Appendix 4

Dust Study Reports

BRIEFING NOTE FOR DEPARMENT OF TRANSPORT

Dust in the Environment
Blue Circle Southern Cement Waurn Ponds

Introduction

Department of Transport are considering a proposal to locate rail marshalling yards on the Waurn Ponds quarry site on the northern side of the rail line and immediately adjacent to the cement manufacturing facility.
Concern has been expressed that the proximity of the quarry and cement plant and the potential for dust generation may adversely impact the proposal.
The purpose of this briefing note is to provide guidance as to the local site impacts of dust fallout, based upon the available data.

Discussion

The potential dust fall out impacts upon the proposed marshalling yards could emanate from either the quarry or the cement plant.
The source of dust generation in the quarry is primarily from the movement of vehicles on the quarry haul roads and the type of dust generated is limestone dust.
The source of dust generation in the cement plant can be point source (either continuous or short term excursion) and fugitive emissions. The dust may be of material origin as limestone, clinker or cement. Clinker is an intermediate material manufactured from limestone and is the precursor to cement.
As part of the site Environment Management Plan, Blue Circle has strategies in place to control and reduce these dust emissions and this whole process is regulated by the Victorian Environment Protection Authority.
In relation to the proposed rail marshalling yards it is relevant to distinguish between limestone dust by type and clinker/cement dust by type. Limestone dust could be described as a nuisance dust which is easily removed while clinker/cement dust is aggressive as it will hydrate in the presence of moisture and adhere to surfaces. However, our experience is that the principle type of dust that could impact the proposed footprint of the marshalling yards is limestone dust rather than clinker/cement dust.
Any attempt to quantify the impact of dust fall out on the proposed marshalling yard footprint is filled with uncertainty, but it is possible to draw some conclusions based upon the available ambient monitoring data and point source modelling work that has been previously conducted. A separate discussion of the origin of these conclusions is attached as a technical note.
The technical note concludes that background levels of dust around the Blue Circle site are higher than the dust fallout that can be attributed to the cement manufacturing operations and that the site meets the EPA ground level criteria for fine particle emissions from point sources, in particular:

- The dust fall out from BCSC operations measured at distances of 0.5 to 1.5km from the operation is typically below 40mg/m2/day
- Background dust fallout can be typically 100mg/m2/day
- If the Protocol for Environmental Management Mining and Extractive Industries (PEM) is taken as the guideline, results should not exceed more than 2g/m2/month above background. 40mg/m2/day is the equivalent of 1.2g/m2/month. The site is, therefore, compliant
- Modelling of the fine particle emissions from point sources on the site show that the emissions are less than one half of the EPA ground level design criteria (0.0231mg/m3 versus a limit of 0.08mg/m)

TECHNICAL NOTE

Dust in the Environment
Blue Circle Southern Cement Waurn Ponds

Monitoring of dust fallout directly with dust deposit gauges on a monthly basis and modelling of the stack dust emissions is conducted to provide a picture of the impacts of dust emissions from the manufacturing and quarry operations on the environment. The data available using these techniques is discussed below. No quantitative data is available on the impact of excursions from the main kiln discharge point which may occur up to fifteen times per year and result in limestone dust emissions lasting several minutes.

Monitoring and Modelling Data Discussion

Monitoring of dust fallout is carried out at five locations around the works at a distance of 0.5 to 1.5km from the manufacturing operations. The dust fallout is measured as both total dust fall from all sources and dust fall that could be attributed to the quarrying and manufacturing operations on site. The results are presented below under the heading Ambient Monitoring in the figure, tables and charts.

The data presented for 2007 showed that the fall out from BCSC operations is typically below 40mg/m2/day which equates to 1.2g/m2/month.

If the Protocol for Environmental Management Mining and Extractive Industries (PEM) is taken as the guideline, results should not exceed more than 2g/m2/month above background. Current operations at the site demonstrate compliance with the specified dust deposition limits.

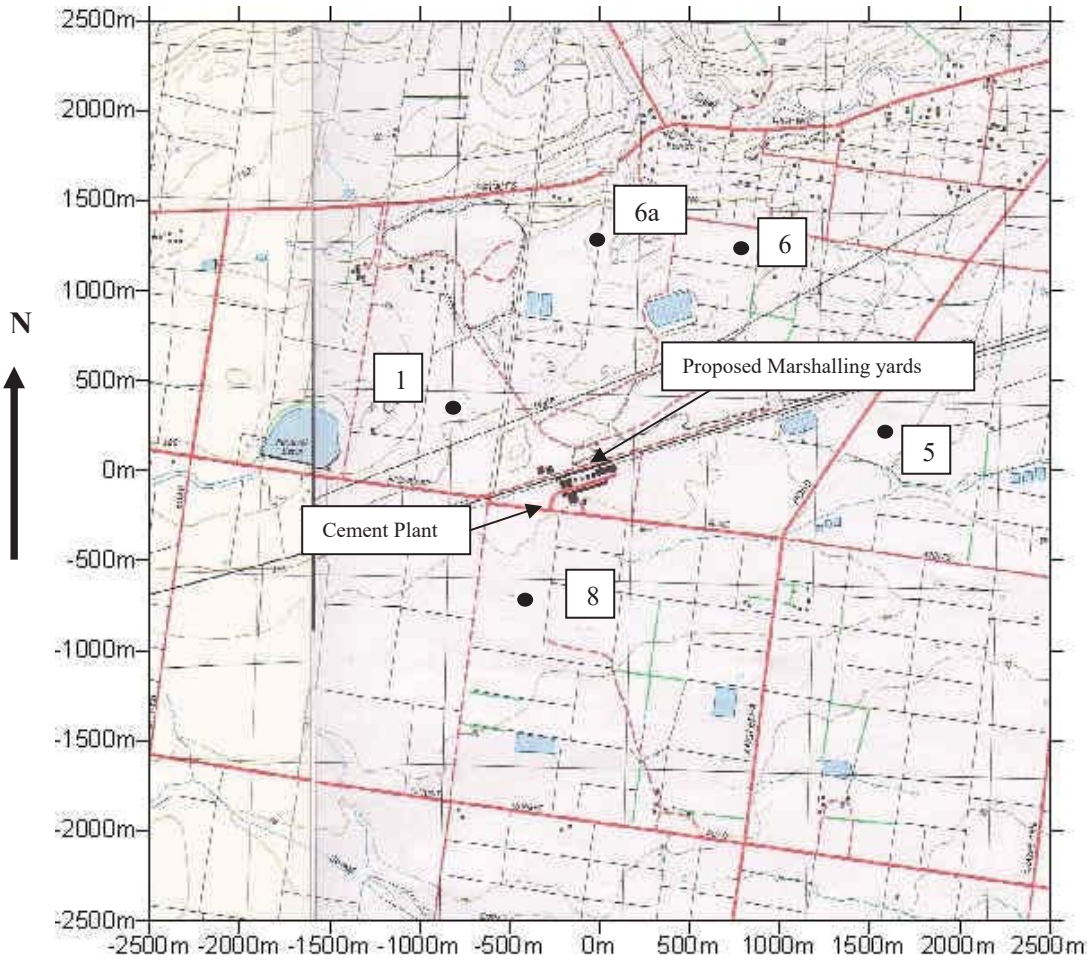
Modelling of stack emissions to determine ground level concentrations of various air quality indicators, including dust, is a standard requirement of EPA. The measure used to determine dust concentration in the ambient air is PM10 (particles smaller than 10 um in size). Modelling work has shown that on a worst case basis the emissions from the main stack at the licence limit run at 39% of the EPA so-called Design Criteria. For dust measured as PM10 the design criteria is 0.08mg/m3 and the worst case ground level concentration is 0.0231mg/m3. The figures presented below under the heading Ambient Modelling illustrate the nature of the dust distribution around the manufacturing operations.

