4 ENVIRONMENTAL ASSESSMENT

4.1 ENVIRONMENTAL RISK REVIEW

As demonstrated in Table 1, there would be no change to the majority of the NCIG CET approved development components and consequently little to no change in potential impacts with the Rail Flyover Modification for several environmental aspects.

An environmental risk review was completed by NCIG to identify any potential changes to otherwise approved impacts for further assessment in this EA.

The results of the environmental risk review are provided in Table 2 with reference to where each environmental aspect is considered in this EA.

Table 2
Environmental Risk Review

Environmental Aspect (From NCIG CET EA)	Potential Changes Associated with Rail Flyover Modification	Consideration and/or Further Assessment in this EA
Land Resources (including land use, soils and erosion potential and ASS)	Temporary minor disturbance of additional lands (less than 2.6 ha) resulting in potential erosion and sediment movement during construction works and excavation of Potential Acid Sulfate Soil [PASS] material.	Section 1.2.2 (land use) and Section 4.2 (soils [including PASS] and erosion potential)
Meteorology (including monitoring)	No change.	-
Noise	Minor realignments of Kooragang Island Main Line and additional elevation (approximately 1.9 m relative to existing NCIG rail spur embankment) of Northern Rail Spur may alter the approved intrusive noise levels at nearest receivers.	Section 4.3 and Appendix B
Air Quality	Temporary dust emissions during construction activities on additional lands resulting in contaminated particulates within the KIWEF becoming airborne.	Section 4.4
Visual Character (including night-lighting)	Minor realignments of Kooragang Island Main Line and additional elevation (approximately 1.9 m relative to existing NCIG rail spur embankment) of Northern Rail Spur and associated night-lighting may change the level of approved visual impact.	Section 4.5 and Appendix C
Surface Water (including surface water quality)	Temporary minor disturbance of additional lands during construction of rail embankments could potentially result in drainage of sediment laden runoff to downstream waterbodies. Management of additional stormwater runoff from the minor realignments of Kooragang Island Main Line.	Section 4.6
Land Contamination and Groundwater (including soil and water management during excavations, and pre-loading of rail infrastructure corridor)	Temporary minor disturbance of additional lands resulting in excavation of contaminated soils. Temporary consolidation of additional lands during construction of rail embankments leading to induced groundwater flows from clay aquitard to fill and estuarine aquifer. Capping of additional lands within KIWEF.	Section 4.7
Flora	Minor disturbance of additional lands (less than 2.6 ha) resulting in a potential effect on threatened species or endangered ecological communities (EECs).	Section 4.8 and Appendix D
Fauna	Minor disturbance of additional lands (less than 2.6 ha) (i.e. potential habitat) resulting in a potential effect on threatened or migratory fauna species. Minor realignments of Kooragang Island Main Line and additional elevation (approximately 1.9 m relative to existing NCIG rail spur embankment) of Northern Rail Spur resulting in minimal additional visibility of train headlights.	Section 4.9 and Appendix D
Heritage (Aboriginal and non-Aboriginal)	Minor disturbance of additional lands (less than 2.6 ha) resulting in identification/excavation of heritage items.	Section 4.10
Transport	Temporary additional traffic movements for import of fill for construction of rail embankments and rail ballast.	Section 4.11 and Appendix E

Table 2 (Continued)
Environmental Risk Review

Environmental Aspect (From NCIG CET EA)	Potential Changes Associated with Rail Flyover Modification	Consideration and/or Further Assessment in this EA
The Regional Economy	No change.	-
Socio-Economic Considerations	No change.	-
Hazard and Risk	Minor disturbance of additional lands (less than 2.6 ha) resulting in an increased level of risk during construction and/or operational activities.	Section 4.12

4.2 LAND RESOURCES

Given the existing industrial land uses on Kooragang Island and associated with the Project site (i.e. approximately 180 ha), impacts on land use from the Rail Flyover Modification would be negligible. The total area of additional land required for the Rail Flyover Modification is less than 2.6 ha.

Modification to the existing topography would result from the construction of the grade separated inbound track for the NCIG Northern Rail Spur, and from the minor realignments of the inbound (western) track and outbound (eastern) track of the Kooragang Island Main Line, however it is considered that these works would be of a scale and nature consistent with the surrounding land use, topography and landscape features. A Visual Assessment Review for the Rail Flyover Modification is presented in Appendix C and Section 4.5.

The Rail Flyover Modification would have the potential to increase erosion and sediment movement due to temporary disturbance of soils. These potential impacts and mitigation measures are described in Section 4.5.

While no ASS were identified in material excavated during Stage 1 or Stage 2AA of the NCIG CET construction, excavations associated with the Rail Flyover Modification would have the potential to intercept ASS material, if present. The presence or otherwise of ASS material would be identified during the surface and sub-surface sampling (Section 4.7).

