Riverlee Corporation

Planning panel C395 (COGG) for quarry dust emissions

Quarry Dust Assessment

November 2019

04 November 2019

Derek Humphries
C/O Asset 1
Riverlee Corporation
Unit 11, 41 Sabre Drive
PORT MELBOURNE Victoria 3207

Our ref: 12519735-95292
Your ref:

Dear Derek

Planning panel C395 (COGG) for quarry dust emissions
Expert Witness Statement

Please find attached two documents to be used as my evidence in the City of Greater Geelong (COGG) Planning Panel amendment C395:

1. Statement for Expert Witness
2. GHD report adopted as majority portion of statement.

I have made all the enquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Sincerely
GHD

Barry Cook
Principal Meteorologist
+61 3 8687 8649

Attachment 1

1 Name and Address

Mr Barry Cook

c/- GHD 180 Lonsdale St Melbourne

2 Qualifications and Experience

B.Sc. (Hons), University of Melbourne 1983

Member and Certified Air Quality Professional (CAQP) with Clean Air Society of Australia and New Zealand

A CV is attached as Appendix A.

Summary of Professional Experience:

- 2007 – current Technical Director Air Quality and Meteorology Assessments, GHD
- 2004 – 2007 Principal Meteorologist, Synergetics Environmental Engineering
- 1996 – 2004 Air Quality Control Meteorologist, Mount Isa Mines, Queensland
- 1987 – 1996 VPS Meteorologist, Environment Protection Authority
- 1985 – 1987 Network Meteorologist, Radio Station 3MP
- 1983 – 1985 Technical Assistant, Glaciology Section, University of Melbourne

3 Areas of Expertise

I am a Technical Director within the Air, Noise and Meteorological Assessments team in GHD's Melbourne office. I have combined consulting, regulatory and industry experience with meteorology, weather forecasting and air quality modelling/monitoring systems and assessments. My previous positions include as a meteorologist at environmental consulting firms, EPA Victoria and Mount Isa Mines (now a part of Xstrata plc) and my current position with GHD have provided me with over 35 years of experience of applied meteorology specialising in air quality meteorology. I have experience in both VCAT and Planning Panels for concrete batching plants as well as other separation distance determinations.

4 Expertise to Prepare Report

I have been a meteorologist practicing in applied meteorology and forecasting, including assessing the air quality impacts of projects, since my graduation from the Meteorology Department at the University of Melbourne in 1983. While in the Victorian Public Service at the Environment Protection Authority I was involved in the formulation of the AQ 2/86 documentation relating to the *Recommended Buffer Distances* for Industrial Residual Air Emissions (EPA Victoria, 1990). This document was the forerunner to the

current guidelines *Recommended separation distances for industrial residual air emissions* (EPA Victoria Publication 1518, March 2013). I have applied these guidelines for numerous projects including for quarries, mines, industrial facilities and concrete batching plants.

5 Facts, matters and Assumptions Relied Upon

- Review of plans, reports and submissions
- Amendment C395 - Settlement Strategy and Northern & Western Geelong Growth Areas: https://www.geelongaustralia.com.au/amendments/default.aspx
- My experience relevant to meteorology, air quality assessments and dust emission from a concrete batching plant
- My experience relevant to recommended separation distances for industrial residual air emissions

6 Documents to be taken into account

- State environment protection policy (Air Quality Management)
- Protocol for Environmental Management: Mining and extractive industries (EPA Victoria Publication 1191)
- Recommended separation distances for industrial residual air emissions (EPA Victoria Publication 1518, March 2013)
- EPA Publication 788.3 Siting, design, operation and rehabilitation of landfills (2015)

7 Identity of Persons Undertaking Work

Barry Cook (self), Diane Kovacs (GHD Project Director and reviewer), Sophie Materia (GHD Graduate scientist) and Meg Turner (GHD Graduate scientist).

8 Summary of Opinions

The substantive portion of my statement is given in the GHD report as Attachment 2.

9 Opinion

My opinions are not provisional except where specifically qualified.

