# APPENDIX B

# NOISE ASSESSMENT REVIEW
# [SLR, 2012]

26 April 2012

610 04515 30000 Rail Flyover Modification 20120426

Newcastle Coal Infrastructure Group Ltd
c/- Resource Strategies Pty Ltd
PO Box 1842
MILTON QLD 4064

**Attention: Mr Phil Reid (NCIG Environmental Advisor)**

Dear Phil

## NCIG Coal Export Terminal
## Rail Flyover Modification - Noise Prediction and Assessment Review

I refer to SLR Offer of Services dated 26 February 2012 and confirmation of engagement email dated 1 March 2012. Please find attached our NCIG Coal Export Terminal (CET) Rail Flyover Modification - Noise Prediction and Assessment Review [**Attachment A**].

As presented in the Rail Flyover Modification - Noise Assessment Review dated 26 March 2012 there are only minor increases in the extent and elevation of the rail infrastructure associated with the Rail Flyover Modification. No additional plant and equipment is introduced by the Rail Flyover Modification and therefore the on-site operating sound powers levels remain unaltered.

As requested, the CET environmental noise model was updated to include the Rail Flyover Modification and incorporates the significant noise sources associated with the CET site and rail loop, surrounding terrain, aspects of the built environment and nearby receiver areas. The noise model was used to predict the CET contributed noise levels at the nearest receiver areas for comparison with the approved noise limits. As anticipated by the preceding noise assessment review, the predicted CET operating noise levels at the nearest receiver areas remain in compliance with the approved noise limits.

We are advised that the Construction Environment Management Plan (CEMP) and Operation Environment Management Plan (OEMP) would continue to be implemented (and revised as required) for the Rail Flyover Modification.

Regards

GLENN THOMAS
Director

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# 1 Introduction

## 1.1 Rail Flyover Modification Overview

The Newcastle Coal Infrastructure Group Limited (NCIG) has approval to construct and operate the 66 million tonnes per annum (Mtpa) capacity Coal Export Terminal (CET) on Kooragang Island in Newcastle, NSW. Noise extracts from the Project Approval (PA 06_0009) dated 13 April 2007 and Environment Protection Licence (EPL 12693) are presented in **Attachment A1** and **A2** respectively.

The CET infrastructure is being constructed in stages, with Stage 1 completed and officially opened on the 3 May 2010 and designed to operate with a nominal capacity of 30 Mtpa. Completing the CET to its approved capacity of 66 Mtpa is anticipated to occur in two further Stages, namely Stage 2AA and Stage 2F, with Stage 2AA currently being commissioned and once operating will increase the CET nominal capacity to 53 Mtpa. The CET Plant Flow Diagram is shown as **Attachment A3** with Stage 2F rail infrastructure understood to commence construction during 2012 and once, operating will increase the CET nominal capacity to 66 Mtpa.

In accordance with Condition 2.40 of PA 06_0009, and in consultation with the Australian Rail Track Corporation (ARTC) and Port Waratah Coal Services Limited (PWCS), NCIG have recently confirmed the need for a high capacity optional inlet rail spur, rail sidings and associated rail flyover to meet the requirements of the ARTC as shown on the General Arrangement Plan in **Attachment A4**. The proposed Rail Flyover Modification includes the following components:

- Grade separation along a portion of the inbound track for the NCIG Northern Rail Spur (also referred to as the 'high capacity optional inlet rail spur and rail sidings') to approximately 10.5 m Australian Height Datum (m AHD)[1];
- Minor realignment of the inbound (western) track of the Kooragang Island main line; and
- Minor realignment and lowering of the outbound (eastern) track of the Kooragang Island main line.

SLR Consulting Australia Pty Ltd (SLR Consulting) has been engaged by NCIG to review the noise impact of the proposed Rail Flyover Modification by comparing on-site sound power levels and off-site operating noise levels presented in the CET Environmental Assessment (EA, NCIG 2006) against the modified CET on-site sound power levels and off-site operating noise levels as well as the relevant noise limits. This review includes:

- the existing and measured CET Stage 1 operating noise levels and on-site sound power levels.
- the proposed Stage 2AA and 2F (modified) operating plant and equipment and associated sound power levels and the rail loop operating sound power levels from Stage 1, 2AA and 2F (modified).
- the rail loop noise mitigation measures adopted in accordance with the requirements of the CET EA.
- update the CET environmental noise model to include the proposed Rail Flyover Modification and predict the CET operating noise levels to the nearest receiver areas consistent with the CET EA.
- an assessment as to whether the proposed Rail Flyover Modification will alter the noise outcomes of the CET EA and/or alter achieving compliance with the relevant noise limits nominated in the CET PA and EPL.

This noise review considered several documents including the following:

- CET Operation Noise Management Plan (NCIG 2010).
- CET Construction, Operation and Road Traffic Noise Impact Assessment (CET NIA, Heggies 2006).

[1] For comparison purposes, the existing NCIG rail spur embankment height to the south is up to approximately 8.6 m AHD, and the final BHP Billiton Hunter River Remediation Project landfill (immediately south of the existing NCIG rail spur) is approximately 1.5 m above this.

- CET Off-site Noise and On-site Sound Power Monitoring – Quarterly Reports including SLR Report 610.04515 R9 dated 9 June 2011, SLR Report 610.04515 R10 dated 20 June 2011, SLR Report 610.04515 R11 dated 29 July 2011, SLR Report 610.04515 R12 dated 24 October 2011 and SLR Report 610.04515 R13 dated 7 February 2012.
- Project information provided by NCIG.

## 2 Existing Approvals and Noise Compliance

### 2.1 Project Approval (PA)

NCIG has approval to construct and operate the CET (with respect to noise and vibration emissions) in accordance with PA 06_0009 dated 13 April 2007. An extract from the PA 06_0009 *Noise Impacts* and *Noise Auditing* conditions are attached as **Attachment A1**. The conditions includes a range of noise criteria (i.e. intrusive, amenity and sleep disturbance) and associated meteorological constraints which are generally consistent with the noise assessment outcomes presented in the CET EA.

The residential and non-residential noise criteria are summarised **Table 1** and **Table 2** respectively.

**Table 1 CET PA - Residential Noise and Meteorological Criteria (dBA re 20 µPa)**

| Residential Location | Construction Noise | $L_{Aeq(15minute)}$ Operation[1] Daytime, Evening, Night[2] | $L_{Aeq(night)}$ Operation[1] Night[2] | $L_{A1(1minute)}$ Operation[1] Night[2] |
|---|---|---|---|---|
| Fem Bay West | The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any residential premises between 0700 hours and 1800 hours, seven days a week. Audible noise is defined as "noise that can be heard at the receiver". | 41 | 37 | 57 |
| Fern Bay East | | 39 | 36 | 55 |
| Stockton West | | 41 | 37 | 57 |
| Stockton East | | 38 | 35 | 56 |
| Mayfield West | | 45 | 40 | 55 |
| Mayfield | | 44 | 39 | 62 |
| Carrington | | 36 | 33 | 52 |

Notes The maximum allowable noise contributions apply under:

a) Meteorological conditions of: wind speeds up to 3 $ms^{-1}$ at 10 metres above ground level; or

b) Temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2$ms^{-1}$ at 10 metres above the ground.

For the purpose of assessment of noise from the project shall be:

c) Measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with $L_{Aeq(15\ minute)}$ night noise limits;

d) Measured at one metre from the dwelling facade to determine compliance with $L_{A1(1minute)}$ noise limits; and

e) Subject to the modification factors provided in Section 4 of the NSW INP, where applicable.

Note 1: 7 days per week, 24 hours a day.

Note 2: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0600 hours.

**Table 2 CET EA - Non-residential Noise Criteria (dBA re 20 µPa)**

| Non-residential Location | Land Use | Intrusive $L_{Aeq(15minute)}$ | | | Acceptable Amenity $L_{Aeq(period)}$[1] | | | Maximum Amenity $L_{Aeq(9hour)}$ |
|---|---|---|---|---|---|---|---|---|
| | | Day | Evening | Night | Day | Evening | Night | Night |
| Mayfield West | Commercial Steel River | Intrusive noise not applicable | | | 65 | 65 | 65 | 70 |
| Kooragang Island | Industrial | Intrusive noise not applicable | | | 70 | 70 | 70 | 75 |
| Mayfield North | | Intrusive noise not applicable | | | 70 | 70 | 70 | 75 |
| Any | School | Intrusive noise not applicable | | | External 45 when in use | | | 50 |
| Any | Hospital | Intrusive noise not applicable | | | External 50 when in use | | | 55 |

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

## 2.2 Environmental Protection Licence (EPL)

NCIG is licensed to construct and operate the CET (with respect to noise and vibration emissions) in accordance with Environment Protection Licence (EPL) No. 12693. An extract from the EPL's *Noise Limits* conditions is attached as **Attachment A2**.

The EPL conditions are very similar to the corresponding PA conditions, nominating noise criteria (i.e. intrusive, amenity and sleep disturbance) and associated meteorological constraints which are generally consistent with the noise assessment outcomes presented in the CET EA.

## 2.3 CET EA Operating Noise Assessment

The CET EA noise impact assessment considered the complete project operating up to the maximum capacity of 66 Mtpa and in all cases the predicted intrusive noise and amenity levels were below the relevant assessment criteria and any noise impacts were considered acceptable. The CET EA predicted daytime, evening and night-time intrusive $L_{Aeq(15minute)}$ noise levels are presented in **Attachments A5(I-III),** respectively.

