Adani Mining Pty Ltd

NORTH GALILEE BASIN RAIL PROJECT

Additional information to the Environmental Impact Statement

Addendum: NGBR Project realignment - three-rail scenario

July 2014

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Terms and abbreviations

Term and abbreviations	Definition
Adani	Adani Mining Pty Ltd
AEIS	Additional information to the North Galilee Basin Rail Project Environmental Impact Statement
Final rail corridor	A nominally 100 m corridor for the length of the NGBR Project, narrowing to a nominal 60 m width for the NGBR Project realignment.
GBCIF	Galilee Basin Coal Infrastructure Framework
LOS	Level of service
NGBR Project	North Galilee Basin Rail Project
NGBR Project EIS	North Galilee Basin Rail Project Environmental Impact Statement
NGBR Project realignment	North Galilee Basin Rail Project realignment
TOR	Terms of Reference

1 Introduction

1.1 Overview and background

Adani Mining Pty Ltd (Adani) proposes the construction and operation of the North Galilee Basin Rail Project (NGBR Project) – a multi-user, standard gauge, greenfield rail line that will transport coal from mines in the northern Galilee Basin to the Port of Abbot Point.

The NGBR Project Environmental Impact Statement (EIS) was prepared and assessed the potential impacts of the NGBR Project in accordance with the Terms of Reference (TOR) and EIS Guidelines. The public consultation phase for the NGBR Project occurred between 16 December 2013 and 11 February 2014, inclusive.

Additional information to the EIS (AEIS) was prepared in April 2014 and reassessed the potential impacts of the NGBR Project, including an assessment of the NGBR Project realignment – an approximately 77 km realignment of the central portion of the NGBR Project final rail corridor southward of the Bowen River – in addition to responding to comments received on the EIS during the public consultation phase. The AEIS was prepared in accordance with the TOR and EIS Guidelines. The AEIS was released by the Office of the Coordinator-General for targeted advisory agency and stakeholder review between 22 April and 19 May 2014, inclusive.

Following completion of the targeted stakeholder consultation process on the AEIS, Adani was requested to provide further information to assist the Office of the Coordinator-General in evaluation of the NGBR Project. In particular, the assessment of potential cumulative impacts of a three-rail operating scenario in the vicinity of the NGBR Project realignment was requested, including the following potential operational rail lines:

- The North Galilee Basin Rail Project – with a proposed maximum capacity of 100 million tonnes per annum (mtpa)
- The existing Newlands rail line (Aurizon) – with an approved and committed capacity of 50 mtpa.
- The proposed Alpha Coal Project rail line (GVK-Hancock) – with a proposed maximum capacity of 60 mtpa

While the NGBR Project AEIS considered both the proposed NGBR Project and the existing Newlands rail line, it did not directly assess the potential for additional impacts associated with simultaneous operation of the approved Alpha Coal Project rail line.

Since release of the NGBR Project AEIS, the Queensland Government has announced the declaration of the Galilee Basin State Development Area (GBSDA) to support the development of two proposed multi-use rail corridors that could service proposed mines in the Galilee Basin. Maps of the declared GBSDA show the two supported multi-use rail corridors being co-located in the vicinity of the QCoal Bowen Basin coal resources in the vicinity of the NGBR Project realignment. The GBSDA implements the government's earlier policy announcements on Galilee Basin Rail corridors to the Port of Abbot Point.

As identified in the NGBR Project AEIS, the NGBR Project realignment final rail corridor coincides with the rail corridor component of the GVK-Hancock Alpha Coal Project for

approximately 64km within what is now the GBSDA. The Coordinator-General's evaluation report for the Alpha project was released in May 2012.

The assessment of potential impacts presented in the NGBR Project AEIS considers the operation of the existing Newlands rail infrastructure in addition to the NGBR Project, but not the additional operation of the proposed GVK/Hancock Alpha line. It is therefore considered appropriate to extend the assessment undertaken for the NGBR Project realignment to encompass the additional potential impacts of other approved proposed projects in the vicinity, such as the Alpha Coal Project rail line (for which public information is available). However, in accordance with recent joint media releases by proponents of the Alpha Coal Project and owners of the Newlands line (GVK Hancock 2013), it is considered likely that the Alpha Coal Project rail infrastructure, if constructed (at least in part), would join with the existing Newlands line and/or Northern Missing Link rail infrastructure far southward of the crossing of the Bowen Developmental Road. As such, it is considered likely that cumulative impacts associated with operation of multiple rail corridor crossings of the Bowen Developmental Road can be largely (if not entirely) avoided.

1.2 Purpose of this additional information to the EIS

The purpose of this report is to document Adani's response to queries regarding the potential cumulative impacts of a three-rail operating scenario in relation to the combination of the NGBR Project realignment, the existing Newlands rail line and proposed Alpha Coal Project rail infrastructure in that vicinity.

In preparing this additional material, Adani has:

- Acknowledged the strategic vision and objectives for the GBSDA, declared in June 2014 (sections 4 and 5 of the GBSDA Development Scheme at: http://www.dsdip.qld.gov.au/resources/plan/cg/galilee-basin/gbsda-development-scheme.pdf)
- Assumed that the exact alignment within the common corridor for the NGBR Project and Alpha Coal Project rail infrastructure would be resolved through detail design phases and securing site-specific approvals subsequent to a Coordinator-General Evaluation Report on the NGBR Project
- Considered whether any additional sensitive receptors would be impacted by the three rail lines operating in parallel and whether there would be any significant change in impact on receptors identified in the AEIS.

Matters that have been included in this assessment of potential additional impacts from the three-rail operating scenario are detailed below.

Matters for which quantification of potential impacts for the scenario has been assessed are:

- Air quality impacts
- Noise and vibration impacts.

Matters for which qualitative discussion of potential impacts for the scenario has been assessed are:

- Surface water hydrology and hydraulics – ongoing coordinated development of drainage structures across multiple lines

- The potential for greater spatial impacts beyond those presented in AEIS material, and the likelihood of multiple lines impacting on:
  - biodiversity, particularly vegetation clearing and habitat connectivity, scenic amenity
  - land use and tenure, including stock routes and occupational crossings
  - topography and geology, particularly in any constrained areas
  - surface water quality from coal dust, including mitigation strategies
  - transport and road crossing treatments where any constraints exist for multiple crossing structures and/or the transition from at-grade to grade-separated (particularly the Bowen Development Road)
- The potential benefits of collocating three rail lines to reduce impacts to the above matters.

1.3 Structure of this report

This report has been structured in accordance with the matters listed in section 1.2. Sections 2 and 3 of this report provide quantitative modelling and assessment of potential combined impacts on air quality and noise & vibration, respectively. Sections 4 onward qualitatively discuss potential impacts from the three-rail operating scenario relating to surface water hydrology & hydraulics, potential for greater spatial impacts than presented in the AEIS, and the potential benefits of collocating three rail lines to reduce potential impacts.

This report should be read in conjunction with the NGBR Project EIS and AEIS.

2 Air quality

2.1 Introduction

2.1.1 Background

As described in the Additional Information to the NGBR Project Environmental Impact Statement (AEIS), the NGBR Project realignment occurs between chainages 128.2 km and 205.3 km. The NGBR Project realignment coincides with the approved Alpha Coal Project for approximately 64 km and travels parallel the existing Aurizon-owned Newlands line for approximately 57 km, at a distance of approximately 50 m. The southern and central rail corridor precincts of the Galilee Basin State Development area thus form a common corridor in this area.

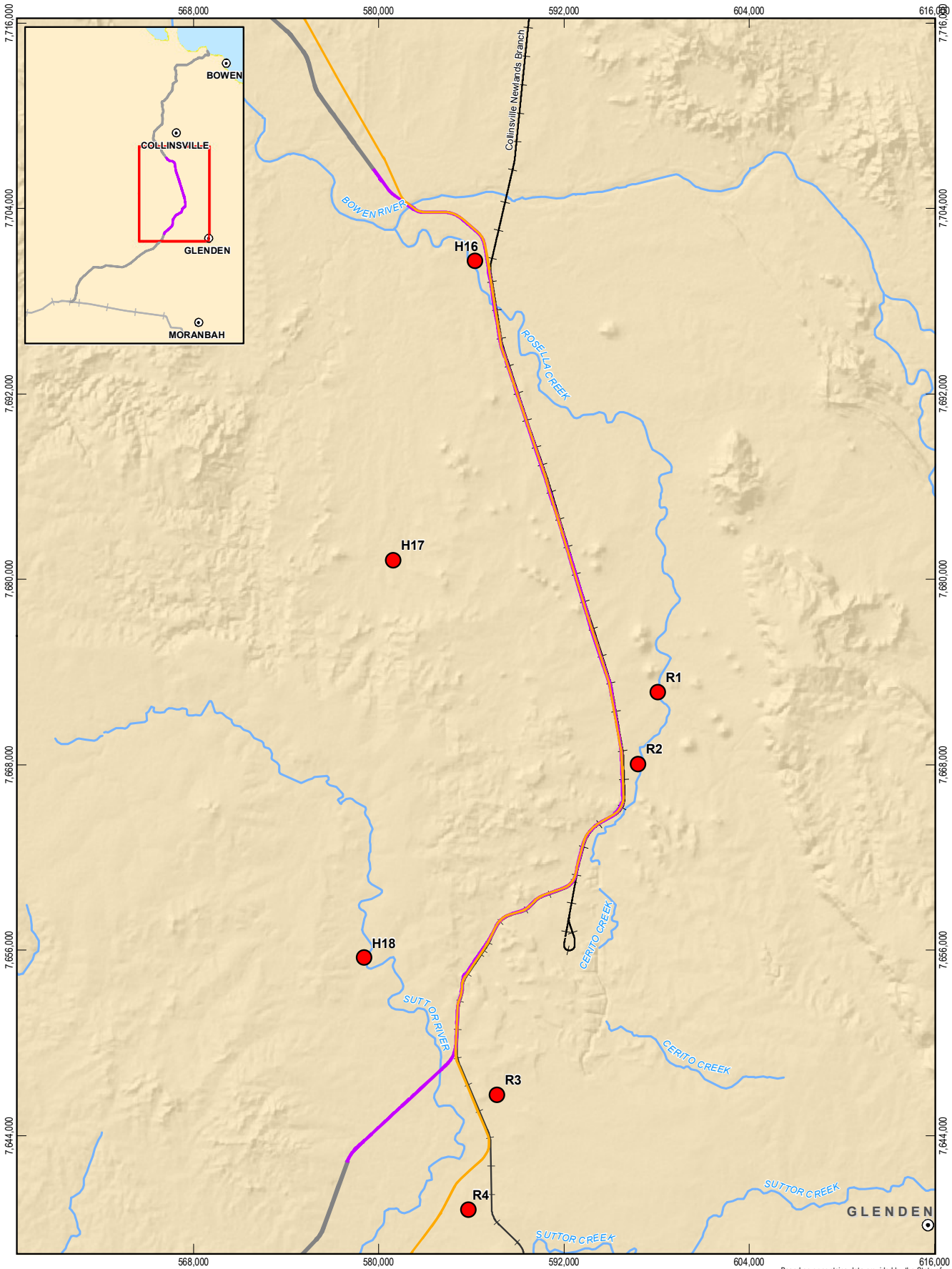
An assessment of the air quality impacts of the NGBR Project realignment in combination with the Newlands line was included in Section 9 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The following material therefore represents the addition of the proposed Alpha Coal Project rail line to the previous assessment.

The NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line are shown in Figure 1.

2.1.2 Purpose

The purpose of this assessment is to assess the potential air quality impacts of the NGBR Project realignment in a scenario where emissions are combined with those arising from the existing Newlands rail line and the proposed Alpha Coal Project rail line.

As requested by the Office of the Coordinator-General, this material has been prepared with regard to the strategic vision and objectives for the Galilee Basin State Development Area, which are discussed in Section 6.



LEGEND

- Populated centres
- Watercourse (Major)
- Newlands rail line
- Alpha Coal Project rail line
- NGBR Project final rail corridor
- NGBR Project realignment
- Sensitive receptors

1:350,000 Paper Size A4

0 3 6 12

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number	41-26457
Revision	A
Date	10 Jul 2014

Emissions sources and sensitive receptors

Figure 1

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145 Ann Street Brisbane QLD 4000 Australia T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data source: GA: Populated Places, Railway, Watercourse(2007); Adani: AEIS Option 9 Rev1 final rail corridor (2014), , GA/NGBR EIS: Sensitive Receptors (2014); Alpha EIS: Indicative Alignment/2010. Created by:MS

2.2 Methodology

2.2.1 Overview

The methodology for this assessment is as described in Section 9.2 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The assessment proceeded as follows:

- Describe local dispersion meteorology with a prognostic meteorological model (TAPM)
- Characterise background air quality, as per NGBR Project EIS Volume 1 Chapter 10 Air quality
- Develop an emissions inventory to characterise emissions from the NGBR Project realignment, the Newlands rail line and the Alpha Coal Project rail line, including:
    - Particulate matter of less than 10 micron (PM10)
    - Particulate matter of less than 2.5 micron (PM2.5)
    - Total suspended particulates (TSP)
    - Deposited dust
    - Gaseous emissions
- Predict dispersion of particulate and gaseous emissions using a dispersion model (AUSROADS)
- Predict deposition of particulate emissions using a dispersion model (AUSPLUME)
- Assess the combined impact of emissions at identified sensitive receptors (see section 2.2.2)

It is noted that a number of air quality model parameters were selected to present a ‘worst case’ scenario for air quality impacts during operation (most notably that the NGBR Project realignment was modelled as operating without any mitigation in place). Further details of the setup parameters of meteorological and dispersion models are provided in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

2.2.2 Identified sensitive receptors

As per the NGBR Project AEIS, the nearest potentially affected sensitive receptors were identified within approximately six kilometres of the NGBR Project realignment. Potential air quality impacts of the NGBR Project realignment are likely to be negligible at a distance of greater than six kilometres. As the scope of this assessment is to assess the impacts of the NGBR Project realignment, in combination with the Newlands rail line and Alpha Coal Project rail line, this methodology is considered appropriate. As such, no additional sensitive receptors were identified.

2.2.3 Air quality objectives

As per Section 9.2.3 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, air quality objectives were determined with reference to the relevant legislative instruments including those identified in the terms of reference for the NGBR Project. The relevant legislative instruments include:

- Environmental Protection Act 1994
- Environmental Protection (Air) Policy 2008
- National Environment Protection (Ambient Air Quality) Measure
- National Environment Protection (Air Toxics) Measure

Air quality objectives are listed in Table 1.

Table 1 Air quality objectives

Emission type	Environmental value	Air quality objective	Period
TSP	Health and wellbeing	90 µg/m^3 (a)	1 year
PM_{10}	Health and wellbeing	50 µg/m^3 (a) (b)	24 hours
$PM_{2.5}$	Health and wellbeing	25 µg/m^3 (a)	24 hours
		8 µg/m^3 (a)	1 year
Deposited Dust	Protecting aesthetic environment	2 g/m^2/month (c) (d)	Annual
		4 g/m^2/month (c) (e)	Annual
Benzene	Health and wellbeing	10 µg/m^3 (a)	1 year
Carbon Monoxide	Health and wellbeing	11,000 µg/m^3 (a)	8 hours
Formaldehyde	Health and wellbeing	54 µg/m^3 (a)	24 hours
	Protecting aesthetic environment	110 µg/m^3 (a)	30 minutes
Nitrogen dioxide	Health and wellbeing	250 µg/m^3 (a) (f)	1 hour
		62 µg/m^3 (a)	1 year
	Health and biodiversity of ecosystems	33 µg/m^3 (a)	1 year
Sulphur dioxide	Health and wellbeing	570 µg/m^3 (a) (f)	1 hour

		230 µg/m^3 [(a) (g)]	1 day
		57 µg/m^3 [(a)]	1 year
	Protecting agriculture	32 µg/m^3 [(a)]	1 year
	Health and biodiversity of ecosystems (for forests and natural vegetation)	22 µg/m^3 [(a)]	1 year
Toluene	Health and wellbeing	4,100 µg/m^3 [(a)]	24 hours
	Protecting aesthetic environment	410 µg/m^3 [(a)]	1 year
	Protecting aesthetic environment	1,100 µg/m^3 [(a)]	30 minutes
Xylenes	Health and wellbeing	1,200 µg/m^3 [(a)]	24 hours
		950 µg/m^3 [(a)]	1 year

[(a)] Queensland Air EPP (2008)

[(b)] Five exceedances of the 24-hour average are allowable per year

[(c)] Approved Methods for the modelling and assessment of air pollutants in NSW

[(d)] Maximum increase in deposited dust level, based on annual average of monthly observations

[(e)] Maximum total deposited dust level, based on annual average of monthly observations

[(f)] A one hour exceedance is allowed on one day each year

[(g)] One exceedance of the 24-hour average is allowed

2.2.4 Emissions sources

Table 2 details the emissions sources considered in the assessment. The description of the NGBR Project realignment and the Newlands rail line are consistent with Section 9.4.2 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The description of the Alpha Coal Project rail line is based on the Alpha Coal Project EIS (Hancock Prospecting 2010) and consultation with the Office of the Coordinator-General.

