12th August 2020

For the attention:
Hoagy Moscrop-Allison
Senior Planner – Major Assessment
City Development Branch
Council of City of Gold Coast

Dear **Hoagy Moscrop-Allison,**

Objection submission COM/2019/81 - Dust Deposition and PM10 Limits

Please find below further information that I think should be considered re this development Application and its 'Noise and Dust' Submission.

I have already identified how the Dust analysis assessment, that was submitted as part of the development application, failed to include any consideration for the cumulative dust effects of other close air polluting industries (identified in Attachment A1). Which are: 'The Bullrin Quarry' only 400m (Attachment A2), 'Holcim Concrete Batching facility' only 200m (Attachment A3), and 'JJ Richards recycling centre' (Attachment A4), which is adjoining the proposed Nucrush extractive boundary. The Nucrush Hart Street batching facility which is only approximately 1125 metres from proposed extractive boundary should also be considered (Attachment A5 and A6). Please see objection: "Modelled Dust Submission results are culpably misleading, incorrect and highly dangerous", dated 17th July 2020 for further info if required.

It also fails to include wind erosion of stockpile appropriately (Attachment A7 and A8), it underestimates the number and effect of the haulage trucks (Attachment A9) and also fails to include any allowance for the immense amount of dust generated during the regular blasting events (Attachment A10). These aspects are all detailed in the objection of 17th July 2020 also.

I have also shown how the dust limits are clearly exceeded, even ignoring all the above critical factors, and just using their submitted data in my 'Dust Limits Exceeded' objection dated 5th August 2020.

Over and above all these clear problems I believe it is also pertinent to examine the 'claimed' dust dispersion figures that have been submitted (within their 'Noise and Dust' assessment) as it would seem significant liberties have been taken in this regard. To this end I have examined some of the data supplied and share my findings below:

Dust Dissipation double legal limit beyond quarry boundary and in public areas

It is interesting to closely study a typical submitted diagram of the modelled 'Dust Deposition' at the Nucrush Quarry (e.g. Fig A7.5 reproduced in Attachment B1). The Dust Deposition has been plotted against the topography of the site (at Cross-section 'A-A' on Attachment B1) and results are shown in Attachment B2.

Here, it can clearly be seen that the modelled data shows that a 240 mg/m² Dust Deposition (Twice the legal limit) is beyond the quarries boundary and stretches right across its entrance, across the

Maudsland road and well into the MK Wake Park and Aqua park entrance (34 Maudsland Road). In fact it is still above the legal limit of 120 mg/m² for 180 metres beyond the quarry boundary.

It must also be remembered that this is average throughout the day. Therefore, for the next 20 years (Stage 1, years 0 to 19, see attachment B3) the dust deposition will be double the legal limit beyond the Nucrush boundary, and protruding for an estimated 180m into public places, along public roads and exposing the entrance to the children's Aqua Park and the MK Wake park also. This is AVERAGE not PEAK!

A cursory glance at the submitted Dust Deposition map (Attachment B1) shows this above limit will be exceeded throughout the Maudsland Road and Tamborine Oxenford Road for over 900 metres of public thoroughfare, and throughout the John Muntz Bridge roundabout, completely engulfing the public accessible area of '304 Tamborine-Oxenford road' and also areas of open space namely: '241 Tamborine Oxenford Road'.

If we also study the affect by Stage 5, Figure A10.5 which is up to year 37 (as shown in Attachment B5) it can again be clearly seen the above the legal limit of dust dispersion in public areas will be prevalent throughout the next thirty seven years.

If we then go on to observe the affect by Stage 7, Figure A12.5 (as shown in Attachment B6), which is up to year 96, it can again be clearly seen the above the legal limit of dust deposition in public areas will be prevalent throughout the next ninety six years. However, by this time it can be seen that not only is the public open space of '304 Tamborine Road' fully engulfed in above legal limit of dust dispersion, but also the publically accessible freshwater lake (366 Tamborine Oxenford Road) is now also submitted to an above legal limit of 120 mg/m2 dust dispersion as is the John Muntz Bridge and also the open space: '241 Tamborine Oxenford Road'.

<u>Expected to believe Dust Dissipation falls from double legal limit to below maximum acceptable concentration within 180 metres</u>

The dust deposition cross-section (Attachment B2) clearly shows how we are expected to believe the maximum dust deposition value of 240 mg/m² (or **double** the permitted legal limit) falls rapidly beyond the confines of the quarry to a below maximum acceptable concentration of 120 mg/m² within a mere 180 metres.

This would seem highly implausible, and even if it were plausible, it would only require one little puff of wind to destroy this 'idealistic' presentation. As a worst case scenario should have been adopted then clearly this is absurd and completely unacceptable assumption that the dust deposition can dissipate so readily.

Wind effect

The New Zealand governments Good Practice Guide to Dust, produced in 2016 (reproduced in Attachment B4) shows how dust particles will be affected by wind.

In summary particles size of 10 micrometres in diameter (PM10) have a settling velocity of about 0.5 cm/sec in still air, while larger particles up to 100 micrometres (PM100) would have a settling velocity of approx 45cm/sec.

In a relatively gentle ten knot wind (5m/sec) the PM100 particles would be blown about 10 metres away from the source while the 10 micrometres inhalable and respiable particles have the potential to travel about a kilometre. Fine particles (respirable) will thus be widely dispersed in any wind conditions.

Therefore, it is clear that the double the legal limit of Dust dispersion of 240 mg/m² that has been demonstrated throughout the quarry and controversially even beyond its boundaries (by their submitted data) will be easily dissipated throughout the local area with the slightest of winds which can only make the surrounding area, including a vast number of sensitive receptors, including residential areas, highly susceptible and vulnerable to an above the legal limit of dust dispersion on an all too regular basis.

Summary

This modelled dust dispersion data is clearly highly questionable due to its apparent claims that it can rapidly deplete within such short distances. It is also highly questionable as it makes no allowance for worst case and/or any wind conditions which will have a marked effect on the level of dust dispersion.

PM10 '24 Hour average' Dust dispersion study

A similar effect to the 'Dust Deposition' examples shown above is also observed for the 'PM10 24 Hour Average' data submitted.

A close study a typical submitted diagram of the modelled 'PM10 24 hour average' at the Nucrush Quarry (e.g. Fig A7.1 reproduced in Attachment C1).

The 'PM10 24 Hour Average' has been plotted against the topography of the site (at Cross-section 'A-A' on Attachment C1). The results are shown in Attachment C2.

Here, it can clearly be seen that the modelled data shows that the 50 µg/m³ maximum acceptable concentration is exceeded by an abhorrent **five** times this limit throughout the quarry. Straight away this should raise significant alarm bells for the Health and safety of workers exposed to this excessive level on a daily basis. Alarm bells should also be raised as the maximum acceptable concentration is exceeded by roughly double at approximately 100 µg/m³ in public areas (e.g. access to Aqua park at '34 Maudsland Road'), the publically accessible '304 Tamborine Oxenford Road' and public roads as clearly shown in Attachment C1.

