

Spoil Management Project Review of Environmental Factors





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Abbreviations

AHIMS	Aboriginal Heritage Information Management System	
AHIP	Aboriginal Heritage Impact Permit	
ARI	Average Recurrence Interval	
ASS	Acid Sulfate Soils	
Bankstown LEP 2015	Bankstown Local Environmental Plan 2015	
ССТV	Closed Circuit TV	
CEEC	Critically Endangered Ecological Community	
CEMP	Construction Environmental Management Plan	
CHL	Commonwealth Heritage List	
CLM Act	Contaminated Land Management Act 1997	
CLP	Community Liaison Plan	
СМР	Conservation Management Plan	
CNS	Transport for NSW Construction Noise Strategy	
СоА	Conditions of Approval	
CPTED	Crime Prevention through Environmental Design	
CRM	Commonwealth Rolling Mills	
CRMFS	CRM Flood Study	
СТМР	Construction Traffic Management Plan	
DBYD	Dial Before You Dig	
DP&E	NSW Department of Planning and Environment	
Eastern Siding Site	Preferred site option for the Sydney Modal Transfer Facility. Refer to Figure 7 for location.	
EEC	Endangered Ecological Community	
EIS	Environmental Impact Statement	
EMS	Environmental Management System	
EPA	Environment Protection Authority	
EPL	Environmental Protection Licence	
EP&A Act	Environmental Planning and Assessment Act 1979	
EP&A Regulation	Environmental Planning and Assessment Regulation 2000	
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999	
ESD	Ecologically Sustainable Development	
FEEP	Flood Emergency Evacuation Plan	
FM Act	Fisheries Management Act 1994	
FMP	Fauna Management Plan	
FRP	Flood Risk Precincts	
GGBF	Green and Golden Bell Frog	



GHG	Greenhouse Gas	
GIS	Geographic Information System	
GPFS	Greenacre Park stormwater catchment	
Heritage Act	Heritage Act 1977	
Infrastructure SEPP	State Environmental Planning Policy (Infrastructure) 2007	
ICNG	Interim Construction Noise Guideline	
INP	Industrial Noise Policy	
LALC	Local Aboriginal Land Council	
LEP	Local Environmental Plan	
LGA	Local Government Area	
LoS	Level of Service	
Μ4	M4 Western Motorway	
NCA	Noise Catchment Area	
NES	National Environmental Significance	
NHL	National Heritage List	
NMP	Noise Management Plan	
NPW Act	National Parks and Wildlife Act 1974	
OEH	Office of the Environment and Heritage	
OEMP	Operational Environmental Management Plan	
PASS	Potential Acid Sulfate Soils	
РКСТ	Port Kembla Coal Terminal	
PMF	Probable Maximum Flood	
POEO Act	Protection of the Environment Operations Act 1997	
PSNL	Project Specific Noise Level	
QA/QC	Quality Assurance/Quality Control	
RAV	Restricted Access Vehicle	
REF	Review of Environmental Factors	
RMS	Roads and Maritime Services (formerly Roads and Traffic Authority)	
RNE	Register of National Estate	
RNP	Road Noise Policy	
Roads Act	Roads Act 1993	
SEPP	State Environmental Planning Policy	
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land	
SEPP 71	State Environmental Planning Policy 71 – Coastal Protection	
SHR	State Heritage Register	
SIDRA	SIDRA modelling software package	
SPL	Sound Pressure Level	
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2011	



Strathfield LEP 2012	Strathfield Local Environmental Plan 2012	
SWL	Sound Power Level	
Three Ports SEPP	State Environment Planning Policy (Three Ports) 2013	
TIA Traffic Impact Assessment		
TSC Act	Threatened Species Conservation Act 1995	
UFP	Unexpected finds protocol	
UGL site	Site option considered for the Sydney Modal Transfer Facility. Refer to Figure 7 for location.	
VENM	Virgin Excavated Natural Material	
WHO	World Health Organisation	
WM Act	Water Management Act 2000	
WollongongLEPWollongong Local Environmental Plan 20092009		



Executive summary

Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Spoil Management Pathway Project (the Proposal).

The Proposal contributes to the NSW Government initiative to reduce heavy vehicle movements on NSW's roads, with the intent to reduce congestion and improve road safety.

This review of environmental factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Description of the Proposal

The Proposal would establish an integrated transport path for the transfer of Virgin Excavated Natural Material (VENM) from the M4 WestConnex project to construction projects in the Illawarra region. The M4 WestConnex project includes an extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Large volumes of spoil will be extracted from 12 locations along the M4 tunnel route which will require disposal. This Proposal intends to transport the spoil via rail to the Illawarra region and reuse the spoil on construction projects, whilst also providing financial, road safety, environmental and wider social benefits. The facilities may be used by other projects in the future, however those projects would be subject to separate assessment.

Transport for NSW seeks to construct two modal transfer facilities for the transfer of road infrastructure VENM. The facilities would be designed to have the capacity to handle 9,000 tonnes of VENM per day. Material would be brought to the Sydney Modal Transfer Facility located at Chullora by truck, loaded onto trains and transported to Illawarra Modal Transfer Facility at Port Kembla, for distribution by truck to construction projects in the region.

Need for the Proposal

Metropolitan Sydney is currently experiencing an intense period of construction through public and private sector development, with this period anticipated to continue for the next five to 10 years. Transport for NSW is contributing to this construction through the delivery of significant transport projects to enhance customer journeys and ease congestion.

Transport for NSW is investigating options to reduce the number of construction related heavy vehicles from Sydney's roads that are contributing to congestion, with a specific examination of the spoil logistics chain for the M4 WestConnex project. The Proposal's objectives are to:

- Reduce heavy vehicle usage and associated congestion on the road network; and
- Improve road safety outcomes through the reduction of heavy vehicle crash involvement.

Due to the large amounts of spoil being generated by the M4 WestConnex project, a reduction in the truck kilometre movements associated with the project's construction activities, through multi-modal options, has the potential to reduce congestion and improve road safety. Consequently, this Proposal has examined spoil truck movements to help satisfy the Proposal intent.



The options for how this spoil can be managed are highly dependent on the type of material being excavated from the M4 WestConnex project. There is rarely a single methodology employed by a project for 100 percent of the spoil generated, and this Proposal would form one component of the overall spoil management solution for the M4 WestConnex project. Transport for NSW has identified a haulage path that meets the objectives of the Proposal as it reduces truck kilometres travelled, to provide financial, road safety, environmental and wider socio-economic benefits. The Proposal is considered to be the best option to address future spoil management needs while achieving the objectives. Similar spoil transfer solutions may be used for future Transport for NSW projects.