Ambient Monitoring

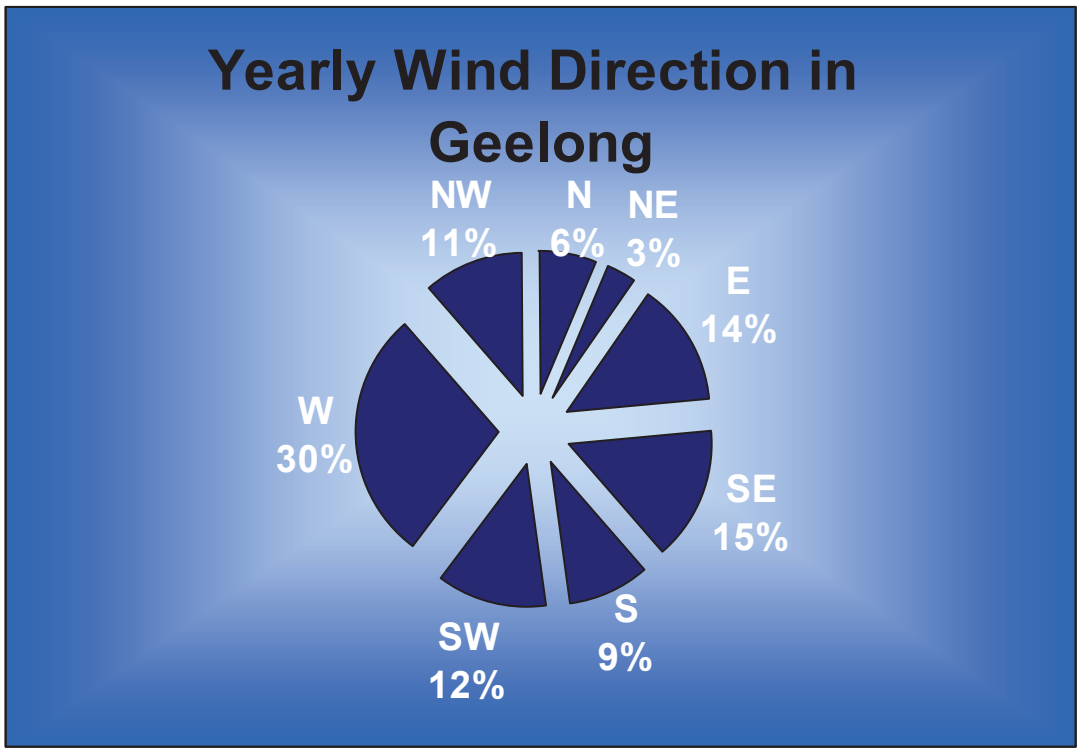
Environmental Testing Dust Fall for 2007