Table 2 Emissions sources

Parameter	NGBR Project realignment	Newlands rail line	Alpha Coal Project rail line
Locomotive type	5000 bhp diesel	4000 bhp diesel	4,400 bhp diesel
Manufacturing Standard	Tier 0	Tier 0	Tier 0

Number of locomotives per consist	4	3	3
Number of wagons per consist	240	82	234
Payload per wagon	108 t	106 t	106 t
Total payload per train	25,920 t	8,692 t	24,000 t
Payload per annum	100 mtpa	50 mtpa	60 mtpa
Loaded trains per day	14	21	7
Unloaded trains per day	14	21	7
Train speed (loaded)	80 km/hr	80 km/hr	80 km/hr
Train speed (unloaded)	100 km/hr	80 km/hr	80 km/hr
Loaded trains per hour – pro rata	0.58	0.88	0.29
Unloaded trains per hour – pro rata	0.58	0.88	0.29

2.3 Existing environment

2.3.1 Identified sensitive receptors

The identified sensitive receptors are mapped in Figure 1 and listed in Table 3. Prior to the NGBR Project realignment, Homestead 17 was approximately 2,772 m from the NGBR Project. Homestead 17 was included in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report to demonstrate changes to impacts from those described in the NGBR Project EIS. It is included here for consistency with those earlier assessments.

Table 3 Sensitive receptors

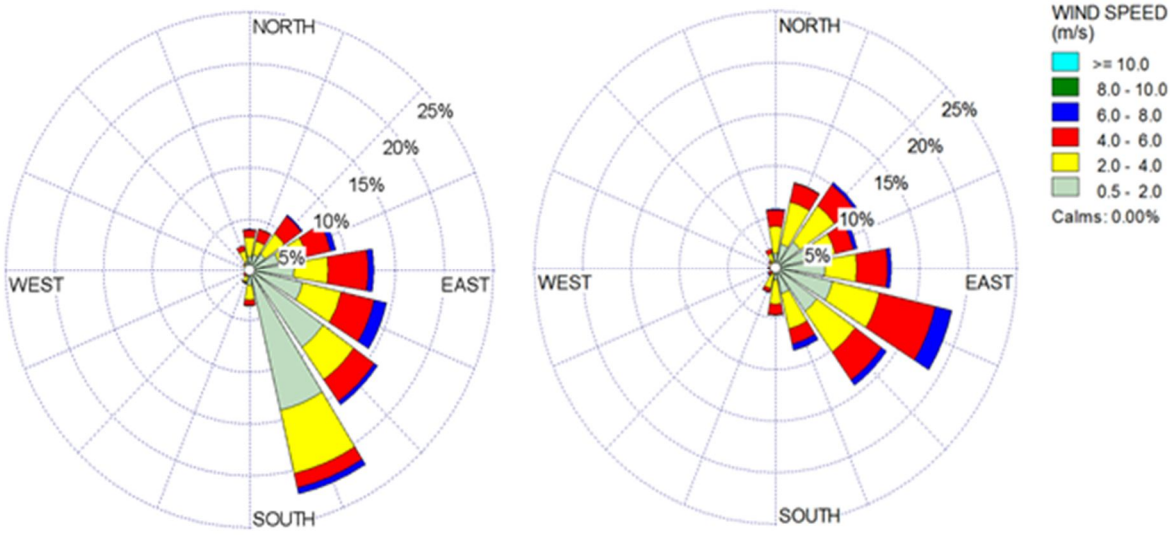
Sensitive receptor	Distance from NGBR Project realignment[1]
Homestead 16	721 m
Homestead 17[2]	10,932 m
Homestead 18	6,485 m

Homestead R1	2,938 m
Homestead R2	1,062 m
Homestead R3	3,764 m
Homestead R4	7,825 m

[1] Measured from nearest edge of final rail corridor

2.3.2 Dispersion meteorology

As described in Section 9.3.3 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, the NGBR Project realignment was divided into northern and southern meteorological zones. Annual wind roses are depicted in Figure 2 for the northern and southern sections.



Northern section **Southern section**

Figure 2 Annual wind roses

2.3.3 Atmospheric stability

As described in Section 9.3.4 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, atmospheric stability is located on the Pasquill-Gifford stability scheme. The Pasquill-Gifford stability scheme includes the following seven stability classes:

- Class A – very unstable
- Class B – unstable

- Class C – slightly unstable
- Class D – neutral
- Class E – slightly stable
- Class F – stable

Figure 3 charts atmospheric stability typical of the climatic zones of the NGBR Project realignment.

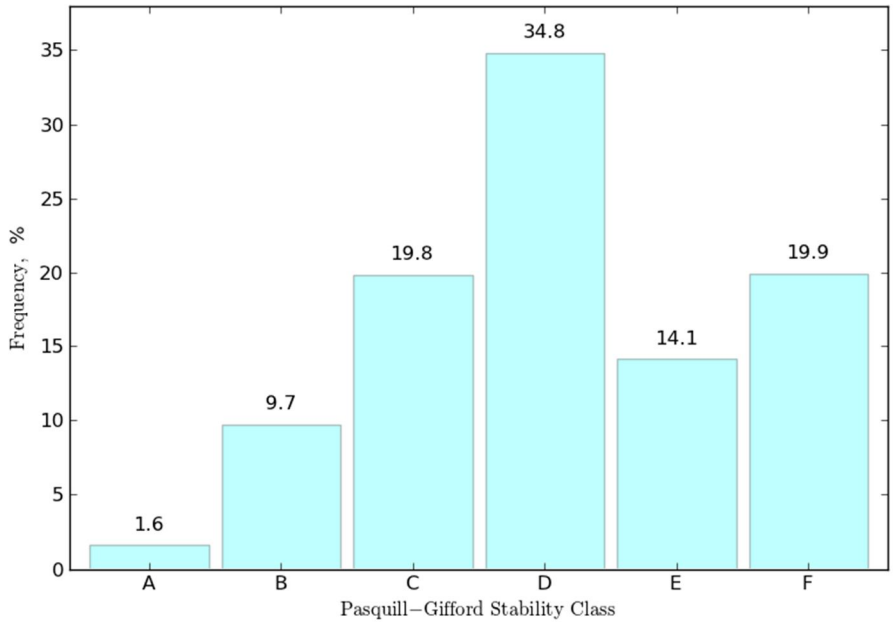


Figure 3 Atmospheric stability

2.3.4 Mixing height

As described in Section 9.3.5 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, mixing height is an indicator of vertical dispersion potential. Figure 4 charts mixing heights typical of the climatic zones of the NGBR Project realignment. The mixing height ranges between 25 m and 2,832 m; Mixing heights tend to be lower at night and higher during the day.

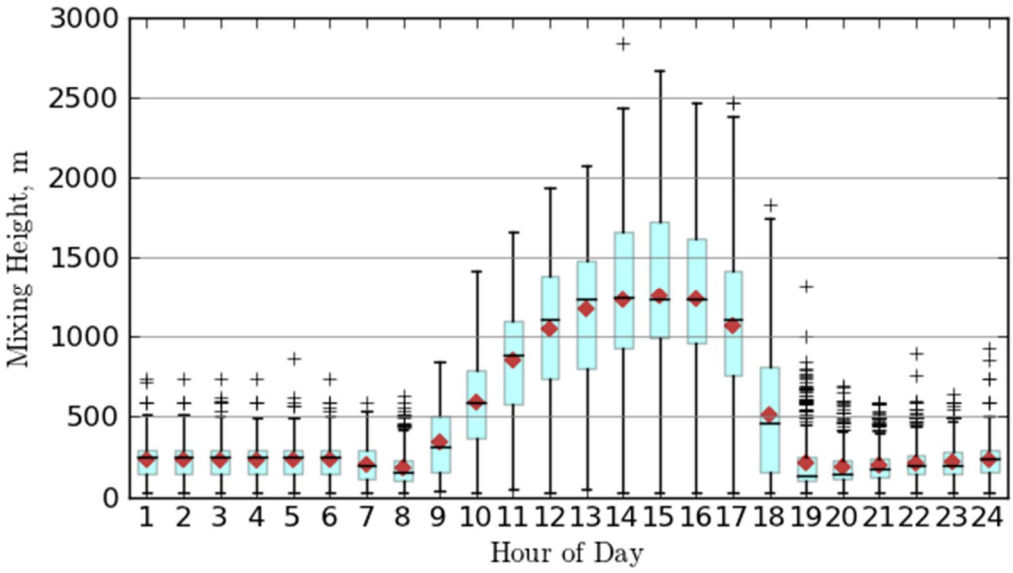


Figure 4 Mixing height

2.3.5 Background air quality

Background air quality as listed in Table 4 was characterised for the region of the NGBR Project realignment, as per the inland region initially described in Section 10.3.6 of NGBR Project EIS Volume 1 Chapter 10 Air quality, and subsequently Section 9.3.6 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. Gaseous constituents can be considered to have zero background due to the remoteness of the region (extended distances to extensive anthropogenic sources such as metropolitan and/or industrial areas).

Table 4 Background air quality

	Deposited dust	TSP (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	$PM_{2.5}$ (µg/m^3)
Averaging time	Annual mean	Annual mean	24 hour maximum	24 hour maximum	Annual mean
Background	1.6	30	15	6.6	5.8
Criterion	2	90	50	25	8

2.4 Potential impacts

2.4.1 Model sections

Dispersion modelling of PM_{10}, $PM_{2.5}$, TSP, deposited dust and gaseous emissions was undertaken for representative one kilometre model sections of the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line. Model sections were chosen based on their proximity to identified sensitive receptors (see Table 3).

The nearest sensitive receptor to the west of the NGBR Project realignment is Homestead 16, approximately 721 m from the final rail corridor. As such, representative model section was developed incorporating the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line in the vicinity of this sensitive receptor (see Figure 5).

The nearest sensitive receptor to the east of the NGBR Project realignment is Homestead R2, approximately 1,062 m from the final rail corridor. As such, a representative model section was developed incorporating the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line in the vicinity of this sensitive receptor (see Figure 6).

The representative model section for Homestead 16 was considered to represent a 'worst case' with respect to other western sensitive receptors (Homestead 17 and Homestead 18). The representative model section for Homestead R2 was likewise considered to represent a 'worst case' with respect to other eastern sensitive receptors (Homestead R1, Homestead R3 and Homestead R4).

Some additional modelling was undertaken in the vicinity of Homestead R3 (see Figure 7) due to its position within the southern meteorological zone and its relative proximity to the existing Newlands rail line and proposed Alpha Coal Project rail line (approximately 1.5 km distant), despite the larger separation distance to the NGBR Project realignment (approximately 3.8 km distant). Dust deposition was not modelled here due to the negligible contribution from the NGBR Project realignment.