## 2.4 CET Stage 1 Operating Noise Compliance

Quarterly on-site and off-site noise monitoring of Stage 1 operations are undertaken in accordance with the CET Operation Noise Management Plan (NCIG 2010) commencing in the December quarter 2010. The off-site noise monitoring results are summarised and presented **Table 3** together with the relevant PA and EPL noise limits. On-site sound power levels measurements are also conducted in order to predict off-site intrusive $L_{Aeq(15minute)}$ noise levels using the NCIG environmental noise model on a quarterly basis.

**Table 3 CET Stage 1 Intrusive $L_{Aeq(15minute)}$ and $L_{A1(1minute)}$ Noise Levels (dBA re 20 μPa)** [1]

| Location | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) | $L_{Aeq}$ (15min) | $L_{A1}$ (1min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **10/12/10 to 13/12/10** | | **21/2/11 to 23/2/11** | | **19/6/11 to 20/6/11** | | **27/7/11 to 28/7/11** | | **6/12/11 to 7/12/11** | | **Noise Limits** | |
| FW1 Fullerton Lane | <37 | <37 | <34 | <34 | <43[2] | <43 | <40 | <40 | <33 | <33 | 41 | 56 |
| FE1 Braid Road | <31 | <31 | <32 | <32 | <38 | <38 | <41[2] | <41 | <37 | <37 | 39 | 55 |
| SW1 Fullerton Street | <36 | <36 | <35 | <35 | <43[2] | <43 | <37 | <37 | <34 | <34 | 41 | 57 |
| SE1 Eames Road | <33 | <33 | <35 | <35 | <36 | <36 | <41[2] | <41 | <30 | <30 | 38 | 56 |
| W1 Stevenson Avenue | <39 | <39 | <31 | <31 | <31 | <31 | <37 | <37 | <30 | <30 | 45 | 55 |
| M1 Bull Street | <38 | <38 | <34 | <34 | <33 | <33 | <37 | <37 | <32 | <32 | 44 | 62 |
| M4 Arthur Street | <33 | <33 | <33 | <33 | <35 | <35 | <39 | <39 | <30 | <30 | 44 | 62 |
| C1 Cnr Hargrave and Young | <33 | <33 | <30 | <30 | <39[2] | <39 | <39[2] | <39 | <30 | <30 | 36 | 52 |
| KI1 Blue Circle Cement | <60 | - | <59 | - | <59 | - | <60 | - | <53 | - | 70 | - |
| KI5 Cargill | <50 | - | <50 | - | <50 | - | <52 | - | <46 | - | 70 | - |
| KI10 Sims Metal | <54 | - | <54 | - | <54 | - | <55 | - | <53 | | 70 | - |

Note 1: NCIG intrusive $L_{Aeq(15minute)}$ and $L_{A1(1minute)}$ noise levels generally not discernible from other industrial noise.

Note 2: Quarterly noise modelling results show that the NCIG intrusive $L_{Aeq(15minute)}$ noise level was below the noise limit.

In summary, the quarterly noise monitoring has demonstrated that the CET Stage 1 operating noise emissions are in compliance with the relevant PA and EPL noise limits and therefore generally consistent of the outcomes anticipated in the CET EA.

## 3 Approved and Modified Operating Plant and Equipment

### 3.1 CET EA Anticipated Plant and Equipment

The potential for machinery to emit noise is quantified as the sound power level (SWL) expressed in A-weighted decibels (dBA) relative to 1 pW. At the receptor, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 μPa. In general terms, any variation in the on-site SWLs will produce a similar variation in the off-site intrusive $L_{eq(15minute)}$ noise level at the nearest receivers.

As discussed, the CET EA noise impact assessment considered the complete project operating up to the maximum capacity of 66 Mtpa. The anticipated major items of operating plant and equipment for 30 Mtpa and 66 Mtpa capacities are presented in **Table 4** together with the anticipated sound power levels (SWLs).

**Table 4 CET EA Anticipated Plant and Equipment Sound Power Levels (dBA re 1 pW)**

| Plant and Equipment | Nominal Capacities | Stage 1 (30 Mtpa)[1] | | Stage 2 (36 Mtpa)[1] | | Stage 1+2 (66 Mtpa)[1] | |
|---|---|---|---|---|---|---|---|
| | | No. Items | SWL (dBA) | No. Items | SWL (dBA) | No. Items | SWL (dBA) |
| Rail Loops | Train 1 – Dump station | 1 | 120 | - | - | 1 | 120 |
| | Train 2 – Dump station | - | - | 1 | 120 | 1 | 120 |
| | Train 3 - Rail spur | - | - | 1 | 117 | 1 | 117 |
| | Train 4 - Rail Spur | 1 | 113 | - | - | 1 | 113 |
| | Train 5 - Rail spur | - | - | 1 | 112 | 1 | 112 |
| | **Sub total** | **2** | **121** | **3** | **122** | **5** | **124** |
| Unloading Stations | 8,500 (tph) | 1 | 104 | 1 | 104 | 2 | 107 |
| Unloading Station to Coal Storage Area | Total conveyors approximately 13 km in length | 1 | 108 | 1 | 108 | 2 | 111 |
| Stacking | | 2 | 109 | 2 | 109 | 4 | 112 |
| Stockpile Area | | 2 | 114 | 2 | 114 | 4 | 117 |
| Reclaim | | 1 | 109 | 1 | 109 | 2 | 112 |
| Buffer Bins to Wharf | | 1 | 108 | 1 | 108 | 2 | 111 |
| Wharf | | 1 | 110 | 1 | 110 | 2 | 113 |
| Coal Stockpiles (Single) | 25 m high (including 4.5 m berm) Capacity 600,000 t | 2 | - | - | - | 2 | - |
| Coal Stockpiles (Wide) | 25 m high (including 4.5 m berm) Capacity 1,800,000 t | 1 | - | 2 | - | 3 | - |
| Combined Stacker/Reclaimers | Boom length - 62.5 m<br>Stacking - 8,500 tph<br>Reclaim - 10,500 tph | 2 | 110 | 2 | 110 | 4 | 113 |
| Transfer Stations | Various | 7 | 111 | 5 | 110 | 12 | 113 |
| Buffer Bins | 2,500 t each | 1 | 103 | 1 | 103 | 2 | 106 |
| Sampling stations | 2 inbound and 2 outbound - enclosed. Cut taken of belt tripper | 2 | 102 | 2 | 102 | 4 | 105 |
| Shiploaders | Nominal 10,500 tph<br>Peak 12,500 tph | 1 | 106 | 1 | 106 | 2 | 109 |
| Berths | 3 of at 315 m long each | 2 | - | 1 | - | 3 | - |
| | **TOTAL** | **29** | **123** | **26** | **124** | **55** | **127** |

Note 1: Source EA Noise Assessment (Heggies, 2006).

The overall Stage 1+2 (66 Mtpa) sound power level was 127 dBA inclusive of the rail loop subtotal sound power level of 124 dBA.

## 3.2 CET Installed and Design Plant and Equipment

The major items of operating plant and equipment for the installed Stage 1 (30 Mtpa) and design Stage 2AA (23 Mtpa) and Stage 2F (13 Mtpa) are presented in **Table 5** together with the installed and design sound power levels (SWLs). The overall Stage 1+2AA+2F (66 Mtpa) sound power level is 127 dBA inclusive of the rail loop subtotal sound power level of 124 dBA and therefore generally consistent of the outcomes anticipated in the CET EA.

**Table 5 CET Installed and Design Plant and Equipment Sound Power Levels (dBA re 1 pW)**

| Fixed Plant | Capacities/ Specifications | Stage 1 (installed) (30 Mtpa)[1] | | Stage 2AA (design) (23 Mtpa)[1] | | Stage 2F (design) (13 Mtpa)[1] | | Stage 1+2AA+2F (66 Mtpa)[1] | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. Items | SWL (dBA) | No. Items | SWL (dBA) | No. Items | SWL (dBA) | No. Items | SWL (dBA) |
| Rail Loops | Train 1 - Rail spur (idle) | 1 | 110 | - | - | - | - | 1 | 110 |
| | Train 2 – Station (dumping) | 1 | 116 | - | - | - | - | 1 | 116 |
| | Train 3 - Station (dumping) | - | - | 1 | 116 | - | - | 1 | 116 |
| | Train 4 – Rail spur (moving) | - | - | 1 | 121 | - | - | 1 | 121 |
| | Train 5 – Rail spur (idle) | - | - | - | - | 1 | 112 | 1 | 112 |
| | **Sub total** | **2** | **118** | **2** | **123** | **-** | **-** | **4** | **124** |
| Unloading Stations | 8,500 (tph) | 1 | 105 | 1 | 104 | - | - | 2 | 108 |
| Unloading Station to Coal Storage Area | Total conveyors approximately 13 km in length | 1 | 113 | 1 | 108 | - | - | 2 | 115 |
| Stacking | | 2 | 111 | 1 | 106 | 1 | 106 | 4 | 113 |
| Stockpile Area | | 2 | 117 | 2 | 114 | 1 | 111 | 4 | 119 |
| Reclaim | | 1 | 111 | 1 | 109 | - | - | 2 | 113 |
| Buffer Bins to Wharf | | 1 | 112 | 1 | 108 | - | - | 2 | 113 |
| Wharf | | 1 | 109 | 1 | 110 | - | - | 2 | 113 |
| Coal Stockpiles (Single) | 25 m high (including 4.5 m berm) Capacity 600,000 t | 2 | - | - | - | - | - | 2 | - |
| Coal Stockpiles (Wide) | 25 m high (including 4.5 m berm) Capacity 1,800,000 t | 1 | - | 1 | - | 1 | - | 3 | - |
| Combined Stacker/Reclaimers | Boom length - 62.5 m<br>Stacking - 8,500 tph<br>Reclaim - 10,500 tph | 2 | 115 | 1 | 107 | 1 | 107 | 4 | 116 |
| Transfer Stations | Various | 7 | 111 | 2 | 106 | 3 | 107 | 12 | 113 |
| Buffer Bins | 2,500 t each | 1 | 100 | 1 | 103 | - | - | 2 | 105 |
| Sampling stations | 2 inbound and 2 outbound - enclosed.<br>Cut taken of belt tripper | 2 | 102 | 2 | 102 | - | - | 4 | 105 |
| Shiploaders | Nominal 10,500 tph<br>Peak 12,500 tph | 1 | 108 | 1 | 106 | - | - | 2 | 110 |
| Berths | 3 of at 315 m long each | 2 | - | 1 | - | - | - | 3 | - |
| | **TOTAL** | **29** | **124** | **19** | **124** | **7** | **116** | **55** | **127** |

Note 1: Source NCIG (2012).