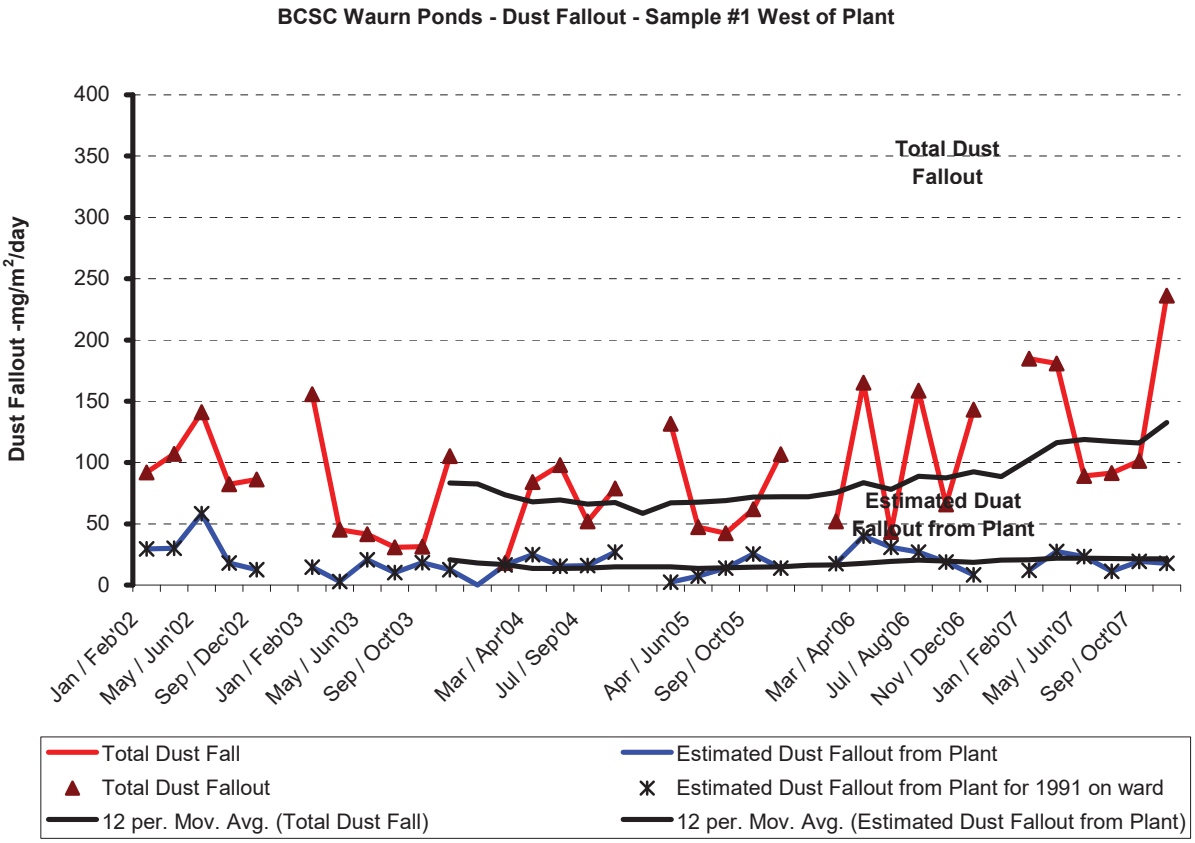
		Period	Jan / Feb'07	Mar / Apr'07	May / Jun'07	Jul / Aug'07	Sep / Oct'07	Nov / Dec'07
		Day's in Period	71	49	64	70	48	58
Total Dust - (mg)	West	1	225.5	152.4	99.5	110.2	83.7	235.6
	East	5	186.6	87.1	118.6	102.5	92.8	1128.4
	North	6A	225.5	138.7	23.9	103.5	73.7	109.4
	NEast	6	223.0	110.8	81.4	115.4	80.9	99.5
	South	8	178.1	113.5	121.8	78.3	106.3	102.4
Dust Fall out mg/m2/day	West	1	184.6	180.8	89.0	91.5	101.4	236.1
	East	5	152.8	103.3	106.1	85.1	112.4	1130.9
	North	6A	13.9	164.5	13.9	85.9	89.3	109.6
	NEast	6	182.6	131.4	72.8	95.8	98.0	99.7
	South	8	145.8	134.6	108.9	65.0	128.7	102.6
Total Dust Fallout % CaO	West	1	7.9	11.8	16.7	10.5	13.6	8.4
	East	5	10.9	13.2	11.4	7.6	17.9	1.5
	North	6A	7.3	11.8	68.6	13.0	13.7	10.6
	NEast	6	7.3	14.8	25.2	15.3	15.3	14.5
	South	8	5.2	13.8	20.7	11.9	21.3	19.0
Estimated Dust Fallout from Plant	West	1	11.9	27.3	23.1	11.2	19.4	17.8
	East	5	20.0	18.8	15.1	4.9	32.2	-88.0
	North	6A	0.7	24.9	19.6	15.3	17.3	13.6
	NEast	6	9.3	28.6	32.7	21.9	22.4	21.0
	South	8	0.6	26.3	38.0	10.0	46.6	31.9
Dust Fall Other sources	West	1	172.7	153.5	65.9	80.3	82.0	218.3
	East	5	132.8	84.5	91.0	80.2	80.2	1218.9
	North	6A	13.2	139.6	-5.7	70.6	72.0	96.0
	NEast	6	173.3	102.8	40.1	73.9	75.6	78.7
	South	8	145.2	108.3	70.9	55.0	82.1	70.7
Remarks						Sample 5 bird droppings	Sample 5 bird droppings	Sample 5 bird droppings