Statutory considerations

The EP&A Act provides for the environmental impact assessment of development activities in NSW. Part 5 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport for NSW, which do not require development consent under the EP&A Act.

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. Clause 94(1) of the Infrastructure SEPP allows development for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent on any land. Clause 94(2) specifies that development for the purpose of road infrastructure facilities includes a reference to development for the purposes of construction works including extraction of extractive materials and stockpiling of those materials, if the extraction and stockpiling are ancillary to road construction, if the development is in connection with a road or road infrastructure facilities. The proposed development of both modal transfer facilities and the associated operations is ancillary to development of a road, with development consent not required, as Transport for NSW is a public authority. The environmental impacts of the Proposal are assessed under the provisions of Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with Clause 228 of the *Environment Planning and Assessment Regulation 2000* (EP&A Regulation).

In accordance with Section 111 of the EP&A Act, Transport for NSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This REF complies with this requirement.

Community and stakeholder consultation

Under the Infrastructure SEPP, consultation is required with local councils or public authorities in certain circumstances, including where council-managed infrastructure or local heritage items are affected. Consultation with council is required if the Proposal is likely to generate traffic to an extent that would strain the capacity of the road system in a local government area. Whilst the increase in the number of truck movements along local roads has been assessed as not having a significant impact, there would be a notable increase in heavy vehicles in the areas surrounding the modal transfer facilities. Councils will be formally notified of the Proposal and consulted in the development of any traffic management plans.

Consultation has been undertaken with relevant key stakeholders including Sydney Trains, the Sydney Motorways Corporation, Bluescope Steel and the Environmental Protection



Authority (EPA). Comments raised by key stakeholders have been considered in the preparation of this REF.

In addition, Transport for NSW will be undertaking consultation with the surrounding community stakeholders, which include:

- Direct notification to community stakeholders by way of newsletter or flyer; and
- Public display of this REF.

Community consultation activities for the Proposal will be undertaken during public display of this REF. The REF is to be displayed for a period of two weeks. Further information about these specific activities is provided in Section 5 of this REF.

During this display period, the REF will be available for viewing at the City of Canterbury-Bankstown office, Bankstown Library and Knowledge Centre, Wollongong City office and Warrawong District Library. The REF will also be available online on the Transport for NSW website **transport.nsw.gov.au/projects**. Information on the Proposal would be available through the Project Infoline (**1800 684 490**) or by email at **projects@transport.nsw.gov.au**.

Transport for NSW would review and assess all feedback received during the public display period prior to determining whether or not to proceed with the Proposal. Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Refer Figure 1 for the consultation process to be followed for the Proposal.





Figure 1: Consultation process for the Proposal



Environmental impact assessment

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures to reduce the identified impacts.

The key likely impacts of the Proposal are as follows:

- Heavy vehicle movements generated in proximity to the modal transfer facilities;
- Air quality and noise impacts associated with the proposed train and truck movements, along with the loading/unloading and temporary storage of spoil material;
- Visual impacts associated with the transport movements, onsite plant and the use of surge piles (short-term storage of material due to inclement weather or machinery breakdown); and
- Impacts on the current operations undertaken at the modal transfer facilities.

These impacts have been investigated, with appropriate management and mitigation measures developed to ensure that significant impacts do not occur. The key management and mitigation measures include:

- Design refinements during the detailed design phase of the Proposal;
- Preparation of a Construction Environmental Management Plan (CEMP); and
- Preparation of an Operational Management Plan (OEMP).

The plans would incorporate a range of management and mitigation measures and procedures (refer Section 7) to ensure impacts to the environment, community and adjoining operations are managed appropriately.

Conclusion

This REF has been prepared having regard to Sections 111 and 112 of the EP&A Act, and Clause 228 of the EP&A Regulation, to ensure that Transport for NSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal has also been designed in accordance with the Transport for NSW's Sustainable Design Guidelines and has taken into account the principles of ecologically sustainable development (ESD). Key initiatives include reusing existing infrastructure such as load train wagons and procuring plant that can be relocated and reused elsewhere on completion of the Proposal. The overall intent of the Proposal is to provide sustainability benefits through reduced congestion and improved road safety. These initiatives would be considered further during the detailed design, construction and operational phases of the Proposal.

Should the Proposal proceed, the likely impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF. Transport for NSW has determined that an environmental impact statement is not required for the Proposal, nor is the approval of the Minister for Planning.



1. Introduction

Transport for NSW was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. Transport for NSW is a public authority and is the proponent and determining authority for the Spoil Management Pathway Project (the Proposal).

1.1. Overview of the Proposal

Transport for NSW seeks to develop two modal transfer facilities to assist in the transfer of Virgin Excavated Natural Material (VENM) from the M4 WestConnex project in Sydney to construction projects in the Illawarra region.

Material would be brought to the Sydney Modal Transfer Facility located at Chullora by truck, loaded onto trains and transported to the Illawarra Modal Transfer Facility at Port Kembla, for distribution by truck to construction projects in the region (refer Figure 2). The facilities may be used by other projects in the future, however those projects would be subject to separate assessment.

Each facility would be designed to have the capacity to handle 9,000 tonnes of VENM per day. The intent of the Proposal is to reduce the number of Transport for NSW construction related heavy vehicles on roads within urban areas of NSW, providing environmental, social and economic benefits for the region.

During the options assessment a number of pathways were considered including transferring the material either north, south or west of metropolitan Sydney. Transportation south to the Illawarra region was the preferred option. Suitable options for the location of the modal transfer facilities in Sydney and in the Illawarra were considered during investigations that considered a number of environmental, engineering, logistical and chronological constraints. Further details of the options assessment and Proposal justification are identified at Section 2 of this report.

1.2. Location of the Proposal

The location of the two modal transfer facilities has been selected based on an assessment of the relevant constraints and opportunities and on consultation with key stakeholders and landowners. The location and context for each of the facilities is described below.