Also, it should be remembered, as discussed above, the significance of any wind. With a ridiculous PM10 value of 250ug/m3 a mere 30 metres from public areas (See Attachment C2) it is obvious with just a slight wind this will subject sensitive receptors to a ridiculously high level of inhalable and respirable PM10 particulate exposure. For example the Oxenford Community pony club is only 200m from the boundary and could expect a level far, far, far higher than the maximum acceptable concentration of 50 µg/m³. This must surely be unacceptable.

This can again be seen up to year 37 by Stages 5 covering years 34-37 (Attachment C3).

If we then go on to observe the affect by Stage 7, Figure A12.1 (as shown in Attachment C4), which is up to year 96, it can again be clearly seen the above the legal limit of 'PM10 24 hour average' of 50 µg/m³ in public areas will be prevalent throughout the next ninety six years. However, by this time it can be seen that not only is the public open space of '304 Tamborine Road' fully engulfed in above legal limit of PM10 particulate exposure, but also the publically accessible and well used freshwater lake (366 Tamborine Oxenford Road) is now also submitted to an above legal limit as is the John Muntz Bridge and also the open space: '241 Tamborine Oxenford Road'.

Conclusion

Firstly, it should be remembered, that despite functioning as a quarry over the last twenty seven years the applicant has chosen, for its Dust assessment, to model the dust data despite having the ability to collate actual real data results. This is suspicious, especially as the development application claims to be merely extending its current program rather than increasing in output.

What did the quarry have to hide by not using real data? Well for a start this enabled it to ignore the cumulative effect of neighbouring industry. It also enabled it to apparently underestimate the wind erosion effect. It also enabled it to underestimate the number of haulage trucks. It also enabled it to forget to include any of the immense dust clouds generated during blasting that have been seemingly ignored in the modelled data.

However, despite all these factors omitted from the submitted modelled data, their submitted data still shows how Nucrush will be unable to fall within the maximum acceptable concentrations for the PM10 and Dust Deposition limits required by a very high margin indeed.

Their modelled data submission shows how all of these parameters will be exceeded in public places and adjoining lots for an envisaged chronic exposure of twenty-four hours a day seven days a week for the proposed one hundred plus years expansion / extension requested.

The extremely high levels so near to the quarry boundary, as shown in their submitted data, will further ensure sensitive receptors receive exceedingly high levels, way, way above the legal limits, when the lightest of winds dissipate the dust in their direction. And, for over a kilometre for the highly dangerous inhalable and respirable particles.

It should also be remembered that the PM10 figures submitted are '24 hour average' and therefore more appropriate for occupational exposure for generally fit healthy young quarry workers, who are provided with appropriate personal protective equipment (PPE), facing an eight hour time weighted average (TWA) exposure. However, given the urban environment that the quarry is located and that the dust limits are already exceeded in public areas it would be far more appropriate to submit the chronic exposure non-occupational limits more accurately reflected in the PM10 'annual average' limit of 25 µg/m³. Unfortunately, these have been omitted. But, would show far worse exposure in the public areas and the adjoining lots identified and many homes to the East. Thus, the chronic 24/7 effect on vulnerable children and adults would be far greater than what the 'PM10 24 hour average' figures might otherwise suggest.

I fail to see how this development application could possibly be accepted when, by its own omission, it cannot meet the maximum acceptable air quality objectives throughout its planned one hundred plus year plan.

I hope the Council Planners and the Councillors deciding this development application will understand the dangers of allowing highly elevated dust pollution levels, within a suburban environment and in public places that are clearly way over limits for everyday exposure let alone for the chronic 24/7 exposure that vulnerable children and adults will be subjected too.

To accept this development application, given that the dust deposition and PM10 parameters are CLEARLY exceeded beyond their boundaries and in public and privately owned places, throughout its one hundred year plan, as proven by their own submitted documentation, would be absolutely heinous and, I believe, highly culpable.

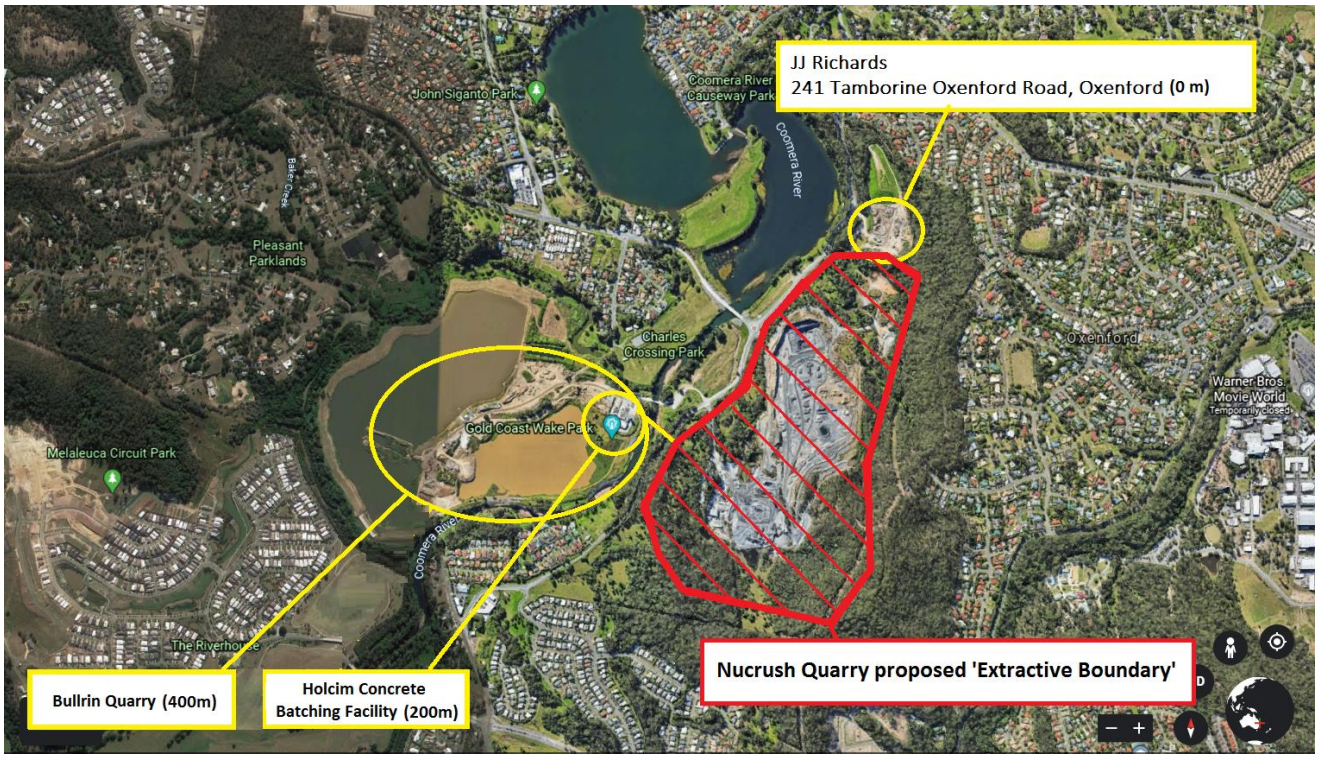
Thank you for considering my objection,

Kind regards

Tony Potter

* Disclaimer. Please note my findings are believed correct and are to the best of my ability. However, there may be errors and assumptions I have made that are incorrect. I do not believe this to be the case, but, realise with the vast amounted of submitted data from the applicant, errors and assumptions on my part may occur. Hopefully this is not the case, but please accept my apologises if this is so. Thank you.