## 3.3 Rail Flyover Modification Plant and Equipment

Details of the proposed Rail Flyover Modification are shown on **Attachment A4** and as discussed in the Section **1.1** includes minor realignments and lowering of the Kooragang Island main line and grade separation along a portion of the inbound track for the NCIG Northern Rail Spur to approximately 10.5 m AHD. For comparison purposes, the existing NCIG rail spur embankment height to the south is up to approximately 8.6 m AHD, and the BHP Billiton Hunter River Remediation Project landfill design (immediately south of the existing NCIG rail spur) is several metres above this.

However, no additional plant and equipment is introduced by the Rail Flyover Modification and the on-site operating sound powers levels (refer **Table 5**) remain unaltered. Hence, it follows that any potential variation in the off-site intrusive $L_{eq(15minute)}$ noise level at the nearest receivers will be negligible.

### 3.4 Rail Loop Noise Barriers

The CET EA anticipated the potential need for rail loop noise barriers. Requirements for the barriers were refined as part of post EA engineering investigations with the following three earth bund walls identified and subsequently constructed as shown on **Attachment A6**:

- Dump Station Signal Bund - adjacent and south of track, up to 6.0 m high and approximately 350 m.
- Southeast Rail Loop Bund - adjacent and south of track, up to 2.0 m high and approximately 350 m.
- South Rail Loop Bund - adjacent and south of track, up to 3.5 m high and approximately 300 m.

## 4 Predicted CET Operating Noise Levels

Based on the CET installed and design sound power levels presented in **Table 5**, the CET environmental noise model has been updated to include the Rail Flyover Modification and incorporates the significant noise sources associated with the CET site and rail loop, surrounding terrain, aspects of the built environment and nearby receiver areas.

The noise model has used to predict the CET operating noise levels at nearest receiver areas (ie at locations consistent with the CET EA) for comparison with the approved noise limits. The CET operating noise levels were calculated from concurrent operation of all items of plant and equipment and therefore represents the maximum operating noise from the simultaneous operation of Stage 1, Stage 2AA and Stage 2F (inclusive of the Rail Flyover Modification).

The predicted daytime, evening and night CET operating noise levels to the nearest receiver areas are presented in **Table 6** together with the approved noise limits (refer **Table 1** and **Table 2**).

**Table 6 Predicted CET Operating Noise Levels (dBA re 20 μPa)**

| Receiver Area | ID/Location | | Day Calm[3] | Evening Wind[3] | Night Wind[3] | Night Inversion[3] | Approved Noise Limits |
|---|---|---|---|---|---|---|---|
| Fern Bay West | FW1 | 1 Fullerton Lane | 26 | 21 | 37 | 38 | 41 |
| | FW2 | Stockton Hospital | 24 | 21 | 38 | 38 | 50[1] |
| Fern Bay East | FE1 | 21 Braid Road | 23 | 19 | 36 | 37 | 39 |
| | FE2 | Fern Bay Primary | 25 | 20 | 36 | 37 | 45[2] |
| Stockton West | SW1 | 284 Fullerton Street | 25 | 22 | 38 | 38 | 41 |
| | SW2 | Cnr Pembroke and Fullerton Sts | 25 | 22 | 36 | 37 | |
| Stockton East | SE1 | 40 Eames Avenue | 24 | 21 | 37 | 38 | 38 |
| | SE2 | Stockton Primary | 23 | 22 | 34 | 35 | 45[2] |
| Warabrook/ Mayfield West | W1 | 47 Stevenson Avenue | 32 | 41 | 31 | 39 | 45 |
| | W2 | 4 Groongal Street | 34 | 43 | 35 | 41 | |
| | W3 | Mayfield West Primary | 32 | 44 | 34 | 41 | 45[2] |
| Mayfield | M1 | 68 Bull Street | 35 | 43 | 36 | 41 | 44 |
| | M2 | 45 Simpson Crescent | 35 | 44 | 37 | 42 | |
| | M3 | 1 Arthur Street | 31 | 43 | 35 | 41 | |
| | M4 | 52 Arthur Street | 33 | 42 | 38 | 41 | |
| | M5 | 21 Crebert Street | 33 | 42 | 38 | 42 | |
| | M6 | Hunter Christian School | 35 | 43 | 36 | 41 | 45[2] |
| | M7 | Mayfield East Primary | 30 | 41 | 37 | 40 | |
| Carrington | C1 | Cnr Hargrave and Young Sts | 26 | 30 | 34 | 35 | 36 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sandgate | SG1 | 4 Mangrove Road | 35 | 44 | 32 | 41 | 65 |
| Mayfield West | MW1 | Steel River | 39 | 47 | 40 | 44 | |
| Kooragang Island | KI1 | Blue Circle Southern | 56 | 55 | 59 | 59 | 70 |
| | KI2 | Origin Energy | 54 | 52 | 58 | 58 | |
| | KI3 | Boral Country Concrete | 55 | 53 | 59 | 59 | |
| | KI4 | Port Waratah Coal Services | 40 | 36 | 49 | 49 | |
| | KI5 | Cargill Australia | 43 | 39 | 51 | 52 | |
| | KI6 | ERS Australia | 45 | 42 | 52 | 53 | |
| | KI7 | Cleanaway | 49 | 47 | 55 | 56 | |
| | KI8 | Port Hunter Commodities | 48 | 46 | 54 | 54 | |
| | KI9 | BOC Gas | 48 | 46 | 55 | 56 | |
| | KI10 | Sims Metal | 45 | 43 | 53 | 54 | |
| Mayfield North | MN1 | OneSteel | 48 | 53 | 50 | 52 | 70 |

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.
Note 2: Equivalent external amenity criteria 45 dBA used in the absence of intrusive criteria.
Note 3: Meteorological conditions in accordance with NIA Table 9 (CET EA, 2006).

As shown by **Table 6** all predicted CET operating noise levels at the nearest receiver areas are in compliance with the approved noise limits.

## 5 Summary of Findings

This review focuses on the proposed Rail Flyover Modification when compared to the approved and operating NCIG CET. The proposed Rail Flyover Modification includes minor realignments and lowering of the Kooragang Island main line and grade separation along a portion of the inbound track for the NCIG Northern Rail Spur to approximately 10.5 m AHD.

The potential need for rail loop noise barriers was identified as part of post EA engineering design with three earth bund walls identified and constructed (refer **Attachment A6)**. Subsequent quarterly noise monitoring has demonstrated that the CET Stage 1 operating noise emissions are in compliance with the relevant PA and EPL noise limits and therefore generally consistent of the outcomes anticipated in the CET EA. In addition, the overall installed and design plant and equipment Stage 1+2AA+2F (66 Mtpa) sound power level is 127 dBA inclusive of the rail loop subtotal sound power level of 124 dBA and therefore generally consistent of the outcomes anticipated in the CET EA.

Although there are minor increases in the extent and elevation of the rail infrastructure associated with the Rail Flyover Modification, no additional plant and equipment is introduced by the Rail Flyover Modification and the on-site operating sound powers levels (refer **Table 5**) remain unaltered. Subsequently, the CET noise model has been used to predict the CET contributed noise levels at the nearest receiver areas for comparison with the approved noise limits. As shown by **Table 6** all predicted CET operating noise levels at the nearest receiver areas are in compliance with the approved noise limits.

Furthermore, NCIG is currently committed to managing the CET's noise emissions to the nearest residential and non-residential receivers under several existing mechanisms including: the CET EA and associated predicted noise levels and associated noise impact assessments; the CET Operating Noise Management Plan; as well as PA Conditions 2.13 to 2.15. These existing mechanisms remain unaltered by the proposed Rail Flyover Modification and at this stage any further noise regulation or condition is considered unnecessary.

Notwithstanding, SLR is advised that the Construction Environment Management Plan (CEMP) and Operation Environment Management Plan (OEMP) would continue to be implemented (and revised as required) for the Rail Flyover Modification and would reflect any updates of the acoustic noise model to include the modified rail infrastructure components.