1.2.1. Sydney Modal Transfer Facility – Eastern Siding site

The Sydney Trains Chullora Rail Yard is situated on Worth Street, Chullora, NSW within the Canterbury-Bankstown Local Government Area (LGA) and the Strathfield LGA. The proposed Sydney Modal Transfer Facility (Eastern Siding site) is primarily positioned within the eastern portion of Lot 1 DP 883526 (refer Figure 3). The site is owned and managed by Sydney Trains.

The Eastern Siding site (refer to the site boundary on Figure 3) is located along the eastern boundary of the Chullora Rail Yard and is currently used for the loading of long freight trains. To the west of the site there are a number of active rail lines which are used by Pacific National to access a fuelling station. The fuelling station is situated adjacent to the main access road, to the immediate south of the Sydney Water owned water main (refer Figure 3). The site is generally flat and contains areas of underutilised cleared land which would be



used for the proposed loading and surge pile areas. The site has a reasonable surface which would be suitable for the movement of heavy vehicles.

Road access to the Eastern Siding site is via the main Chullora Rail Yard access on Worth Street. Access to the northern loading area is via the main haul road to the Major Works Loading Yard and requires the crossing of a number of existing rail alignments. Rail access to the Eastern Siding site is through the main rail entrance to Chullora Rail Yard. This entrance also provides access to all the operational sites within the rail yard e.g. Ballast Recycling Centre and Major Works Yard.

The existing Chullora Rail Yard is currently used for a wide range of Sydney Trains activities including maintenance, provision of rail sidings, storage of memorabilia, unused rail infrastructure and rail ballast recycling facilities to support broader network maintenance activities. The Proposal would result in negligible impacts to the existing operations of Sydney Trains.

The surrounding land is characterised by a mix of industrial, residential and commercial land uses. The Hume Highway runs along the south eastern boundary, with residential and commercial development located beyond. A stand of remnant vegetation is located at the western boundary of the site and connects to a portion of bushland to the west and north within the rail corridor. Worth Street is situated to the south west of the site, with Fleet Serve Pty Ltd and Australia Post depot buildings and warehouses located beyond. The residential areas of Greenacre and Strathfield represent the closest sensitive receivers to the site, at a distance of 50 metres and 70 metres respectively.

Figure 2 shows the location of the Sydney Modal Transfer Facility within the regional context, while Figure 5 shows the proposed site layout. Note the layout shown here is indicative only and would be refined at detailed design in consultation with Sydney Trains and other operators within the area.

1.2.2. Illawarra Modal Transfer Facility - CRM Site

The BlueScope Steel Commonwealth Rolling Mills Site (CRM Site) is located approximately 100 metres to the south west of Port Kembla Harbour on Old Port Road, within the Port Kembla Precinct, in the Wollongong LGA. The proposed facility is within Lot 1 DP 190251 and is currently owned and managed by BlueScope Steel (refer Figure 4).

The surrounding land is characterised by predominately industrial uses, with the CRM Site located within the wider Port Kembla Steelworks (the location of the proposal is on the outskirts of the works area), which is primarily situated directly to the north west. Residential dwellings are located 450 metres to the south within Port Kembla. Harbour Creek bisects the site and crosses under Old Port Road before discharging to Port Kembla Harbour. The site is relatively flat and of low elevation, at less than 5 metres above sea level. Vegetated areas are scattered throughout the site, with the remainder comprising hardstand, rail sidings, offices and warehouses. The major rail corridor, which comprises the Port Kembla spur of the South Coast Intercity Passenger line and various rail sidings associated with the Port Kembla Steelworks, is located along the southern boundary of the site.

Figure 2 shows the location of the Illawarra Modal Transfer Facility within the regional context while Figure 6 shows the proposed site layout.





Figure 2: Concept plan





Figure 3: Sydney Modal Transfer Facility - Constraints plan





Figure 4: Illawarra Modal Transfer Facility - Constraints plan





Figure 5: Sydney Modal Transfer Facility - Site plan





Figure 6: Illawarra Modal Transfer Facility – Site plan



1.3. Purpose of this Review of Environmental Factors

This REF has been prepared by Cardno on behalf of Transport for NSW. For the purposes of these works, Transport for NSW is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) Act.

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of Section 111 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Threatened Species Conservation Act 1995* (TSC Act), *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to significantly impact a matter of national environmental significance (NES) or Commonwealth land and the need to make a referral to the Commonwealth Department of Environment and Energy for any necessary approvals under the EPBC Act.



2. Need for the Proposal

Section 2 discusses the need and objectives of the Proposal. This section also provides a discussion of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

2.1. Strategic and planning context

Several NSW Government policies and strategies are relevant to the Proposal and are summarised in Table 1.

Policy/Strategy	Commitment	Comment
NSW 2021 (Department of Premier and Cabinet, 2011)	 NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal: Reduce travel times; Minimise public transport waiting times for customers; Improve co-ordination and integration between transport modes; Grow patronage on public transport; Improve customer experience with transport services. 	The key objective of the Proposal is to reduce truck movements and therefore traffic congestion. Consequently, the Proposal contributes to the NSW 2021 priority action of reducing travel times. Transport for NSW has examined rail pathways, with the southern pathway considered most appropriate and having the redundancy to accommodate the rail movements proposed.
NSW Long Term Transport Master Plan (Transport for NSW, 2012)	The Transport Master Plan identifies the congestion of freight routes as a key challenge, with a 67 percent road freight increase to 2030. The Plan identifies congested road and rail freight networks as being key issues, with off peak movements suggested.	The Proposal includes three rail movements in each direction per day. Two of these movements (morning and evening) would partially occur outside of peak hour, helping to use the network more efficiently and reducing peak demand.
Metropolitan Strategy 2010	In 2005, the NSW Government released Sydney's Metropolitan Strategy—City of Cities: A Plan for Sydney's Future—to support growth while balancing social and environmental impacts over 25 years. In 2010 that Strategy was updated and integrated with the Metropolitan Transport Plan, The Metropolitan Plan was released on 16 December 2010, to deliver a new 25–year plan for Sydney 2036. The Metropolitan Transport Plan – Connecting the City of Cities (February 2010) was the NSW Government's response to the specific challenges of passenger travel and transport within and across Sydney as identified in the	The Proposal contributes to integrating transport and land use planning through the reuse of sites with redundant capacity for the intermodal transfer of spoil material. The Proposal would help to free up the road network to ease road based public transport congestion without impacting on the rail based public transport network.