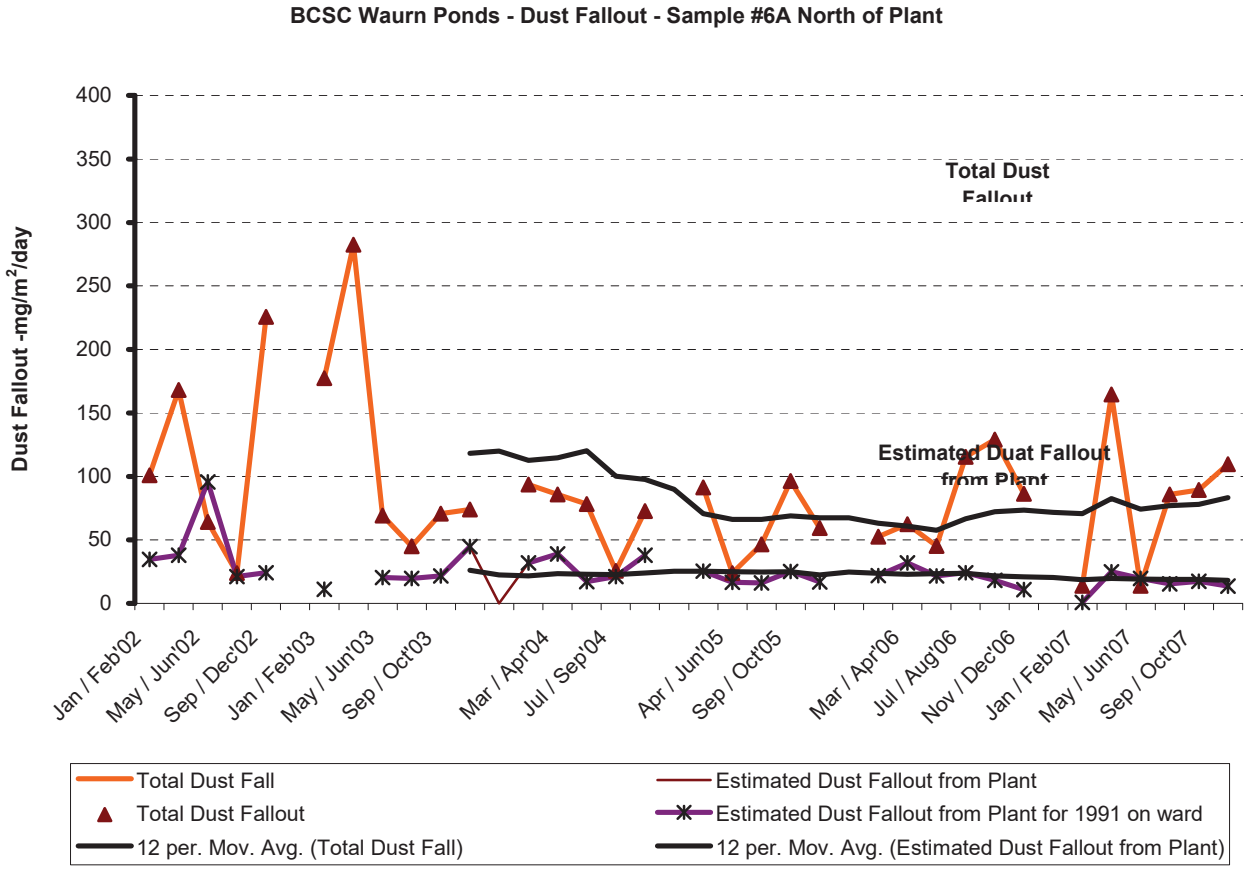
Dust Fallout Data

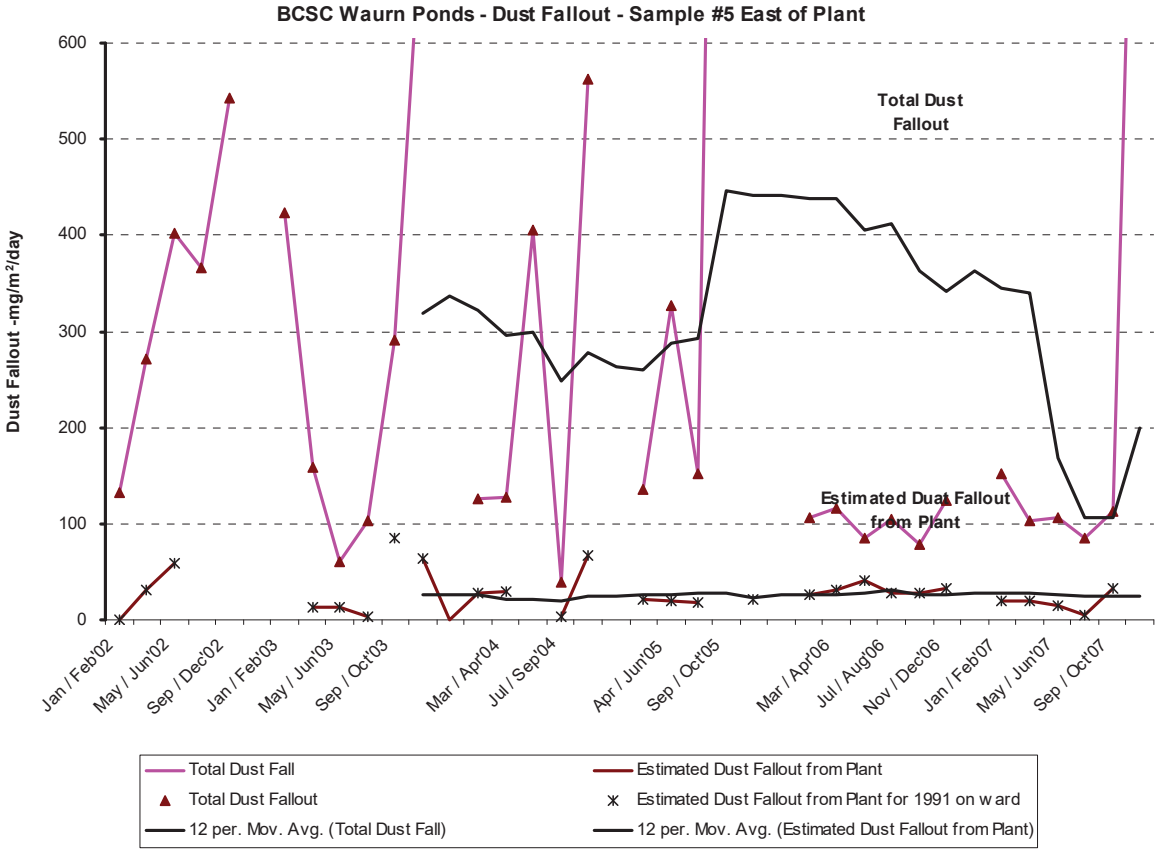


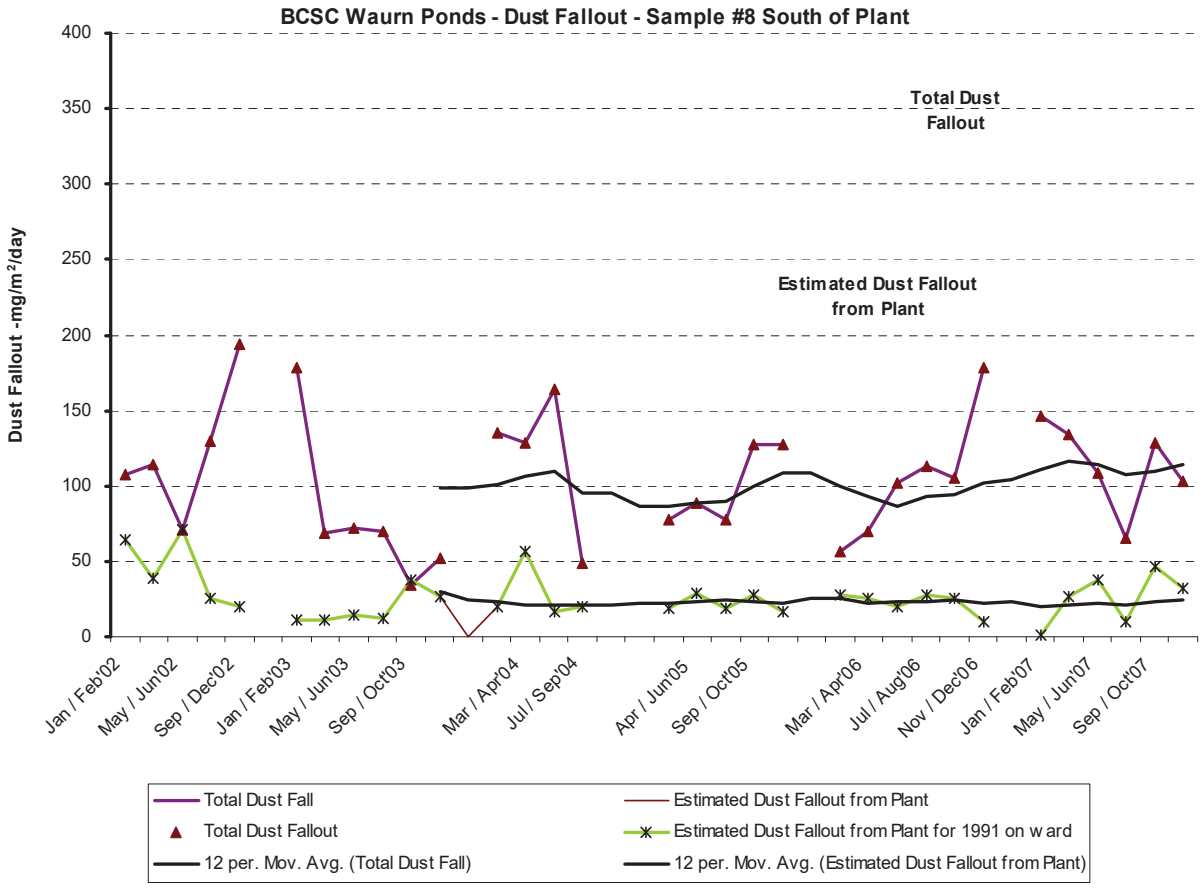
Location of Dust Deposit Gauges

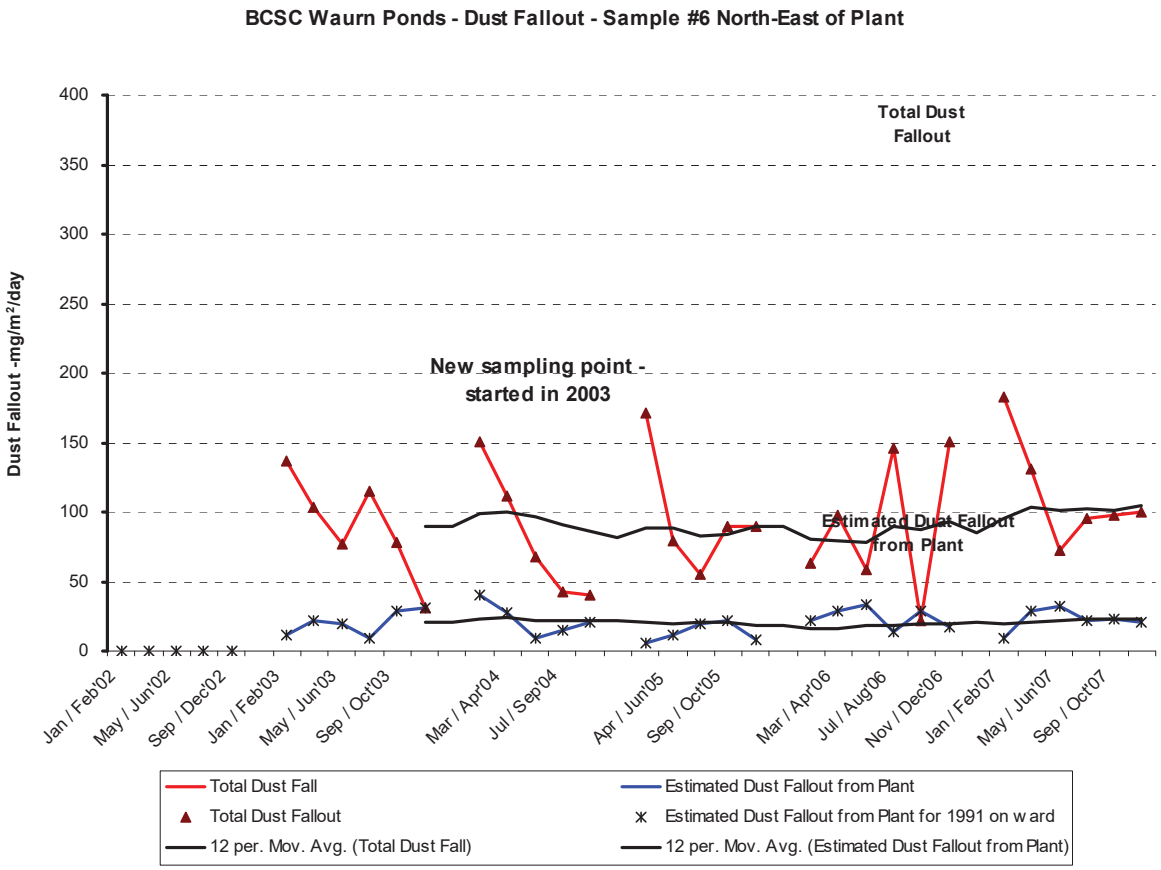



BCSC Waurn Ponds - Dust Fallout - Sample #1 West of Plant
Dust Fallout -mg/m2/day
400
350
300
250
200
150
100
50
0
Total Dust Fallout
Estimated Duat Fallout from Plant
Jan / Feb'02
May / Jun'02
Sep / Dec'02
Jan / Feb'03
May / Jun'03
Sep / Oct'03
Mar / Apr'04
Jul / Sep'04
Apr / Jun'05
Sep / Oct'05
Mar / Apr'06
Jul / Aug'06
Nov / Dec'06
Jan / Feb'07
May / Jun'07
Sep / Oct'07
Total Dust Fall
Total Dust Fallout
12 per. Mov. Avg. (Total Dust Fall)
Estimated Dust Fallout from Plant
Estimated Dust Fallout from Plant for 1991 on ward
12 per. Mov. Avg. (Estimated Dust Fallout from Plant)