## SPECIFIC ENVIRONMENTAL CONDITIONS

### Noise Impacts

2.9 The Proponent shall minimise noise emissions from plant and equipment operated on the Site in relation to the project according to the principles outlined in the NSW Government's *Industrial Noise Policy.*

### Construction Noise

2.10 All Site preparation, filling/preloading and construction works that may generate an audible noise at any residential receptor shall only be undertaken between 7:00 am and 6:00 pm. Audible noise is defined as "noise that can be heard at the receiver." This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons.

*Note: 'Safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.*

2.11 Notwithstanding condition 2.10 of this approval, piling works shall not be conducted on Sundays or public holidays.

2.12 The Proponent may seek the Director-General's approval to conduct Site preparation, filling/ preloading and construction works outside the hours specified under condition 2.10 on a case-by-case basis. In seeking the Director-General's approval, the Proponent shall demonstrate a need for activities to be conducted during varied hours and how local acoustic amenity will be protected, as well as details of how the DEC's requirements with respect to the variation of hours have been addressed.

### Operation Noise

2.13 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the project do not exceed the maximum allowable noise contributions specified in Table 1 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

a) meteorological conditions of: wind speeds up to 3 $ms^{-1}$ (measured at 10 metres above ground level); or

b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2$ms^{-1}$ (measured at 10 metres above ground level).

***Table 1 - Maximum Allowable Noise Contributions (dB(A))***

| **Location** | **Day, Evening, Night**<br>**At all times** | **Night**<br>**10.00 pm Monday to Saturday**<br>**10.00pm to 6.00am on Sundays and Public Holidays** | |
|---|---|---|---|
| | **LAeq(15minute)** | **LAeq(night)** | **LA1(1minute)** |
| Fem Bay West | 41 | 37 | 57 |
| Fern Bay East | 39 | 36 | 55 |
| Stockton West | 41 | 37 | 57 |
| Stockton East | 38 | 35 | 56 |
| Mayfield West | 45 | 40 | 55 |
| Mayfield | 44 | 39 | 62 |
| Carrington | 36 | 33 | 52 |

2.14 For the purpose of assessment of noise contributions specified under condition 2.13 of this consent, noise from the project shall be:

a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with LAeq(15 minute) night noise limits;

b) measured at one metre from the dwelling facade to determine compliance with LA1(1minute) noise limits; and

c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DEC (refer to Section 11 of the New South Wales *Industrial Noise Policy* (EPA, 2000)). Details of such an alternative noise assessment accepted by the DEC shall be submitted to the Director-General to the implementation of the assessment method.

**Train Noise Performance**

2.15 The Proponent shall take necessary action to ensure that trains operated on the Site meet the noise performance criteria established under condition 2.13.

**3. ENVIRONMENTAL MONITORING AND AUDITING**

**Noise Auditing**

3.6 Within 90 days of the commencement of operation of the project, or as otherwise agreed by the Director-General, and during a period in which the project is operating under normal operating conditions, the Proponent shall undertake a program to confirm the noise performance of the project. The noise program shall include, but not necessarily be limited to:

a) noise monitoring, consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA, 2000), to assess compliance with condition 2.13 of this approval.

b) methodologies, locations and frequencies for noise monitoring;

c) identification of monitoring sites at which pre- and post-project noise levels can be ascertained;

d) details of any complaints and enquiries received in relation to noise generated by the project within the first 90 days of operation;

e) an assessment of night-time use of audible alarm systems;

f) a statement of whether the Site is in compliance with noise limits outlined in condition 2.13; and

g) any additional noise mitigation measures and timetables for implementation.

3.7 Within 28 days of conducting the noise monitoring referred to under condition 3.6 of this approval, the Proponent shall provide the Director-General and the DECC with a copy of the report. If the noise monitoring report identifies any non-compliance with the noise limits imposed under this approval (refer condition 2.13), the Proponent shall detail what additional measures would be implemented to ensure compliance, clearly indicating who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be measured and reported to the Director-General.

3.8 The requirements of conditions 3.6 and 3.7 shall be repeated within 90 days of the project exceeding an export rate of 33 million tonnes of coal per annum.

**L6 NOISE LIMITS**

L6.1 **Construction Noise**

All site preparation, filling/preloading and construction works that may generate an audible noise at any residential receptor shall only be undertaken between 7:00 am and 6:00 pm, except land-based activities associated with the spread of material from the dredging operations considered to form part of the dredging works in accordance with Development Consent (DA-134-3-2003-i). Such land based activities can be undertaken 24 hours per day, seven days a week.

This condition does not apply in the event of a direction from police or other emergency authority for safety or emergency reasons.

Note: *'safety or emergency reasons' refer to emergency works which may need to undertaken to avoid loss of life, property loss and / or to prevent environmental harm.*

L6.2 Not withstanding condition L6.1, dynamic replacement activities at the premises may be undertaken between 0600 and midnight, seven days a week, for a period commencing on 23 June 2008 and ceasing on 25 August 2008.

L6.3 Notwithstanding any other condition of this license, piling works shall not be conducted on Sundays or public holidays.

L6.4 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the project do not exceed the maximum allowable noise contributions specified in Table 1 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

a) meteorological conditions of: wind speeds up to 3 ms-1 (measured at 10 metres above ground level); or

b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to $2ms^{-1}$ (measured at 10 metres above ground level).

***Table 1 - Maximum Allowable Noise Contributions (dB(A))***

| **Location** | **Day, Evening, Night**<br>**At all times** | **Night**<br>**10.00 pm Monday to Saturday**<br>**10.00pm to 6.00am on Sundays and Public Holidays** | |
|---|---|---|---|
| | **LAeq(15minute)** | **LAeq(night)** | **LA1(1minute)** |
| Fem Bay West | 41 | 37 | 57 |
| Fern Bay East | 39 | 36 | 55 |
| Stockton West | 41 | 37 | 57 |
| Stockton East | 38 | 35 | 56 |
| Mayfield West | 45 | 40 | 55 |
| Mayfield | 44 | 39 | 62 |
| Carrington | 36 | 33 | 52 |

For the purpose of assessment of noise contributions specified under condition 2.13 of this consent, noise from the project shall be:

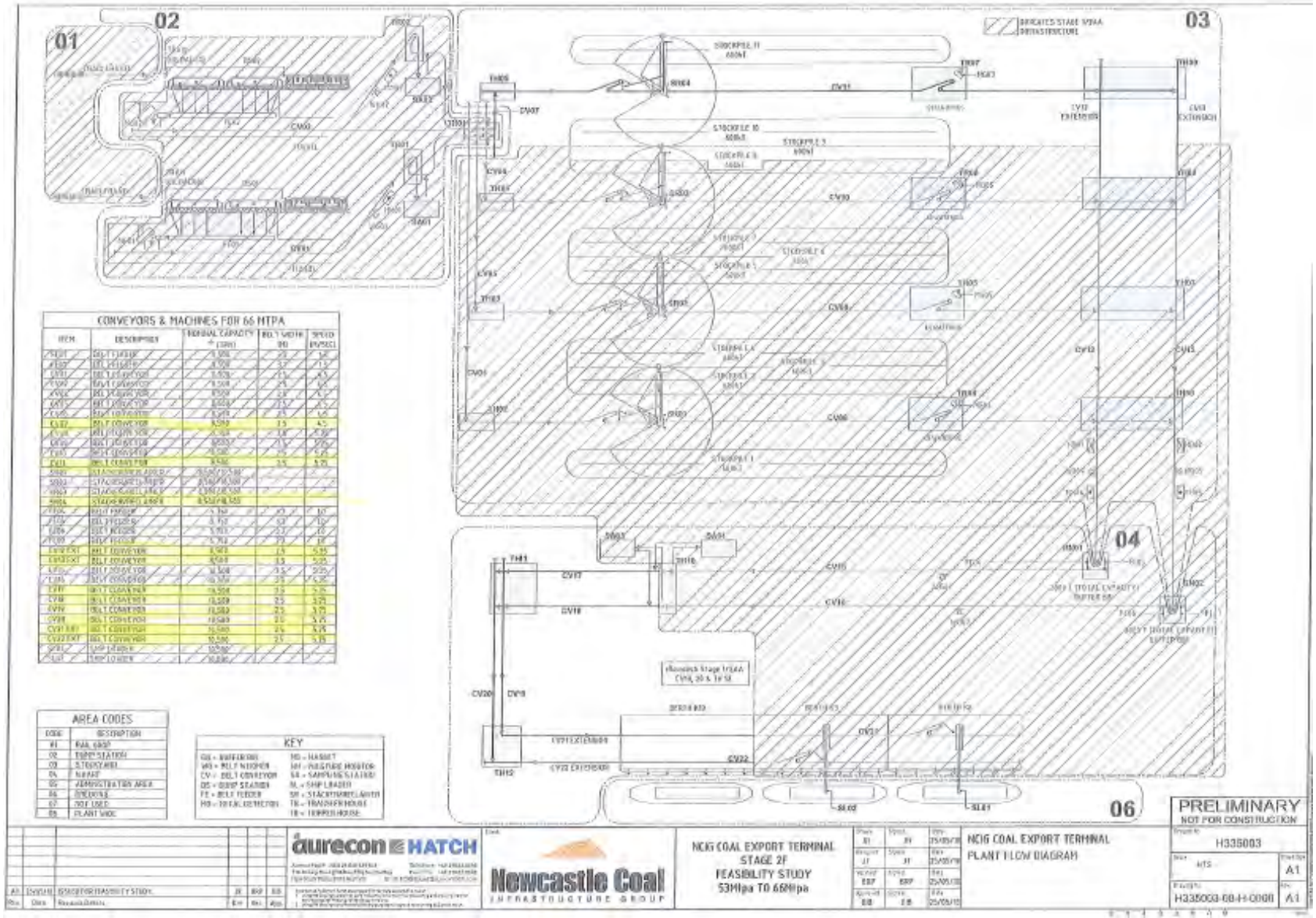
a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with LAeq(15 minute) night noise limits;

b) measured at one metre from the dwelling facade to determine compliance with LA1(1minute) noise limits; and