Attachment 2

Riverlee Corporation

Planning Panel C395 (COGG) for quarry emissions

Quarry Dust Assessment

November 2019

Table of contents

Table index

Figure index

1. Introduction

1.1 Project appreciation

GHD have prepared this report for Riverlee Corporation outlining the dust amenity assessment (buffer assessment) for the proposed development at 355 Church St, Fyansford (the site). The proposed development is for residential purposes and therefore requires a change to the land zoning. In line with the proposal for this assessment, industries within a three kilometre radius of the site have been assessed, however the major focus of the assessment remains the Batesford Quarry (where the Geelong Lime Works is located). It is noted that the other (hard-rock) quarry immediately west of the Moorabool River at the site is closed and subject to rehabilitation.

The Batesford Quarry business website suggests a 20-30 year quarry life remains, with the Framework Plan suggesting a 'long-term' (over fifteen years) timeline. The Framework Plan and the amendment recognise the ongoing extractive operations of Batesford Quarry, maintaining the quarry within a Special Use Zone for the immediate future.

1.2 Purpose of this report

David King of Kings Lawyers has provided a letter of instructions for preparing an expert witness statement for the C395 Planning Panel hearing. Expert witness statement declarations are made in a covering letter. The following sections (2, 3 and 4) set out my opinion on the issues raised in the letter of instructions.

The purpose of the buffer assessment is to consider the impact from the quarry and other nearby industries on the proposed development, with consideration of the Planning Scheme Clause 14.03-1S 'Resource exploration and extraction', with the relevant strategy being "Develop and maintain buffers around mining and quarrying activities". A claim made by COGG is that "this has been taken into account in relation to the Batesford Quarry, which has a 500 m buffer under EPA guidelines" (COGG, p 5) . The EPA guidelines referred to is EPA Victoria Publication 1518: Recommended separation distances for industrial residual air emissions (EPA Victoria, 2013). The guideline has a preference for using "the term 'separation distance' to mean the space between industrial land uses and sensitive land uses" (EPA Victoria, 2013, p.2). Separation distances can be interchangeably called, as in the past, buffer zones. Consistent with EPA Victoria (2013), the separation distance is measured from the 'activity boundary' within the industrial site to the residential (sensitive landuse) boundary – assuming the 'urban' method is used (EPA Victoria, 2013, p.12).

1.3 Scope and limitations

This report has been prepared by GHD for Riverlee Corporation Pty Ltd and may only be used and relied on by Riverlee Corporation Pty Ltd for the purpose agreed between GHD and Riverlee Corporation Pty Ltd. This includes as a witness statement to be filed at the Panel hearing for COGG Amendment C395. GHD otherwise disclaims responsibility to any person other than Riverlee Corporation Pty Ltd arising in connection with this Report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in the Report and are subject to the scope limitations set out in the Report.

The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no

responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect

GHD has prepared this Report on the basis of information provided by Riverlee Corporation Pty Ltd, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the Report which were caused by errors or omissions in that information.

1.4 Assumptions

The operating Batesford Quarry has a current and valid Work Authority from Earth resources Victoria.

The operating Batesford Quarry has operating hours as per their website: 7:00 am to 4:30 pm weekdays only.

2. Default buffers

Four industrial sites were identified in a desktop assessment focusing on a three kilometre radius from the site. These include the Batesford Quarry, Fyansford Waste Disposal (landfill), Regional Recycle and Perry Recycling/ Perry Demolition. The assignment of default buffers is described for each industry below.

2.1 Batesford Quarry

Two default buffer distances from EPA Victoria (2013) exist for quarry operations (250 and 500 m), as listed in Table 2-1 below. While it is likely that only the 250 m buffer distance applies to this site, both buffer distances have been applied to the quarry in Figure 2-1. The reasoning for this is COGG coming to that conclusion (see section 1.2), and the opportunity to vary the default buffer due to size or other means. The plotted buffers indicate that even when the more conservative buffer distance is applied, the default buffer does not impact the site. Moreover, the larger conservative buffer extends to the very edge of the Special Use Zone that applies to the Batesford Quarry but the correctly applied buffer (sans blasting and respirable crystalline silica) does not.