Attachment A1 - Additional nearby industry that requires consideration to establish total 'Cumulative effect' of air pollution for the local environment



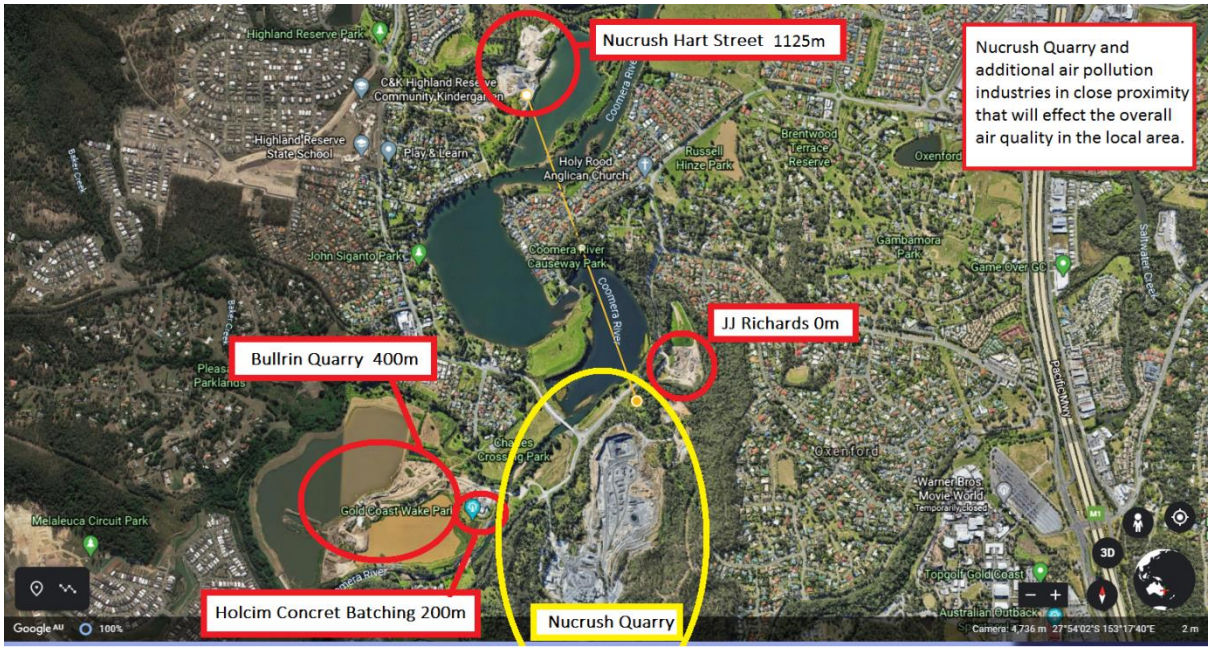
Attachment A2 - 'Bullrin Quarry' approx 400m from Nucrush extractive Boundary

Attachment A3 - ‘Holcim Concrete Batching Facility’ approx 200m from Nucrush extractive Boundary

Attachment A4 - ‘JJ Richards Recycling centre’ attached to Nucrush proposed extractive Boundary

Attachment A5 - 'Nucrush batching facility' in Hart Street, Upper Coomera, approx 1100 metres from proposed extractive Boundary (Location shown in Attachment A6)

Attachment A6 - Location of the 'Nucrush batching facility' in Hart Street, Upper Coomera



Attachment A7 - Stockpiles covering an approximate area of 136,874 m² however only 30,000m² was modelled (See Attachment A8)

Attachment A8 - Despite Stockpiles covering an approximate area of 136,874 m² (Attachment A7) only 30,000m² was modelled

ATTACHMENT 6 *Particulate Emission Estimation Calculations*

WIND EROSION

Processing Plant and Stockpile Area:	30,000	m^2	MWA Estimate - Group to 3 Area Sources
Exposed Pit and Plant Areas:			
Existing Stage	246,600	m^2	MWA Digitised
Silt Content (s):	5	%	
Days of rainfall > 0.25mm (p):	126	days	Coombabah Water Treatment Plant 1998 - 2017
Percentage wind speed > 5.4m/s (f):	4.11	%	From CALMET
Mean wind speed m/s (U):	3.11	m/s	From 6am to 6pm (Affects stockpile area)
Material moisture content (M):	0.7	%	(mean from Table 13.2.4-1)

Attachment A9 - Haulage trucks modelled at 102.4 in 'Noise and Dust' assessment. But, 171 in 'Traffic Impact' assessment

ATTACHMENT 6 *Particulate Emission Estimation Calculations*

ACCESS ROADS - For Product Trucks

Number of Product Trucks (one-way)			
Average Trips Per Day	102.4	trips/day	MWA Calc
Average Trips Per Hour	9.3127	trips/hour	MWA Calc
Average Trips Per Hour - QA Check	9.3127	trips/hour	MWA Calc
Peak Trips Per Hour	13.6	trips/hour	MWA Calc

Traffic Impact Assessment by Rytenskild - Version 1.pdf 13 / 47

4.0 DEVELOPMENT TRAFFIC ESTIMATES

Nucrush has provided heavy vehicle traffic generation data for the period between 1 June 2017 and 30 April 2018 (11 months). This data provided as Appendix C indicates the following heavy vehicle composition :

- Heavy rigid - 45%
- Semi trailer - 15%
- Truck and dog trailer - 40%

The average heavy vehicle generation was 141 loaded vehicles per day (281 days per year), which equates to an average annual daily traffic generation of 109 loaded vehicles, for a ten hour day.

The total amount of material hauled from the site during the 11 month period was approximately 755,000 tonnes, which equates to approximately 825,000 tonnes for a year. Therefore, the heavy vehicle trip generation for the proposed upper extraction rate of one million tonnes per annum would be 171 loaded trucks per day, as follows :