Table 1: Relevant NSW Government Policies/Strategies



Policy/Strategy	Commitment	Comment
	Metropolitan Strategy. This Transport Plan has been integrated into the Metropolitan Plan. The Metropolitan Plan is designed to meet the targets in the updated NSW State Plan— notably in integrated transport and land use planning. The Strategy also includes an objective to maximise the efficiency of freight transport and the proportion transported by rail.	
Draft South District Plan (Greater Sydney Commission, 2016)	The Draft South District Plan identifies Chullora as an intermodal hub and the area as one of the primary employment generators for the Southern District.	The Proposal would retain the existing use of the Chullora site as an intermodal terminal, while increasing usage of redundant space within the site. The Proposal has the potential to create local jobs during both construction and operation.
Illawarra Shoalhaven Regional Plan (Department of Planning and Environment, 2015)	The Illawarra Shoalhaven Plan identifies the importance of BlueScope Steel and associated industries to the Region's employment base and also identifies freight and logistics as priority growth sectors. The Plan then aims to drive diversity and innovation in the economy through growth in priority growth sectors.	The Proposal would retain the existing BlueScope land holdings and make use of a currently underutilised site to create employment and economic activity in the area. The Proposal would also contribute to building the freight and logistics market in the area, which is a priority of the Plan.
NSW Ports and Freight Strategy (Transport for NSW, 2013)	The Strategy identifies that as freight continues to grow, the capacity of existing roads to support this growth, as part of overall traffic demand, is a distinct challenge. Constraints exist around heavy vehicle use, particularly on local and regional roads, with impacts on the efficiency of the road freight task. The Strategy also notes that road freight is increasingly subject to capacity constraints and peak hour congestion in Sydney and other regional centres. The significant growth in freight is projected to impact all key NSW road corridors over the next 20 years.	The Proposal would contribute to reducing demand on Sydney's road network, with movements taken up by rail, with two thirds of these rail movements at off peak times.



2.2. Strategic justification

Metropolitan Sydney is currently experiencing an intense period of construction through public and private sector development, with this period anticipated to continue for the next five to 10 years. Transport for NSW is contributing to this construction through the delivery of significant transport projects to enhance customer journeys and ease congestion.

Transport for NSW is investigating options to reduce heavy vehicle movements from NSW roads that are contributing to congestion and safety concerns, with a specific examination of the spoil logistics chain for the M4 WestConnex project.

The spoil management plan for the M4 WestConnex project includes the extraction of spoil from 12 locations along the M4 route with the majority of this spoil classified as VENM. VENM is a highly desirable product for many uses including land development fill. Spoil from this M4 WestConnex project was proposed to be transported to sites in Western Sydney by truck with estimated peak truck movements of 680 trucks per day on the Sydney road network over a two year period to December 2018. Spoil production is expected to peak at 27,000 tonnes per day in August 2017.

Due to the large amounts of spoil being generated by the M4 WestConnex project, a reduction in the associated truck kilometres travelled has the potential to reduce congestion and improve safety. This could be achieved through the use of multi modal transport options.

Transport for NSW has identified a haulage path that meets the primary objectives of substantially reducing truck kilometres travelled by moving the transportation of VENM extracted from the M4 WestConnex project from road to rail, providing financial, road safety, environmental and wider social benefits.

The road safety benefits of the Proposal would be substantial, noting a high number of crashes involving heavy vehicles are of a high severity and occur during long distance trips. Based on data provided by Transport for NSW, 6107 crashes involving a heavy vehicle were recorded for the period 2011 to 2015 in the Sydney Metropolitan area. These crashes resulted in 66 fatalities and 928 serious injuries. For the same period in the Wollongong area, 263 crashes were recorded resulting in four fatalities and 67 serious injuries. The most common period for crashes in both areas was on weekdays between 9am to 3pm, which falls into standard business hours. It is expected that Proposal would reduce the potential for an increase in heavy vehicle crash involvement in the future.

The Proposal also offers a cost saving to the M4 WestConnex project by reducing truck haulage and tipping fees, in addition to the social and environmental benefits. Transporting fill material via truck to Chullora and then rail to the Illawarra, compared to transporting fill material all by truck would result in greenhouse gas savings.

The Proposal would create initial employment benefits through the direct engagement of personnel to construct and set up the two modal transfer facilities. There would also be an ongoing need for personnel during the operation of the facilities including logistics, technical, administration, general operations and management. In addition, there may be indirect employment of personnel in the support and services sector, for example, through education and training services for new employees, local laboratories for material testing and environmental compliance.

The import of materials into the Illawarra region would provide construction material for land development projects. Given the demand for VENM in the region, the import of material may



be a catalyst for a series of construction projects that would otherwise be on hold, for example residential or commercial developments and/or landfill rehabilitation. On a broader scale, the proposal would support the diversification of industry and trade in the region in line with existing skills and expertise, and there may be an increased demand for future trade through Port Kembla.

The Proposal is considered to be the best option to address future spoil management needs while achieving the objectives described in Section 2.2.1.

2.2.1. Objectives

Transport for NSW is proposing to establish an integrated transport path to carry spoil from the M4 WestConnex project within the Sydney metropolitan area to areas where the spoil is needed in the Illawarra region. The objectives of the spoil management path are to:

- Reduce heavy vehicle usage and associated congestion on the Sydney Metropolitan road network;
- Improve road safety outcomes through the reduction of heavy vehicle crash involvement; and
- To assess the feasibility of the proposed pathway with a view to develop policy to ensure a multi modal approach to spoil management for major projects in the Sydney basin.

Establishment of an integrated transport pathway would result in a number of benefits including:

- Efficient transfer of spoil from the M4 WestConnex project with minimal stockpiling or processing;
- Result in no impacts on the approved project contracts or planning approvals;
- Enable the re-use of suitably classified spoil for development projects throughout NSW; and
- Provide economic, social and environmental benefits while capitalising on the use of existing Transport for NSW assets and arrangements.

It is noted that the project would have applicability beyond the current Proposal and could be used to carry spoil from other Transport for NSW projects within the Sydney metropolitan area to areas where the spoil is needed. These projects would be subject to a separate assessment.



2.3. Alternatives considered

Clause 7(1)(c) of Schedule 2 of the EP&A Regulation requires an analysis of feasible alternatives to the carrying out of the development, including the consequences of not proceeding with the Proposal.

The following sections identify the design development process, along with the alternative options considered, to satisfy the requirements of Clause 7(1)(c).