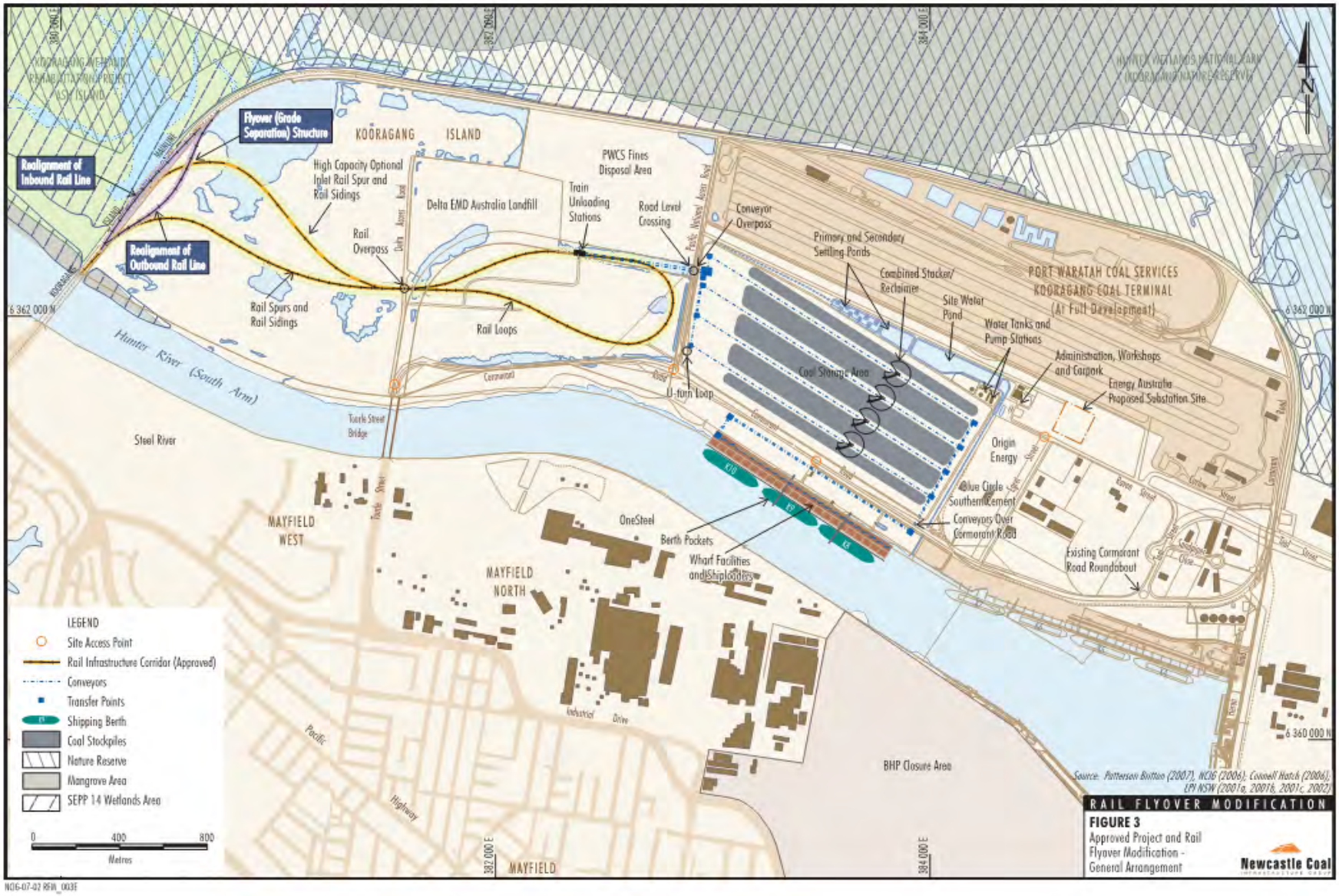
c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DEC (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment accepted by the DEC shall be submitted to the Director-General to the implementation of the assessment method.

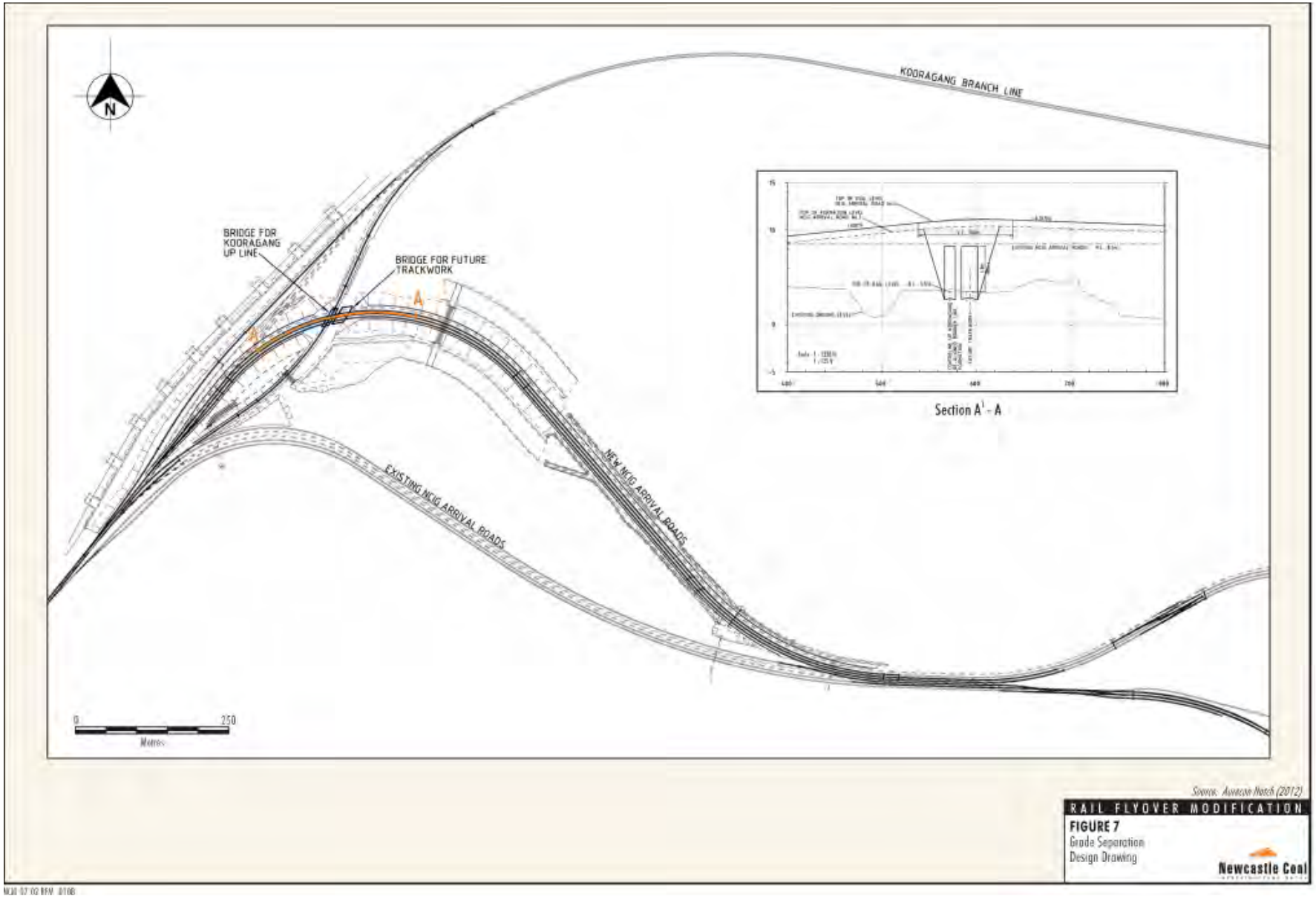
PLANT FLOW DIAGRAM



GENERAL ARRANGEMENT PLAN



GENERAL ARRANGEMENT PLAN



The predicted CET EA daytime intrusive $L_{Aeq(15minute)}$ noise levels from 66 Mtpa operations to the nearest receiver areas are below. All predicted intrusive noise levels are below the relevant assessment criteria and any noise impacts are considered acceptable.