141 loaded trucks x (1,000,000 / 825,000) = **171 loaded trucks per day**

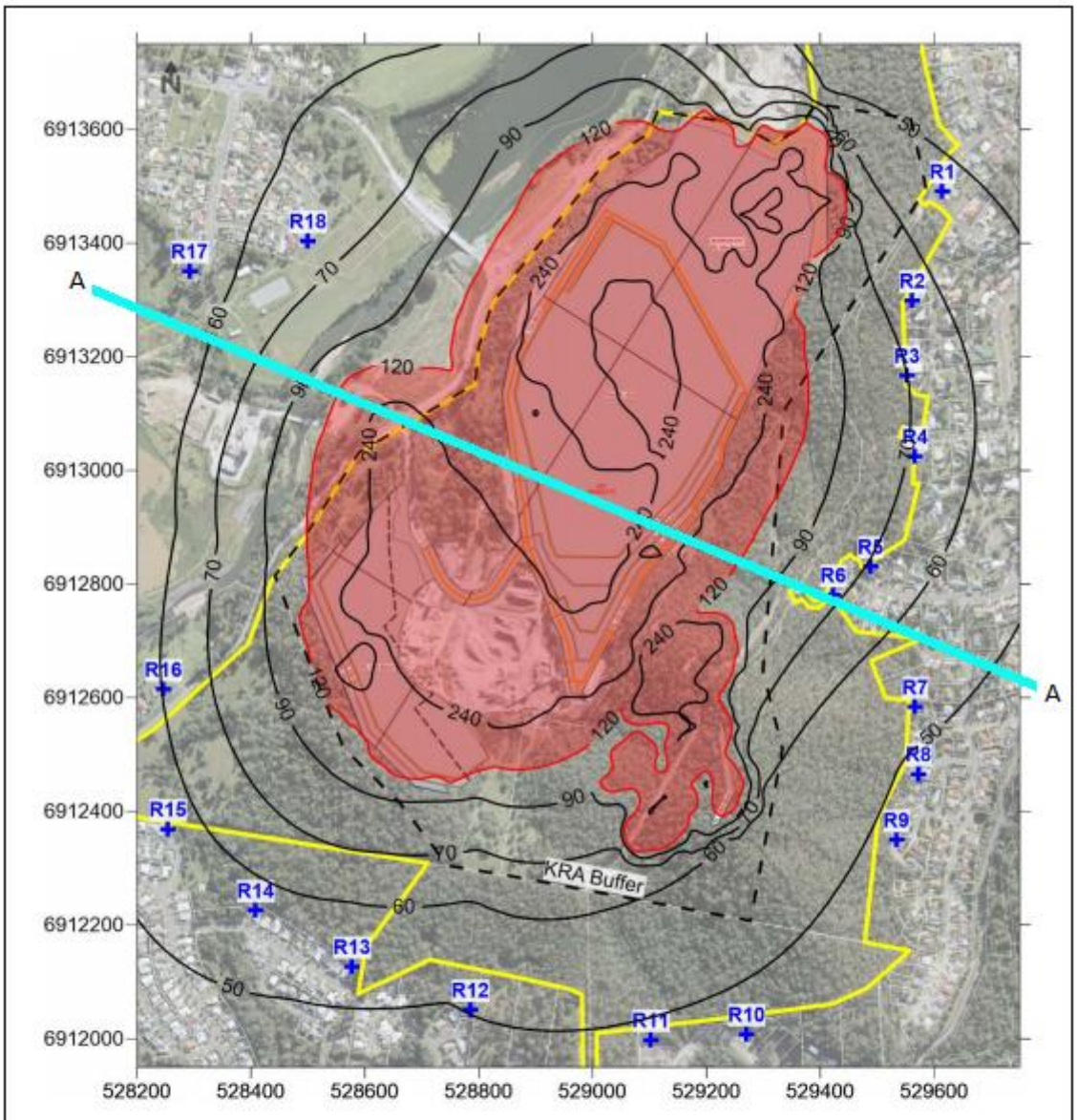
(342 trucks in total (loaded and unloaded)

Attachment A10 - Dust Assessment has ignored Blasting effects

(picture is Nucrush blast in November 2019 looking North to South)

Attachment B1 - Figures A7.5 Stage 1 (First 20 years) Dust Deposition

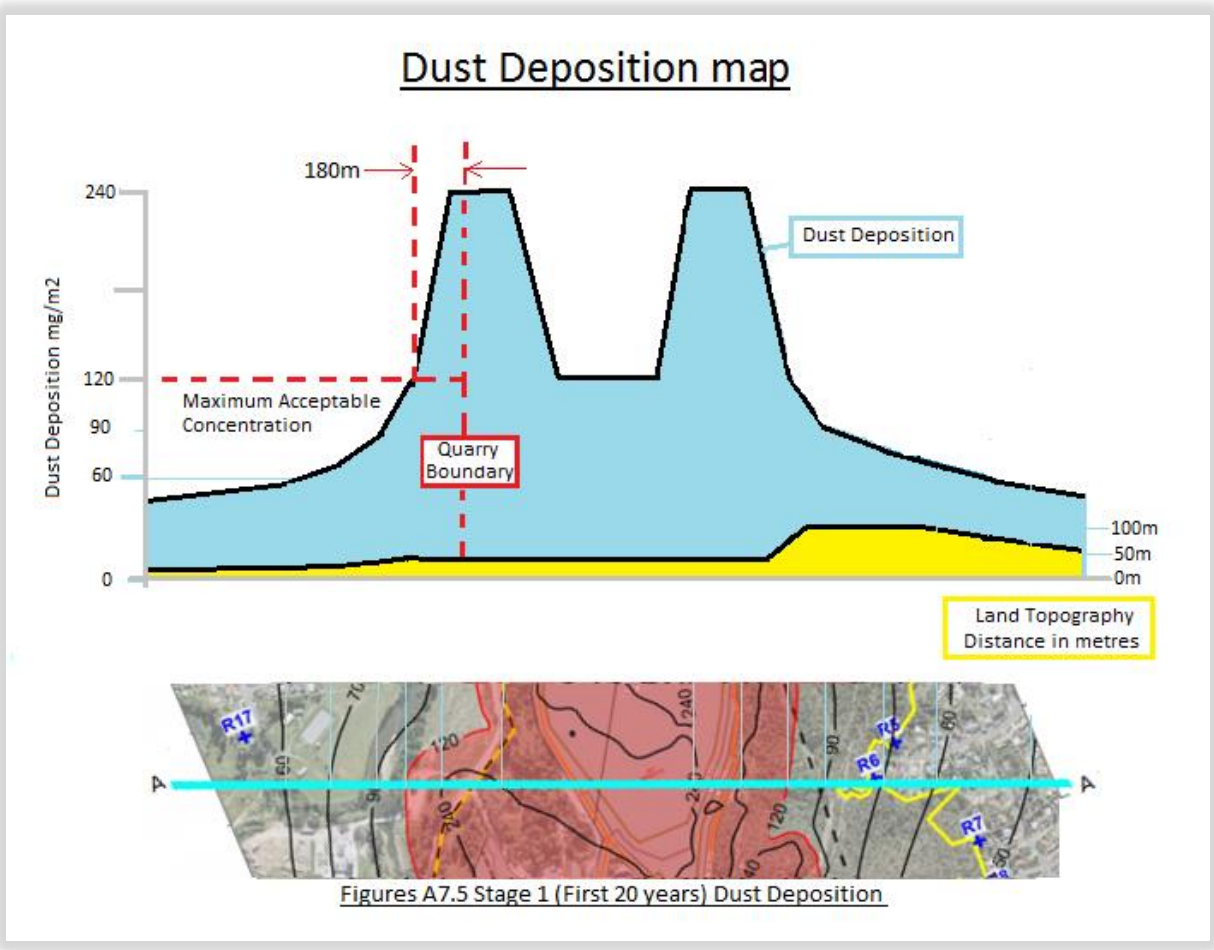
Taken from 'Noise and Dust Assessment, Fig A7.5'. With added notes and cross-section identification 'A-A'.