2.3.1. Haulage methodology options

Potential options were strategically investigated for transport of the material via rail to the north, south and west of Sydney, with a number of rail transport mechanisms considered.

Based on an assessment of the existing rail network capacities, travel distances, demand for fill material and the long term management of spoil, Transport for NSW determined the preferred option was to transport the material south as:

- There is existing capacity on the southern railway line, resulting in the least impact to the existing network. Three train movements in each direction per day with minimal disruption to the existing network would be possible;
- Development projects within the Illawarra region have a demand for fill material, providing a beneficial reuse of the spoil generated; and
- Should the material supply be greater than the demand, the material can be transported to Bombo Quarry to fill the quarry void, providing a long term management solution, if required. This would be subject to a separate approval.

The initial investigations also examined alternative technologies for the transport of material with two options considered:

- Transport via half shipping container; and
- Transport via load train wagon.

The half shipping container option required more extensive infrastructure investment associated with the design and sourcing of unloading plant, which would lift and flip the containers for emptying. This option would also require the retrofitting of the shipping containers. The alternative option was based on using load train wagons to transport material. The tailing off of the mining boom has resulted in load train wagons being available in the quantities required to transport material. Load train wagons do not require retrofitting, with only limited loading and unloading plant, in the form of conveyors for loading and a catch bin and conveyor for unloading required. Consequently, the load train wagon option was selected for the purpose of this proposal.



2.3.2. Design development

Cardno prepared a Spoil Management Feasibility study (Cardno, 2016a), which aimed to assess the feasibility of establishing a functional transport path to manage spoil from the M4 WestConnex project out of Sydney to areas where it is needed for development purposes in the Illawarra region. The key objectives of this study were to:

- Assess the strategic feasibility of the proposal, including mitigating against environmental, financial, reputational and safety risk;
- Assess the capability of the proposed origin and destination to manage spoil;
- Review existing planning and environmental approvals for managing sites and on road transfers and identify potential gaps or challenges;
- Provide insight in to the engineering requirements at the managing sites and haulage opportunities;
- Provide an indicative project plan and timeline for implementation; and
- Provide insight into potential spoil pipeline opportunities to utilise the newly established logistics pathway.

2.3.3. Modal transfer facility options

Sites for both the Sydney and Illawarra modal transfer facilities were examined with six options reviewed at Chullora in Sydney and three options in the Illawarra region. The options are described in the subsections below, with the preferred option identified in Section 2.4.

(a) Sydney Modal Transfer Facility options

The Chullora site is a large area currently used for rail operation and maintenance activities, and set within an industrial context in a fairly central area of metropolitan Sydney. The site accommodates a number of uses and has a number of distinct areas of activity. The site is owned and operated by Sydney Trains and this, together with the physical features of the site, identify Chullora generally as a suitable location for the Sydney Modal Transfer Facility, prompting further investigation.

Investigations, including initial environmental investigations and consultation with Sydney Trains, were undertaken across six of these areas to identify their potential for use in the Proposal, while considering impacts on Sydney Trains operations and the surrounding environment. The six potential sites are identified in Figure 7. The potential sites are all located within working areas of the Chullora Rail Yard; the siding sites are short sections of rail track used to store rolling stock, especially for loading and unloading, while the UGL and Igloo sites contain buildings with the same names and are used for storage. Each site was subject to a number of constraints and opportunities, with notes from the preliminary investigations summarised in Table 2 below.

The UGL site was initially selected based on the preliminary investigations for the ability to design out the key constraints, which comprised potential impacts on heritage fabric and insufficient track length. Design amendments allowed the heritage fabric to be retained without impact and the development of limited track extensions.

However, further consultation with Sydney Trains identified that the Proposal in the UGL site would potentially cause unacceptable business impacts through the requirement to block an



access road during train loading periods. Additionally, Sydney Trains are looking at a number of alternative uses at this location. This consultation has identified a sixth site (Eastern Siding site) for investigation as the location of the Sydney Modal Transfer Facility. This location is situated on the eastern side of the Chullora Rail Yard, adjacent to the Hume Highway as shown in Figure 7.

The Eastern Siding site was selected as the preferred location due to the presence of minimal constraints as follows:

- Least impact to the existing operations of Sydney Trains, with no blockage of the main rail entrance (provided the train does not move during loading. This would result in five wagons not being loaded as discussed below);
- Large areas of cleared underutilised land at the proposed location;
- The ability to load all but five wagons of the 45 wagon train (note the loading of the final five wagons would be discussed in the preparation of the operational management plan. Loading of the full train is desirable during operation and may be achievable in consultation with other operators in the area);
- No vegetation clearing required and no impact to identified heritage items; and
- No track extension work required.





Figure 7: Sydney Modal Transfer Facility - Options assessment

Report 001 Ver 6 - REF TfNSW Spoil Management Pathway.doc © TfNSW 2017

Site	Planning Approvals/Environment	Engineering	Ranking
A. Major Works Loading Yard	 No approval for materials handling. No conflict with existing use. 	 Poor truck access. Insufficient track length for loading Reasonable stockpile space. Complex train loading. 	5
B. Ballast Recycling Centre	 Approval for materials handling. Restricted truck access (weighbridge). Conflict with existing use. 	 Insufficient track length for loading but can be readily improved. Reasonable Stockpile Space. Simple loading. 	3
C. Southern Siding	 No approval for materials handling. Significant ecological constraints, with extensive approvals timeframes. 	 Good truck access. Insufficient track length for loading but can be readily improved. Simple Loading. 	4
D. UGL site	 No approval for materials handling. Conflict with existing use/lease. Heritage building management required (Sydney Trains register). 	 Good truck access. Insufficient track length for loading but can be readily improved (minor track extension (~2 x 120m) Simple to Moderate Loading Complexity. 	1
E. Igloo site	 No approval for materials handling. No conflict with existing use. Significant heritage building management required, including potential removal. 	 Good truck access. Insufficient track length for loading but can be readily improved. Moderate Loading Complexity Reasonable Stockpile Space, can be improved. 	2
F. Eastern Siding	 No approval for materials handling Potential conflict with existing use of Major Works Yard No ecological constraints Extension of haul road and additional surge pile area 	 Good truck access The length of track is sufficient to fit the spoil train, however it does not allow the train to move without blocking the main rail entrance to the whole Chullora site. Loading via front end loader both north and south of the existing bridge is possible (refer Figure 5). However five wagons under the bridge would not be able to be loaded assuming the main entrance cannot be blocked. 	Preferred

Table 2: Sydney Modal Transfer Facility options assessment



(b) Illawarra Modal Transfer Facility options

Three options were examined for the Illawarra Modal Transfer Facility comprising:

- Port Kembla Coal Terminal (PKCT), Port Kembla;
- West Dapto Road, Kembla Grange; and
- Commonwealth Rolling Mills (CRM), Port Kembla.