Table 2-1 Default buffers for Quarrying, crushing, screening, stockpiling and conveying of rock

Operation specifications	Buffer distance (m)
Without blasting	250
With blasting	500
With respirable crystalline silica	500

2.2 Fyansford Waste Disposal (Landfill)

A review of the EPA licence for the landfill indicates that the site is licenced to accept only solid inert waste and prescribed industrial waste[1]. This categorises the landfill as 'Class 2' according to the *EPA Publication 788.3 Siting, design, operation and rehabilitation of landfills* (2015) (EPA Publication 788.3). A Class 2 type landfill incurs a 200 m buffer to buildings and structures in EPA Publication 788.3. The most stringent buffer distance for a landfill site is 500 m, applicable to sites receiving putrescible waste. A highly conservative 500 m buffer has been applied to the landfill in Figure 2-1 to demonstrate that impact is not anticipated from the landfill - even in the unlikely event that the licence were to be amended to accept putrescible waste.

2.3 Regional Recycle

Regional recycle is a resource recovery centre accepting solid waste and debris from construction and demolition industries. The site produces recycled concrete, recycled asphalt, sand and soil among other products[2]. The facility contains a mobile crushing and screening plant and an impactor and conveyor. Materials recovery and recycling facilities are to be assessed on a case-by-case basis according to EPA Publication 1518. Given the site has crushing capabilities, the buffer distance for "Crushing, screening, stockpiling and conveying of other minerals" (other than coal) (250 m) may be appropriate for the site. To be particularly

[1] EPA licence 11848. Retrieved from https://portal.epa.vic.gov.au/irj/portal/anonymous?NavigationTarget=ROLES://portal_content/epa_content/epa_roles/epa.vic.gov.au.anonrole/epa.vic.gov.au.searchanon&trans_type=Z001. Viewed 01/11/2019.

[2] Regional Recycle. Retrieved from http://www.regionalrecycle.com.au/. Viewed 01/11/2019.

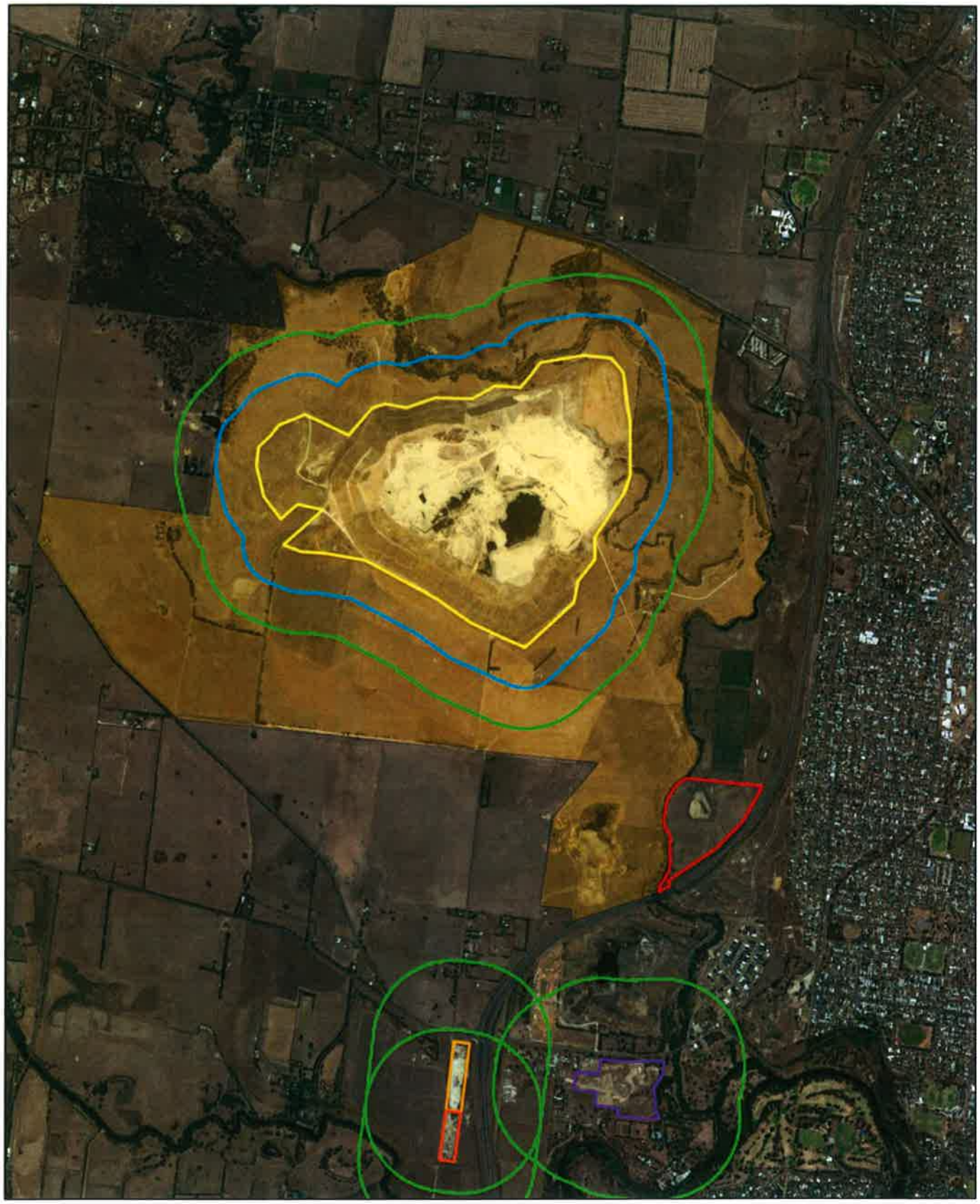
conservative, the buffer for rock containing crystalline silica (500 m) has been applied in Figure 2-1. This gives the most conservative analysis for the sites that involve the crushing (recycling) of concrete.