Stage 1 Operations (Northern Haul Route) plus Ambient Maximum Monthly Dust Deposition Rates

Figure A7.5	Pollutant	Averaging Period	Background Deposition Rate	Common ERA Guideline	Date
mwa ENVIRONMENTAL	Dust Deposition	Maximum Monthly Average	40 mg/m²/day	120 mg/m²/day	2019-01-22

Attachment B2 - Dust Deposition cross-section with topographical overlay also



Figures A7.5 Stage 1 (First 20 years) Dust Deposition

Attachment B3 - Development Application 100 year plus plan

The extraction will be staged over the life of the quarry operation, which is likely to continue for approximately 100 years. The staging sequence for pit development and, hence, subsequent rehabilitation, will be dependent on resource demand and cannot be forecast accurately for the life of the quarry. Estimated (subject to change) stage timing for the development of the pit is as follows:

- Stage 1 - Year 0 to 19
- Stage 2 - Year 19 to 25.
- Stage 3 - Year 25 to 30.
- Stage 4 - Year 30 to 34.
- Stage 5 - Year 34 to 37.
- Stage 6 - Year 37 to 40.
- Stage 7 - Year 40 to 96.
- Stage 8 - Year 96 to 100+.
- Stage 9 - Year 100+.
- Stage 10 – Rehabilitated.

Attachment B4 - Wind effect on dust particles

mfe.govt.nz/sites/default/files/media/Air/good-practice-guide-dust-2016.pdf

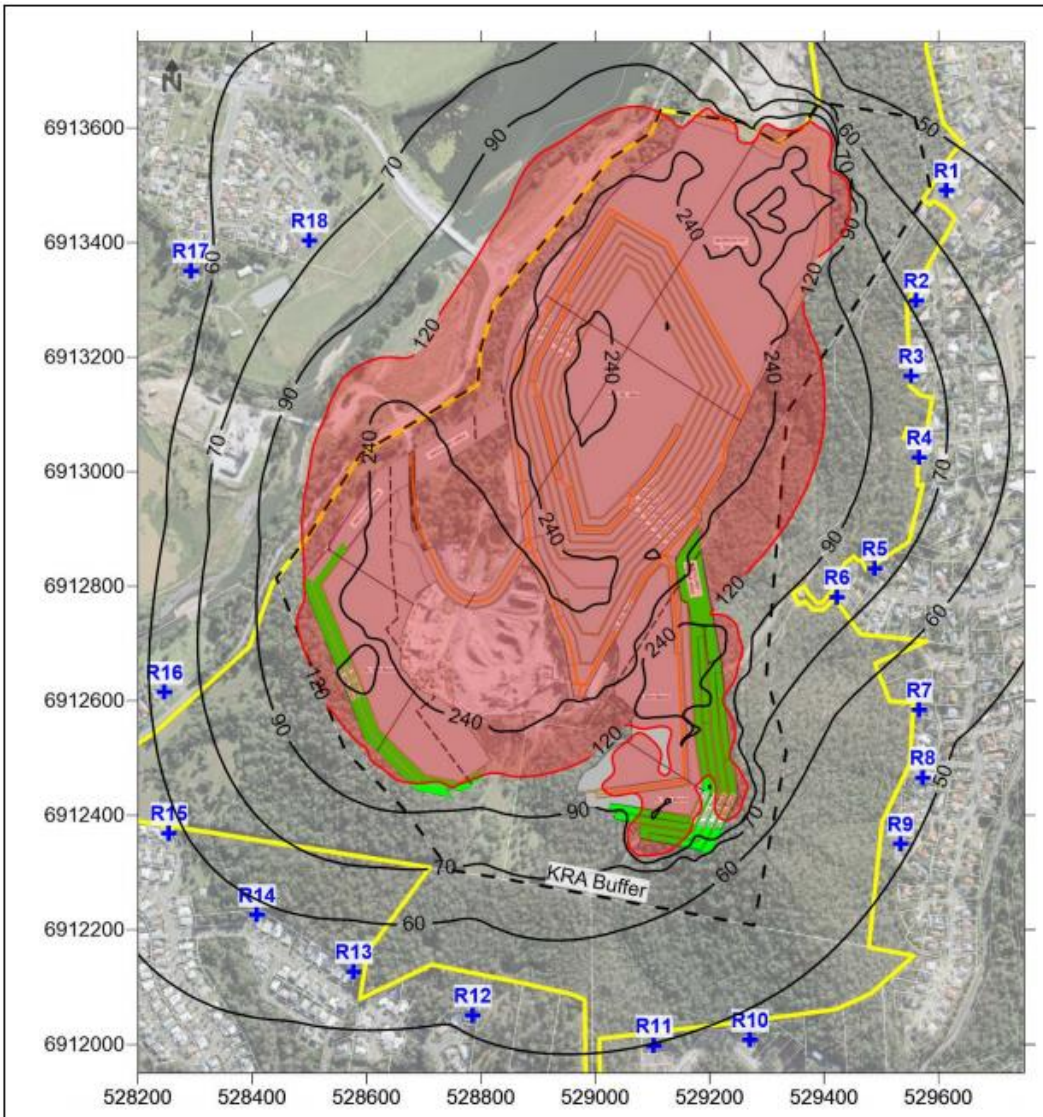
(Source: World Health Organisation, 2006)

When dust particles are released into the air they tend to fall back to ground at a rate proportional to their size. This is called the settling velocity. For a particle 10 micrometres in diameter, the settling velocity is about 0.5 cm/sec, while for a particle 100 micrometres in diameter it is about 45 cm/sec in still air. In a 10-knot wind (5 m/sec), the 100-micrometre particles would only be blown about 10 metres away from the source while the 10-micrometre particles have the potential to travel about a kilometre. Fine particles can therefore be widely dispersed, while the larger particles simply settle out in the immediate vicinity of the source (under calm conditions).

It is the larger dust particles that are generally responsible for nuisance effects. This is because they are more visible to the naked eye, and therefore more obvious as deposits on clean surfaces. Smaller particles ($PM_{2.5}$ and PM_{10}) are known to cause adverse health effects.

This guide is primarily concerned with assessing and managing the nuisance effects of the larger size fraction of dust due its impact on visuals and amenity values. The primary mechanism to address the smaller dust size, PM_{10}, is the resource management instrument, the NESAQ. It is the responsibility of regional councils to comply with, implement and enforce these regulations.