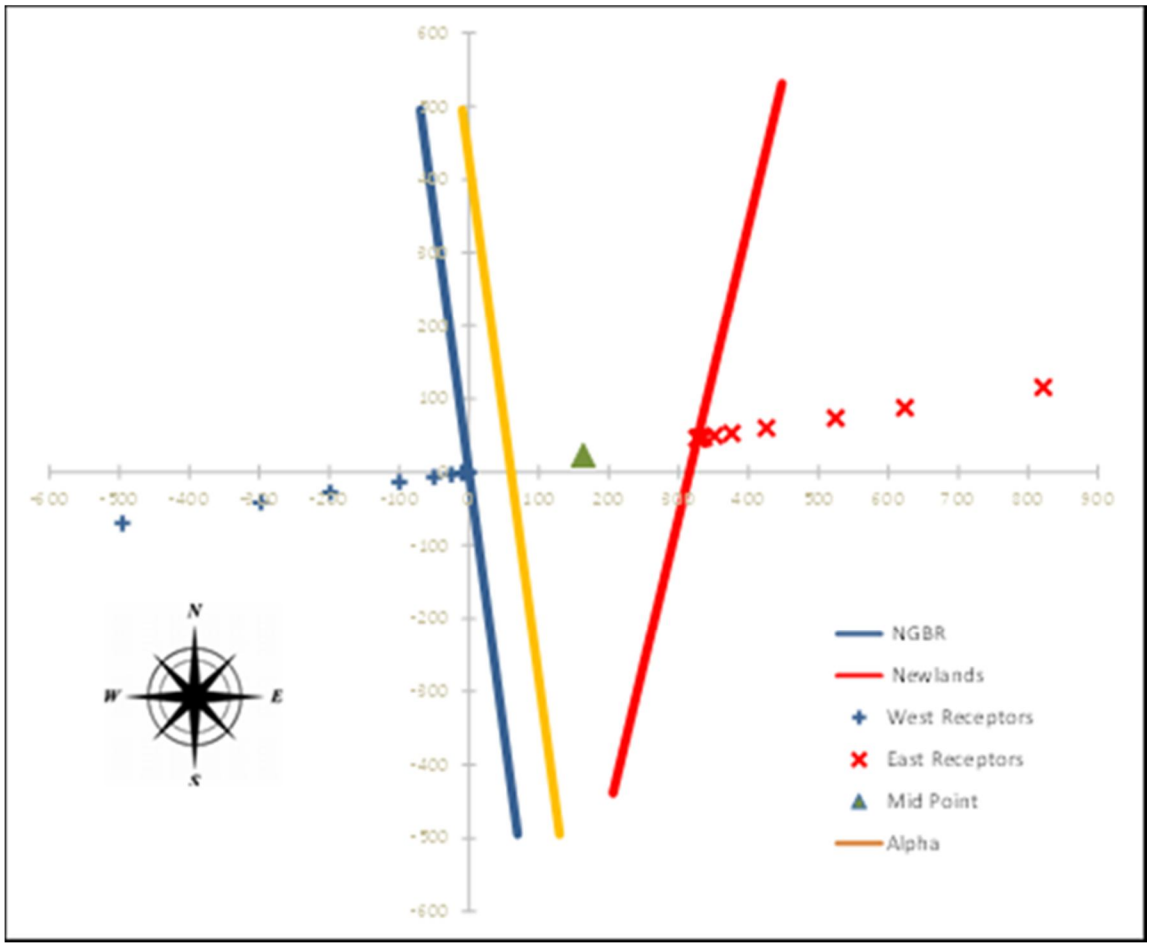


Figure 5 Homestead 16 model section

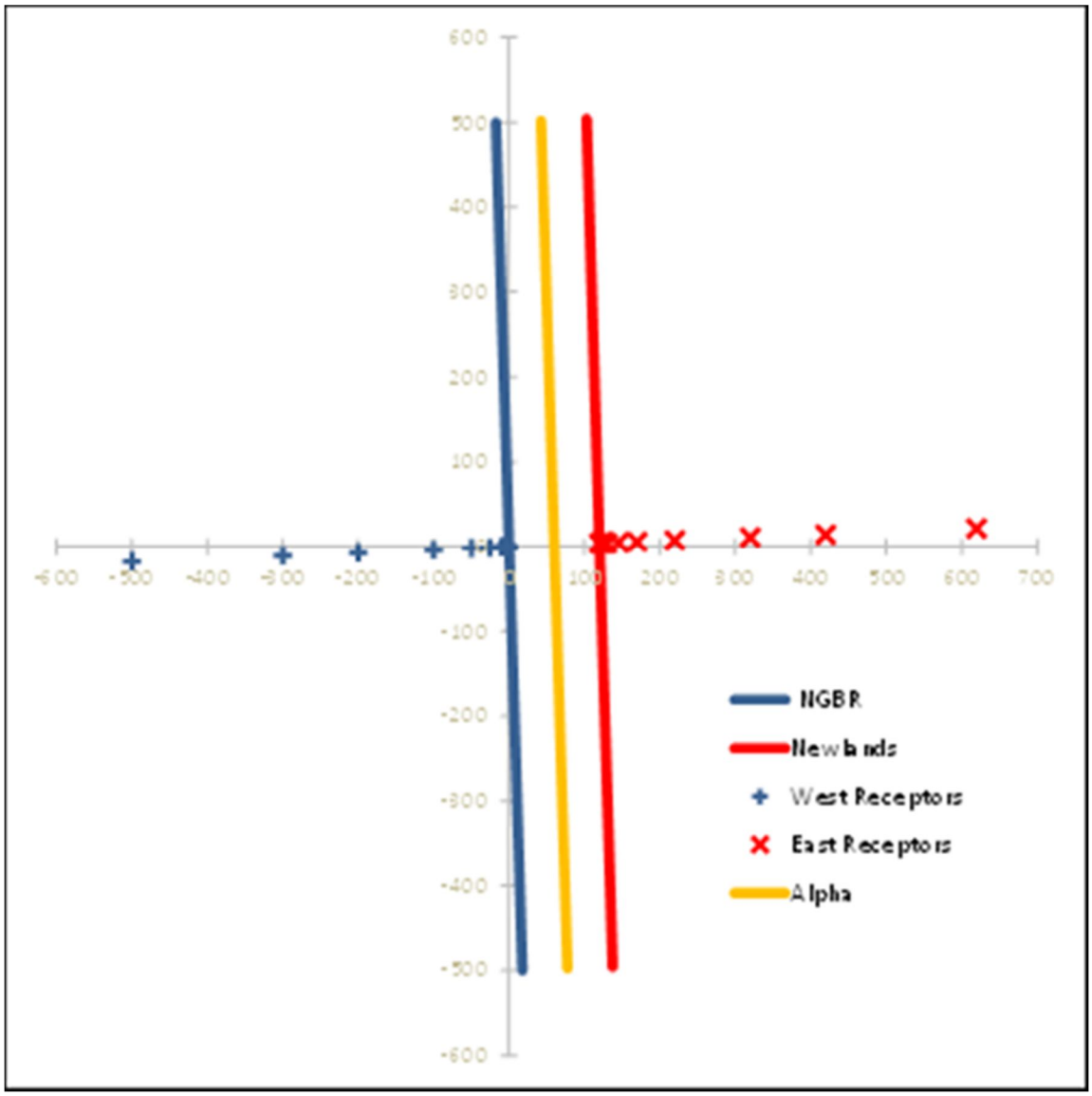


Figure 6 Homestead R2 model section

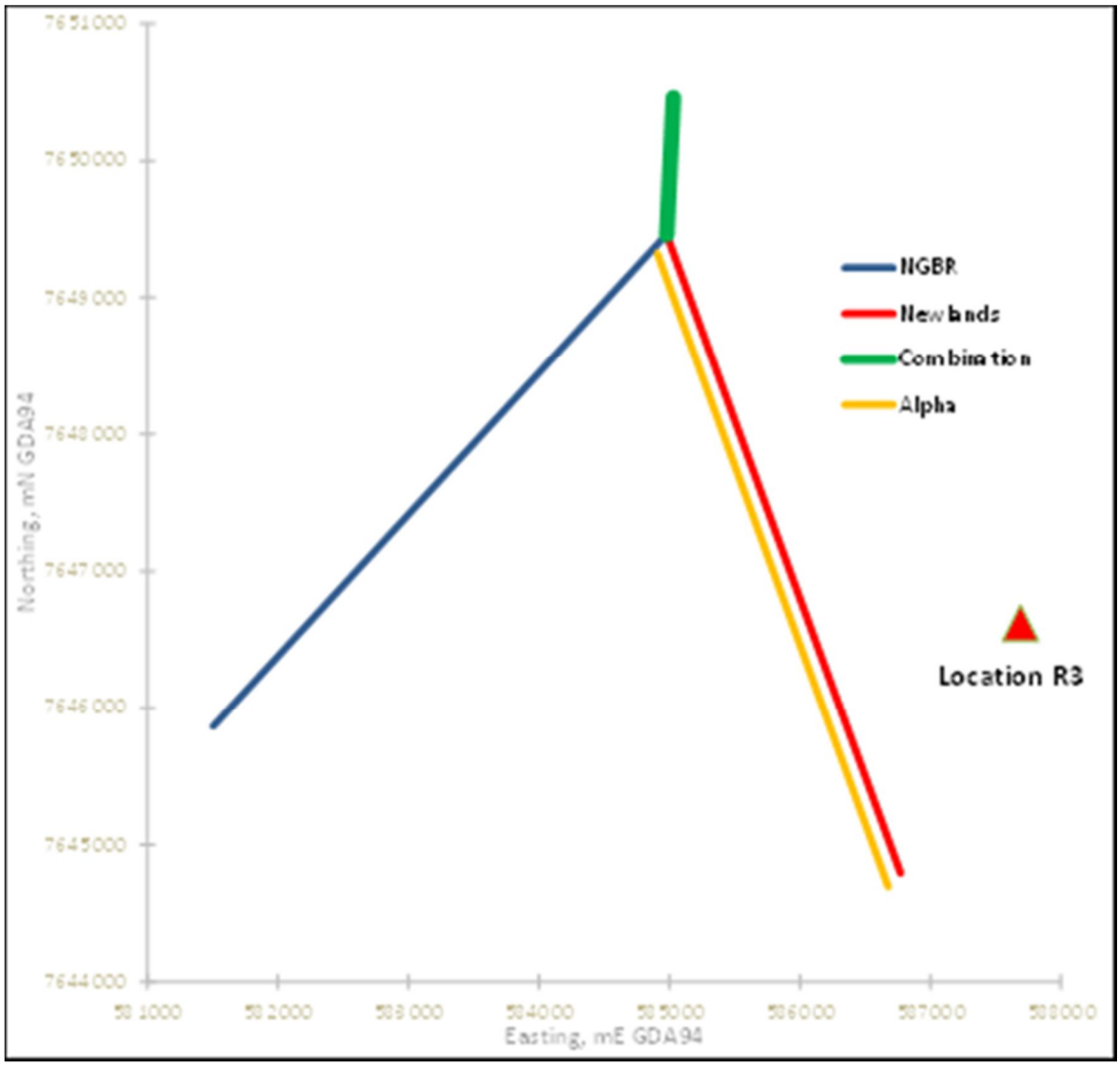
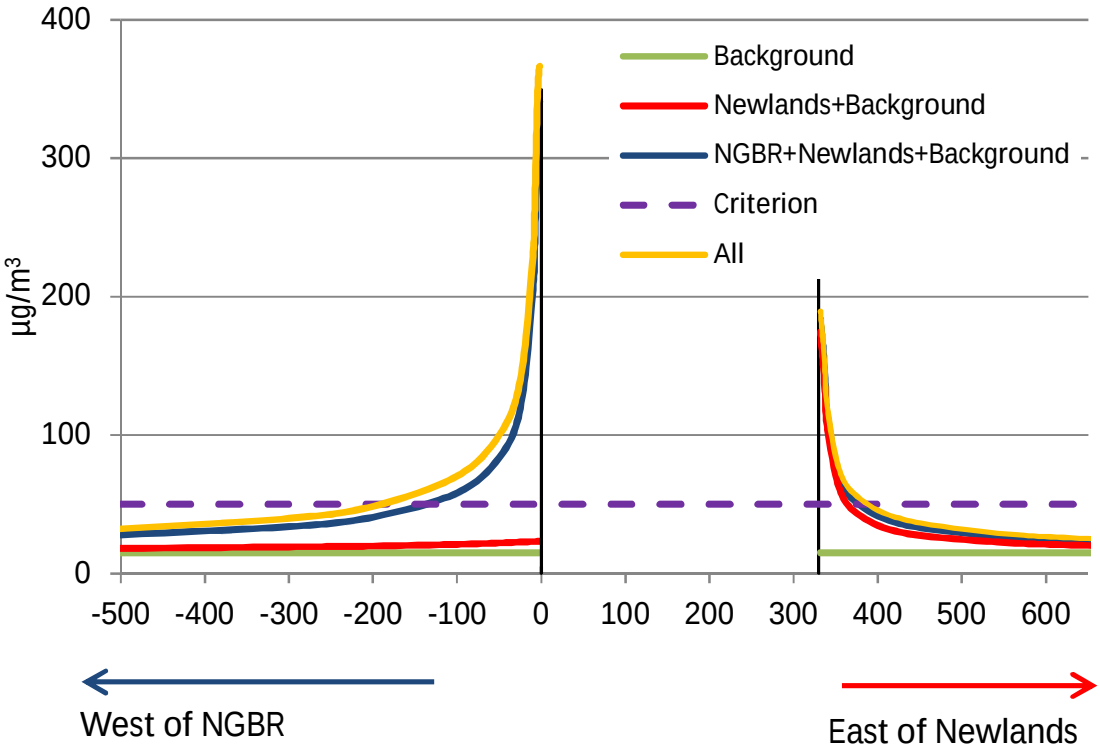


Figure 7 Homestead R3 model section

2.4.2 Homestead 16

2.4.2.1 PM10 and PM2.5

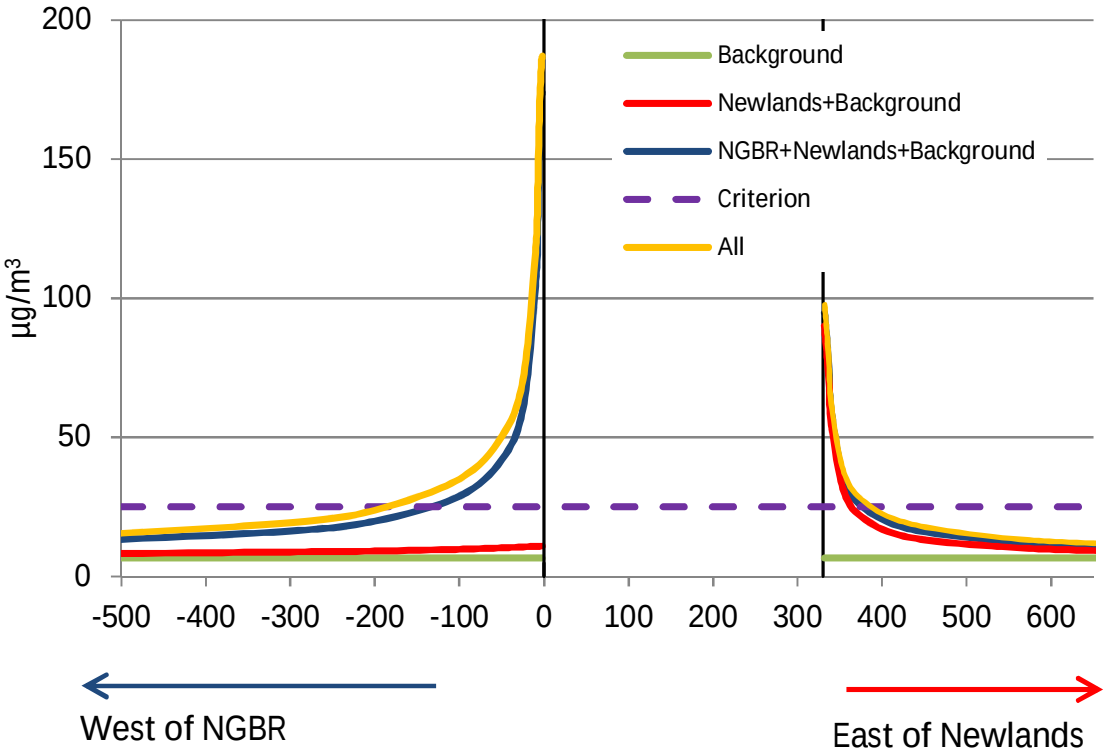
Figure 8 shows the predicated daily maximum PM_{10} concentrations to the east and west of the Homestead 16 model section (i.e. the boundary formed by the NGBR Project realignment on the west and the Newlands rail line on the east). The relevant objective of the Environmental Protection (Air) Policy 2008 is met within 200 m to the west and 100 m to the east. As Homestead 16 is 721 metres west of the model section, PM_{10} is expected to be well below the relevant objective.



Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 8 Predicted maximum daily-mean PM_{10} concentration in the vicinity of Homestead 16

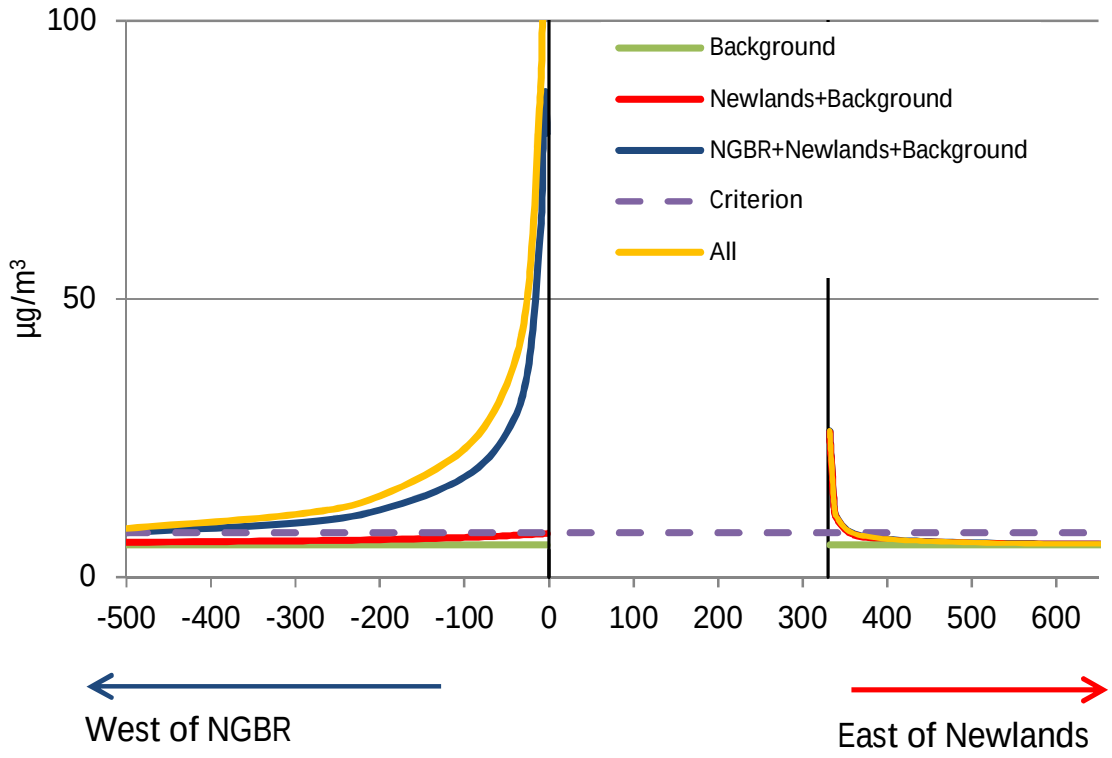
Figure 9 shows the finer $PM_{2.5}$ fraction maximum daily-averaged concentrations downwind of the east and west of the Homestead 16 model section. As with PM_{10}, the relevant objective of the Environmental Protection (Air) Policy 2008 is met within 200 m to the west and 100 m to the east. As Homestead 16 is 721 metres west of the model section, $PM_{2.5}$ is expected to be well below the relevant objective.



Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 9 Predicted maximum daily-mean $PM_{2.5}$ concentration in the vicinity of Homestead 16

Figure 10 provides the longer term view of an annual average. At 500 m west of the Homestead 16 model section, $PM_{2.5}$ is slightly above the annual criterion (8.8 µg/m3). However, at this location the background level is the major constituent, equalling 5.8 µg/m3. Nevertheless it is considered that $PM_{2.5}$ would be compliant with the relevant objective of the Environmental Protection (Air) Policy 2008 within 600 m and therefore at Homestead 16 721 m distant, where the objective applies. To reiterate, the distance to compliance is primarily due to high background levels relative to the annual criterion (see Table 4).To the east, compliance is achieved within approximately 100 m.