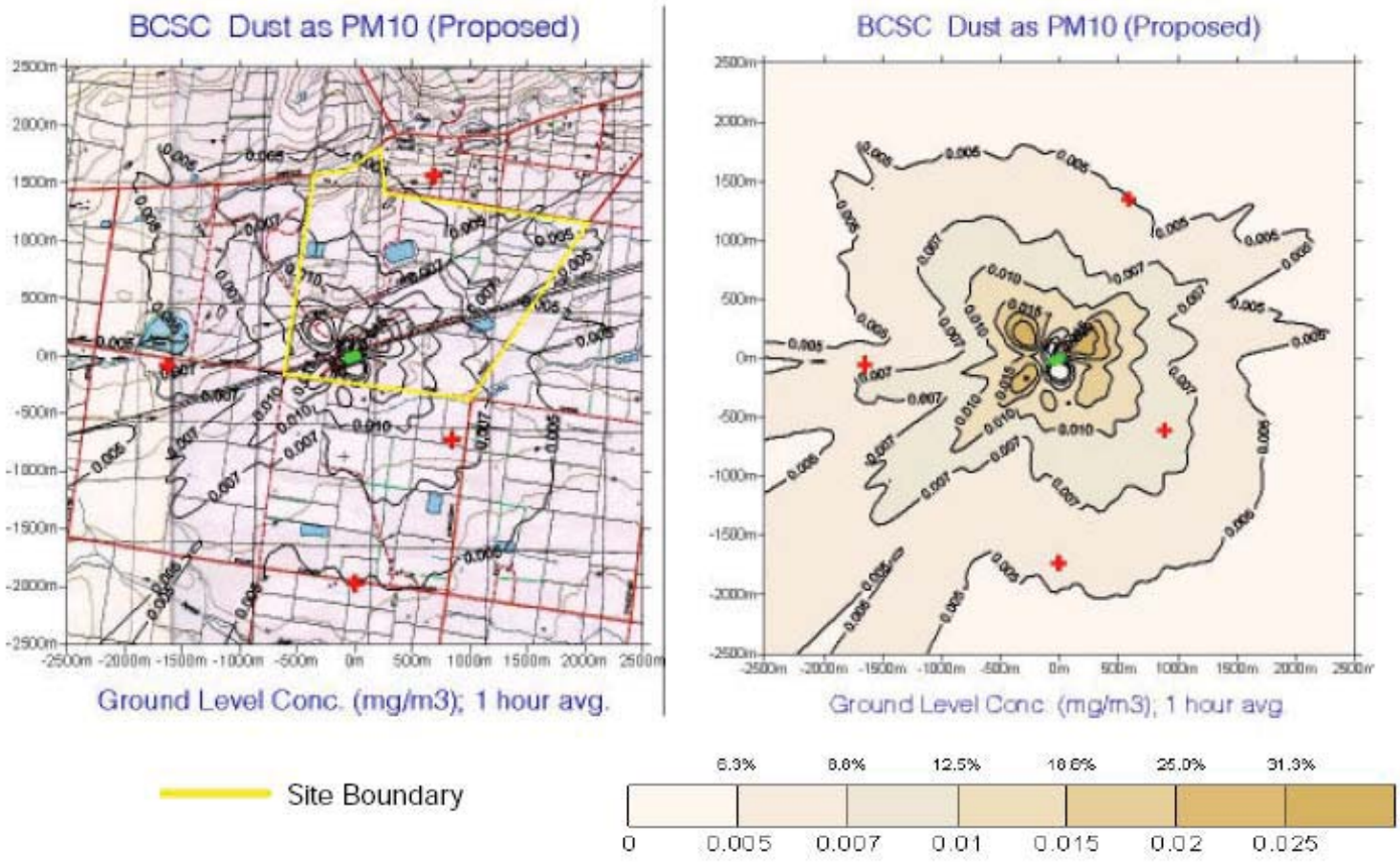

BCSC Waurn Ponds - Dust Fallout - Sample #6A North of Plant
Dust Fallout -mg/m2/day
400
350
300
250
200
150
100
50
0
Total Dust Fallout
Estimated Duat Fallout from Plant
Jan / Feb'02
May / Jun'02
Sep / Dec'02
Jan / Feb'03
May / Jun'03
Sep / Oct'03
Mar / Apr'04
Jul / Sep'04
Apr / Jun'05
Sep / Oct'05
Mar / Apr'06
Jul / Aug'06
Nov / Dec'06
Jan / Feb'07
May / Jun'07
Sep / Oct'07
Total Dust Fall
Total Dust Fallout
12 per. Mov. Avg. (Total Dust Fall)
Estimated Dust Fallout from Plant
Estimated Dust Fallout from Plant for 1991 on ward
12 per. Mov. Avg. (Estimated Dust Fallout from Plant)


BCSC Waurn Ponds - Dust Fallout - Sample #5 East of Plant
Dust Fallout -mg/m²/day
600
500
400
300
200
100
0
Total Dust Fallout
Estimated Dust Fallout from Plant
Jan / Feb'02
May / Jun'02
Sep / Dec'02
Jan / Feb'03
May / Jun'03
Sep / Oct'03
Mar / Apr'04
Jul / Sep'04
Apr / Jun'05
Sep / Oct'05
Mar / Apr'06
Jul / Aug'06
Nov / Dec'06
Jan / Feb'07
May / Jun'07
Sep / Oct'07
Total Dust Fall
Total Dust Fallout
12 per. Mov. Avg. (Total Dust Fall)
Estimated Dust Fallout from Plant
Estimated Dust Fallout from Plant for 1991 on w ard
12 per. Mov. Avg. (Estimated Dust Fallout from Plant)


BCSC Waurn Ponds - Dust Fallout - Sample #8 South of Plant
Dust Fallout -mg/m²/day
400
350
300
250
200
150
100
50
0
Total Dust Fallout
Estimated Dust Fallout from Plant
Jan / Feb'02
May / Jun'02
Sep / Dec'02
Jan / Feb'03
May / Jun'03
Sep / Oct'03
Mar / Apr'04
Jul / Sep'04
Apr / Jun'05
Sep / Oct'05
Mar / Apr'06
Jul / Aug'06
Nov / Dec'06
Jan / Feb'07
May / Jun'07
Sep / Oct'07
Total Dust Fall
Total Dust Fallout
12 per. Mov. Avg. (Total Dust Fall)
Estimated Dust Fallout from Plant
Estimated Dust Fallout from Plant for 1991 on w ard
12 per. Mov. Avg. (Estimated Dust Fallout from Plant)