Given the limited amount of excavation works associated with the Rail Flyover Modification, and that no ASS material was identified during Stage 1 and Stage 2AA construction of the NCIG CET, the risk of intercepting ASS material is considered low. Notwithstanding, any ASS material encountered during construction works would be managed in accordance with the NCIG ASSMP.

4.3 NOISE

As part of the NCIG CET EA, a Noise Impact Assessment was undertaken by Heggies Australia (2006) including the development of an acoustic model. The Noise Impact Assessment considered operations 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.

A Noise Assessment Review for the Rail Flyover Modification was undertaken by SLR (2012) and is presented in Appendix B.

The Noise Assessment Review presented the sound power levels associated with the CET plant and equipment as described in the NCIG CET EA, and compared these against the ‘as-built’ plant and equipment currently, and predicted, to be in use at the CET. The CET noise model was also updated to predict the CET contributed noise levels including the Rail Flyover Modification at the nearest receiver areas for comparison with the approved noise limits.

The review identified that the sound power level associated with the plant and equipment which will be in operation once the CET is operating at full capacity (of 66 Mtpa) is consistent with the predicted sound power level presented in the NCIG CET EA.

The review also assessed the potential noise impacts associated with the Rail Flyover Modification and concluded that although there are minor increases in the extent and elevation of the rail infrastructure associated with the Rail Flyover Modification, no additional operational plant or equipment would be introduced as a result of the Rail Flyover Modification and the on-site operating sound powers levels would remain unaltered. Therefore, any potential variation in the off-site intrusive noise level at the nearest receivers would be negligible as a result of the Rail Flyover Modification (Appendix B). These conclusions were confirmed by the prediction results from the updated CET noise model.

4.4 AIR QUALITY

As part of the NCIG CET EA, an Air Quality Impact Assessment (AQIA) was undertaken by Holmes Air Sciences (2006) for the construction and operation of the NCIG CET. The potential air quality impacts were modelled for both the Stage 1 (i.e. 30 Mtpa) and maximum 66 Mtpa capacity CET operations.

The AQIA considered that air quality impacts during construction (e.g. dust generated during earthworks undertaken in a progressive manner) would be less than that during Project operations, and combined with the sporadic nature of dust emissions from construction activities, modelling of a construction scenario was not required, and therefore is also not considered necessary for the Rail Flyover Modification.

Dust emissions during construction of the NCIG CET including the Rail Flyover Modification would continue to be controlled in accordance with the requirements of Project Approval (06_0009) as follows:

- Conditions 2.2 and 2.4, Schedule 2: NCIG will design and construct the Project in a manner that minimises or prevents the emission of visible dust beyond the boundary of the site (including wind blown and traffic generated dust).
- Condition 2.5, Schedule 2: NCIG will control dust emissions on all internal roads, trafficable areas and manoeuvring areas to minimise the potential for dust generation by sealing, or otherwise treating surfaces in a manner acceptable to the Director-General.
- Condition 2.45, Schedule 2: All stockpiled construction materials will be managed to minimise erosion or dispersal (including wind-blown dust) of the materials.

Dust control measures to be implemented during construction of the NCIG CET including the Rail Flyover Modification would include the following:

- demarcation and minimisation of ground disturbance areas;
- watering of exposed ground disturbance areas and high traffic areas using water trucks (or similar) to minimise the generation of dust;
- confining vehicle movements to designated access routes;
- limiting the speed of vehicles on unpaved roads; and
- encapsulation of contaminated materials considered unsuitable for use as construction fill (Section 4.7).

Air quality monitoring (dust deposition) would continue to be undertaken in accordance with the existing environmental monitoring program for the NCIG CET, and consistent with the requirements of EPL 12693.

4.5 VISUAL CHARACTER

As part of the NCIG CET EA, a Visual Impact Assessment was undertaken by EDAW Australia (2006).

For the purposes of this EA in support of the Rail Flyover Modification, Urbis was commissioned to conduct 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. The Visual Assessment Review for the Rail Flyover Modification is provided in Appendix C and the findings summarised below.

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.

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.

Sensitive viewpoints that were assessed in the NCIG CET EA and have been re-assessed with the Rail Flyover Modification included (Figure 9):

- 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).

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

RAIL FLYOVER MODIFICATION

FIGURE 9

Sensitive Viewpoints

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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.

The Visual Assessment Review (Appendix C) concluded that while the Rail Flyover Modification would result in a slight change of visibility of infrastructure 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 above viewpoints. Further, the Rail Flyover Modification would not change the number of sensitive public viewpoints as assessed in the NCIG CET EA.

The mitigation measures and management measures for the maintenance of visual amenity at the NCIG CET outlined in the NCIG's approved CEMP and OEMP would continue to be implemented for the Rail Flyover Modification.