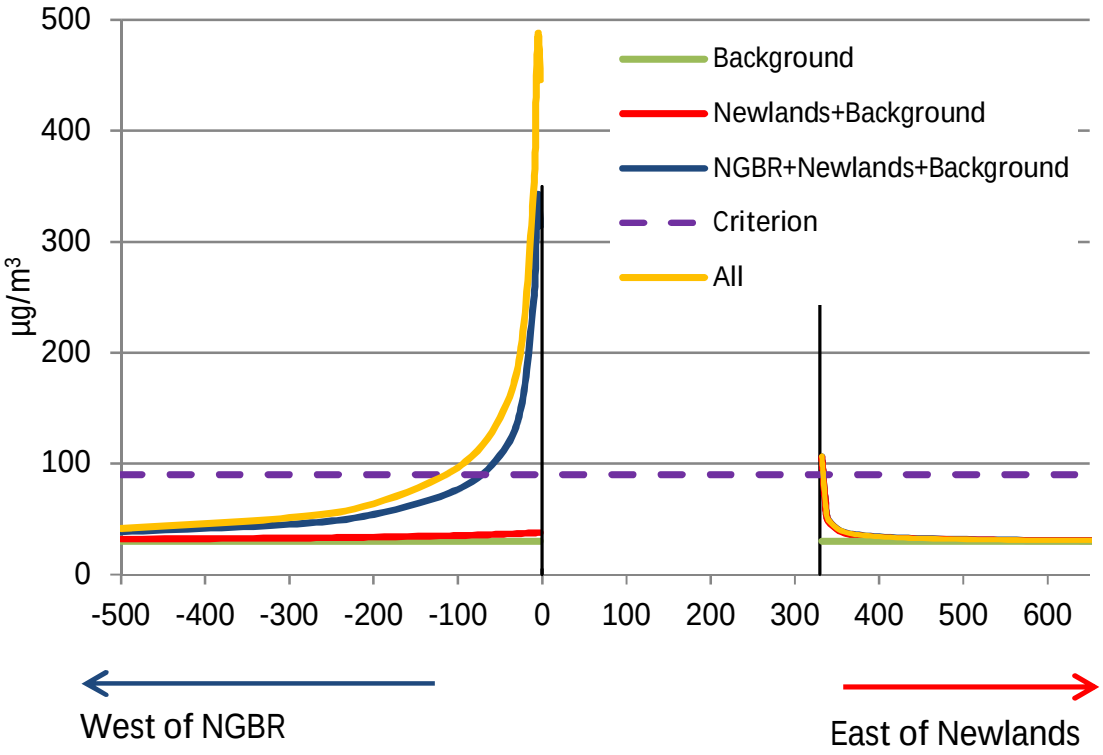


Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 10 Predicted annual $PM_{2.5}$ concentration in the vicinity of Homestead 16

2.4.2.2 Total suspended particulates

Figure 11 shows the total suspended particulate annual averaged concentrations. The relevant objective of the Environmental Protection (Air) Policy 2008 is met within 100 m to the west and 10 m to the east of the Homestead 16 model section. As Homestead 16 is 721 metres west of the model section, TSP is expected to be well below the relevant objective.

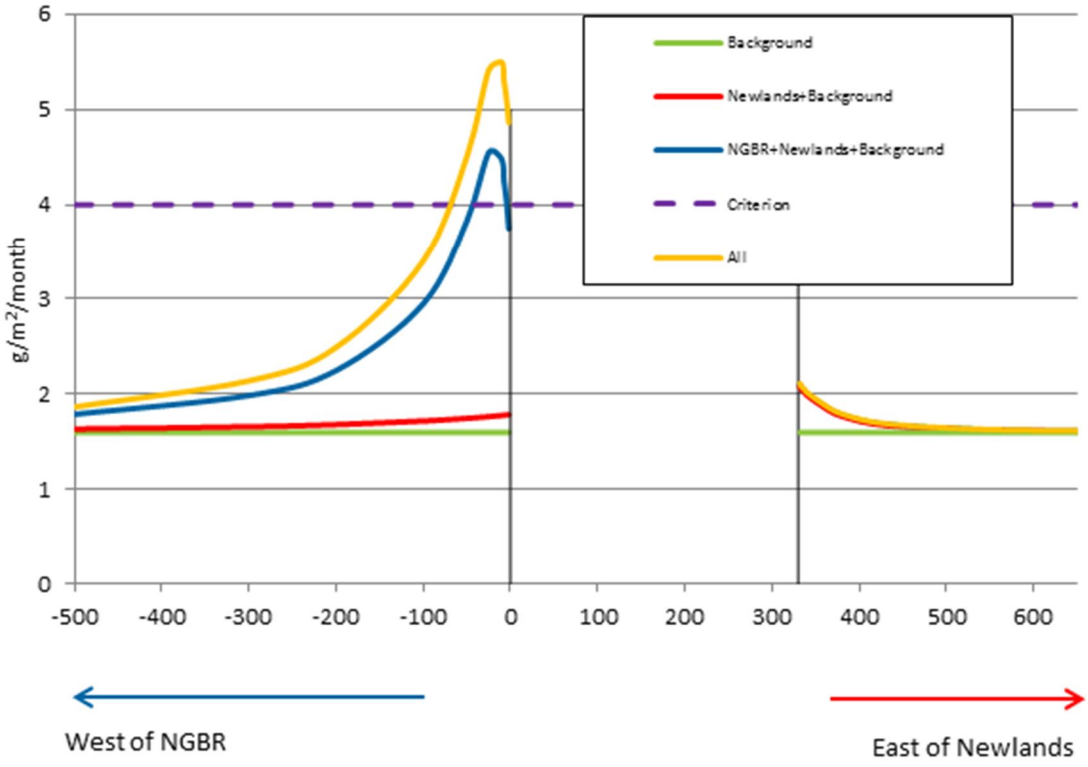


Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 11 Predicted annual TSP concentration in the vicinity of Homestead 16

2.4.2.3 Deposited dust

Figure 12 shows the annual dust deposition rate, dominated by the coal dust emissions but also containing some locomotive emissions. Dust deposition is compliant with the relevant air quality objective 100 m west of the Homestead 16 model section. It is also noted that dust deposition is compliant with the relevant air quality objective at the edge of the model section to the east. As Homestead 16 is 721 metres west of the model section, deposited dust is expected to be well below the relevant objective.



Note 1 – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 12 Predicted annual dust deposition rate in the vicinity of Homestead 16

2.4.2.4 Gaseous emissions

Concentrations of gaseous indicators are all predicted to be compliant with the relevant objectives of the Environmental Protection (Air) Policy 2008 within a few metres of the Homestead 16 model section (see Table 5 and Table 6).

Table 5 Predicted gaseous concentrations to the west of the Homestead 16 model section

Distance from NGBR (m)	Maximum hourly mean NO_2 ($\mu g/m^2$)	Annual mean NO_2 ($\mu g/m^2$)	Maximum hourly mean SO_2 ($\mu g/m^2$)	Maximum daily mean SO_2 ($\mu g/m^2$)	Annual mean SO_2 ($\mu g/m^2$)	8-hour maximum CO ($\mu g/m^2$)	Annual mean benzene ($\mu g/m^2$)	Maximum 30-minute formaldehyde ($\mu g/m^2$)	Maximum daily mean formaldehyde ($\mu g/m^2$)	Maximum 30-minute toluene ($\mu g/m^2$)	Maximum daily mean toluene ($\mu g/m^2$)	Annual mean toluene ($\mu g/m^2$)	Maximum daily mean xylene ($\mu g/m^2$)	Annual mean xylene ($\mu g/m^2$)
Criterion $\mu g/m^3$	**250**	**62**	**570**	**230**	**57**	**11000**	**10**	**110**	**54**	**1100**	**4100**	**410**	**1200**	**950**
-500	14	1	0.04	0.010	0.003	21	0.2	0.002	0.000	0.035	0.008	0.003	0.012	0.004
-300	19	2	0.05	0.014	0.006	29	0.4	0.003	0.001	0.045	0.011	0.005	0.017	0.007
-200	25	3	0.06	0.018	0.009	38	0.7	0.004	0.001	0.060	0.015	0.007	0.022	0.011
-100	37	7	0.09	0.030	0.017	60	1.3	0.006	0.001	0.089	0.024	0.014	0.036	0.021
-50	52	11	0.13	0.045	0.028	86	2.2	0.008	0.002	0.125	0.037	0.023	0.055	0.035
-25	74	17	0.19	0.065	0.044	125	3.4	0.011	0.003	0.178	0.053	0.036	0.080	0.053
-10	115	30	0.30	0.112	0.078	204	6.1	0.017	0.006	0.279	0.092	0.064	0.137	0.096
-7.5	142	37	0.37	0.134	0.096	249	7.5	0.021	0.007	0.343	0.110	0.078	0.164	0.117
-5	177	43	0.45	0.167	0.111	336	8.7	0.026	0.008	0.428	0.137	0.091	0.206	0.137
-3	191	41	0.49	0.182	0.107	370	8.3	0.029	0.009	0.462	0.149	0.087	0.223	0.131
-2	194	40	0.50	0.184	0.102	374	7.9	0.029	0.009	0.469	0.151	0.083	0.226	0.125

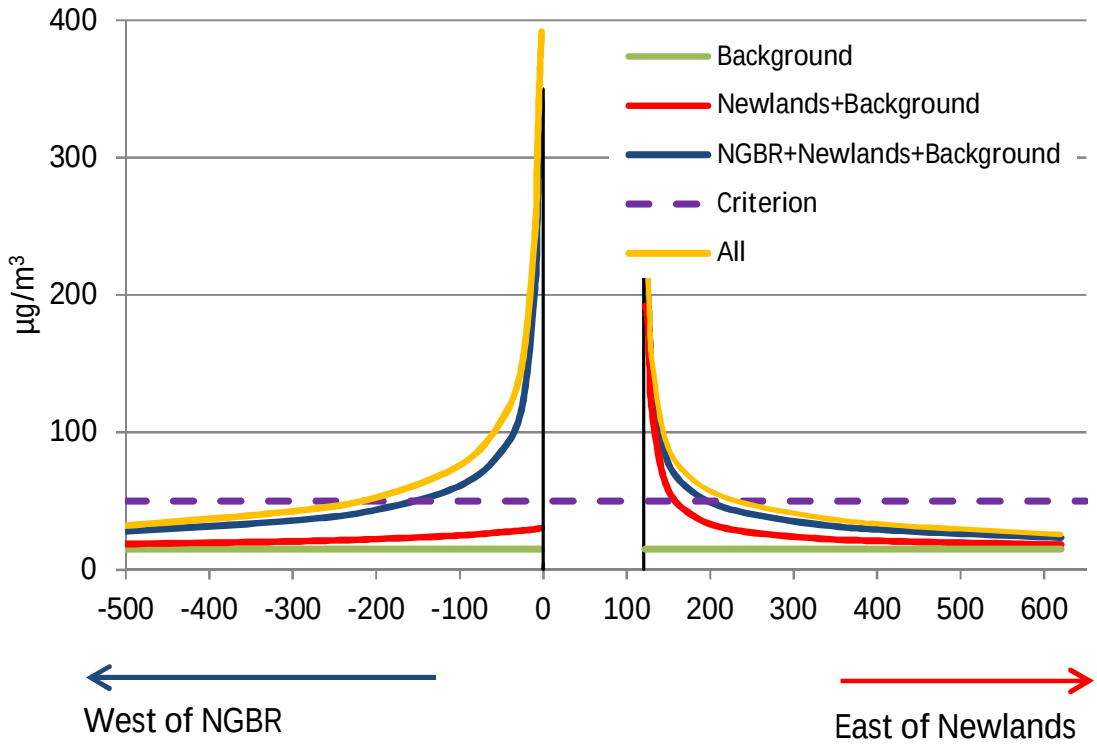
Table 6 Predicted gaseous concentrations to the east of the Homestead 16 model section

Distance from NGBR (m)	Maximum hourly mean NO_2 ($\mu g/m^2$)	Annual mean NO_2 ($\mu g/m^2$)	Maximum hourly mean SO_2 ($\mu g/m^2$)	Maximum daily mean SO_2 ($\mu g/m^2$)	Annual mean SO_2 ($\mu g/m^2$)	8-hour maximum CO ($\mu g/m^2$)	Annual mean benzene ($\mu g/m^2$)	Maximum 30-minute formaldehyde ($\mu g/m^2$)	Maximum daily mean formaldehyde ($\mu g/m^2$)	Maximum 30-minute toluene ($\mu g/m^2$)	Maximum daily mean toluene ($\mu g/m^2$)	Annual mean toluene ($\mu g/m^2$)	Maximum daily mean xylene ($\mu g/m^2$)	Annual mean xylene ($\mu g/m^2$)
Criterion $\mu g/m^3$	**250**	**62**	**570**	**230**	**57**	**11000**	**10**	**110**	**54**	**1100**	**4100**	**410**	**1200**	**950**
2	14	0.39	0.153	0.036	279	2.3	0.023	0.008	0.367	0.125	0.030	0.188	0.045	14
3	13	0.40	0.146	0.032	270	2.0	0.023	0.007	0.372	0.120	0.026	0.179	0.040	13
5	9	0.38	0.135	0.023	269	1.5	0.022	0.007	0.360	0.110	0.019	0.165	0.029	9
7.5	6	0.32	0.117	0.015	235	1.0	0.019	0.006	0.302	0.096	0.012	0.143	0.019	6
10	6	0.27	0.095	0.015	190	0.9	0.015	0.005	0.251	0.077	0.012	0.116	0.018	6
25	5	0.18	0.054	0.014	107	0.9	0.010	0.003	0.169	0.044	0.012	0.066	0.017	5
50	8	0.14	0.037	0.021	73	1.3	0.008	0.002	0.134	0.030	0.017	0.045	0.026	8
100	9	0.12	0.025	0.024	51	1.5	0.007	0.001	0.110	0.021	0.020	0.031	0.030	9
200	11	0.10	0.019	0.027	40	1.7	0.006	0.001	0.095	0.015	0.022	0.023	0.033	11
300	10	0.09	0.016	0.026	33	1.6	0.005	0.001	0.089	0.013	0.021	0.020	0.032	10
500	9	0.09	0.013	0.024	28	1.5	0.005	0.001	0.083	0.011	0.020	0.016	0.030	9

2.4.3 Homestead R2

2.4.3.1 PM10 and PM2.5

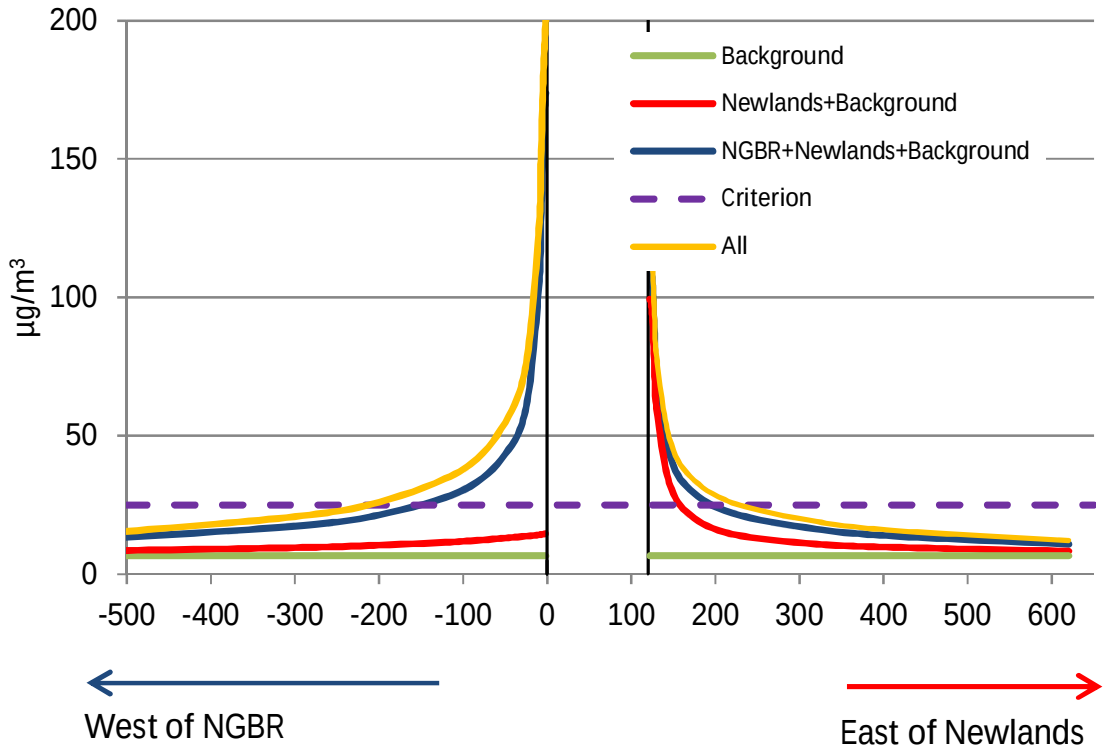
Figure 13 shows the predicated daily maximum PM_{10} concentrations to the east and west of the Homestead R2 model section. The relevant objective of the Environmental Protection (Air) Policy 2008 is met within approximately 230 m to the west and approximately 100 m to the east. As Homestead R2 is approximately 1 km east of the model section, PM_{10} is expected to be well below the relevant objective.



Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 13 Predicted maximum daily-mean PM_{10} concentration in the vicinity of Homestead R2

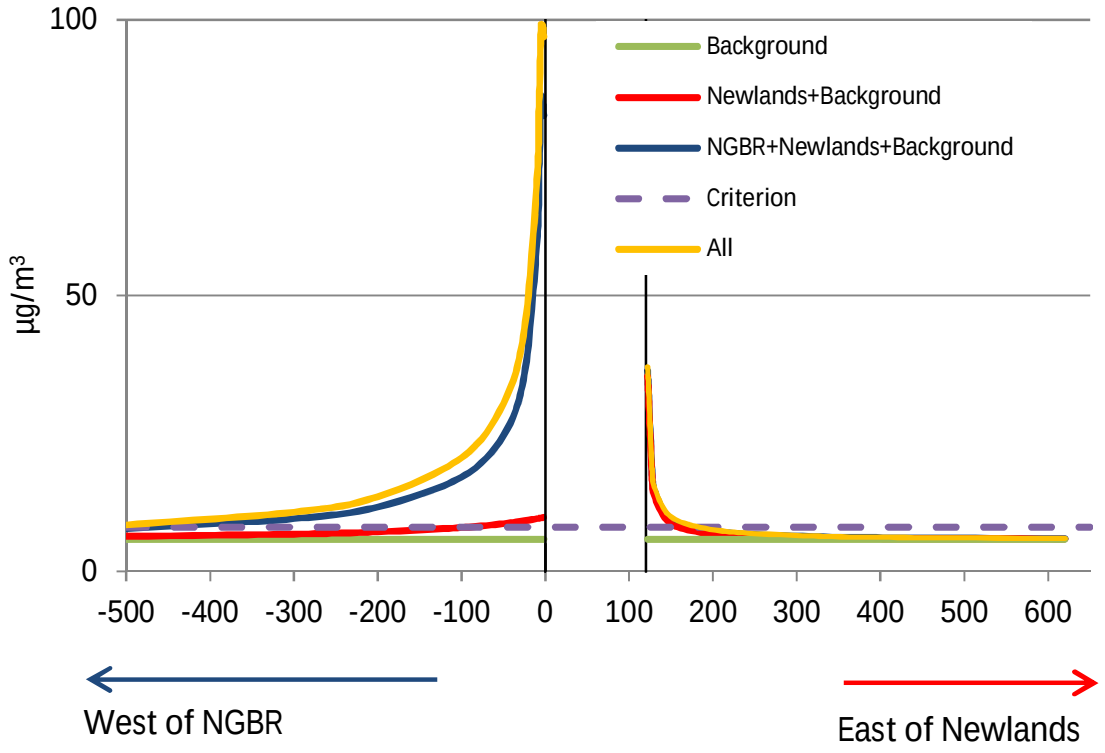
Figure 14 shows the finer $PM_{2.5}$ fraction maximum daily-averaged concentrations downwind of the east and west of the Homestead R2 model section. As with PM_{10}, the relevant objective of the Environmental Protection (Air) Policy 2008 is met within approximately 200 m to the west and approximately 100 m to the east. As Homestead R2 is approximately 1 km east of the model section, $PM_{2.5}$ is expected to be well below the relevant objective.



Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 14 Predicted maximum daily-mean $PM_{2.5}$ concentration in the vicinity of Homestead R2

Figure 15 provides the longer term view of an annual average. At 500 m west of the model section, $PM_{2.5}$ is slightly above the annual criterion (8.4 µg/m3). However, at this location the background level is the major constituent, equalling 5.8 µg/m3. Nevertheless it is considered that $PM_{2.5}$ would be compliant with the relevant objective of the Environmental Protection (Air) Policy 2008 within 600 m. To the east, compliance is achieved within approximately 100 m. As Homestead R2 is approximately 1 km east of the model section, $PM_{2.5}$ is expected to be below the relevant objective.

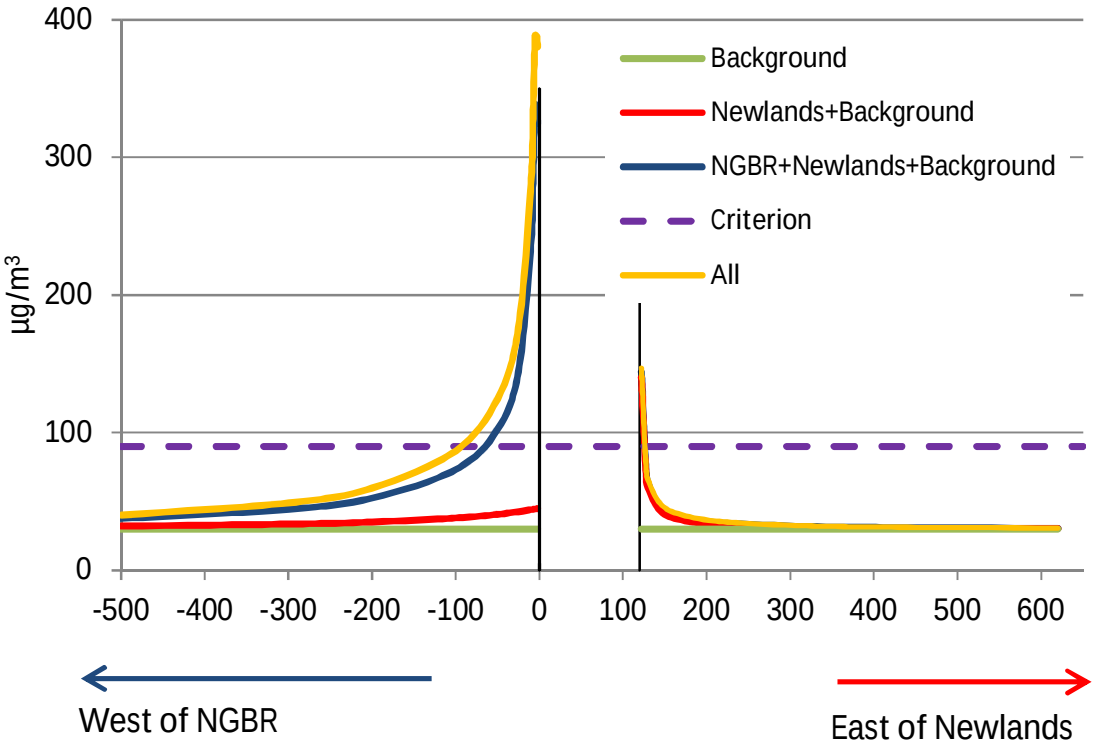


Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 15 Predicted annual $PM_{2.5}$ concentration in the vicinity of Homestead R2

2.4.3.2 Total suspended particulates

Figure 16 shows the total suspended particulate annual averaged concentrations. The relevant objective of the Environmental Protection (Air) Policy 2008 is met within 100 m to the west and 10 m to the east of the Homestead R2 model section. As Homestead R2 is approximately 1 km east of the model section, TSP is expected to be well below the relevant objective.

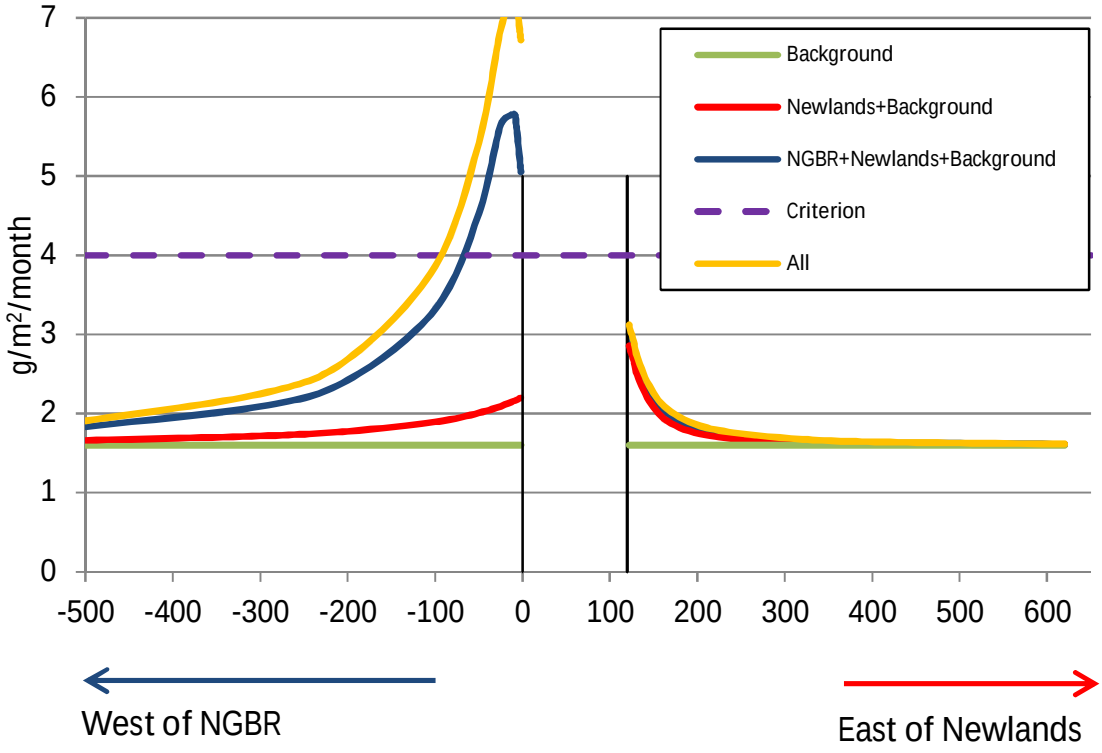


Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 16 Predicted annual TSP concentration in the vicinity of Homestead R2

2.4.3.3 Deposited dust

Figure 17 shows the annual dust deposition rate, dominated by the coal dust emissions but also containing some locomotive emissions. Dust deposition is compliant with the relevant air quality objective approximately 100 m west of the Homestead R2 model section. Dust deposition is compliant with the relevant air quality objective at the edge of the model section to the east. As Homestead R2 is approximately 1 km east of the model section, deposited dust is expected to be well below the relevant objective.



Note – 'All' in the above chart refers to the combined impact of the NGBR Project, Newlands rail line and Alpha Coal Project rail line in addition to background air quality

Figure 17 Predicted annual dust deposition rate in the vicinity of location R2

2.4.3.4 Gaseous emissions

Concentrations of gaseous indicators are all predicted to be compliant with the relevant objectives of the Environmental Protection (Air) Policy 2008 within a few metres of the Homestead R2 model section (see Table 7 and Table 8).

Table 7 Predicted gaseous concentrations to the west of Homestead R2 model section

Distance	Maximum hourly mean NO_2 ($\mu g/m^3$)	Annual mean NO_2 ($\mu g/m^3$)	Maximum hourly mean SO_2 ($\mu g/m^3$)	Maximum daily mean SO_2 ($\mu g/m^3$)	Annual mean SO_2 ($\mu g/m^3$)	8-hour maximum CO ($\mu g/m^3$)	Annual mean benzene ($\mu g/m^3$)	Maximum 30-minute formaldehyde ($\mu g/m^3$)	Maximum daily mean formaldehyde ($\mu g/m^3$)	Maximum 30-minute toluene ($\mu g/m^3$)	Maximum daily mean toluene ($\mu g/m^3$)	Annual mean toluene ($\mu g/m^3$)	Maximum daily mean xylene ($\mu g/m^3$)	Annual mean xylene ($\mu g/m^3$)
Criterion $\mu g/m^3$	**250**	**62**	**570**	**230**	**57**	**11000**	**10**	**110**	**54**	**1100**	**4100**	**410**	**1200**	**950**
-500	15	1	0.04	0.010	0.003	24	0.2	0.002	0.000	0.035	0.008	0.002	0.012	0.004
-300	20	2	0.05	0.016	0.005	37	0.4	0.003	0.001	0.049	0.013	0.004	0.019	0.007
-200	26	3	0.07	0.021	0.008	47	0.6	0.004	0.001	0.062	0.017	0.007	0.026	0.010
-100	40	6	0.10	0.034	0.016	73	1.2	0.006	0.002	0.096	0.028	0.013	0.041	0.019
-50	60	10	0.15	0.051	0.026	105	1.9	0.009	0.003	0.145	0.041	0.021	0.062	0.031
-25	87	15	0.22	0.072	0.039	150	3.0	0.013	0.004	0.211	0.059	0.032	0.088	0.048
-10	142	26	0.36	0.120	0.066	239	5.2	0.021	0.006	0.343	0.098	0.054	0.148	0.081
-7.5	170	31	0.44	0.145	0.079	290	6.3	0.025	0.007	0.412	0.119	0.065	0.179	0.097
-5	208	37	0.54	0.173	0.094	383	7.6	0.031	0.009	0.503	0.142	0.077	0.213	0.116
-3	224	37	0.58	0.189	0.094	416	7.5	0.034	0.010	0.543	0.154	0.077	0.232	0.115
-2	230	36	0.59	0.196	0.092	419	7.3	0.034	0.010	0.557	0.160	0.075	0.241	0.113

Table 8 Predicted gaseous concentrations to the east of Homestead R2 model section

Distance	Maximum hourly mean NO_2 ($\mu g/m^2$)	Annual mean NO_2 ($\mu g/m^2$)	Maximum hourly mean SO_2 ($\mu g/m^2$)	Maximum daily mean SO_2 ($\mu g/m^2$)	Annual mean SO_2 ($\mu g/m^2$)	8-hour maximum CO ($\mu g/m^2$)	Annual mean benzene ($\mu g/m^2$)	Maximum 30-minute formaldehyde ($\mu g/m^2$)	Maximum daily mean formaldehyde ($\mu g/m^2$)	Maximum 30-minute toluene ($\mu g/m^2$)	Maximum daily mean toluene ($\mu g/m^2$)	Annual mean toluene ($\mu g/m^2$)	Maximum daily mean xylene ($\mu g/m^2$)	Annual mean xylene ($\mu g/m^2$)
Criterion $\mu g/m^3$	**250**	**62**	**570**	**230**	**57**	**11000**	**10**	**110**	**54**	**1100**	**4100**	**410**	**1200**	**950**
2	163	21	0.42	0.177	0.053	316	3.4	0.024	0.009	0.395	0.145	0.044	0.218	0.066
3	164	19	0.42	0.177	0.049	305	3.1	0.024	0.009	0.397	0.145	0.040	0.218	0.060
5	154	14	0.40	0.168	0.036	295	2.3	0.023	0.008	0.372	0.137	0.029	0.206	0.044
7.5	128	9	0.33	0.138	0.022	250	1.4	0.019	0.007	0.311	0.113	0.018	0.170	0.028
10	113	7	0.29	0.114	0.019	211	1.2	0.017	0.006	0.274	0.093	0.016	0.140	0.023
25	86	5	0.22	0.069	0.013	139	0.8	0.013	0.003	0.207	0.056	0.011	0.084	0.016
50	79	5	0.20	0.050	0.012	100	0.8	0.012	0.003	0.191	0.041	0.010	0.062	0.015
100	71	4	0.18	0.038	0.010	78	0.7	0.011	0.002	0.172	0.031	0.009	0.046	0.013
200	67	4	0.17	0.030	0.010	66	0.6	0.010	0.002	0.162	0.025	0.008	0.037	0.012
300	67	4	0.17	0.028	0.010	61	0.7	0.010	0.001	0.162	0.023	0.008	0.034	0.013
500	66	4	0.17	0.024	0.010	52	0.7	0.010	0.001	0.159	0.020	0.009	0.030	0.013

2.4.4 Homestead R3

2.4.4.1 PM10 and PM2.5

Figure 18 shows the combined effects of the predicted worst case day of PM_{10} impact at Homestead R3. Background concentration dominates the predicted PM_{10}, with each of the respective emissions sources contributing two or less micrograms per cubic metre. Figure 18 demonstrates that Homestead R3 is below the relevant air quality objective of the Environmental Protection (Air) Policy 2008. Figure 19 shows a similar trend for $PM_{2.5}$ both for worst-case daily averages and the annual impact, also demonstrating that Homestead R3 is below the relevant air quality objective.

