures for the control of dust from the overburden disposal operations.*
- iv) Other actions necessary to comply with the requirements of this resource consent.”*

3.2. Reference Documents

Condition 1 of the General Conditions of Consent attached to the Discharge to Air Consent 108119 requires the following:

“Condition 1 The activities described in resource consents shall, subject to the consent conditions that follow, be generally in accordance with the application and supporting information entitled “Winstone Aggregates Waikato, Whitehall Quarry: Applications for Quarry Activities Including Realignment of a Modified Watercourse (Karapiro Stream)” (dated September 2002) Volumes I & II and further information entitled “Whitehall Quarry – Technical Assessment of Hazards from Proposed Works” (dated January 2003), “Whitehall Quarry Consent Application – Clarification of information Supplied” (Dated March 2003) accompanying the application and Figure 1B (Figure 1), except where otherwise directed by a specific consent condition below.”

Condition 5 of the Discharge to Air Consent 108119 requires the following:

“Condition 5: The consent holder shall, unless otherwise directed in writing by the Waikato Regional Council, undertake continuous monitoring for deposited particulate matter. Results shall be reported to the Waikato Regional Council at three monthly intervals unless proposed trigger levels are exceeded. If the trigger levels are exceeded these shall be reported as provided for in (iii) below. See Note 1 below.

- i) The number and location of the deposition gauges shall be approved by the Waikato Regional Council acting in a technical certification capacity prior to commencing the exercise of this consent.*
- ii) The method of the measurement shall be the horizontal deposit gauge method ISO/DIS 4222.2. The consent holder shall record the dust gauge exposure period and date on which the sample is collected for each monitoring location. The sample shall be analysed for insoluble solids and total solids in accordance with the methods detailed in the “Standard Methods for the Examination of water and Wastewater, 1998” 20th edition by A.P.H.A, A.W.W.A and W.E.F., or any other method approved by the Waikato Regional Council acting in a technical certification capacity,*
- iii) The trigger level for deposited particulate matter shall be no more than 4g/m²/30 days above ambient level established at the control site. In the event this trigger level is exceeded the consent holder shall report to the Waikato Regional Council within 7 days of receiving the result. The report shall include an explanation of any reasons for the exceedance and any remedial measures taken to prevent any further exceedance.*

Note 1: Implementation of this condition 5 is to delayed until 31 December 2003 pending resolution of the Environment Court reference RMA 1196-01 in so far as it relates to Rule 6.1.16.1 of the proposed Waikato Regional Plan.”

There has been no further movement towards resolution of the Environment Court reference RMA 1196-01 in the time of preparing this Dust Management Plan.

3.3. Limit conditions

Discharge to Air consent 108119 states specific limit conditions which operations at Whitehall Quarry are required to meet. These conditions are 2, 3, 4, 5(iii) above and 9.

“Condition 2: The consent holder shall manage the quarry and ancillary activities in such a manner to ensure that dust emissions are kept to a practical minimum, including;

- i) The use of water sprays to suppress dust from the crushing and screen plants and haul roads,*
- ii) Revegetation of disturbed land which is currently not being worked,*
- iii) The sealing of the site access roadway up to the site office within six months of the commencement of this consent, and,*
- iv) To cover and/or dampen loads on vehicles leaving the quarry which could create a dust nuisance.”*

“Condition 3: There shall be no particulate matter as a result of the activities authorised by this resource consent that causes an objectionable or offensive effect beyond the boundary of the site being that land described as;

- i) Certificate of Title SA 61A/508, being Lot 1 DPSA 76874, Lots 1-3 DPSA 22660 and Lot 1 DPSA 86845,*
- ii) Part Certificate of Title SA 50B/848, being Section 1 SO 59143*
- iii) Part Certificate of Title 21C/1171, being Part Lot 1 Section 13, Block X Cambridge Survey District, and*
- iv) Part Hinuera No. 2 Fishing Reserve, Section 122 Land Act 1898.*

Note 1: For the purpose of condition 3 of this resource consent, if any officer of the Waikato Regional Council will consider an effect that is objectionable or offensive to have occurred with technical experience in dealing with dust emissions, deems it so after having regard to:

- i) The frequency, intensity, duration, amount, effect and location of suspended or particulate matter; and/or*
- ii) Receipt of complaint from neighbours or the public; or*
- iii) Relevant written advice or a report from an Environmental Health Officer of a territorial local authority or health authority.”*

“Condition 4: Should an emission of particulate matter occur that has an objectionable or offensive effect, the consent holder shall inform the Waikato Regional Council within 24 hours of the incident and provide a written report to the Waikato Regional Council within 5 days of being notified by the Waikato Regional Council. The report shall specify:

- i) The cause or likely cause of the event and any factors that influenced its severity;*
- ii) The nature and timing of any measures implemented by the consent holder to avoid, remedy or mitigate and adverse effects; and*

iii) The steps taken in future to prevent recurrence of similar events.”

“Condition 9: The consent holder shall maintain 20kph maximum speed signs along the unsealed roads and ensure that these vehicle speed restrictions are complied with at all times.”

3.4. Recording and Reporting Conditions

Discharge to Air consent 108119 has recording and reporting requirements. These are detailed in conditions 5 above, 7, and General Condition 3.

“Condition 7: The consent holder shall record the following in a daily log:

- i) Any dust control equipment malfunctions and any remedial action(s) taken;*
- ii) Any visible emission of dust and the source;*
- iii) Wind direction*
- iv) The frequency of water cart use and the volume of water applied;*
- v) The volume of water used for dust suppression other than water cart usage; and*
- vi) The date and signature of the person entering the information.*

A summary of the information recorded shall be submitted to the Waikato Regional Council annually. Records shall be made available to the Waikato Regional Council within 10 working days upon request.”

“General Condition 3: The consent holder shall maintain and keep a complaints register for complaints regarding all aspects of operations at the site related to the exercise of this consent, received by the consent holder. The register shall record:

- i) The date, time and duration of the event/incident that has resulted in complaint,*
- ii) The location of the complainant when the event/incident (if possible, specify the nature of the incident eg dust) was detected,*
- iii) The possible cause of the event/incident,*
- iv) The weather conditions and wind direction at the site when the event/incident allegedly occurred,*
- v) Any corrective action undertaken by the consent holder in response to the complaint,*
- vi) Any other relevant information*

The register shall be made available to the Waikato Regional Council at all reasonable times. Complaints received by the consent holder that may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Waikato Regional Council within 5 days of the complaint being received.”

4. Roles and Responsibilities

Winstone Aggregates, Quarry Manager: Manages all site operations

Waikato Regional Council, Manager, Air Quality: Review Dust Management Plan

5. Dust Management in Operations

Winstone personnel are aware of the potential adverse effects of dust emissions and monitor the quarry for actual and potential visible dust sources. The results of this visual monitoring are recorded in the daily air permit log by the quarry manager and/or the site administration and environmental coordinator. Although all Winstone personnel monitor dust levels, senior personnel including quarry supervisor and quarry manager ensure that dust emission sources are controlled.

Dust control is undertaken at Whitehall Quarry by a number of measures outlined below. The combination of measures used depends on factors such as location of dust source, wind strength and wind direction and is determined in practice by senior quarry personnel.

5.1. Sprinkler System

Current production of aggregates at Whitehall is mainly chip seal, basecourse and PAP products. These are clean products, which have been washed during processing.

Stockpiles of these types of materials will not generate dust so there is currently no fixed sprinkler system in the stockpile area at Whitehall Quarry. It is proposed that fixed sprinklers be installed in the stockpile area if daily monitoring records show an increase in dust emissions from stockpiles despite use of other dust management techniques in this area.

5.2. Stockpiles

Stockpiles are located in the stockpile area, (Figure 1) off the access way into the quarry site. The stockpile area is more than 500m away from the nearest residential dwelling in any direction and it is sheltered from northerly winds that could blow dust emissions towards the closest dwellings in the south, by a hill.

Winstone minimises the amount of aggregate stored in stockpiles not only for environmental purposes but also for business efficiency reasons, however some large stockpiles may still exist on site.

