

26th January 2017

Team Leader – Air Quality
 Auckland Council
 Private Bag 92 300
 Auckland 1142

Dear Team Leader – Air Quality

Re: Investigation of Total Suspended Particulate Trigger at Three Kings Quarry

With regard to condition 21 of the Three Kings Quarry Air Discharge Consent (Permit Number 40041), this is to confirm that a result greater than 60µg/m³ as a 24 hour average was recorded by the Office BAM unit on the 16th January 2017.

The trigger is as follows:

- 16 January 2017 – 72.1 µg/m³ at the BAM monitor located at the site office.

As required by condition 21 of the Air Discharge Permit, an investigation has been undertaken. This letter details the results and conclusions of the investigation.

Air quality monitoring at Three Kings Quarry consists of:

- Two Beta Attenuation Monitors (BAM) units. These units are located at the Office and the Southern Boundary.
- A meteorological monitoring station located at the site offices that records wind speed, wind direction and rainfall on a continuous basis.
- Video cameras that monitor the site from the north and south.
- Visual inspections of air quality carried out by site staff.
- Recording of dust suppression equipment use and malfunctions.

All relevant air quality monitoring results collected on the day of the trigger have been summarised in Table 1.

Table 1: Air Quality Monitoring Results

Date	16/01/2017
BAM - Office (µg/m³)	72.1
BAM – Southern Boundary (µg/m³)	35.0
Daily Rainfall (mm)	0.0
Daily Average Wind Speed (m/s)	4.02
Daily Average Wind Direction (degrees)	230.7
Sprinklers Operational? (yes/no)	Yes
Video Monitors Operational (yes/no)	Yes
BAM Text Alarm Received (yes/no)	Yes

Investigation of the Trigger:

- There was no rainfall recorded on the day of the trigger or the two days prior.
- The daily average wind speed on the day of the trigger was 4.02 m/s which was one of the highest average daily wind speeds recorded for the month of January 2017 thus far.
- The daily average wind direction was 230.7° (South-West).
- The BAM monitor at the site office was the only unit to record a value over 60 $\mu\text{g}/\text{m}^3$ as a 24 hour average. The BAM monitor located at the Southern Boundary recorded 35.0 $\mu\text{g}/\text{m}^3$ as a 24 hour average for the same day.
- The sprinkler system and water cart were fully operational on the day of the exceedance.
- The watercart distributed approximately 144 m^3 of water to the site on the day of the exceedance, which is the highest daily quantity recorded for the month of January 2017 thus far.
- The BAM monitors are currently set to send out text messages to the Site Manager, Supervisor and Environmental Fill Specialist at levels which provide an early warning of potential dust issues if action is not taken. A number of text messages were received on the day of the exceedance which prompted visual inspection of the site throughout the day. Points to note include:
 - Very strong South-West wind throughout the day
 - The Three Kings Quarry Operations Manager noted dust being generated by mobile plant driving internally on the fill. The watercart was utilised immediately to dampen all accessible areas of the fill and mobile plant were re-routed to damp areas to avoid dust generation
 - Drain laying earthworks were taking place in the adjacent SHA site along the Three Kings Quarry entranceway in close proximity to the office BAM unit
 - SHA stockpiles of aggregate were being utilised and replenished throughout the day along the Three Kings Quarry entranceway in close proximity to the office BAM unit

Cause of Trigger and Corrective Actions:

The investigation conducted into the result of 72.1 $\mu\text{g}/\text{m}^3$ as a 24 hour average recorded at the Office BAM monitor on the 16th January 2017 concluded the following potential sources:

- Very strong South-West wind
- Mobile plant driving internally on the fill
 - **Corrective Action:** Watercart utilised immediately in affected areas and mobile plant re-routed.
- Drain laying earthworks taking place in the adjacent SHA site along the Three Kings Quarry entranceway in close proximity to the office BAM unit
- SHA stockpiles of aggregate being utilised and replenished throughout the day along the Three kings Quarry entranceway in close proximity to the office BAM unit

We consider that the additional measures of dampening affected areas of the fill and re-routing internal mobile plant, though did not prevent a trigger, certainly managed the degree of exceedance and effect as best as practicable.

Closing:

No complaints to date have been received as a result of this exceedance.

Three Kings Quarry staff will continue to record visible sources of dust in the Daily Dust Log Field sheet and mitigate these sources as soon as practicable.

With the ongoing daily practices being implemented, we are confident that we can continue to manage the site to minimise the occurrence of such triggers.

If there are any further queries or comments on this investigation please do not hesitate to contact me on 027 504 3624 or at angela.klein@gbcwinstone.co.nz

Yours faithfully



Angela Klein

Environmental Fill Specialist