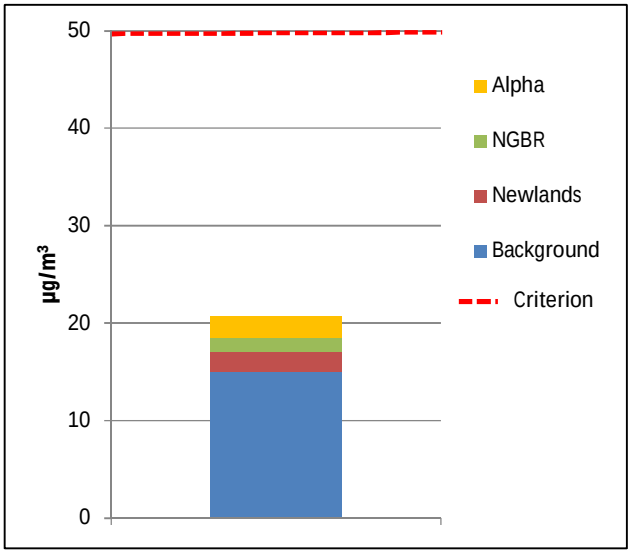


Figure 18 Predicted maximum daily average PM_{10} at Homestead R3

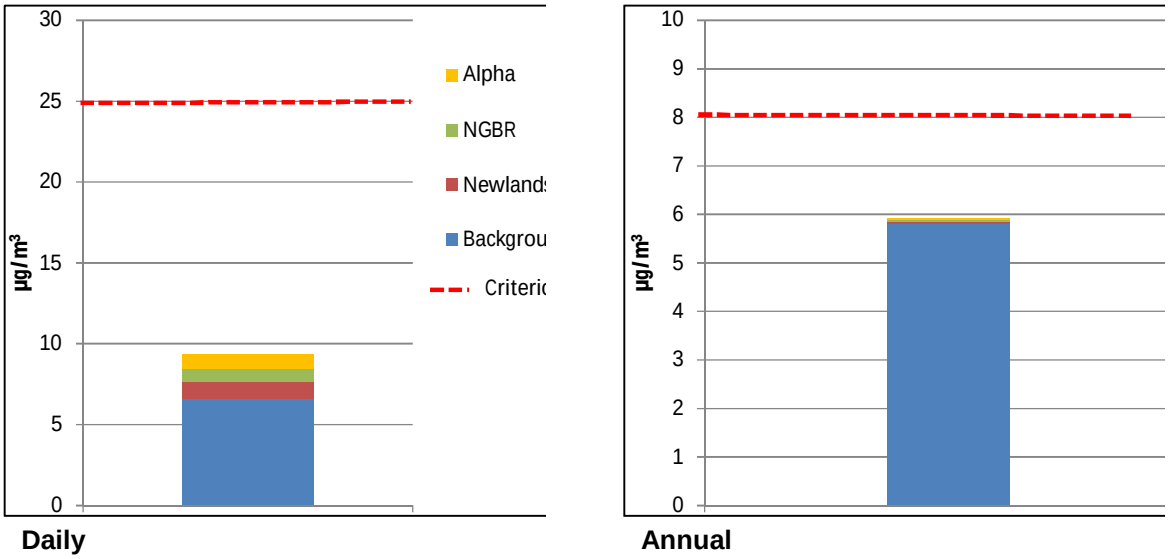


Figure 19 Predicted maximum daily average and annual $PM_{2.5}$ at location R3

2.4.4.2 Total suspended particulates

Figure 20 again shows background concentrations of TSP domination, with relatively negligible contributions from the Newlands rail line (0.18 µg/m^3), Alpha Coal Project rail line (0.15 µg/m^3) and NGBR Project realignment (0.03 µg/m^3). Figure 20 demonstrates that Homestead R3 is below the relevant air quality objective of the Environmental Protection (Air) Policy 2008.

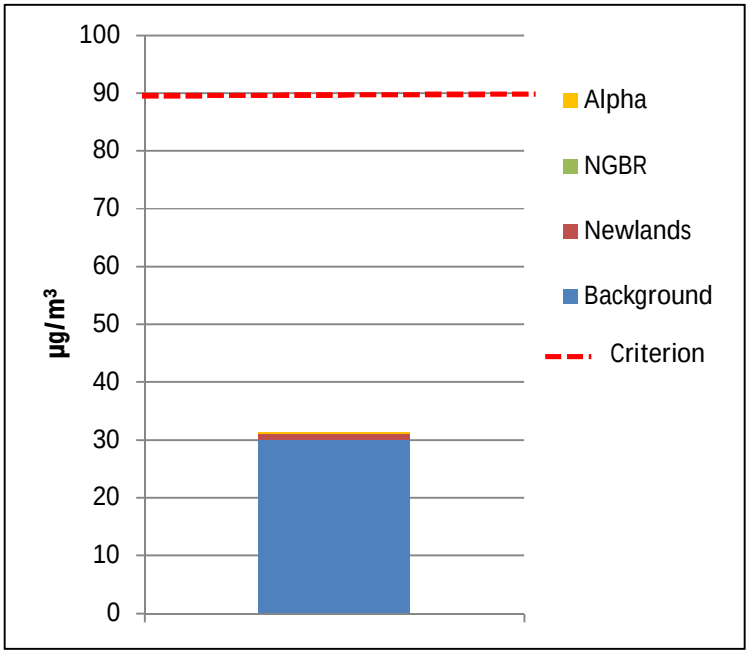


Figure 20 Predicted annual average TSP at location R3

2.4.4.3 Gaseous emissions and deposited dust

As demonstrated for Homestead 16 and Homestead R2, gaseous emissions and deposited dust are expected to be compliant with the relevant criteria within a very short distance to the east. These findings are considered representative for Homestead R3, which is therefore considered compliant with the relevant air quality objectives for TSP and deposited dust.

2.4.5 Homestead R4

Homestead R4 is located approximately 1.5 km to the west of Newlands rail line and 1.5 km east of the Alpha Coal Project rail line, but is approximately 8 km east of NGBR Project realignment. It is therefore considered that the air quality impacts from the NGBR Project realignment at this receptor are negligible. With regard to the Newlands rail line, potential impacts at Homestead R4 are likely to be lower than those predicted at Homestead 16. With regard to the Alpha Coal Project rail line, potential impacts at Homestead R4 are likely to be lower than those predicted at Homestead R2. As Homestead 16 and Homestead R2 are closer than 1.5 km to their respective model sections, it is considered very unlikely that air quality objectives would be exceeded at Homestead R4 under the model conditions.

2.5 Mitigation and management measures

As stated in Section 9.4.3 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report and Volume 2 Appendix G Revised commitments, Adani commit to managing coal dust in a manner consistent with the Aurizon Coal Dust Management Plan (2010).

Typical measures include wagon loading systems, veneering and coal dust monitoring. These measures will be considered by Adani in developing the coal dust management plan for the NGBR Project.

Based on the result of this assessment, it is not envisaged that monitoring of coal dust at sensitive receptors will be required. However, the coal dust management plan will include a provision to implement coal dust monitoring in the event of a complaint.

2.6 Conclusion

Air quality assessment of the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line indicates that PM_{10}, $PM_{2.5}$, TSP, deposited dust and gaseous emissions will be compliant with the relevant air quality objectives at identified sensitive receptors. These conclusions are consistent with NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

As is common and expected in a wind climate dominated by south-east trade winds, the impacts were found to be greater to the west of emissions sources. PM^{10}, $PM_{2.5}$, TSP and deposited dust were generally met within approximately 200 m of the nearest emissions source. The distance to compliance for the $PM_{2.5}$ annual objective was greater, being achieved within 600 m; However, this was primarily due to the high background concentrations relative to the annual criterion. Gaseous emissions were orders of magnitude lower than the relevant objectives at less than 10 m from the emissions source.

3 Noise & vibration

3.1 Introduction

3.1.1 Background

As described in the Additional Information to the NGBR Project Environmental Impact Statement (AEIS), the NGBR Project realignment occurs between chainages 128.2 km and 205.3 km. The NGBR Project realignment coincides with the approved Alpha Coal Project for approximately 64 km and travels parallel the existing Aurizon-owned Newlands line for approximately 57 km, at a distance of approximately 50 m.

An assessment of the noise and vibration impacts of the NGBR Project realignment in combination with the Newlands line was included in Section 10 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The following material therefore represents the addition of the proposed Alpha Coal Project rail line to the previous assessment.

The NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line are shown in Figure 1.

3.1.2 Purpose

The purpose of this assessment is to assess the potential noise impacts of the NGBR Project realignment in a scenario where the emissions are combined with those arising from the existing Newlands rail line and the proposed Alpha Coal Project rail line.

As requested by the Office of the Coordinator-General, this material has been prepared with regard to the strategic vision and objectives for the Galilee Basin State Development Area, which are discussed in Section 6.

3.2 Methodology

3.2.1 Overview

The methodology for this assessment is as described in Section 10.2 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. As such, the assessment proceeded as follows:

- Describe existing noise and vibration based on attended and unattended monitoring undertaken for NGBR Project EIS Volume 1 Chapter 12 Noise and vibration
- Identify appropriate noise and vibration objectives (see Section 3.2.3)
- Identify noise emissions using a noise model (CadnaA)
- Estimate vibration emissions using distant loss calculations
- Assess the combined impact of emissions at identified sensitive receptors (see Section 3.2.2).

It is noted that a number of noise model parameters were selected to present a ‘worst case’ scenario for noise impacts during operation (notably that the NGBR Project realignment was modelled as operating without any mitigation in place at any sensitive receptor).

Further details of the noise model setup are provided in Section 10.2.4 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

3.2.2 Identified sensitive receptors

As per the NGBR Project AEIS, the nearest potentially affected sensitive receptors were identified within approximately six kilometres of the NGBR Project realignment (see Figure 1). Potential noise and vibration impacts of the NGBR Project realignment are likely to be negligible at a distance of greater than six kilometres. As the scope of this assessment is to assess the impacts of the NGBR Project realignment, in combination with the Newlands rail line and Alpha Coal Project rail line, this methodology is considered appropriate. As such, no additional sensitive receptors were identified.

3.2.3 Noise and vibration objectives

As per Section 10.2.3 of NGBR Project AEIS, noise and vibration objectives were determined with reference to the relevant legislative instruments including those identified in the terms of reference for the NGBR Project. The relevant legislative instruments include:

- *Environmental Protection Act 1994*
- Environmental Protection (Noise) Policy 2008
- Rail Infrastructure Noise Guideline (NSW)
- British Standard 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting
- Noise and vibration objectives are listed in Table 9.

The acoustic quality objectives of the *Environmental Protection (Noise) Policy 2008* do not apply to noise from the ordinary use of rail transport infrastructure. As such, the Rail Infrastructure Noise Guideline, administered by the NSW Environment Protection Authority was applied. The Rail Infrastructure Noise Guideline has been recognised by administering authorities in Queensland as being suitable for the assessment of similar projects.

Table 9 Noise and vibration quality objectives

Emission type	Timeframe	Objective
Noise[1]	Monday to Sunday 7 am to 10 pm	60 dB $L_{Aeq,15\ hour}$
		80 dB L_{AFmax}
	Monday to Sunday 10 pm to 7 am	55 dB $L_{Aeq,\ 9\ hour}$
		80 dB L_{AFmax}
Vibration[2]	Monday to Sunday 7 am to 11 pm	Low probability for adverse comment: 0.2 to 0.4 $m/s^{1.75}$
	Monday to Sunday 11 pm to 7 am	Low probability for adverse comment: 0.1 to 0.2 $m/s^{1.75}$

[1] Rail Infrastructure Noise Guideline

[2] British Standard 6472-1:2008

It is noted that the Rail Infrastructure Noise Guideline is more stringent than the comparable Queensland Rail Code of Practice for Railway Noise Management. The objectives under the less stringent Queensland Rail Code of Practice for Railway Noise Management are 65 dB $L_{Aeq,24h}$ and 87 dB L_{Amax}. A comparison against the Queensland Rail Code of Practice for Railway Noise Management has been included in Section 3.4.1 for completeness.

The rationale for selecting noise and vibration objectives is further detailed in Section 4.1 and Section 4.3 of NGBR Project EIS Volume 2 Appendix J Noise and vibration.

3.2.4 Emissions sources

Table 10 details the emissions sources considered in the assessment. The description of the NGBR Project realignment and the Newlands rail line are consistent with Section 10.2.4 of NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The description of the Alpha Coal Project rail line is based on the Alpha Coal Project EIS (Hancock Prospecting 2010) and consultation with the Office of the Coordinator-General.

Table 10 Emissions sources

Parameter	NGBR Project realignment	Newlands rail line	Alpha Coal Project rail line
Locomotive type	5000 bhp diesel	4000 bhp diesel	4,400 bhp diesel
Manufacturing Standard	Tier 0	Tier 0	Tier 0
Number of locomotives per consist	4	3	3
Number of wagons per consist	240	82	234
Payload per wagon	108 t	106 t	106 t
Total payload per train	25,920 t	8,692 t	24,000 t
Payload per annum	100 mtpa	50 mtpa	60 mtpa
Loaded trains per day	14	21	7
Unloaded trains per day	14	21	7
Train speed (loaded)	80 km/hr	80 km/hr	80 km/hr
Train speed (unloaded)	100 km/hr	80 km/hr	80 km/hr

3.3 Existing environment

3.3.1 Sensitive receptors

The identified sensitive receptors are mapped in Figure 1 and listed in Table 11. All of the identified sensitive receptors are homesteads. Prior to the NGBR Project realignment, Homestead 17 was approximately 2,772 m from the NGBR Project. Homestead 17 was included in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report to demonstrate changes to impacts from those described in the NGBR Project EIS. It is included here for consistency with those earlier assessments.

Table 11 Sensitive receptors

Sensitive receptor	Distance from NGBR Project realignment[1]
Homestead 16	721 m
Homestead 17[2]	10,932 m
Homestead 18	6,485 m
Homestead R1	2,938 m
Homestead R2	1,062 m
Homestead R3	3,764 m
Homestead R4	7,825 m

[1] Measured from nearest edge of final rail corridor to the homestead, represented as a point in GIS

3.3.2 Noise and vibration monitoring

Background noise monitoring was undertaken at four locations for the NGBR Project. As described in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, background noise monitoring at Homestead 17 (Location C) is considered representative for the region of the NGBR Project realignment. The results of background noise monitoring at Homestead 17 are presented in Table 12.

Table 12 Noise and vibration monitoring

Measurement	Period	Result
Background noise	Day	21 L_{A90} dB(A)
	Evening	30 L_{A90} dB(A)
	Night	20 L_{A90} dB(A)
Ambient noise	Day	49 L_{Aeq} dB(A)
	Evening	40 L_{Aeq} dB(A)
	Night	39 L_{Aeq} dB(A)
Vibration	Day	0.093 mm/s

3.4 Potential impacts

3.4.1 Noise model results

The results of noise modelling for the combined operation scenario of the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line are presented in Table 13. Sensitive receptors that exceed the Rail Infrastructure Noise Guideline (see Section 3.2.3) are underlined.

Predicted noise levels comply with the Rail Infrastructure Noise Guideline objectives at the majority of sensitive receptors. Homestead 16 is predicted to exceed the day and night L_{Aeq} objective while Homestead R2 is predicted to exceed the night L_{Aeq} objective. It is noted that the L_{AFmax} objective for the maximum predicted noise level as a train passes a sensitive receptor would not be exceeded.

It is noted that no sensitive receptors are predicted to exceed Rail Infrastructure Noise Guideline objectives that were not previously reported in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. Predicted noise levels at sensitive receptors exceeding the Rail Infrastructure Noise Guideline have increased by approximately 1 dB. It is further noted that none of the identified sensitive receptors exceed the Queensland Rail Code of Practice for Railway Noise Management (Table 13).

Table 13 Model results (includes +2.5dB façade correction)

Sensitive receptor	Day (dB $L_{Aeq, 15h}$)[a]	Night (dB $LA_{eq,9h}$)[b]	24 hours (dB $LA_{eq,24}$)[c]	Maximum (dB L_{AFmax})[d]
Homestead 16	62.2	61.9	62.1	73.6
Homestead 17	32.1	31.9	32.0	35.3
Homestead 18	37.9	37.7	37.8	44.1
Homestead R1	49.6	49.3	49.5	58.6
Homestead R2	60.0	59.8	60.0	70.0
Homestead R3	53.8	53.7	53.8	64.7
Homestead R4	53.3	53.2	53.2	65.2

[a] Rail Infrastructure Noise Guideline objective is 60 dB $L_{Aeq,15hr}$
[b] Rail Infrastructure Noise Guideline objective is 55 dB $L_{Aeq,9hr}$
[c] Queensland Rail Code of Practice for Railway Noise Management objective is 65 dB $L_{Aeq,24h}$
[d] Rail Infrastructure Noise Guideline objective is 80 dB L_{AFmax}; Queensland Code of Practice for Railway Noise Management objective is 87 dB L_{Amax}

3.4.2 Vibration impacts

As stated in Section 10.4.2 of NGBR Project AEIS, vibration monitoring was undertaken for coal trains in the Hunter Valley of a similar type to those assessed for NGBR Project, Newlands rail line and Alpha Coal Project rail line (Hunter8 Alliance 2010). The monitoring indicated a low probability of exceeding British Standard 6472-1:2008 (see Section 3.2.3) beyond 50 m from the emissions source. The monitoring also indicated no appreciable difference between single and simultaneous train movements.