BCSC Waurn Ponds - Dust Fallout - Sample #6 North-East of Plant
Dust Fallout -mg/m²/day
400
350
300
250
200
150
100
50
0
Total Dust Fallout
New sampling point - started in 2003
Estimated Dust Fallout from Plant
Jan / Feb'02
May / Jun'02
Sep / Dec'02
Jan / Feb'03
May / Jun'03
Sep / Oct'03
Mar / Apr'04
Jul / Sep'04
Apr / Jun'05
Sep / Oct'05
Mar / Apr'06
Jul / Aug'06
Nov / Dec'06
Jan / Feb'07
May / Jun'07
Sep / Oct'07
Total Dust Fall
Total Dust Fallout
12 per. Mov. Avg. (Total Dust Fall)
Estimated Dust Fallout from Plant
Estimated Dust Fallout from Plant for 1991 on w ard
12 per. Mov. Avg. (Estimated Dust Fallout from Plant)

Ambient Modelling



coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

12 February 2009

Allan Hoy
Coffey Rail
Level 20, Collins Street
Melbourne VIC 3000

Attention: Allan Hoy

Dear Allan

RE: Waurn Ponds Briefing Note For Department of Transport

1 SCOPE

Coffey Environments has been engaged to review and evaluate the Briefing note for Department of Transport titled “Dust in the Environment, Blue Circle Southern Cement (BCSC) Waurn Ponds” and comment on the content of the document regarding environmental and occupational health & safety implications to the proposed marshalling yards.

2 LIMITATIONS

The advice provided in the letter is limited to the information and data contained within the previously mentioned Briefing Note alone. The Briefing Note appears to be part of a larger document, which Coffey Environments has not sighted.

No documentation has been provided regarding potential dust generation activities within the proposed marshalling area that may impact total dust levels. Any additional dust generating activities should be investigated as part of a complete assessment.

All the monitoring data in the assessment is off site data and Coffey Environments has not physically visited the proposed marshalling yards area.

3 DISCUSSION

The proposed area for the marshalling yards within the quarry is located on the northern side of the rail line and immediately adjacent north of the cement plant. The Briefing Note identifies that possible dust sources from the cement plant and quarry include; movement of heavy vehicles on the quarry haul roads (primary source of dust – limestone dust), and limestone, clinker or cement dust emitted from the cement plant. The clinker and cement dust are considered aggressive as it would hydrate in the presence of moisture and adhere to surfaces.

The Briefing Note concludes that limestone dust is the most likely dust to impact on the marshalling yards. The wind direction data within the briefing note indicates that the wind direction is generally across the cement plant onto the proposed marshalling yards (64% of wind direction is W, NW, N, NE or E), indicating that the deposition rate of any dust generated from the cement plant is more likely to be deposited on the marshalling yards than areas to the south.

3.1 Environmental Impact on the Proposed Marshalling Yards

It is difficult to draw conclusions from the data in the Briefing Note due to the absence of data directly from the proposed marshalling area, however, based on the results presented, the conclusions of the briefing note that BCSC is adhering to The Protocol for Environmental Management Mining and Extractive Industries guidelines are supported.

The PM_{10} modelling data within the brief note represents only the data from point source stack emissions and does not include background dust levels. While the measured (and modelled) levels are within the EPA ground level design criteria they do not provide an overall level of point source and background levels. This leads to an underestimation of the total PM_{10} levels that may be experienced in the proposed marshalling yards area.

3.2 Occupational Health & Safety Impact on the Proposed Marshalling Yards

There is currently no data available from any occupational hygiene monitoring (personal monitoring within the breathing zone) undertaken within the proposed marshalling yards area (inhalable or respirable fractions). It is not possible to draw direct conclusions from the environmental monitoring data for occupational purposes; however, general interpretations can be made.

On site activities have not been assessed and no conclusions can be made regarding inhalable dust if it would be below the 10 mg/m^3 guideline for limestone/inhalable dust without the collection of inhalable dust monitoring data. In our experience, the results of such data are expected to be well within the occupational exposure standard of 10 mg/m^3 (TWA -8hr)*.

There is no respirable silica or respirable dust monitoring results for the proposed marshalling yards area (less than 7µm equivalent aerodynamic diameter (EAD) particles for respirable fraction as opposed to 10 µm EAD for PM_{10}). These two parameters are likely to be the most important when assessing the suitability of the proposed site for its intended purpose within the scope of this advice letter.

The point source modelling data provided in the Briefing Note shows a maximum level of PM_{10} particles of 0.025 mg/m^3 directly adjacent the point sources and gradually decreasing as the plume passes over the proposed marshalling yards. This level is an over estimation of the respirable fraction and is well below the guideline values for respirable dust (3 mg/m^3 TWA – 8 hr) and respirable silica (0.1 mg/m^3 TWA – 8hr). In the absence of additional monitoring data it is not possible to make conclusive statements regarding respirable dust and respirable silica and the overall suitability of the site, however, in our experience, the results of such data are expected to be well within the occupational exposure standards. *TWA = Time Weighted Average.

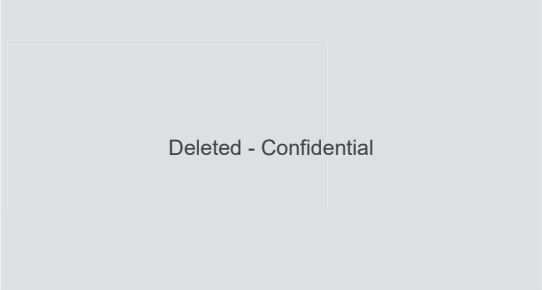
4 SUMMARY & CONCLUSIONS

Additional data is required to be collected before any conclusive statements can be made regarding the suitability of the site. Additional data includes:

- Dust deposition data from within the proposed marshalling yards area;
- Occupational exposure data for inhalable dust concentrations from within the proposed marshalling yards area; and
- Occupational exposure data for respirable dust and respirable silica concentrations from within the proposed marshalling yards area.

Based on the data contained within the briefing note, the above additional monitoring requirements are expected to provide results that assess the site suitable with respect to environmental and occupational exposure standards.