If stockpiles are identified as a significant source of dust emissions then they are dampened but mostly this source is recognised to be the current unsealed access way. If, after the sealing of the access way, dust emissions from the stockpile area are shown to be a significant continuous source, and daily monitoring shows that dust emissions from this area are increasing despite the use of other dust management techniques, a sprinkler system will be installed.

5.3. Water Cart Management Procedure

Winstone operates a water cart to dampen main haul roads throughout the site including the stockpile area, and currently the access way in dry conditions. The water cart is operated by Winstone personnel in response to weather conditions and observed dust emissions on all haul roads and working areas.

Pit sump 1 and 2 are the primary water source for the water cart. There will be a sufficient supply of water from this source for all dust management operations at Whitehall Quarry. Chemical dust suppressants will only be used in consultation with Iwi, Landowners and the Waikato Regional Council.

Water cart use, including amount of water used, is recorded in the daily Discharge to Air Consent Log.

5.4. Vehicle Speed Limit

All visitors to the quarry are requested, via a sign at the entrance, to reduce speed to avoid dust emissions. Condition 9 of the Discharge to Air Consent 108119 requires that “20kph maximum speed signs” be placed “along unsealed roads” and that the consent holder ensures “that these vehicle speed restrictions are complied with at all times”.

5.5. Site Access Way

The Whitehall site access way is currently dampened by the water cart on dry days when visual checks have identified dust to be rising with vehicle movements.

This access way will be fully sealed from the quarry entrance as far as the site office during the 2003-04 earthworks season. After this regular maintenance in the form of sweeping and repair of pot holes will take place to ensure there is no dust nuisance created by vehicle movements along the access road.

6. Overburden Removal and Disposal Operations

6.1. Overburden Removal

Overburden will be removed from above the west face of Pit No 2 and the southwestern face of Pit No 1 as part of quarry expansion activities. Overburden will also be removed during re-alignment of the Karapiro Stream, east of the current plant site. The main dust nuisance anticipated from stripping operations for neighbouring residential properties will be visual as the distance to existing properties from areas of stripping is between 500 and 1000 metres.

6.1.1. Dust Management Measures for Stripping

The following measures will ensure that there is no dust nuisance created by stripping operations at Whitehall.

- A large separation distance of over 500m between operations and residential dwellings.
- During stripping activities and prior to dust becoming a nuisance, a water cart will be used on site to dampen haul roads and stripped areas in dry windy conditions.
- The duration of stripping operations will be minimised and is likely to take approximately eight to twelve weeks.

6.2. Overburden Disposal

Overburden from areas around the quarry pit to be developed, is transported on a truck to sites designated for disposal on the site, or removed off site. The current overburden disposal area and the area south of this into the gully (Figure 1) are used for overburden disposal.

Overburden from the stripping operations associated with construction of the new Karapiro Stream channel will be placed in an overburden disposal area south east of the stockpile yard (Figure 1). Overburden from above the west face of Pit No 2 and the south-west face of Pit No 1 will be placed in the current overburden disposal area, which will eventually utilise the south end of the paddock in a staged development from the south east back in towards the current disposal area.

6.2.1. Dust Management Measures for Disposal

The following measures will ensure that there is no dust nuisance created by overburden disposal operations at Whitehall.

- A separation distance of over 200m between operations and residential dwellings in area D3.
- Construction of a visual barrier on the south east side of overburden disposal area, activity area D3 that will eventually act as a shield for dust nuisance when planted with tall growing trees on the top of the batter slope.
- A water cart will be used on site to dampen haul roads and overburden disposal areas in dry conditions to avoid dust nuisance.
- The duration of stripping operations will be minimised and is likely to take approximately eight to twelve weeks.
- Overburden disposal areas will be re-vegetated following construction activity. Revegetation may include hydro-seeding or other techniques suited to the location and potential 'take' of the planting.
- Overburden disposal areas will be constructed in a sequence of staged developments and areas of disturbed land not currently being worked shall be revegetated.
- The disposal area to the south of the site will be progressively rehabilitated to permanent pasture on the upper surface with batters revegetated as woodlots or indigenous vegetation.

7. Additional Dust Control Measures at Whitehall

7.1. Water Sprays on Processing Plant

The current processing plant operates a dry system, where only minimal water sprays are utilised.