As the nearest sensitive receptor is 721 m distant, vibration levels from the NGBR Project would be negligible and would not interact with vibration from the Newlands rail line or Alpha Coal Project rail line. Furthermore, cuts and fills would likely have a mitigating effect on vibration propagation due to increased travel distance of vibration to a receptor and, in the case of fills, increased dampening of vibration.

3.5 Mitigation and management measures

As stated in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, Adani commit to operational noise monitoring at Homestead 16 and Homestead R2 to validate the predictions.

As committed in NGBR Project AEIS Volume 2 Appendix G Revised commitments, Adani will consult with the Department of Environment and Heritage Protection regarding noise standards to apply in operational noise monitoring.

Where operational noise monitoring exceeds the agreed noise standard, mitigation and management measures will be considered. Mitigation and management measures may include construction of noise barriers or building works at sensitive receptors.

3.6 Conclusion

Noise modelling of a scenario including the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line indicates that the Rail Infrastructure Noise Guideline will be exceeded at Homestead 16 and Homestead R2. It is noted that none of the predicted noise levels exceed the less stringent Queensland Rail Code of Practice for Railway Noise Management. Vibration impacts are expected to be negligible. These conclusions are consistent with NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

As stated in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, Adani commit to operational noise monitoring at Homestead 16 and Homestead R2 to validate predictions.

4 Surface water

4.1 Overview

As presented in Section 8 of the NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report, the assessment of waterway crossings and potential treatments at cross-drainage structures for the NGBR Project realignment included evaluation of desktop information relating to the Alpha Coal Project SEIS (Hancock Prospecting 2011).

A hydrology and hydraulics assessment was undertaken for the NGBR Project to assess the impacts of cross drainage structures of surface water flow and flooding. This assessment will continue to be refined during detailed design of the NGBR Project. An hydrology and hydraulics assessment has since been completed for the NGBR Project realignment, and indicated that the hydraulic design criteria as outlined in the NGBR Project AEIS Volume 2 Appendix B Revised project description (refer Tables 2-11 and 2-12) remains suitable to, and will be complied with in all locations, by the NGBR Project realignment. In addition, property scale flood mapping for affected landholders has been prepared and consulted upon in regard to the NGBR Project realignment with landholders impacted by the NGBR Project realignment.

The crossings (culverts and bridges) proposed for the NGBR Project realignment are consistent with the configurations and design criteria proposed in the NGBR Project AEIS as well as the design criteria originally proposed in the NGBR Project EIS (refer Tables 2-11 and 2-12 in NGBR Project EIS Volume 1 Chapter 2 Project description). In addition, the proposed NGBR Project realignment crossing configurations are consistent with the existing Newlands line.

4.2 Potential impacts

The impacts of the NGBR Project, including the NGBR Project realignment, on water resources are expected to be relatively minor and temporary. Cumulative hydraulic and hydrologic impacts also have the potential to occur where the NGBR Project realignment runs parallel to the Newlands line and Northern Missing Link, due to their respective waterway crossing treatments. All crossing structures for the NGBR Project, including the NGBR Project realignment, will be required to meet the relevant design criteria (refer NGBR Project AEIS Volume 2 Appendix B Revised project description).

It is considered that there is limited opportunity for cumulative hydrological and hydraulic impacts arising from a scenario where three rail lines are operating and/or under construction in the vicinity of the NGBR Project realignment simultaneously, particularly where the following criteria are implemented by all parties:

- Flood immunity criteria for below-rail infrastructure are maintained (or bettered) consistent with the existing Newlands line in this locale
- The same sized (and/or over-sized) culvert and/or bridge structures are included in design of rail infrastructure downstream of the existing Newlands line in accordance with configurations present in the existing Newlands line
- Erosion and sediment controls are implemented by the respective proponents within each respective rail corridor during construction and operation, consistent with the International Erosion Control Association (Australasia) *Best Practice Erosion and Sediment Control* document.

Potential impacts during construction will be bound to specific locations or timeframes and are thus unlikely to interact with similar impacts from the existing Newlands line and/or proposed

Alpha Coal Project. In addition, should both the NGBR Project and the proposed Alpha Coal Project be under construction simultaneously within the vicinity of the NGBR Project realignment (a scenario that is considered unlikely), this may have benefits to downstream surface water quality in regard to there being only one period of potential for increased erosion and sedimentation rather than two-separate periods of such potential for impacts (i.e. where the proposed projects are constructed separately in time); albeit the potential for adverse impacts will be low if the above-listed criteria are implemented by all parties.

The potential for impacts on the hydrologic regime of the area (related to both surface and ground waters) may be reduced in a scenario where the NGBR Project and proposed Alpha Coal Project the projects are constructed separately in time. However, given that the construction timeframes and associated demands for water supply (both surface and/or groundwater within proximity of the NGBR Project realignment) for each of the proposed projects are low and the durations short, it is considered unlikely that significant hydrologic impacts would be encountered, even in a simultaneous construction scenario.

Simultaneous operation of the existing and proposed rail projects in proximity to the NGBR Project realignment is not expected to significantly impact on the hydraulic or hydrologic regime of the locale or region generally.

As detailed in Section 2, while there is potential for increased coal dust deposition immediately adjacent the three parallel operational rail corridors, it is considered that this would not lead to significant impacts on adjacent flora, fauna or water quality as the increased levels of deposition are low and reach statutory compliance levels generally within approximately 200 m from the outer boundary of the corridors. It is also important to note that the associated modelling was conducted for a scenario before any dust mitigation and management controls are implemented and with all three rail corridors operating simultaneously at approved and/or proposed capacity (i.e. worst case). It is considered that management of coal dust generally consistent with the Aurizon Coal Dust Management Plan (Aurizon 2010) will mitigate these potential impacts.

4.3 Conclusion

It is considered unlikely that significant hydraulic, hydrological or surface water quality impacts would occur in a three-rail construction and/or operating scenario in the vicinity of the NGBR Project realignment. Further, the mitigation and management measures and commitments proposed in the NGBR Project EIS and AEIS to be implemented during construction and operation of the NGBR Project (including the NGBR Project realignment) are considered to be comprehensive in respect of avoiding and/or minimising impacts on water resources, and would further reduce the potential for significant impacts. Therefore, no further commitments and/or mitigation and management measures are considered necessary.

5 Potential for broader spatial impacts

5.1 Overview

A scenario where three separate rail corridors are constructed and/or operational in the vicinity of the NGBR Project realignment is considered to present potential for broader spatial impacts in the locale on various environmental matters, as compared to the scenario of only the NGBR Project realignment being constructed and operated adjacent to the existing Newlands line as presented in the NGBR Project AEIS. However, the consolidation or collocation of rail corridors in this area will also limit the potential for multiple rail corridors being spatially separated in the region, and thereby limit the potential for multiple separate impacts on environmental and social values in the region, each corridor having potentially significant impacts in their own right.

While the final combined width of the three rail corridors is not known, it can be approximated at around 180 m, representing approximately 60 m per rail corridor (subject to change along the length of the combined corridor depending on topographical constraints). However, in accordance with recent joint media releases by proponents of the Alpha Coal Project and owners of the Newlands line (GVK Hancock 2013), it is considered more likely that the Alpha Coal Project rail infrastructure, if constructed (at least in part), would join with the existing Newlands line and/or Northern Missing Link rail infrastructure far southward of the crossing of the Bowen Developmental Road. As such, it is considered likely that cumulative impacts associated with operation of multiple rail corridor crossings of the Bowen Developmental Road can be largely (if not entirely) avoided.

The various environmental and social values that may be more broadly impacted in the three-rail scenario are assessed in this section.

5.1.1 Biodiversity, clearing and connectivity

Potential impacts discussed in the NGBR Project EIS Volume 1 Chapter 6 Nature conservation and NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report related primarily to clearing of:

- Endangered and of concern regional ecosystems
- Threshold REs
- Threatened ecological communities
- Potential habitat for protected species
- Watercourse vegetation
- Wetland protection areas and wetland regional ecosystems.

The NGBR Project seeks first to avoid, minimise and or mitigate impacts, where practicable. However, as committed in NGBR Project EIS Volume 1 Chapter 6 Nature conservation, any unavoidable residual impacts to the above values will be offset. An updated offset strategy is provided as part of the NGBR Project AEIS at Volume 2 Appendix E Revised offsets. Similar offset requirements for significant residual impacts were also proposed as commitments in the Alpha Coal Project EIS and supplementary information, and thereafter conditioned to be implemented by both the State and Commonwealth Governments in the respective approval instruments related to that project. As such, the potential for cumulative impacts associated with the NGBR Project in combination with other rail infrastructure within the vicinity of the NGBR Project realignment is considered to be low.

The key finding of the cumulative impact assessment for the NGBR Project EIS was that as the NGBR Project will be in accordance with the Galilee Basin Coal Infrastructure Framework (GBCIF) (State of Queensland 2013a), cumulative impacts to REs and threatened species are not expected to be significant. As such, the finding regarding these projects' consistency with the GBCIF is considered to readily extend to the consideration of impacts under a three-rail scenario.

It is considered that the scale of impact to values assessed in the NGBR Project EIS and AEIS have not changed significantly, due to the co-alignment of the existing and proposed corridors for much of the length of the NGBR Project realignment. Furthermore, the direct clearing impacts of the NGBR Project realignment in addition to those potentially resulting from the proposed Alpha Coal Project are not considered to be regionally significant. The NGBR Project realignment corridor predominantly traverses historically cleared grazing and pasture lands, and therefore potential impacts, even under a three-rail scenario, are expected to be minimal.

Impacts on habitat connectivity, regional biodiversity corridors and fauna crossings already exist due to the existing Newlands line (corridor approximately 60 m in width). Increasing the width of this overall corridor under the three-rail scenario (approximately 180 m wide, constituting the nominal 60 m corridor assessed in the NGBR Project AEIS and the additional approximately 60 m from each of the other existing and proposed rail corridors), while increasing direct impacts, is not expected to significantly increase the scale and intensity of impacts on these connectivity, biodiversity and fauna crossing values already experienced in proximity to the Newlands line.

Considering the scale of potential impacts, the mitigation and management measures proposed and the provision of offsets for any unavoidable residual impacts, the cumulative impacts of the NGBR Project, including the NGBR Project realignment, are expected to be low.

5.1.2 Scenic amenity and lighting

As discussed in NGBR Project EIS Volume 1 Chapter 4 Scenic amenity and lighting, the majority of sensitive visual receptors in the area of the NGBR Project would experience minor or negligible impacts. The NGBR Project realignment is likely to alter the level of visual impact experienced at some of these receptors, as discussed in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

They key finding of the cumulative impact assessment in the NGBR Project EIS was that as the NGBR Project will be in accordance with the GBCIF, cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment in isolation, and equally to a three-rail scenario. Further, as the majority of the NGBR Project realignment runs parallel to the existing Newlands line, cumulative impacts to receptors that may experience both the NGBR Project, the existing Newlands line and the proposed Alpha Coal Project – such as transient views from Bowen Developmental Road – are reduced.

5.1.3 Land use, tenure, stock routes and occupational crossings

As discussed in NGBR Project EIS Volume 1 Chapter 3 Land use and tenure, residual land use impacts resulting from the NGBR Project are anticipated to be minimal. Details of these impacts as they result from the NGBR Project realignment are discussed in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report.

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF and Galilee Basin Development Strategy cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment in isolation, and equally to a three-rail scenario.

In addition, it is noted that the NGBR Project realignment minimises known/potential sterilisation of coal resources and/or encroachment on existing coal tenements. Further, as the majority of the NGBR Project realignment runs parallel to the Newlands line and proposed Alpha Coal Project, severance of properties at a landscape scale is reduced compared to the NGBR Project presented in the NGBR Project EIS.

5.1.4 Topography, geology, soils and land contamination

As discussed in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination, residual impacts of the NGBR Project were anticipated to be predominantly of local significance. Details of these impacts as they result from the NGBR Project realignment are discussed in NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report. The main potential for cumulative impacts was identified as resulting from fragmentation of good quality agricultural land and strategic cropping land with other proposed projects.

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF and Galilee Basin Development Strategy (State of Queensland 2013b), and cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment in isolation, and equally to a three-rail scenario. Further, as the majority of the NGBR Project alignment runs parallel to the Newlands line and proposed Alpha Coal Project, fragmentation and land sterilisation impacts are expected to be reduced compared to the NGBR Project presented in the NGBR Project EIS.

5.1.5 Water resources

Potential impacts on water resources are considered in Section 4.

5.1.6 Transport and road crossing treatments

The key finding of the cumulative impact assessment for the NGBR Project regarding transport was that the level of service (LOS) on key roads will be LOS C or higher during construction, and LOS B during operation. Potential traffic growth due to other regional projects was considered in background traffic demands. A traffic assessment has been undertaken for the NGBR Project realignment (refer NGBR Project AEIS Volume 2 Appendix C NGBR Project realignment report). The assessment concluded that LOS on key roads will be similarly maintained to a satisfactory level.

Additional traffic growth due to simultaneous construction of the Alpha Coal Project, which is considered unlikely, would likely increase regional traffic demand (albeit some or all of that increased demand may already be accounted for in the background traffic growth considered in the NGBR Project realignment traffic assessment), and potentially reduce the LOS on key roads to around LOS C or LOS D during construction and LOS B during operation. However, such construction-related impacts would be of a short duration for the respective project construction periods. Therefore, it is expected that the LOS on key roads would be similarly maintained at a satisfactory level under the three-rail scenario.

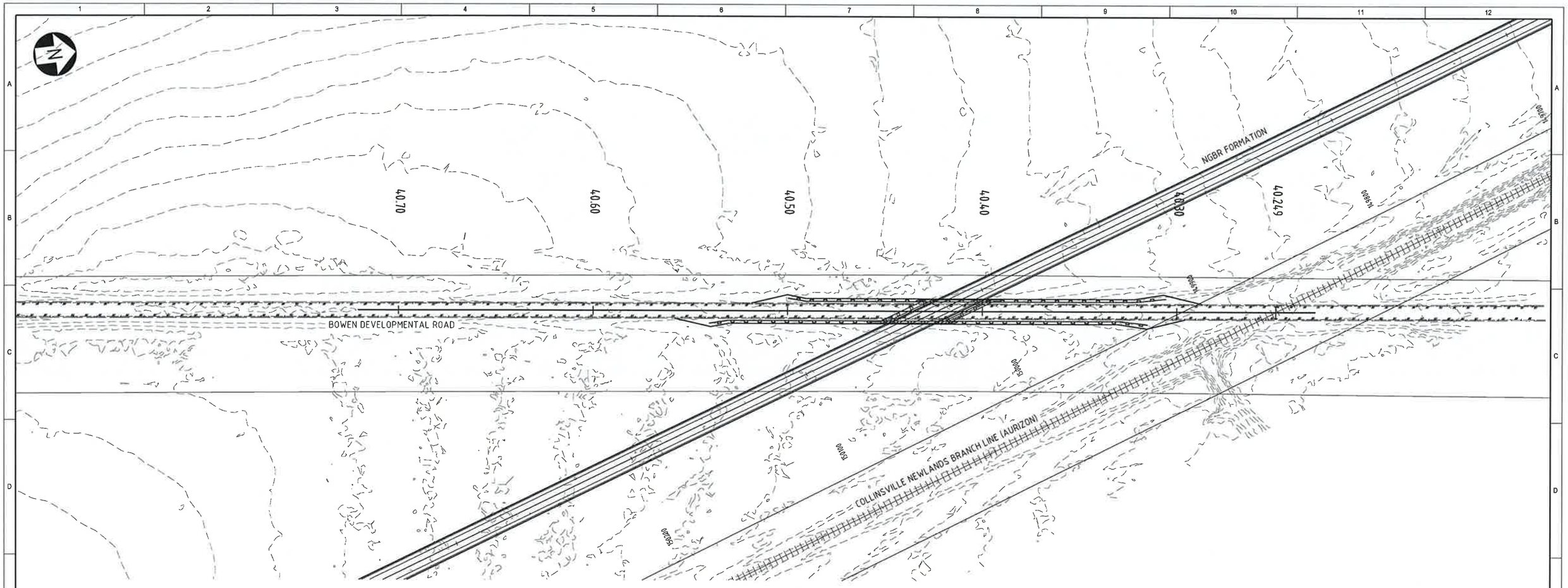
The potential for pavement impacts from simultaneous construction of the NGBR Project and the Alpha Coal Project would be expected to increase with increased construction-related traffic. However, the proposed Alpha Coal Project was conditioned in its Coordinator-General's evaluation report, and corresponding commitments have been made for the NGBR Project, to undertake detailed road impact assessments for approval of the Department of Transport and Main Roads and relevant local government authorities prior to commencement of construction. These road impact assessments would then inform road use management plans and infrastructure agreements with relevant road infrastructure owners, including the development of

mitigation works and/or contribution charges commensurate with the level of impact on road pavements and the road network generally. A road use management plan will be prepared for the NGBR Project, including the NGBR Project realignment, in consultation with key stakeholders. Presumably, in accordance with the associated conditions of approval, a similar plan would be developed by the proponent for the Alpha Coal Project. As such, the potential for cumulative impacts remains low.