2.4 Perry Recycling/ Perry Demolition

An online review revealed little information on the site south of the Regional Recycle facility. It is likely that this is a small-scale concrete batching plant which would incur a buffer of up to 100 m. To be conservative, given the limited information available, GHD has applied the buffer for cement manufacturing between 5,000 to 150,000 tonnes per annum, of 500 m. Perry Recycling is displayed in Figure 2-1.

2.5 Default buffer result

Figure 2-1 shows that when applying conservative interpretations of default buffer distances, the site is not impacted by the surrounding industries.



LEGEND

- Site boundary
- Landfill boundary
- Resource recovery boundary
- SUZ7
- Quarry boundary
- Concrete batching boundary
- 500 m buffer
- 250 m buffer

Paper Size A4

0 500 1000 m

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid Of Australia, Zone 55

N

GHD

Riverlee Corporation Pty Ltd

Planning panel C389 (COGG) for quarry dust emissions

Default Buffers

Project No. 12519735
Revision No. -
Date. 30/10/2019

FIGURE 2-1

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3. Site-specific variation

The separation distance guidelines (EPA Victoria, 2013)[3] allow for site-specific variation. Examples, that apply to this assessment, include (ibid. p.14):

- "Transitioning of the industry - Existing industry has formally indicated that it will transition out of an area and over a specified timeframe."
- "Size of the plant - The plant is significantly smaller or larger than comparable industries."
- "Topography or meteorology- There are exceptional topographic or meteorological characteristics which will affect dispersion of IRAEs."

3.1 Batesford Quarry

Unconfirmed, anecdotal evidence[4] is that the quarry is to be filled with water over the coming years:

- "Pumps are currently being used to keep the site dry for works but they will soon stop, allowing the quarry to fill with lime-filtered groundwater."
- "It's estimated that it will take several years for the quarry to reach its final depth."

The eventual closure and rehabilitation of a site due to the resource expiring is a clear rationale to argue that the industry is transitioning out of the area. However, this is likely over the longer-term rather than the immediate/short-term argument being used for the site to proceed earlier.

EPA Victoria (2013) allows for the adjustment of the default buffer to reflect the scale and throughput of an individual facility. This can result in a reduced buffer where it can be proven that a facility has operational measures, equipment or throughput scales which would reduce off-site impact compared with typical industry examples. Conversely, a default buffer may be extended where the scale of a facility is larger than is typical within an industry.

GHD has made a conservative assessment of the physical footprint of the site (pit diameter of approximately one kilometer) and have deemed the site to be large compared with other industry examples (hard rock quarries and extractive industries - other than coal). Therefore, GHD adopts applying the 500 m buffer distance to the site as shown in Figure 2-1. This is a conservative assumption as blasting and respirable crystalline silica are not involved for the extracted material types.