Port Kembla Coal Terminal

Port Kembla Coal Terminal (PKCT) currently transfers coal from the Southern and Western Coal Fields of NSW from train and truck to ship via a series of stackers, reclaimers and ship loaders. This site was investigated as there was the potential to transfer spoil material directly to the site by rail from Sydney along the existing coal transfer pathways, with the existing infrastructure at PKCT then used to transfer material from train to truck for regional distribution.

The inclusion of spoil within the coal transfer pathway had a high potential for cross contamination of the two streams, with a comprehensive cleaning and maintenance program required to allow change over from coal to spoil and back again throughout the day. The associated change over times and cross contamination potential were considered to be unviable, along with the timeframes to review the design and ensure that the existing infrastructure had the durability to accommodate the alternate material were considered to be too great a risk, with this site being set aside. It is noted that this site may be considered for use for the transfer of spoil material in the future should circumstances change and the PKCT site be considered more appropriate.

West Dapto Road, Kembla Grange

The BlueScope Steel owned site at West Dapto Road, Kembla Grange was also considered as the modal transfer facility. This site has ready access to an existing rail spur and truck access via West Dapto Road and the Princes Highway. The site is primarily cleared and currently underutilised.

The Kembla Grange Site would require the development of a loop on site to allow trains access for unloading off the primary rail line. Additionally, the site is partially flood affected and would require filling to ensure appropriate flood immunity. The Kembla Grange site is not currently subject to industrial uses and the Proposal would require a significant increase in the type and intensity of operations. The Proposal may impact on the existing level crossing near the West Dapto Road/Princes Highway intersection, due to the potential for queuing along West Dapto Road backing up across the level crossing.

Commonwealth Rolling Mills (CRM)

The BlueScope Steel owned CRM site (a site that originally housed machines for rolling steel into sheets) at Port Kembla is an existing underutilised industrial site currently used for logistics associated with steel production. The decline in the steel industry has resulted in the site having additional capacity for rail and truck movements, with adequate track lengths for unloading, along with space for loading trucks and short term truck parking. The development would not change the industrial nature of the site use, with only a minor increase in intensity required.

The increase in intensity of use has the potential for localised impacts, associated with increased traffic, noise air quality and visual amenity. However, these impacts would be present with any option and can be addressed through appropriate management and



mitigation measures. The site is located within the Port of Port Kembla, with the surrounding amenity commensurate with an industrial area.

2.3.4. The do-nothing option

Transport for NSW has identified the need for a spoil management pathway as a priority to help alleviate congestion and improve safety, with subsequent follow on environmental, social and economic benefits.

The 'do nothing' option was not considered a feasible alternative as it is inconsistent with NSW Government objectives and would fail to address the growing number of truck movements, with the associated impacts on NSW roads.

2.4. Justification for the preferred option

The preferred options for the Sydney and Illawarra modal transfer facilities were selected based on a review that examined key environmental, social and economic considerations, as well as consultation with the relevant land owners and operators.

The Eastern Siding site at the Chullora Rail Yard was selected as the site would require limited investment in infrastructure, with only limited environmental impacts and minor impacts on the current operations of Sydney Trains. Through appropriate management and mitigation measures these impacts can be adequately managed. The Proposal would be consistent with the current use of the site for industrial purposes.

CRM at Port Kembla was selected due to the extent of underutilised existing infrastructure on site that could be adapted for the Proposal with only limited modifications and associated investment. The site is already used for industrial purposes and is located within the heavy industrial precinct of Port Kembla. Consequently, the development would not significantly change current uses on site and would be consistent with uses in the surrounding area. The Proposal would potentially result in minor amenity impacts for adjacent residents to the south east, however, these can be offset through appropriate operational management and mitigation measures, including no on site stockpiling and appropriate dust control measures, along with suitable sediment and erosion control.



3. Description of the Proposal

Section 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities. Note that the final operational model would be subject to detailed design and discussions with Bluescope Steel, Sydney Trains and other key stakeholders.

3.1. The Proposal

Transport for NSW is seeking to develop two modal transfer facilities to assist in the transfer of VENM from the M4 WestConnex project in Sydney to construction projects in the Illawarra region.

Material would be brought to the Sydney Modal Transfer Facility located at Chullora by truck, loaded onto trains and transported to Illawarra Modal Transfer Facility at Port Kembla, for distribution by truck to construction projects in the Illawarra region. The facilities may be used by other projects in the future, however those projects would be subject to separate assessments.

Each facility would be designed to have the capacity to handle approximately 9,000 tonnes of VENM per day. The intent of the Proposal is to reduce the number of Transport for NSW construction related heavy vehicles on roads within urban areas of NSW, providing environmental, social and economic benefits for the region.

The design of the proposed works is described in more detail below. Figure 2, Figure 3 and Figure 4 identify the regional context and site constraints associated with the Proposal.

3.2. Design features

The Proposal comprises the following primary elements and processes:

- Establishment, construction and operation of the Sydney Modal Transfer Facility at the Eastern Siding site; and
- Establishment, construction and operation of the Illawarra Modal Transfer Facility at the CRM site.

The proposed construction and operational activities are described in Sections 3.4 and 3.5 respectively.

3.3. Design standards

The Proposal has been designed having regard to the following:

- RailCorp Business Requirements;
- RailCorp Design Standards;
- RailCorp Landscaping Guidelines;
- Transport for NSW Sustainable Design Guidelines 4.0;
- Relevant Australian Standards, including AS2890.1;
- Crime Prevention through Environmental Design (CPTED) principles; and
- Building Code of Australia.



3.3.1. Sustainability in design

The design of the Proposal has been undertaken with consideration of reducing triple bottom line impacts associated with heavy vehicle movements. That is impacts relating to social, economic and environmental aspects.