Night-lighting

The Rail Flyover Modification would not include any additional night-lighting sources to those assessed in the NCIG CET EA.

The Visual Assessment Review (Appendix C) concluded that 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.

Notwithstanding, in accordance with Condition 7 of Particular Manner Decision (EPBC 2006/2987) (Attachment 3), 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.

4.6 SURFACE WATER

Surface water runoff from disturbance areas during the construction of the rail infrastructure could potentially contain sediments, soluble salts, heavy metals, organic contaminants, fuels, oils and grease. The surface water management layout for the NCIG CET including the Rail Flyover Modification is shown on Figure 8 and described in Section 3.5.

The Rail Flyover Modification would result in an increase in the Project disturbance area by less than 2.6 ha. Erosion and sediment control measures would be implemented for the Rail Flyover Modification consistent with the CSWMP and OEMP.

The following principles underpin the approach to erosion and sediment controls at the NCIG CET and for the Rail Flyover Modification to protect adjacent wetland areas, Deep Pond and the Hunter River:

- Minimising surface disturbance and restricting access to undisturbed areas.
- Separation of runoff from disturbed and undisturbed areas where practicable.
- Construction of surface drains to facilitate the efficient transport of surface runoff or utilisation of existing stormwater systems.
- Construction of the site drainage network including construction settling ponds, primary and secondary settling ponds and an overflow pond to contain runoff up to specified design criterion (Section 2.5.3).

The above principles take into account the general recommendations for site drainage works presented in *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004).

In addition to these principles, development activities would generally occur in the following order:

1. Construction of sediment fences (down slope of disturbance areas) where required.
2. General construction works will then take place once erosion and sediment control measures are in place.
3. Construction of drainage diversions (typically upslope of disturbance areas) – these will only be constructed where they will significantly reduce the runoff catchment of disturbance areas and will connect to the site drainage network where practicable.
4. Construction of collection drains (down slope of disturbance areas) where required to convey runoff to the site drainage network (including the construction settling ponds, primary and secondary settling ponds and the overflow pond).

All stockpiled construction materials would be managed to minimise erosion or dispersal of the materials in accordance with Condition 2.45 of Project Approval (06_0009).

All fill/preload material brought to the Project site would be managed in manner that minimises erosion and dispersal of those materials to the downstream waters (e.g. south arm of the Hunter River or adjacent wetland areas).

All erosion, sediment and pollution control infrastructure would be maintained on the Project site at or above design capacity for the duration of construction of the Project and until such time as all ground disturbed by the works has been stabilised and rehabilitated so that it no longer acts as a source of sediment, in accordance with Condition 2.44, Schedule 2 of Project Approval (06_0009).

In accordance with Condition 2.42 of the Project Approval, unless otherwise agreed by the Director-General, NCIG will design, construct, maintain and operate surface water and stormwater management infrastructure on the site to accommodate a 1 in 100 ARI rainfall event. In accordance with Condition 7.3 (b), Schedule 2, of the Project Approval (06_0009), all elements of the site drainage network will include appropriately-sized stormwater controls, in accordance with *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004).

The general design criteria for sediment control structures are summarised in Table 3.

Table 3
Sediment Control Structures –
General Capacity Requirements

Sediment Control Structure	Function	Design Capacity
Upslope diversion drains	Reduce runoff from undisturbed areas onto disturbed areas.	Peak flow calculated for 1 in 100 year ARI rainfall event.
Downslope collection drains	Intercept and convey disturbed area runoff water to sediment ponds.	Peak flow calculated for 1 in 100 year ARI rainfall event.
Settling ponds	Containment of sediment-laden runoff.	Capacity to store the runoff produced from the 1 in 100 year ARI rainfall event and suitable sediment storage capacity in accordance with Landcom (2004).

Source: CSWMP (NCIG, 2010a)

Given the above measures, the proposed Rail Flyover Modification would have negligible additional impact on the surface water flows or quality to surrounds.

4.7 LAND CONTAMINATION AND GROUNDWATER

A Land Contamination and Groundwater Assessment (RCA Australia, 2006) was conducted as part of the NCIG CET EA in accordance with *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land*. The assessment identified a range of fill materials (including contaminated material) within the KIWEF:

- blast furnace slag;
- coal washery fine and coarse rejects;
- brecketts material and slag;
- refuse;
- BOS dust;
- dredge material;
- unknown fill status (water and marshes);
- miscellaneous fill (majority dredge material); and
- unknown fill.