Site-specific variation on the basis of topographical or meteorological features will affect dispersion of industrial residual air emissions. In the directions of poor dispersion, the buffer is extended and in the directions of good dispersion the buffer is retracted. The effect is to produce the same degree of protection from exposure to impact as the default buffer but shaped by the local meteorology to represent a more realistic site specific buffer in the event of a process upset. The Batesford Quarry is not only in a sheltered valley location but it also has its own substantial pit.

GHD have made a qualitative assessment of the quarry using aerial and terrain imagery. The following sources of dust emissions are expected to be present at the site:

- Material transfer and handling during operating (daylight) hours
- Stockpiles as stationary sources, present all hours.

[3] The separation guidelines apply to Industrial Residual Air Emissions (IRAE).

[4] Site to Be Transformed into a Freshwater Lake, Quarry Magazine, Posted April 29, 2019, https://www.quarrymagazine.com/Article/9073/Site-to-be-transformed-into-a-freshwater-lake

Due to the sheltered nature of the operations in a pit in a valley, the quarry stockpiles and majority of handling and transport activity will be contained within a pit. The interaction of meteorology and topography to produce exceptional characteristics of affected dust (or odour) dispersion manifests as either night-time cold air drainage flows or wind funnelling due to canyon like effects (most often daytime as stable conditions are excluded). Neither of these apply in this situation. The limestone extracted at the site is a bright white colour, which contrasts clearly against the surrounding landscape. Aerial imagery suggests that there is directional dispersion toward the east of the site within the confines of the extraction pit, however there is no indication that lime dust is being dispersed outside of the pit and certainly not to the extremes of the Special Use Zone. Therefore a directional modification to the default buffer is considered unnecessary at this buffer when determining impacts on the proposed site.

3.2 Other industries

The other industries are elevated relative to the riverbank location of the site. Night-time stable flow is an unlikely consideration as the only dust source possible at night is wind erosion from the small-scale material stockpiles involved. Therefore stable drainage flows will not cause dust to lift-off from the industrial sites.

GHD does not have sufficient detail on the size of operations at the landfill and resource recovery sites to recommend a de-rated buffer. Aerial imagery of the sites suggests that these facilities are relatively small, therefore it is not anticipated that a larger buffer would apply to either the landfill or resource recovery facility. Default buffers can also continue to be applied on the assumption that the industries will not be transitioning from the area.

4. Summary

While both the Batesford Quarry and the site are both within the same proposed Precinct Structure Plan (PSP), quarry dust emissions are not a consideration to exclude the site from having its zoning changed to residential (sensitive land use within the definitions of the separation distance guidelines from EPA Victoria). It has been demonstrated that the site lies beyond a conservative buffer zone that could be applied to the Batesford Quarry using assumptions from the guidance material that errs on the side of the largest buffers possible. Further, an unlikely extension to the Work Authority boundary would need to be in the order of over 500 m toward the southeast before an inflated buffer would reach the east side of the Moorabool River.

GHD

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12519735-45900/https://projectsportal.ghd.com/sites/pp17_04/planningpanelc389cog/ProjectDocs/12519735-Rev-A_Quarry Dust Assessmnet.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Rev A	M. Turner B. Cook	A . Sala Tenna				5/11/2019

www.ghd.com

Curriculum Vitae

Barry Cook

Principal Meteorologist

Qualified. Bachelor of Science with Honours (Meteorology, Physics) – University of Melbourne, 1983

Connected. Member, Clean Air Society of Australia and New Zealand. Certified Air Quality Professional of CASANZ.

Relevance to project. Barry is a Principal Professional of the Air and Noise Assessment team in GHD's Melbourne office. He has combined consulting, regulatory and industry experience with air quality modelling systems and assessments. His previous positions as an air quality meteorologist at environmental consulting firms, EPA Victoria and Mount Isa Mines and now with GHD, have provided him with over 35 years of experience.

Air Quality Assessment
Nolans Rare Earth Mine (2011-15) | Northern Territory, Australia
Arafura Resources proposed a rare earth mine, processing plant and rail loadout operation south of Alice Springs, NT. Ambient dust monitoring was conducted and used in an EIS.

Air Quality Assessment
Alumina Refinery (2012-14) | United Arab Emirates
A confidential client required an EIS for a smelter and refinery expansion. Cumulative plant emissions were to be considered as well as dust modelling for a bauxite residue storage area in a desert environment.