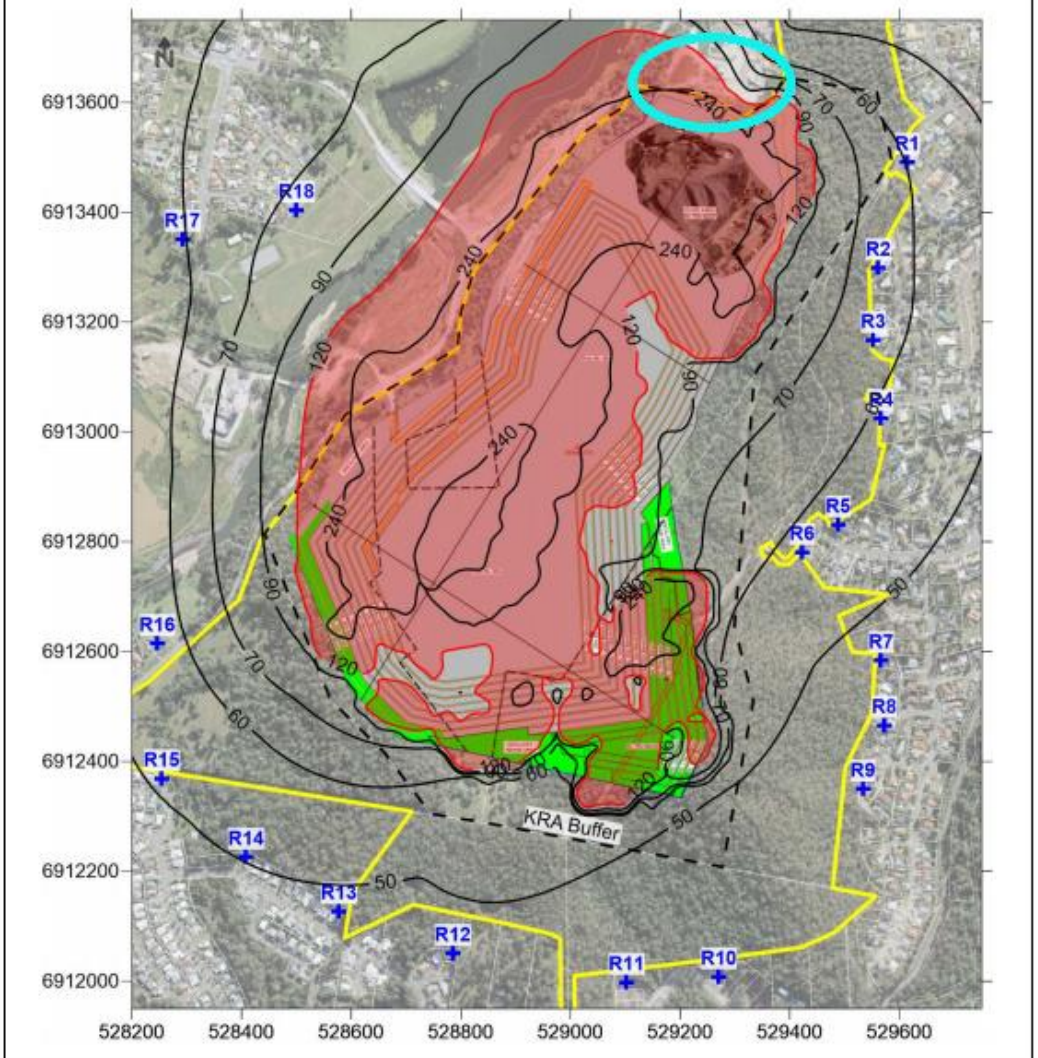
Attachment B5 - Figures A10.5 Stage 5 (years 34-37) Dust Deposition



Stage 5 Operations (Northern Haul Route) plus Ambient
Maximum Monthly Dust Deposition Rates

Figure A10.5	Pollutant	Averaging Period	Background Deposition Rate	Common ERA Guideline	Date
mwa ENVIRONMENTAL	Dust Deposition	Maximum Monthly Average	40 mg/m²/day	120 mg/m²/day	2019-01-22

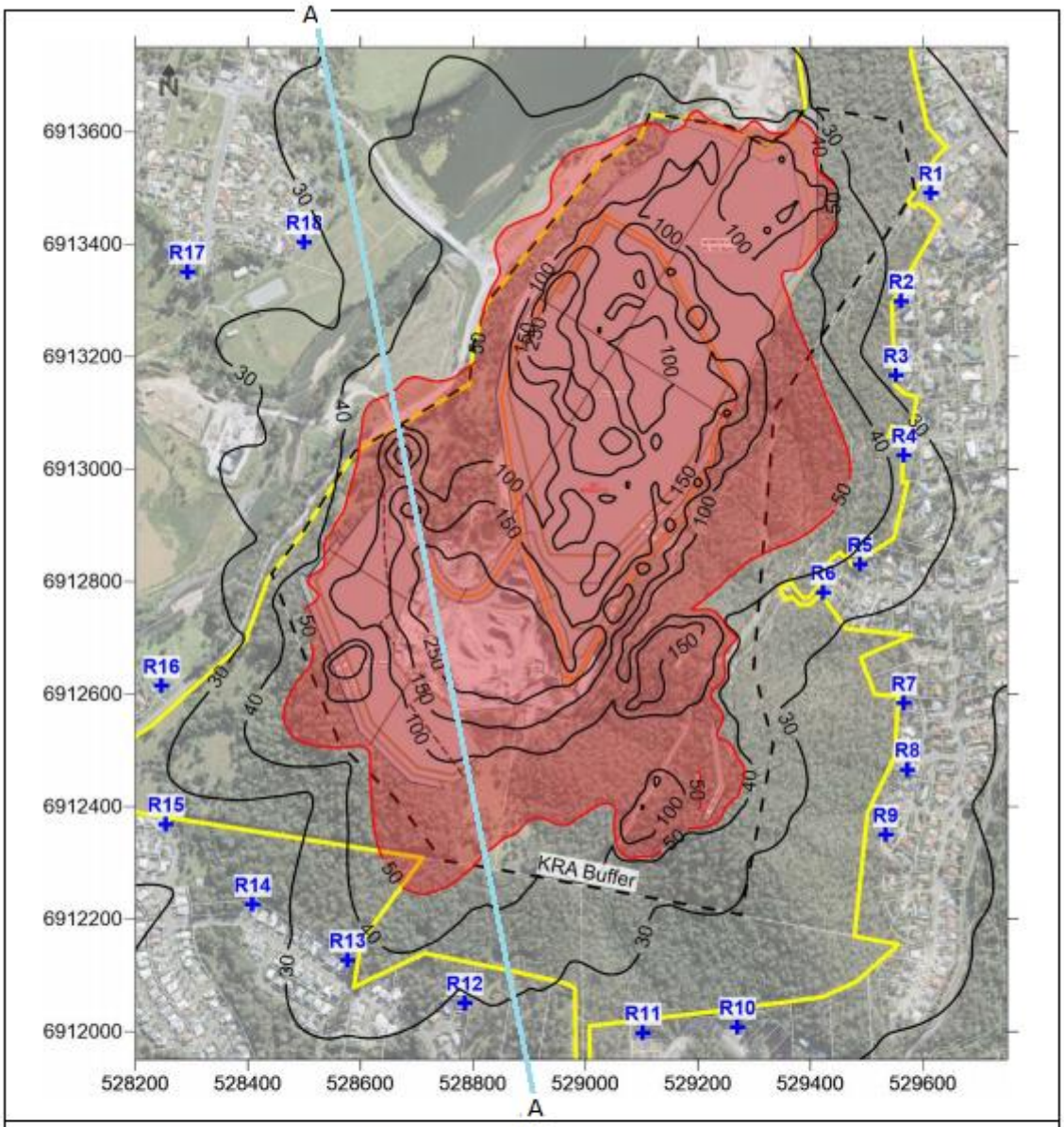
Attachment B6 - Figures A10.5 Stage 5 (years 40-96) Dust Deposition