**TABLE A5(I) - CET EA Daytime Intrusive $L_{Aeq(15minute)}$ Noise Levels (dBA re 20 µPa)**

| Receiver Area | ID/Location | | East Operation Calm[3] | West Operation Calm[3] | Daytime Noise Limit |
|---|---|---|---|---|---|
| Fern Bay West | FW1 | 1 Fullerton Lane | 27 | 26 | 41 |
| | FW2 | Stockton Hospital | 27 | 25 | 50[1] |
| Fern Bay East | FE1 | 21 Braid Road | 25 | 25 | 39 |
| | FE2 | Fern Bay Primary | 27 | 25 | 45[2] |
| Stockton West | SW1 | 284 Fullerton Street | 25 | 24 | 41 |
| | SW2 | Cnr Pembroke and Fullerton Sts | 25 | 25 | |
| Stockton East | SE1 | 40 Eames Avenue | 24 | 24 | 38 |
| | SE2 | Stockton Primary | 24 | 23 | 45[2] |
| Warabrook/ Mayfield West | W1 | 47 Stevenson Avenue | 34 | 33 | 45 |
| | W2 | 4 Groongal Street | 36 | 35 | |
| | W3 | Mayfield West Primary | 33 | 32 | 45[2] |
| Mayfield | M1 | 68 Bull Street | 37 | 36 | 44 |
| | M2 | 45 Simpson Crescent | 37 | 36 | |
| | M3 | 1 Arthur Street | 31 | 32 | |
| | M4 | 52 Arthur Street | 33 | 33 | |
| | M5 | 21 Crebert Street | 33 | 32 | |
| | M6 | Hunter Christian School | 37 | 36 | 45[2] |
| | M7 | Mayfield East Primary | 30 | 30 | |
| Carrington | C1 | Cnr Hargrave and Young Sts | 26 | 26 | 36 |
| Sandgate | SG1 | 4 Mangrove Road | 32 | 43 | 65 |
| Mayfield West | MW1 | Steel River | 41 | 42 | |
| Kooragang Island | KI1 | Blue Circle Southern | 56 | 56 | 70 |
| | KI2 | Origin Energy | 53 | 52 | |
| | KI3 | Boral Country Concrete | 51 | 51 | |
| | KI4 | Port Waratah Coal Services | 41 | 39 | |
| | KI5 | Cargill Australia | 43 | 42 | |
| | KI6 | ERS Australia | 45 | 44 | |
| | KI7 | Cleanaway | 49 | 48 | |
| | KI8 | Port Hunter Commodities | 48 | 47 | |
| | KI9 | BOC Gas | 48 | 47 | |
| | KI10 | Sims Metal | 44 | 43 | |
| Mayfield North | MN1 | OneSteel | 42 | 46 | 70 |

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.

Note 2: Equivalent external amenity criteria 45 dBA used in the absence of intrusive criteria.

Note 3: Daytime calm meteorological parameters as described in Table 9 of the EA NIA.

The predicted CET EA evening intrusive $L_{Aeq(15minute)}$ noise levels from 66 Mtpa operations to the nearest receiver areas are below. All predicted intrusive levels are below the relevant assessment criteria and any noise impacts are considered acceptable.

**TABLE A5(II) - CET EA Evening Intrusive $L_{Aeq(15minute)}$ Noise Levels (dBA re 20 µPa)**

| Receiver Area | ID/Location | | East Operation Wind[3] | West Operation Wind[3] | Evening Noise Limit |
|---|---|---|---|---|---|
| Fern Bay West | FW1 | 1 Fullerton Lane | 22 | 22 | 41 |
| | FW2 | Stockton Hospital | 22 | 21 | 50[1] |
| Fern Bay East | FE1 | 21 Braid Road | 20 | 20 | 39 |
| | FE2 | Fern Bay Primary | 21 | 20 | 45[2] |
| Stockton West | SW1 | 284 Fullerton Street | 22 | 21 | 41 |
| | SW2 | Cnr Pembroke and Fullerton Sts | 23 | 22 | |
| Stockton East | SE1 | 40 Eames Avenue | 21 | 21 | 38 |
| | SE2 | Stockton Primary | 22 | 21 | 45[2] |
| Warabrook/ Mayfield West | W1 | 47 Stevenson Avenue | 43 | 43 | 45 |
| | W2 | 4 Groongal Street | 45 | 43 | |
| | W3 | Mayfield West Primary | 42 | 42 | 45[2] |
| Mayfield | M1 | 68 Bull Street | 44 | 43 | 44 |
| | M2 | 45 Simpson Crescent | 44 | 43 | |
| | M3 | 1 Arthur Street | 40 | 40 | |
| | M4 | 52 Arthur Street | 40 | 40 | |
| | M5 | 21 Crebert Street | 40 | 40 | |
| | M6 | Hunter Christian School | 44 | 42 | 45[2] |
| | M7 | Mayfield East Primary | 38 | 38 | |
| Carrington | C1 | Cnr Hargrave and Young Sts | 30 | 29 | 36 |
| Sandgate | SG1 | 4 Mangrove Road | 43 | 50 | 65 |
| Mayfield West | MW1 | Steel River | 52 | 50 | |
| Kooragang Island | KI1 | Blue Circle Southern | 55 | 55 | 70 |
| | KI2 | Origin Energy | 51 | 50 | |
| | KI3 | Boral Country Concrete | 48 | 48 | |
| | KI4 | Port Waratah Coal Services | 36 | 35 | |
| | KI5 | Cargill Australia | 40 | 39 | |
| | KI6 | ERS Australia | 41 | 40 | |
| | KI7 | Cleanaway | 46 | 45 | |
| | KI8 | Port Hunter Commodities | 46 | 45 | |
| | KI9 | BOC Gas | 46 | 45 | |
| | KI10 | Sims Metal | 42 | 40 | |
| Mayfield North | MN1 | OneSteel | 50 | 49 | 70 |

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.

Note 2: Equivalent external amenity criteria 45 dBA used in the absence of intrusive criteria.

Note 3: Evening wind meteorological parameters as described in Table 9 of the EA NIA

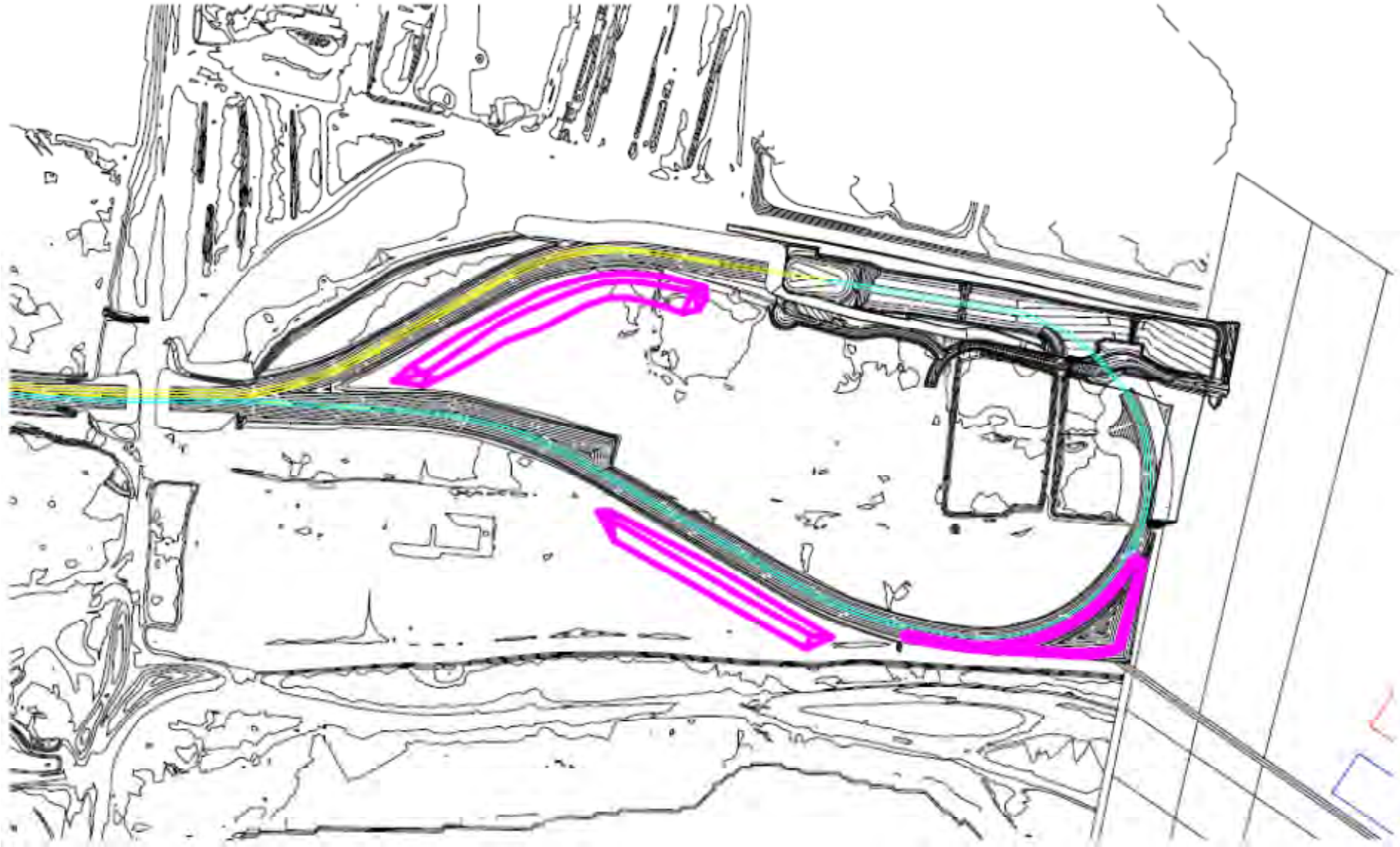
CET NIGHT-TIME OPERATION 66 MTPA

The predicted $L_{Aeq(15minute)}$ intrusive noise emissions from night-time 66 Mtpa operation to the nearest receiver areas are presented in the table below. All predicted intrusive levels are below the relevant assessment criteria and any noise impacts are considered acceptable