Key sustainability initiatives include:

- Reusing existing track, sidings, freight trains and train wagons that would otherwise be underutilised as opposed to procuring new infrastructure;
- Using some of the spoil material in capping the sites of both modal transfer facilities;
- Using spoil material as fill for land development projects, saving the transfer of material to landfill and reducing movements associated with cutting material at other sites to then use on these land development projects; and
- Spreading truck movements throughout the day, across three timeframes, with two of those timeframes (morning and evening) being outside peak usage times to maximise usage of the road and rail networks.

3.4. Construction activities

3.4.1. Work methodology

(a) Sydney Modal Transfer Facility

The following is a summary of construction activities proposed at the Sydney Modal Transfer Facility:

- Modification to the existing haul road;
- Minor signage and access improvement works; and
- Transfer of drive over truck unloader to site, if required.

It is anticipated construction activities would occur for approximately three weeks with timing for mobilisation yet to be determined. Construction activities would occur during standard working hours and would occur outside of the school holiday period. Deliveries would be timed for outside of peak hours where possible.

(b) Illawarra Modal Transfer Facility

The following is a summary of construction activities proposed at the Illawarra Modal Transfer Facility:

- Installation of a boom gate to improve access to the site;
- Construction of a new haul road and widening of the existing access way;
- Minor signage and road improvements works;
- Excavation of a pit for the unloading equipment (dimensions to be determined during detailed design);
- Transfer and installation of unloading equipment to site; and
- Construction of a wagon dump station on the existing rail line with a conveyor extending from the dump station to the surge pile area.


It is anticipated construction activities would occur for approximately three weeks with timing for mobilisation yet to be determined. Construction activities would occur during standard working hours and would occur outside of the school holiday period. Deliveries would be timed for outside of peak hours where possible.

3.4.2. Plant and equipment

The equipment required for construction and site preparation activities at both locations is detailed in Table 3.

Item	Description
30 Tonne excavator	Spread fill and construction of haul road
Smooth Drum Roller 12 Tonne	Compact fill and construction of haul road
Franna Crane	Carry equipment and materials
Grader	Construction of haul road
Water cart	Dust suppression

Table 3: Construction equipment list

3.4.3. Working hours

The proposed construction activities at both of the proposed modal transfer facilities would occur during the recommended standard hours indicated in the NSW Interim Construction Noise Guidelines (ICNG) (DECCW, 2009) to limit disruption to traffic flows and impacts to surrounding sensitive receivers. Should extended construction hours be required, an out-of-hours work application, with approval from the Transport for NSW environmental representative, would be required. Deliveries would be timed to occur outside of peak periods where possible.

Recommended standard hours of work for the proposal include:

- Monday to Friday 7am to 6pm;
- Saturday 8am to 1pm; and
- No work on Sundays or public holidays.

The potential noise and vibration impact of construction activities is assessed in Section 6.3.

3.4.4. Traffic access and vehicle movements

The numbers of heavy and light vehicles travelling to the sites during construction are expected to be minimal and would use existing roadways surrounding the proposed modal transfer facilities. The main access roads to Chullora are the Hume Highway and Worth Street. The main access roads to the Port Kembla facility are Five Islands Road, Flinders Street and Old Port Road. A Traffic Management Plan (TMP) would be prepared prior to construction by the relevant contractor and included in the construction environmental management plan (CEMP).

Traffic and transport impacts associated with the Proposal are assessed in detail in Section 6.1.



3.4.5. Public utility adjustments

During the subsequent phases of design, a utility investigation including a dial before you dig (DBYD) enquiry, would be undertaken to identify utilities with the potential to occur within the works area. The following utilities could potentially occur within the Proposal area.

- Electricity;
- Telecommunications;
- Water and sewerage;
- Stormwater;
- Closed Circuit TV (CCTV); and
- Rail signalling.

Some services may require relocation. Such relocation is unlikely to occur outside of the works footprint assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken.

The Transport for NSW Environmental Manager would be consulted during the detailed design phase to determine whether any changes or additions to scope constitute the need for additional assessment. The appropriate utility providers would be contacted should utility relocation be required.

3.5. Operational activities

3.5.1. Work methodology

The following is a summary of the operational activities and processes associated with the proposed activity:

- Outgoing spoil classified as VENM from the M4 WestConnex project would be transported by road to the Sydney Modal Transfer Facility in Chullora, NSW;
- Trucks would tip VENM directly into train wagons at Chullora. Should trains not be in place, a temporary surge pile with a capacity of 3,000 tonnes of material (one train load) would be allowed for at Chullora;
- Three 3,000 tonne (net payload) trains would transport the VENM to the Illawarra Modal Transfer Facility at Port Kembla, which equates to 9,000 tonnes per day; and
- Incoming VENM would be direct transferred from train to truck at Port Kembla and distributed to construction projects throughout the Illawarra region. Should trucks not be in place, a temporary surge pile with a capacity of 3,000 tonnes of material (one train load) would be allowed for at the site.

Loading of train wagons via front end loader both north and south of the existing bridge at the Eastern Siding site is feasible. However, assuming the main rail entrance to the whole Chullora Rail Yard cannot be blocked, five wagons under the bridge would not be able to be loaded. Consultation with Sydney Trains would be undertaken to discuss the possibility of blocking the main entrance for short periods (for approximately 20 minutes, three times a day) to facilitate final loading of the train wagons.

A flowchart of the proposed spoil management pathway is provided as Figure 8.





Figure 8: Proposed spoil management pathway

3.5.2. Plant and equipment

The equipment required for operational activities is detailed in Table 4 and Table 5.

Item	Description
Locomotive Type (Two per train)	82 Class or 81 Class
Wagon Type	Pacific National 100 tonne wagons
Net Tonnes per Train	~3,600
Train Length (metres)	~789
Load Time - Chullora	3 hours
TU66X48-800 Drive over truck unloader	Train Loader. 800 tonnes per hour load time direct into train wagons
Front End Loader	Load assist into train wagons

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Item	Description
Locomotive Type (Two per train)	82 Class or 81 Class
Wagon Type	Pacific National 100 tonne wagons
Net Tonnes per Train	~3,600
Train Length (metres)	~789
Ashross RUMig3	2,600 tonnes per hour train wagon unload rate
Thor Direct Feed Loader x Two	1,600 tonnes per hour portable conveyor
Front End Loader	Load assist into trucks
30 Tonne Excavator	Site maintenance - Load assist

 Table 5: Illawarra Modal Transfer Facility - Operational equipment list

3.5.3. Working hours

Spoil transfer and truck movements would be undertaken in three campaigns to coincide with train arrivals. The truck fleet would work for a three hour shift to unload the spoil from each train and transfer the spoil for use within the wider Illawarra region. The sites would remain active for around nine hours per day with the proposed sites operational 24 hours a day seven days per week.