Air Quality Assessment
Mount Todd Gold Mine (2011-13) | Northern Territory, Australia
Vista Gold proposed to recommence gold mining at Mount Todd near Pine Creek, NT. An EIS was required which included assessment of air quality with consideration of dust impacts and a gas-fired power station.

Air Quality Assessment
Carmichael Coal Mine (2012-14) | Queensland, Australia
Adani required an EIS for a greenfields development in the Galilee Basin of inland Queensland. Multiple open-curt pits and underground-to-surface operations were assessed. Rail (to the coast) and power station options were also considered as part of the EIS.

Air Quality Assessment
Alumina Refinery (2012-14) | UAE
Air Quality modelling to include in comprehensive EIS for Alumina refinery at existing port site and inland disposal of bauxite residue.

Coal to Urea - Airshed impact study (2009) WA, Australia – Tall stack emissions into air shed at Collie with coal-fired power station sources requiring meteorological and TAPM modelling.

Air Quality Assessment
Teresa Coal Mine (2012-13) | Queensland, Australia
EIS & Haul Road options for an underground coal mine proposed by Linc Energy in the Bowen Basin of Queensland.

Air Quality Assessment
Aurukun Bauxite Mine & Port (2008-09) | Queensland, Australia
EIS for overburden stripping and truck hauling involving extensive shallow open pit operations south of Weipa, Qld.

Air Quality Assessment
Hard Rock Quarries (2008-10) | Victoria, Australia
Air Quality Assessment of expanding operations as original resources depleting, planning approvals in northern Victoria and South Gippsland.

Curriculum Vitae

Air Quality Assessment
Didipio Gold Mine (2011-12)
| Philippines
Review and update environmental impact studies for expanding mine operation adjacent to local community.

Air Quality Assessment
Coal Mine - Westport (2011-12)
| New Zealand
Review environmental impact studies and design dust monitoring for coal load out on west coast of South Island, NZ.

Air Quality Assessment
Coal to Urea (2009)
| Western Australia, Australia
Value adding of converting coal resource into fertiliser product nearby Collie in WA. An already 'crowded airshed' that required assessment of cumulative impacts.

Air Quality Assessment
Ash Dump Relocation (2010) | Victoria, Australia
TruEnergy at their Yallourn, Vic operations required a dust assessment associated with changing ash dump operations.

Air Quality Assessment and Monitoring
Sugarloaf Pipeline Alliance Project (2007- 08) | Victoria, Australia
Technical Study and Report into dust impacts associated with 83 km pipeline construction including development of an Environmental Management System for dust mitigation and control. Inclusive of forward looking weather conditions to enable weather sensitive operations to proceed with minimal downtime.

Air Quality Assessment and Dust Management Plan
Rosebery Mine (2010-12)
| Tasmania, Australia
MMG required review and updated dust management plans including monitoring of meteorology and dust impacts.

Meteorologist
Environment Protection Authority | Melbourne, Victoria, Australia
Authority Meteorologist and Authorised Officer (1987-1996) - Air pollution forecasting (Melbourne Smog Alert), support for modellers, Latrobe Valley Airshed Study, litigation, review of Environmental Impact Statements, quality assurance of meteorological data, compilation of AUSPLUME meteorological data files, 3D graphics to represent and animate scientific data.

Air Quality Control Meteorologist
Mount Isa Mines | Mount Isa, Queensland, Australia
(1996-2004) – Closed-loop control system to restrict smelter emissions from entering residential areas to the east of the Mount Isa metallurgical plants as required by licence conditions.

Other related areas of interest

- **Air Dispersion Meteorology.** Use of prognostic and diagnostic mathematical models for assessment of air quality impacts.
- **Risk Assessment.** Provide meteorological input for modelling associated with Quantitative Risk Assessments.
- **Weather Outlooks and Nowcasting.** Use of meteorological skills to support mission critical operations such as dust mitigation, tall tower installation and photography.
- **Meteorological Measurements.** Field installation and data retrieval from networks of Automatic Weather Stations, involving standard (climatic) and micrometeorological parameters for use in applied meteorology.
- **Master Planning of Airports.** Meteorological analysis for the best orientation of airport runways – Greenfields or the addition of additional alignment(s).