**TABLE A5(III) - CET EA Night-time Intrusive $L_{Aeq(15minute)}$ Noise Levels (dBA re 20 μPa)**

| Receiver Area | ID/Location | | East Operation | | West Operation | | Noise Limit |
|---|---|---|---|---|---|---|---|
| | | | Wind[3] | Inversion[3] | Wind[3] | Inversion[3] | |
| Fern Bay West | FW1 | 1 Fullerton Lane | 39 | 39 | 38 | 38 | 41 |
| | FW2 | Stockton Hospital | 39 | 39 | 38 | 39 | 50[1] |
| Fern Bay East | FE1 | 21 Braid Road | 38 | 39 | 37 | 38 | 39 |
| | FE2 | Fern Bay Primary | 38 | 38 | 37 | 37 | 45[2] |
| Stockton West | SW1 | 284 Fullerton Street | 38 | 38 | 37 | 38 | 41 |
| | SW2 | Cnr Pembroke and Fullerton Sts | 36 | 37 | 36 | 37 | |
| Stockton East | SE1 | 40 Eames Avenue | 37 | 38 | 37 | 38 | 38 |
| | SE2 | Stockton Primary | 34 | 35 | 34 | 35 | 45[2] |
| Warabrook/ Mayfield West | W1 | 47 Stevenson Avenue | 32 | 40 | 37 | 41 | 45 |
| | W2 | 4 Groongal Street | 39 | 43 | 39 | 42 | |
| | W3 | Mayfield West Primary | 38 | 41 | 39 | 41 | 45[2] |
| Mayfield | M1 | 68 Bull Street | 38 | 42 | 38 | 41 | 44 |
| | M2 | 45 Simpson Crescent | 40 | 42 | 40 | 42 | |
| | M3 | 1 Arthur Street | 38 | 40 | 37 | 39 | |
| | M4 | 52 Arthur Street | 38 | 39 | 38 | 39 | |
| | M5 | 21 Crebert Street | 36 | 39 | 38 | 39 | |
| | M6 | Hunter Christian School | 38 | 42 | 38 | 41 | 45[2] |
| | M7 | Mayfield East Primary | 38 | 38 | 38 | 38 | |
| Carrington | C1 | Cnr Hargrave and Young Sts | 34 | 33 | 34 | 32 | 36 |
| Sandgate | SG1 | 4 Mangrove Road | 29 | 40 | 42 | 47 | 65 |
| Mayfield West | MW1 | Steel River | 42 | 49 | 48 | 49 | |
| Kooragang Island | KI1 | Blue Circle Southern | 59 | 57 | 59 | 57 | 70 |
| | KI2 | Origin Energy | 58 | 55 | 57 | 54 | |
| | KI3 | Boral Country Concrete | 56 | 54 | 56 | 53 | |
| | KI4 | Port Waratah Coal Services | 49 | 45 | 49 | 44 | |
| | KI5 | Cargill Australia | 52 | 47 | 51 | 46 | |
| | KI6 | ERS Australia | 53 | 49 | 52 | 48 | |
| | KI7 | Cleanaway | 55 | 52 | 54 | 51 | |
| | KI8 | Port Hunter Commodities | 54 | 50 | 53 | 50 | |
| | KI9 | BOC Gas | 55 | 51 | 54 | 50 | |
| | KI10 | Sims Metal | 52 | 48 | 51 | 47 | |
| Mayfield North | MN1 | OneSteel | 47 | 48 | 47 | 48 | 70 |

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.
Note 2: Equivalent external amenity criteria 45 dBA used in the absence of intrusive criteria.
Note 3: Night-time wind, temperature inversion and drainage meteorological parameters as described in Table 9 of the EA NIA.



# APPENDIX C

# VISUAL ASSESSMENT REVIEW
# [URBIS, 2012]

23rd March 2012

Phil Reid
Environmental Advisor
PO Box 6003
Hunter Region Mail Centre NSW 2310

Dear Phil,

## NCIG Coal Export Terminal Project Approval (06_0009) - Rail Flyover Modification *Visual Assessment Review*

Newcastle Coal Infrastructure Group (NCIG) is undertaking an Environmental Assessment (EA) to support a request to modify the NCIG Coal Export Terminal Project Approval (06_0009) (NCIG CET EA) under Section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). The modification is referred to as the Rail Flyover Modification.

This report presents an assessment of the potential visual impacts associated with the Rail Flyover Modification and provides a comparison with the development for which approval was originally granted as described and assessed in the NCIG CET EA, 2006.

### DESCRIPTION OF THE PROJECT

The Rail Flyover Modification includes the following components:

- grade separation of the inbound track for the NCIG Northern Rail Spur (also referred to as the 'high capacity optional inlet rail spur and rail sidings'). This will entail the construction of an elevated section of track and a bridge structure over the realigned and lowered outbound (eastern) track of the Kooragang Island Main Line. The section of elevated track will have 3:1 embankments west of the eastern bank of Deep Pond, tapering to ground level for the section east of Deep Pond. The length of the grade separated flyover structure is approximately 100 metres (m);
- minor realignment of the inbound (western) track of the Kooragang Island Main Line; and
- minor realignment and lowering of the outbound (eastern) track of the Kooragang Island Main Line.

The plan alignment of the Northern Rail Spur is currently approved with an at-grade connection to the Kooragang Island Main Line. The Rail Flyover Modification proposes a change in elevation along a portion of the Northern Rail Spur corridor to a height of approximately 10.5 m AHD. For comparison purposes, the existing NCIG rail spur embankment height to the south is up to approximately 8.6 m AHD and the BHP Billiton Hunter River Remediation Project (HRRP) landfill design (immediately south of the existing NCIG rail spur) is several metres above this.



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## BACKGROUND

Urbis has reviewed the Project description for the Rail Flyover Modification, and compared it to the original Project description as described and assessed in the 2006 NCIG CET EA. The key differences between the original NCIG CET EA and the Rail Flyover Modification, from a potential visual impact perspective, relate to minor increases in the extent and elevation of rail infrastructure when compared to the existing components both on site and immediately adjacent (i.e. BHP Billiton HRRP landfill), and the existing landform along the North Rail Spur corridor.

Within the regional setting, the Rail Flyover Modification is a minor component in the context of the already approved NCIG CET which includes large scale industrial elements including, rail infrastructure, rail unloading facilities, conveyors, coal stockpiles, large stacker/reclaimers, wharf facilities and ship-loading facilities.

***Figure 1*** shows the Rail Flyover Modification in the context of the approved elements of the NCIG CET EA.

The Visual Impact Assessment undertaken by EDAW (2006) as part of the NCIG CET EA identified the following sensitive areas which would potentially have views of the NCIG CET (***refer to Figure 2***). These were:

- Mayfield (Viewpoint 1);
- Mayfield West (Viewpoint 2);
- Fern Bay - Nelson Bay Road (Viewpoint 3);
- Hunter Wetlands National Park (Kooragang Nature Reserve) (Viewpoint 4);
- Stockton Bridge (Viewpoint 5);
- Cormorant Road (Viewpoint 6); and
- Sandgate (Viewpoint 8).

Other areas (i.e. areas not assessed as sensitive areas) assessed to have the potential views of the Rail Flyover Modification included:

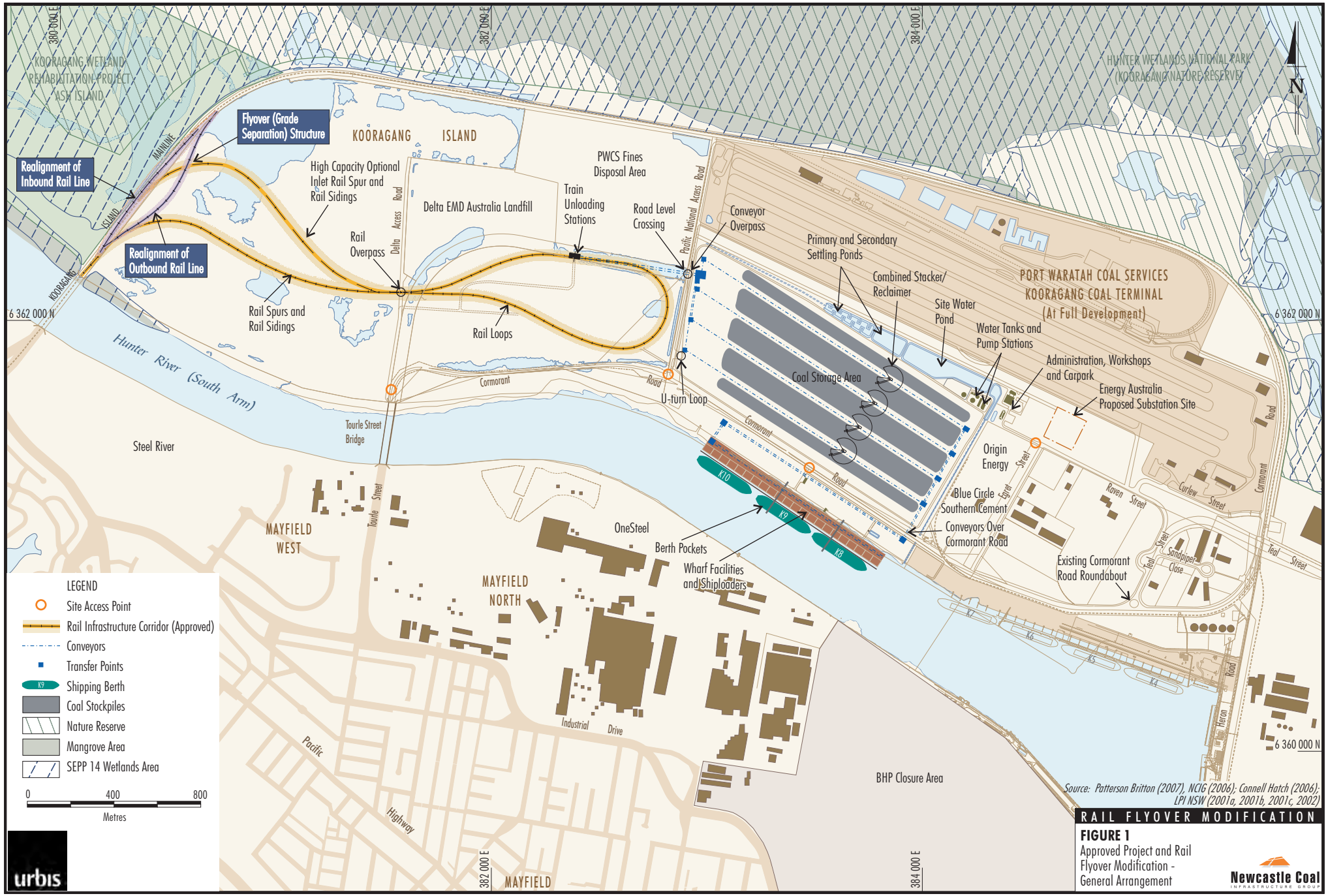
- The Hunter River (Viewpoint 7); and
- The Port related activities and industrial areas within the visual catchment.