Stage 7 Operations plus Ambient
Maximum Monthly Dust Deposition Rates

Figure A12.5	Pollutant	Averaging Period	Background Deposition Rate	Common ERA Guideline	Date
mwa	Dust Deposition	Maximum Monthly Average	40 mg/m^2/day	120 mg/m^2/day	2019-01-22

Attachment C1 - Predicted PM10 24 hour annual average for Stage 1 (Years 0 to 19)

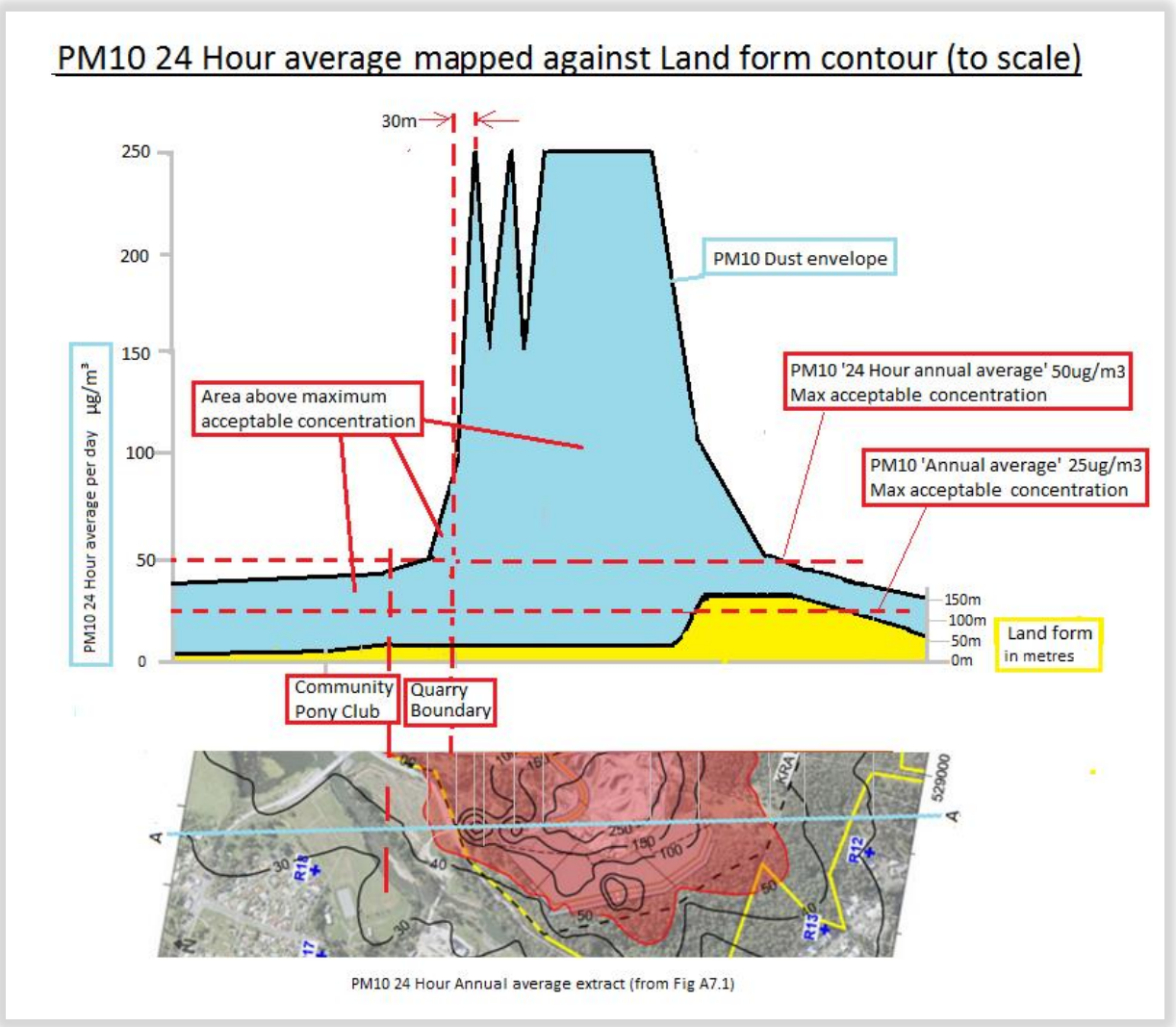


Stage 1 Operations (Northern Haul Route) plus Ambient
Predicted Maximum PM_{10} 24-hour average concentrations

Figure A7.1	Pollutant	Averaging Period	Ambient Concentration	EPP Objective	Date
mwa ENVIRONMENTAL	PM_{10}	Maximum 24-hour average	14.6 µg/m³	50 µg/m³	2019-01-22