Road crossing treatments for adjacent rail corridors in a three-rail scenario have the potential to introduce public safety risks and/or operability constraints where they are not complementary. For instance, the construction of a grade-separated crossing (road over rail) adjacent the existing Newlands line crossing of the Bowen Developmental Road that alters the vertical grade of the Bowen Developmental Road (i.e. a road bridge over new rail infrastructure situated on the existing level terrain) has the potential to introduce sighting distance constraints for multiple crossing structures in proximity of the transition from grade-separated to at-grade crossings of the Bowen Development Road. To avoid this potential impact, the final Front End Engineering Design (FEED) report for the NGBR Project has lowered the grade of the NGBR Project rail infrastructure to allow for a road over rail crossing below-grade of the Bowen Developmental Road, via the construction of a cutting for the NGBR Project rail infrastructure and road bridge to maintain the grade of the Bowen Developmental Road (see Figure 21). This design allows for the uninterrupted and continued operation of the existing Newlands line level-crossing and associated sighting distances on both the Newlands line and the Bowen Developmental Road. Furthermore, whilst not specifically included in the NGBR Project FEED design, it is considered that this design also enables either of the following opportunities for the Alpha Coal Project in its crossing of the Bowen Developmental Road at this location (either solely and/or in conjunction with the owner of the Newlands line):

- Implement a similar design change to allow a crossing below-grade of the Bowen Developmental Road, as proposed above for the NGBR Project, in an expanded or separate cutting (bridged accordingly)
- Implement a grade-separated road bridge over both the proposed Alpha Coal Project rail infrastructure and the existing Newlands line, in accordance with approval conditions contained in the Coordinator-General's evaluation report for the Alpha Coal Project.

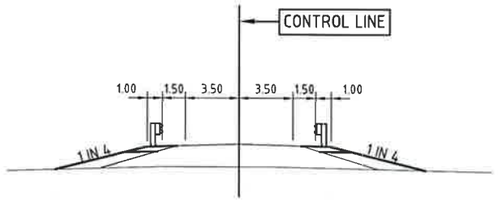
However, in accordance with recent joint media releases by proponents of the Alpha Coal Project and owners of the Newlands line (GVK Hancock 2013), it is considered more likely that the Alpha Coal Project rail infrastructure, if constructed (at least in part), would join with the existing Newlands line and/or Northern Missing Link rail infrastructure far southward of the crossing of the Bowen Developmental Road. As such, it is considered likely that cumulative impacts associated with operation of multiple rail corridor crossings of the Bowen Developmental Road can be largely (if not entirely) avoided. However, in such a case the proponents of the Alpha Coal Project and owners of the Newlands line would need to agree appropriate mitigation measures with the Department of Transport and Main Roads for the increased impacts on the road network as a result of increased rail traffic at the existing level crossing. Notably, these mitigation measures would not require the input of, nor action from, the proponents for the NGBR Project due to the FEED design specifications outlined above.



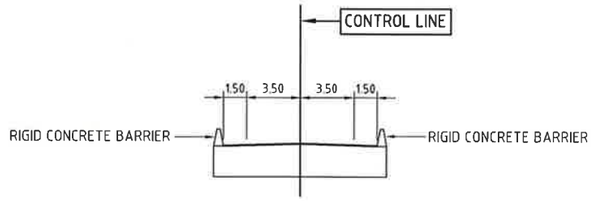
PLAN
1:1000 (A1)

GENERAL NOTES:

1. LEVELS SHOWN IN A.H.D.
2. PIER AND GIRDER ARRANGEMENT AND DIMENSIONS ARE INDICATIVE ONLY.
3. LENGTH OF BARRIER BASED ON ROAD PLANNING AND DESIGN MANUAL CHAPTER 8.
   PARAMETERS FOR BARRIER:
   - LR = 120m (TABLE 8.1 DESIGN SPEED 110km/h)
   - LA = Lc (LONGITUDINAL HAZARD)
   - Lc = 7m (FIGURE 8.4, ≥ 100km/h DESIGN SPEED, 750-1500 AADT)



BOWEN DEVELOPMENTAL ROAD
WIDENING ENABLING GUARDRAIL INSTALLATION
TYPICAL SECTION
N.T.S.



BOWEN DEVELOPMENTAL ROAD
TYPICAL SECTION - BRIDGE
N.T.S.

SCALE 1:1000

NGBR ALIGNMENT
OPTION 12 - REV 1

ISSUED FOR USE
NOT FOR CONSTRUCTION

Rev	Description	By	Verified	Date
1	ISSUED FOR USE	TJR	SJS	08-04-2014
0	ISSUED FOR USE	TJR	SJS	02-12-2013

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

Consultant: aarvee associates architects engineers & consultants pvt.ltd.

Consultant: WorleyParsons resources & energy

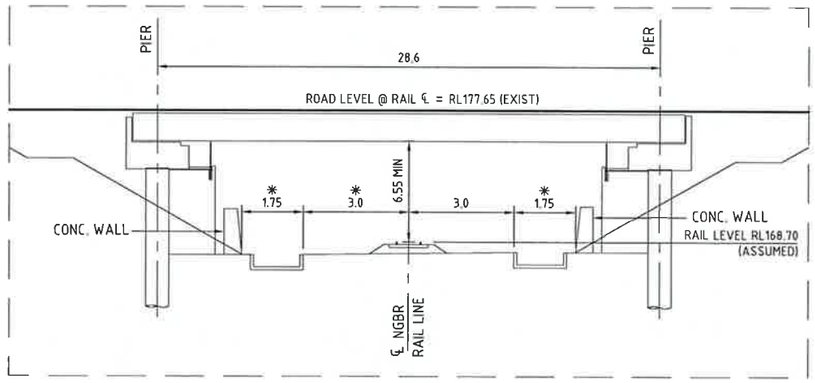
Client: adani Adani Mining Pty Ltd

Drawn	Checked
TJR	SJS
Designed	Approved
TJR	SFJ

RPEQ No. 4612
Date 29.4.14

Drawing Title
NORTH GALILEE BASIN RAIL PROJECT
Figure 21 - Sheet 1 of 2
ROAD CROSSING
BOWEN DEVELOPMENTAL ROAD, SHEET 1

Client Drawing No.: CCMP-ADRAIL-TCK-CV-0625
Rev: 1



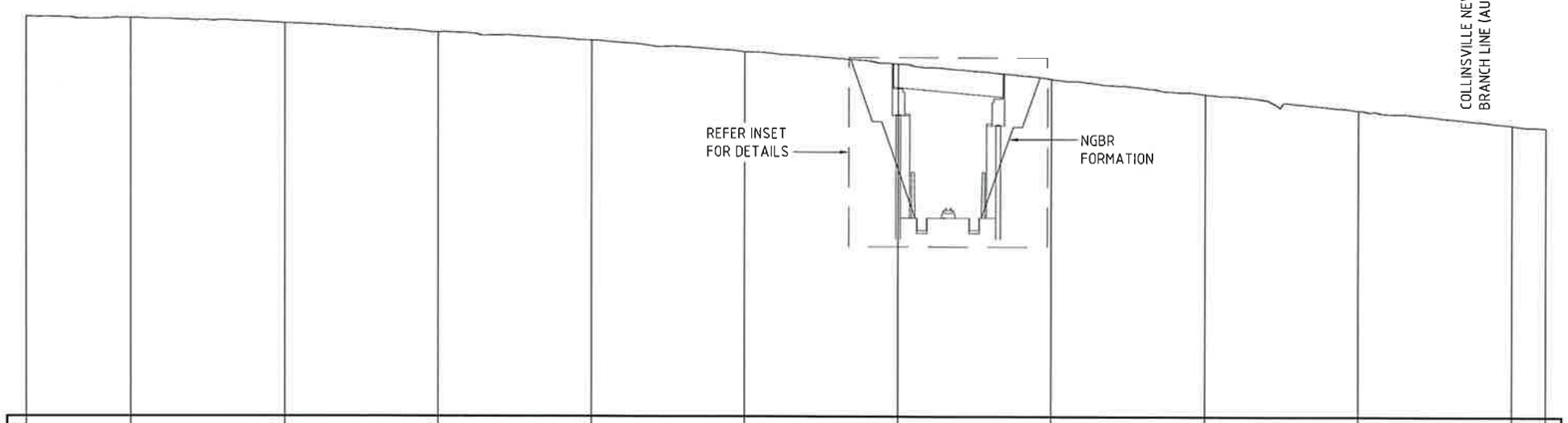
INSET
N.T.S.

NOTES:

1. ASSUMED CLEARANCE DATA;
   FORMATION LEVEL = 167.95
   BALLAST TO TOP OF RAIL = 0.75
   GIRDER DEPTH = 1.80
   ASPHALT DEPTH = 0.20

   CONC. WALL THICKNESS = 0.50 ✳
   CONC. WALL BACK TO WALL FACE = 0.25 ✳
   WALL FACE TO HEADSTOCK FACE = 0.75 ✳
   HEADSTOCK WIDTH = 1.80 ✳

   SKEW = 64°
2. ✳ DENOTES PERPENDICULAR DIMENSION (NOT IN SKEW)
3. ALL OTHER DIMENSIONS SHOWN ARE REQUIRED MINIMUM CLEARANCES.
4. REFER SHEET 1 FOR GENERAL NOTES.



DATUM RL 155.000

EXISTING SURFACE LEVELS	180.989	180.918	180.572	179.985	179.473	178.730	177.962	176.987	176.003	174.969	173.997	173.823
CONTROL LINE CHAINAGE	40.734	40.700	40.650	40.600	40.550	40.500	40.450	40.400	40.350	40.300	40.250	40.229

BOWEN DEVELOPMENTAL ROAD
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:200

20 0 20 40 60 80 100m
SCALE 1:1000

4 0 4 8 12 16 20m
SCALE 1:200

NGBR ALIGNMENT
OPTION 12 - REV 1

ISSUED FOR USE
NOT FOR CONSTRUCTION

Rev	Description	By	Verified	Date
1	ISSUED FOR USE	TJR	SJS	08-04-2014
0	ISSUED FOR USE	TJR	PZ	02-12-2013

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

Consultant
aarvee associates
architects engineers & consultants pvt.ltd.

Consultant
WorleyParsons
resources & energy

Client
adani™
Adani Mining Pty Ltd

Drawn	Checked
TJR	SJS
Designed	Approved
TJR	SFJ

RPEQ No. 4672
Date 29.4.14.

Drawing Title
NORTH GALILEE BASIN RAIL PROJECT
Figure 21 - Sheet 2 of 2
ROAD CROSSING
BOWEN DEVELOPMENTAL ROAD, SHEET 2

Client Drawing No.
CCMP-ADRAIL-TCK-CV-0626

Rev
1

6 Benefits of collocation

As outlined in various sections within this report, there are several benefits of collocating rail corridors in order to reduce potential cumulative impacts under a combined three-rail scenario. Similarly, the collocation of such rail corridors in close proximity to one another in the vicinity of the NGBR Project realignment is consistent with the intent of various Queensland Government policies, which are explored in this section.

6.1 Galilee Basin State Development Area

The NGBR Project is proposed in accordance with the GBCIF and Galilee Basin Development Strategy, being a north-south, multi-user, common access rail corridor from the northern Galilee Basin to the Port of Abbot Point. One of the key initiatives of the Galilee Basin Development Strategy is the declaration of the Galilee Basin State Development Area, to make land available for future infrastructure to assist in the facilitating development of resources. The declaration of this land will protect preferred land uses from encroachment by incompatible land uses. The Galilee Basin State Development Area includes two multi-user rail corridors, one from the southern Galilee Basin and one from the central Galilee Basin. The NGBR Project is within the central rail corridor precinct of the Galilee Basin State Development Area.

It is considered that the NGBR Project, including the NGBR Project realignment, is consistent with the strategic vision and overall objectives of the Galilee Basin State Development Area (State of Queensland 2014). In accordance with the strategic vision, the rail corridor precincts will inform future land use planning so as to avoid any alienation or encroachment by incompatible land uses. The potential for noise objectives to be exceeded at two sensitive receptors in adjacent rural land uses is considered reasonable and supportable given the commitment to implement mitigation and the consistency of the NGBR Project realignment with intended land use of the rail corridor precinct. Other potential impacts of the NGBR Project realignment, when considered in a cumulative context along with potential impacts from the existing Newlands line and proposed Alpha Coal Project, are not considered to result in significant residual impacts.

The NGBR Project will support the development of the Galilee Basin and provide both short-term and long-term benefits to the region and the State of Queensland. Assessments completed to date in the NGBR Project EIS and NGBR Project AEIS are pursuant to overall objectives for land use for the Galilee Basin State Development Area, including ensuring that development “recognises and manages impacts on environmental, cultural heritage and community values”. Future detailed design and site-specific development applications for the NGBR Project will likewise consider the vision, overall objectives and other assessment criteria that are relevant to the Galilee Basin State Development Area.

Based on publicly available documentation (GVK Hancock 2013) it is understood that the Alpha Coal Project will be developed within the southern rail corridor precinct, connecting to the existing Newlands rail line. It is noted that this ‘southern rail connection’ effectively excludes the northern 200 km of the Alpha Coal Project rail line described in the EIS (Hancock Prospecting 2010). The central rail corridor precinct and southern rail corridor precinct are generally geographically separate but form a common corridor in the vicinity of the NGBR Project realignment. The potential cumulative noise and vibration impacts from this common corridor are described in Section 3.4.

To the north of the NGBR Project realignment, the southern rail corridor follows the existing Newlands rail line. Due to the separation distance of the NGBR Project and the Newlands rail line in this area there is expected to be limited potential for cumulative noise and vibration impacts.

6.2 Abbot Point State Development Area

The NGBR Project, Newlands rail line and Alpha Coal Project rail line (traffic) also coincide at approximate NGBR Project chainage 7 km, within the infrastructure and corridors precinct of the Abbot Point State Development Area. The nearest sensitive receptor to this common corridor area is Homestead 1, approximately 6.5 km distant.

As described in Section 10.4.2 of NGBR Project EIS Volume 1 Chapter 10 Air quality, the relevant air quality objectives for PM_{10}, $PM_{2.5}$, TSP, deposited dust and gaseous emissions in the 'coastal region' were all met within 144 m. It is therefore considered that there is minimal potential for cumulative impacts to occur at Homestead 1.

Based on the results of the noise and vibration assessment in Section 3.4.1, it is considered unlikely that noise and vibration objectives would be exceeded at Homestead 1 due to cumulative impacts from the common corridor area. Predicted noise at Homestead 18 at a similar distance did not exceed the Rail Infrastructure Noise Guideline. Furthermore, predicted noise did not exceed the Rail Infrastructure Noise Guideline at Homestead R1 which is substantially closer to the common corridor of the NGBR Project realignment, Newlands rail line and Alpha Coal Project rail line.

Other potential impacts of the NGBR Project realignment, when considered in a cumulative context along with potential impacts from the existing Newlands line and proposed Alpha Coal Project, are not considered to result in significant residual impacts.

7 References

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	Michael Goodall (GHD) Barry Cook (GHD) Craig Evenden (GHD) Philip Bradley (GHD) Michael Campbell (Delta Environmental Pty Ltd)	Michael Campbell (Delta Environmental Pty Ltd)	On File	Hamish Manzi	On File	24/07/2014