The proposed new processing plant will operate on a partially wet processing system where aggregate will be dampened both for dust control and aggregate washing purposes.

Some water sprays on the proposed processing plant may be turned off if conditions are such that they are not required for dust control purposes.

7.2. Drilling and Blasting

A licensed contractor carries out drilling and Blasting for Winstone. The contractors are required to use techniques, which minimise dust emissions and use minimum blast force.

7.3. Truck Spillage

Winstone ensures that all of its trucks, customers trucks and other equipment (eg loaders) avoid spillage to minimise dust emissions. Dust emissions may be caused by the spillage event itself and spilled material may act as a later source of dust emission if material is further crushed by truck movements.

Whitehall is a hard rock quarry and the majority of distribution loads will be carrying heavy material that is not prone to dust emissions when carried in truck and trailer trays. In the event that a potentially dusty load is carried, then this load will be covered or dampened as required by Condition 2 (iv) of the discharge to air consent 108119.

7.4. Vehicle Exhausts

Winstone ensures that all its vehicles do not have downward facing exhausts as these may act to raise dust in dry conditions.

All vehicles are regularly maintained to ensure minimum emissions.

7.5. Processing Plant Spillage

Spillage from the processing plant is minimised and where it does occur is removed. This reduces dust from material spilling from the plant and reduces the sources of fine material that may subsequently act as a source of dust emission.

8. Additional Elements

8.1. Discharge to Air Consent Expiry

The current discharge to Air Consent number 108119 is due to expire on 30 June 2028. It is expected that further consents will be applied for at this time.

8.2. Location of Operation

Areas A1, A2, B1, C1, C2, D2, D3, E, F2, G, H, I and J as shown in Figure 1.

8.3. Visitor Awareness of Dust Emissions

Winstone has erected, and will maintain, a sign at the entrance to the quarry, which informs drivers to reduce speed to avoid dust emissions.

9. Monitoring

The following on site monitoring is relevant to dust emissions to air:

- Contact will be made with Mr John Fairclough, neighbour on the south boundary, property at 209 Whitehall Road prior to overburden disposal in the south paddock close to the Fairclough property boundary.
- Continuous monitoring and recording of visible dust emissions, wind strength, wind direction and rainfall required as a condition of the Discharge to Air consent 108119 and the Discharge to Water Consent 108118.
- Recording of frequency of water cart use, volume of water applied with the water cart and the volume of water used for dust suppression other than water cart use.
- Continuous monitoring of deposited particulate matter as required by condition 5 of the Discharge to Air Consent (Implementation of this condition is to be delayed until 31 December 2003 pending resolution of Environment Court Reference RMA 1196-01 in so far as it relates to Rule 6.1.16.1 of the proposed Waikato Regional Plan). Dust deposition gauges will be installed pending discussions with the Waikato Regional Council after the 31st of December 2003.

10. Reporting

Winstone will undertake the following reporting.

- Continuous deposited particulate monitoring results shall be reported to the Waikato Regional Council at three monthly intervals. If trigger levels are exceeded a report shall be provided to Waikato Regional council within 7 days of receiving the result.

- The Waikato Regional Council shall be informed within 24 hours of an emission of particulate matter that has an objectionable or offensive effect. Within 5 days of the occurrence of such an event the Waikato Regional Council shall be provided with a written report as outlined in Condition 4 of the Discharge to Air consent 108119.
- The daily weather and dust control log shall be made available to Waikato Regional Council within 10 days of request.
- The complaint register shall be made available to the Waikato Regional Council at all reasonable times.

11.Availability of the Dust Management Plan

A current Dust Management Plan is held on site at all times. Contact should be made with the Quarry Manager or their designate to ensure that the most recent plan is referenced.

12.Audit and Review of Plan

Winstone carries out periodic internal and external environmental reviews and audits. These are undertaken by Winstone management or external consultants.

Quarry personnel hold a monthly meeting to review and evaluate environmental issues. The outcome of these meetings is documented and forwarded to Winstone support office.

The results of audits and reviews lead to revisions of plans. The Waikato Regional Council will be notified and consulted regarding any necessary changes to the Dust Management Plan following a review, and will receive an updated version.

Appendix A

Waikato Regional Council Discharge to Air Consent 108119