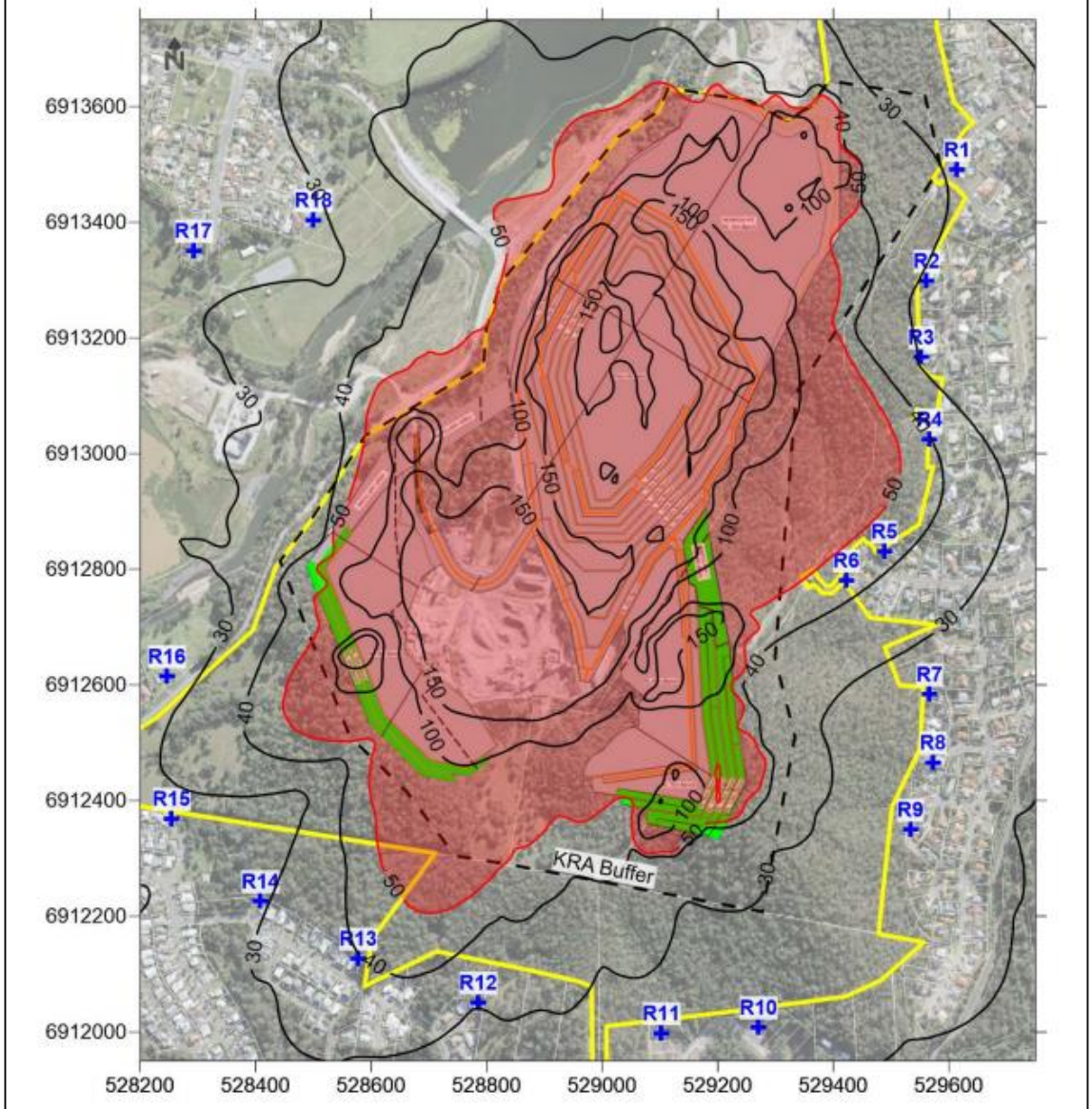
Attachment C2 - PM10 24 hour average cross-section with topographical overlay underneath

Taken from Fig A7.1 (Attachment C1 at cross-section 'A-A')



PM10 24 Hour Annual average extract (from Fig A7.1)

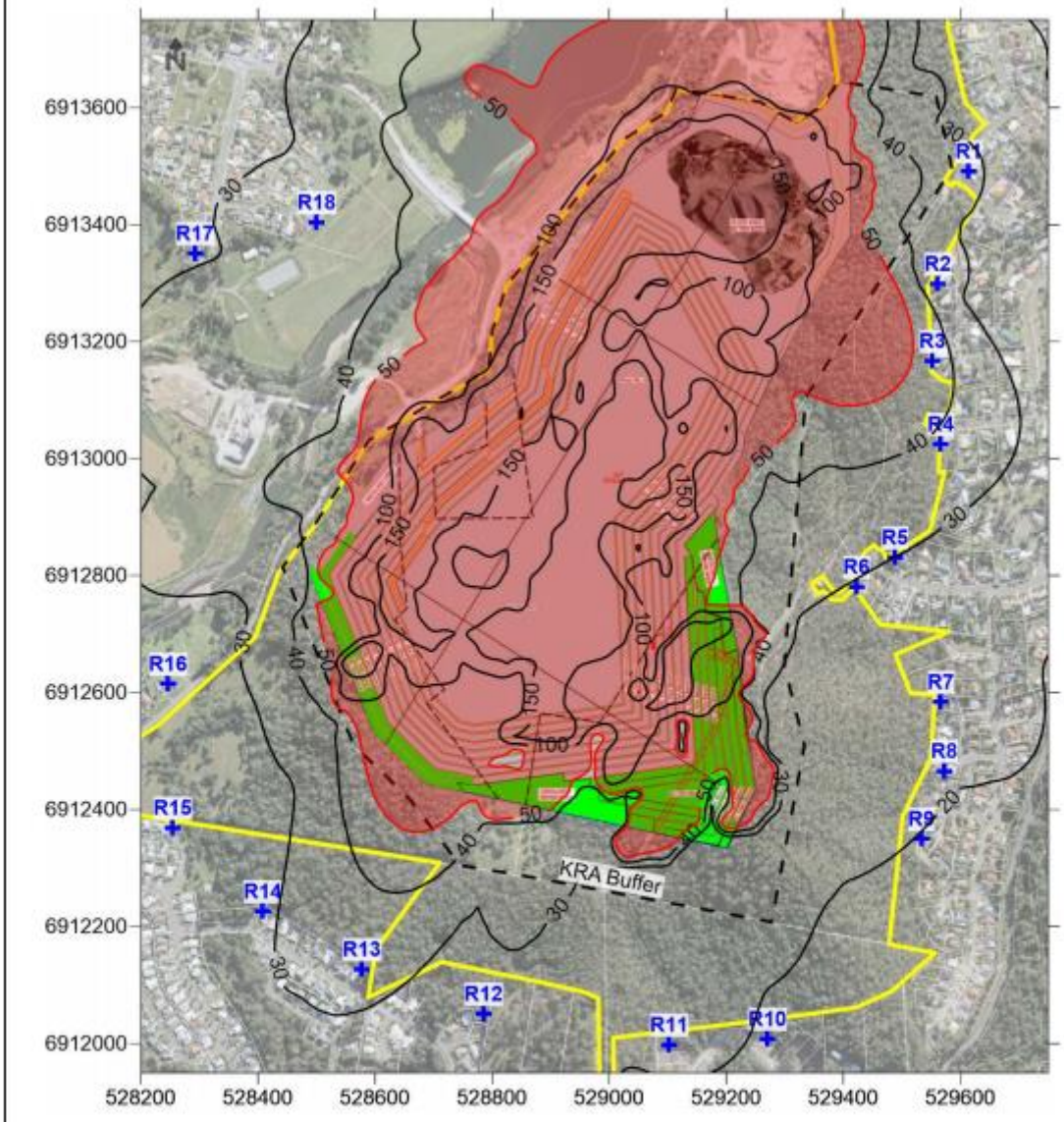
Attachment C3 - Predicted PM10 24 hour annual average for Stage 5 (Years 34 to 3)



Stage 5 Operations (Northern Haul Route) plus Ambient
Predicted Maximum PM_{10} 24-hour average concentrations

Figure A10.1	Pollutant	Averaging Period	Ambient Concentration	EPP Objective	Date
mwa ENVIRONMENTAL	PM_{10}	Maximum 24-hour average	14.6 µg/m³	50 µg/m³	2019-01-22

Attachment C4 - Predicted PM10 24 hour annual average for Stage 7 (Years 40 to 96)



Stage 7 Operations plus Ambient
Predicted Maximum PM_{10} 24-hour average concentrations

Figure A12.1	Pollutant	Averaging Period	Ambient Concentration	EPP Objective	Date
mwa ENVIRONMENTAL	PM_{10}	Maximum 24-hour average	14.6 µg/m³	50 µg/m³	2019-01-22