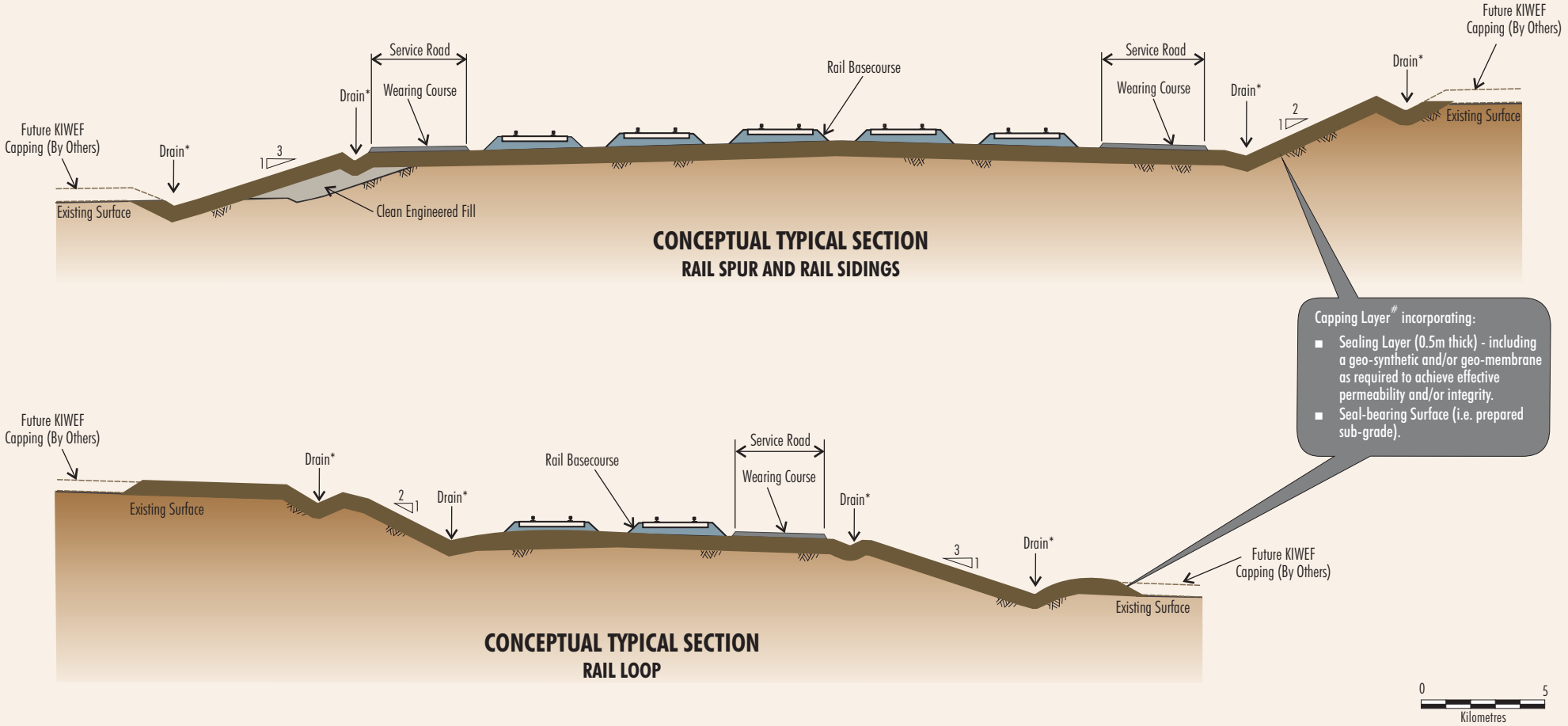
Limited excavations would be required during the construction of the Rail Flyover Modification components. As part of the CEMP required in accordance with Project Approval (06_0009), procedures are included for the sampling and analysis of soil prior to any excavations and subsequent handling of contaminated materials, if identified.

As described in Section 2.1.1, the rail infrastructure corridor would continue to be designed and constructed such that it meets the goals of benchmark techniques 28 and 29 in *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996) where it traverses the KIWEF, and would include capping and drainage works (Figure 10).

With continued implementation of the management measures for the NCIG CET site for the additional lands associated with the Rail Flyover Modification in accordance with SEPP 55, the development site would be suitable.

Groundwater

As described in the NCIG CET EA, the fill aquifer that the rail infrastructure corridor traverses comprises various waste materials. The permeability of the waste materials varies from low to moderate and groundwater flow is generally dominated by areas of recharge across the site, as evidenced by groundwater mounding. The groundwater flow from these mounds is radial to the surrounding surface water ponds and is expected to be downward to the underlying estuarine aquifer (RCA Australia, 2006).



Notes:

* *Lining/armouring of drain alignments as required.*

\# *An Infiltration Drainage Layer and Revegetation Layer would be placed across the Capping Layer as part of Project closure and rehabilitation works.*

Source: NCIG (2006); Connell Hatch (2006); RCA Australia (2006)

RAIL FLYOVER MODIFICATION

FIGURE 10

Conceptual Typical Cross Section of the Rail Infrastructure Corridor

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NCIG-07-02 RFM_013A