Within the local and sub-regional setting, the number of sensitive viewpoints and the scenic quality at those viewpoints has not substantially changed since the NCIG CET EA was prepared. To date, NCIG has not received any complaints regarding visual amenity, nor has NCIG been made aware of any complaints in regards to visual amenity of the NCIG CET.

## POTENTIAL IMPACTS

A desktop assessment was undertaken, which included a review of the NCIG CET EA Visual Impact Assessment (EDAW, 2006) to determine the potential change in visual impact of the Rail Flyover Modification as compared with the approved NCIG CET.

The components of the Rail Flyover Modification are visually consistent with the approved NCIG CET as well as other coal, port and industrial developments within the setting. At its completed elevation, the proposed elevated track will sit at, or below, the top of the many buildings and infrastructure elements on Kooragang Island as well as below the canopy level of the tallest vegetation in the vicinity which lines the banks of the Hunter River. In addition, the Kooragang Island Main Line outbound line is being lowered which would reduce its potential visibility.




NCIG-07-02 RFM Visual_002B


Source: NCIG (2006); Connell Hatch (2006); RLMC (2006); UBD (2002)

RAIL FLYOVER MODIFICATION

**FIGURE 2**

Regional Location

urbis

Newcastle Coal INFRASTRUCTURE GROUP

NCIG-07-02 RFM Visual_001D

Due to previous industrial development in the area, including existing components of the NCIG CET, surrounding areas have potentially become accustomed to this type of development, from a visual amenity perspective. This is highlighted by the fact that no complaints have been received to date regarding visual amenity of the NCIG CET.

The sensitive areas as assessed by EDAW (2006) as part of the NCIG CET EA have been re-assessed to determine any change in impact that may result from the Rail Flyover Modification (***refer to Figure 2***).

***Mayfield (Viewpoint 1)***
From Mayfield, buildings between the viewpoint and the NCIG CET with the Rail Flyover Modification, including residences in the foreground and industrial buildings in the middle ground, as well as vegetation, screen views to the NCIG CET site.

***Mayfield West (Viewpoint 2)***
Buildings between the viewpoint and the NCIG CET with the Rail Flyover Modification, primarily residences in the foreground and middle ground, as well as vegetation, screen views to the NCIG CET site.

***Fern Bay - Nelson Bay Road (Viewpoint 3)***
Views to the NCIG CET with the Rail Flyover Modification are partially screened by existing road and riverside vegetation. Beyond the vegetation, views across the Hunter North Arm are dominated by the existing Port Waratah Coal Services (PWCS) Kooragang Coal Terminal. Views to the Rail Flyover Modification would be screened by the existing industrial buildings.

***Hunter Wetlands National Park (Kooragang Nature Reserve) (Viewpoint 4)***
The estuarine environment is predominantly flat with the low-lying vegetation allowing for distant views towards the NCIG CET with the Rail Flyover Modification, the PWCS Kooragang Coal Terminal and BHP Billiton HRRP landfill. The Rail Flyover Modification would be visible as a middle ground element (1.8 km distant) with the existing Kooragang Island Main Line and set in the context of a background which includes the NCIG CET coal storage area (2.5 km distant) and PWCS Kooragang Coal Terminal. While the Rail Flyover Modification would result in a slight change of visibility of project elements, the level of visual modification would remain as low (i.e. could not be considered a moderate visual modification in the context) and the resulting visual impact would remain as low to moderate.

***Stockton Bridge (Viewpoint 5)***
From the elevated viewpoint of the bridge, the existing built form infrastructure of PWCS Kooragang Coal Terminal and NCIG CET screen views between the viewpoint and the Rail Flyover Modification.

***Cormorant Road (Viewpoint 6)***
From the previously assessed viewpoint on Cormorant Road, the Rail Flyover Modification would be largely screened due to the presence of vegetation adjacent to the roadside.

***Hunter River (Viewpoint 7)***
Given that heavy industrial elements dominate the viewshed of the Hunter River and the visual sensitivity of users is considered low, the slight increase in the visibility of the NCIG CET with the Rail Flyover Modification remains low.

***Sandgate (Viewpoint 8)***
Vegetation fringing the northern bank of the Hunter River screens any views to the NCIG CET with the Rail Flyover Modification from this low-lying viewpoint.

A summary of the potential change in the visual impact of the NCIG CET EA and the Rail Flyover Modification is presented in Table 1.

TABLE 1 – POTENTIAL VISUAL IMPACT SUMMARY

| Change in Potential Visual Impact | | | | | | |
|---|---|---|---|---|---|---|
| *Viewing Location (Figure 2)* | | NCIG CET EA[1] | | | | NCIG CET with Rail Flyover Modification |
| | | Sensitivity | Visual Modification Level | Impact | Impact After Final | |
| **Regional Setting (Greater than 5 km)** | | **L** | **VL** | **VL-N** | **VL-N** | **Unchanged** |
| **Sub-Regional Setting (1 – 5 km)** | | **M-H** | **L-VL** | **L-M** | **L-M** | **Unchanged** |
| **Viewpoint 1** | Mayfield | **H** | L-VL | L-M | L-M | **Unchanged** |
| **Viewpoint 2** | Mayfield West (Gregson/Stevenson Avenue) | **H** | **L-VL** | **L-M** | **L-M** | **Unchanged** |
| **Viewpoint 3** | Fern Bay (Nelson Bay Road) | **H** | **VL** | **L** | **L** | **Unchanged** |
| **Viewpoint 4** | Hunter Wetlands National Park (Kooragang Nature Reserve) | **M-H** | **L** | **L-M** | **L-M** | **Unchanged** |
| **Viewpoint 5** | Stockton Bridge | **M** | **L** | **L** | **L** | **Unchanged** |
| **Local Setting (Up to 1 km)** | | **Varies** | **Varies** | **Varies** | **L-M** | **Unchanged** |
| **Viewpoint 6** | Cormorant Road | **M-H** | **M-H** | **M-H** | **L-M** | **Unchanged** |
| **Viewpoint 7** | Hunter River | **L** | **L** | **L** | **L** | **Unchanged** |
| **Viewpoint 8** | Sandgate Residential - Urban Services Zone (River/Ferry Road) | **H** | **Nil** | **Nil** | **Nil** | **Unchanged** |

H – High, M – Moderate, L – Low, VL – Very Low, N – Negligible

While the Rail Flyover Modification would result in a slight change of visibility of project elements at some viewpoints, the Rail Flyover Modification would not change the level of visual impact described in the NCIG CET EA for each of the viewpoints listed in Table 1. Further, the Rail Flyover Modification would not change the number of sensitive public viewpoints as assessed in the NCIG CET EA.

The Rail Flyover Modification would not include any additional night-lighting sources to those assessed in the NCIG CET EA. The nature of the night-lighting associated with trains would be of a similar intensity when compared to the existing night-lighting associated with rail operations on the Kooragang Island Main Line.

## MITIGATION MEASURES AND MANAGEMENT

The mitigation measures and management measures that have been implemented for the maintenance of visual amenity for the NCIG CET are outlined in the NCIG's approved Construction Environment Management Plan (CEMP) and the Operation Environment Management Plan (OEMP).

We are advised that the CEMP and OEMP would continue to be implemented (and revised as required) for the Rail Flyover Modification.

In addition, in accordance with Condition 7 of Particular Manner Decision (EPBC 2006/2987) for the NCIG CET under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999,* NCIG would place screens, comprising timber paling fences or similar structures, at intervals along the rail infrastructure (including the Rail Flyover Modification) to minimise lighting impacts from trains and rail corridor lighting.

[1] NCIG CET EA Visual Assessment, EDAW (2006)

***Conclusion***

It is my professional opinion that while the Rail Flyover Modification would result in a slight change of visibility of project elements at some viewpoints, the potential visual impact resulting from the NCIG CET with the Rail Flyover Modification would remain unchanged when compared to the assessment conclusions in the NCIG CET EA.

Should you have any queries relating to the above overview assessment, please do not hesitate calling me on (03) 8663 4888.

Yours sincerely,

Peter Haack
Director