For and on behalf of Coffey Environments Pty Ltd



Lee McAlister-Smiley
Workplace Health & Safety Group Leader - QLD

From: Howard Ellis
Sent: Tuesday, February 17, 2009 4:15 PM
To: Chris.Banger@transport.vic.gov.au
Cc: Allan Hoy; John.Hearsch@transport.vic.gov.au; Mauro DeThomasis
Subject: FW: Geelong RS Facility - Dust Report

Chris,

Attached is Coffey Environment's review of the briefing note for DOT titled "Dust in the Environment, Blue Circle Southern Cement (BCSC) Waurn Ponds".

The text from Coffey Environments' specialist uses some scientific terminology that might not be readily understood. Some definitions are included in the text. Those and my additional layman's clarifications (non-expert) follow.

Summary of abbreviations and units:

μm = micro metre or micron = one millionth of a metre, i.e. one thousandth of a millimetre

PM stands for "particulate matter"

EAD stands for "equivalent aerodynamic diameter"

PM_{10} means particulate matter with an EAD of 10 micron or 10 μm

TWA means "time weighted average" fallout of dust over a nominated period

Respirable Fraction (RF) applies to that portion of the dust particle distribution which is less than a certain diameter and might be inhalable.

Essentially the indications are that the respirable fraction levels of particulate matter will fall well within EPA standards; however, there were no measurements taken within the proposed marshalling yard area, so it is not possible to be conclusive about this. It could be argued that any area in the vicinity of BCSC would be subject to some degree of uncertainty about the acceptability of dust levels until site-specific test are conducted.

Coffey Environments therefore recommends that additional data be collected from the proposed marshalling yards area.

I have requested brief details of what additional tests and data are required, how long that will take (e.g. is it necessary to conduct tests over all four seasons) and an estimate of cost.

My suggestion to DOT is that planning should proceed on the assumption that dust levels in the marshalling yard will meet OHS standards. Confirmatory tests should be arranged as soon as possible.

Regards,

HOWARD ELLIS
Principal, Project Management
Coffey Rail
Level 2, 60 Collins St Melbourne Victoria 3000 Australia
Deleted - Confidential F (+61) 3 9650 7622 M Deleted - Confidential
coffey.com

<mailto: Deleted - Confidential

-----Original Message-----
From: Mauro DeThomasis
Sent: Friday, 13 February 2009 4:48 PM
To: Howard Ellis
Cc: Allan Hoy
Subject: RE: Geelong RS Facility - Dust Report

Hi Howard / Allan

Apologies for the late reply, however, I have been out of the office for most of Thursday 12th and Friday 13th.

Please find attached our initial response in relation to the Dust Report.

I would be pleased to discuss this further with you prior to finalising for DoT.

Kind regards

MAURO DE THOMASIS
Principal and Manager Workplace Services
Coffey Environments
126 Trenerry Crescent Abbotsford VIC 3067 Australia
Deleted - Confidential F (+61) (3) 9473 1450 Deleted - Confidential
coffey.com
-----Original Message-----
From: Allan Hoy
Sent: Friday, 13 February 2009 4:27 PM
To: Mauro DeThomasis
Cc: Howard Ellis
Subject: FW: Geelong RS Facility - Dust Report

Hi Mauro,

I was unable to reach you Friday 13/2 so am not aware of your progress with the Dust study Report. I was contacted by the DOT this afternoon re delivery of the report (it was requested for Friday 13/2). In your absence I assured the DOT that we would deliver no later than 11am Tuesday 17/2.

I would very much appreciate your assistance in meeting this deadline.

In your response, would you please copy Howard Ellis.

Regards,

Allan

Allan Hoy
Principal, Operations
Coffey Rail
Level 2 60 Collins St Melbourne VIC 3000 Australia
Deleted - Confidential F (+61) (3) 9650 7622
coffey.com

-----Original Message-----
From: Allan Hoy
Sent: Thursday, February 12, 2009 2:06 PM
To: Mauro DeThomasis
Subject: FW: Geelong RS Facility - Dust Report

Hi Mauro,

Enclosed herein is the acceptance (NTP) by DOT for your work on this matter.

I look forward to receiving your report as we discussed. Please forward a 'soft' copy by email and the signed original report by mail.

Please call me if any problem arises.

Regards,

Allan

Allan Hoy
Principal, Operations
Coffey Rail
Level 2 60 Collins St Melbourne VIC 3000 Australia
Deleted - Confidential F (+61) (3) 9650 7622
coffey.com

-----Original Message-----
From: Chris.Banger@transport.vic.gov.au
[mailto:Chris.Banger@transport.vic.gov.au]
Sent: Friday, February 06, 2009 11:57 AM
To: Allan Hoy
Cc: Bronwyn.Hughes@transport.vic.gov.au;
Mike.Sweetland@transport.vic.gov.au; Graeme.Vellacott@transport.vic.gov.au;
John.Hearsch@transport.vic.gov.au
Subject: Re: Geelong RS Facility - Dust Report

Hello Allan,

The Department has accepted your offer of Deleted - Confidential (including GST) to interprete the Dust Study prepared for the Waurn Ponds Train stabling site. The funding for this work is being sourced from Bus and Regional Services.

The Purchase Order Number for this work is 163913.

Could you please confirm the delivery date when you have a chance.

Thank you

Kind Regards

Chris Banger
DOT
Deleted - Confidential

Allan Hoy
Deleted - Confidential

22/01/09 04:22 PM

To
"Chris.Banger@transport.vic.gov.au"
<Chris.Banger@transport.vic.gov.au>
cc
Howard Ellis
Deleted - Confidential
u>, Alan Burns
Deleted - Confidential
Subject
Geelong RS Facility - Dust Report

Hi Chris,

Regarding the Briefing Note – “Dust in the Environment Blue Circle Southern Cement Waurn Ponds” which you provided to Coffey Rail.

I am attaching our proposal to obtain a summarized interpretation of the Briefing Note in accordance with your request.

The findings you require can be made available within 3 to 4 days of your acceptance and NTP.

Please contact me if you have any queries.

Regards,

Allan

Allan Hoy
Principal, Operations
Coffey Rail

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coffey.com

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