3.5.4. Source and quantity of materials

VENM for the Proposal would be sourced from the existing M4 WestConnex Project for transfer to projects in the Illawarra Region. The material would be classified as VENM prior to transfer to the Sydney Modal Transfer Facility.

The forecast quantity and source of the material is summarised in Table 6 with both modal transfer facilities designed to accommodate this material.

Material Source	Composition	Quantity
M4 Excavations	Hawkesbury Sandstone VENM	9,000 tonnes/day
	65 percent sandstone;	
	 35 percent mixed; and sandstone/siltstone/shale. 	
	Particle Size	
	 Less than 50 millimetres (80 percent); 	
	• Less than 150 millimetres (15 percent); and	
	 Less than 250 millimetres (five percent) 	

 Table 6: Estimated material source, composition and quantity

No materials would be stored at either site (i.e. stockpiled); although some (no more than one train's worth or 3,000 tonnes) material may be temporarily deposited during inclement weather or during mechanical maintenance as a surge pile, before being loaded out.

A surge pile is the transient placement of material on the ground during modal transfer, i.e. when the unloading rate (tonnes per hour) from one mode (i.e. train) is greater than the



loading rate to another mode (i.e. truck). A surge pile is different from a stockpile, where a stockpile is 'stock' that is stored (available) for distribution, before it has a receiving destination.

Surge piles would be sprayed down to supress dust, with a sediment and erosion control system in place to capture and treat run off.

The Sydney Modal Transfer Facility would only accept material classified as VENM. However the Operational Management Plan (OEMP), to be prepared for the Proposal, would include alternative arrangements to be implemented in the event that unsuitable spoil is received onsite. These arrangements would include a specific quarantine area for the unsuitable spoil and a process for its management and disposal.

The OEMP would ensure that there is a location for spoil to be transported to prior to loading it onto the train in Sydney.

3.5.5. Traffic access and vehicle movements

The Proposal would be constructed and would operate within a working port and industrial area. Therefore the design of access and egress locations would consider the vehicle type, turning pathways and appropriate sight lines to ensure road safety and to minimise operational impacts to the greater environment.

The proposed road accesses and egresses have been assessed as part of the Traffic Impact Assessment in Section 6.1. The assessment considers operational vehicles entering and exiting the Proposal area. Heavy vehicle access to each site is shown on Figures 5 and 6 with the main access to the Sydney Modal Transfer Facility provided via Worth Street and the main access to the Illawarra Modal Transfer Facility provided via Old Port Road.

It is assumed that site based personnel would drive light vehicles to facilities during operation. An estimated 255 heavy vehicle movements (one-way) would enter each facility each day. It is likely the fleet would consist of 14 trucks working three, three hour shifts. Truck movements would be undertaken in three campaigns as outlined below:

- Early Morning: 85 truck movements;
- Midday: 85 truck movements; and
- Late Afternoon: 85 truck movements.

Both the Sydney and the Illawarra modal transfer facilities would have a traffic management plan, with sufficient redundancy to manage the movement of trucks. This would include multilane queuing and stop-go lights. The traffic management layout is shown on the site configuration drawings located at Appendix 3.

Traffic and transport impacts associated with the Proposal are assessed in detail in Section 6.1.

3.5.6. Material Reconciliation

Reconciliation of spoil is considered a critical process to validate that the volume of material excavated at the source corresponds with the volume of material received in the Illawarra for reuse. The proponent for this Proposal has consulted with the EPA to develop an appropriate and suitable process for tracking the spoil. It is noted that the NSW EPA do not have a specific requirement to track material of this nature (i.e. VENM).



Specific requirements regarding material reconciliation would be provided in the project Environmental Protection Licence (EPL), which is yet to be issued by the NSW EPA (refer Section 4.1.2). In the interim, the project material reconciliation procedure may include the following:

- Weighing of material;
 - Trucks would be required to pass through a weigh bridge when exiting the source site to quantify the total weight of VENM removed; and
 - Weighing of spoil is intended to ensure that loads of spoil have not been altered during haulage.
- Load identification;
 - Trucks at the spoil source site weighbridge would be assigned a unique load identification number and entered into a project database that would note the vehicle registration and the net weight; and
 - Truck drivers would be issued with a docket when exiting the spoil source site that summarises the key parameters of each load. Upon arrival at the Sydney Modal Transfer Facility truck drivers would be required to present the docket that was issued at the weigh bridge at the spoil source site.
- Train Reconciliation;
 - Material reconciliation would take place at the Sydney Modal Transfer Facility where the net weight of each loaded wagon would be measured prior to departure and recorded on a material tracking database;
 - Each wagon would be equipped with an instrument that can quantify and display weight; and
 - Reconciliation of throughput between the spoil source site and the Sydney Modal Transfer Facility would be completed on a routine basis to confirm the tonnages remained consistent.
- Reporting;
 - A material reconciliation report would be prepared on a routine basis and provided to nominated stakeholders that may include the NSW EPA and Transport for NSW; and
 - Significant discrepancies would be subject to investigation and appropriate corrective actions would be determined.

In addition to the material reconciliation process described above, QA/QC measures are also recommended to manage the risk of cross contamination throughout the Proposal, as described in Section 3.5.7.

3.5.7. Quality Assurance / Quality Control

Suitable mitigation measures would be developed and implemented throughout the project to ensure that Quality Assurance and Quality Control (QA/QC) is maintained, validation of the VENM classification and delivery of the desired project outcomes.



3.6. Operational Management

The operational management of both the proposed modal transfer facilities would be negotiated between the M4 WestConnex project, Transport for NSW, Sydney Trains, Bluescope Steel and any other relevant party. This negotiation would occur at the project agreement scope and would be specific to the agreement. Issues such as responsibilities for movements, timings, EPL holder and alternative movement plans in the event that spoil cannot be moved by train would be included in these negotiations.



4. Statutory considerations

Section 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government polices/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

4.1. Ecologically sustainable development

Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD).

The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 of the EP&A Regulation as:

- **The precautionary principle** If there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation;
- Intergenerational equity the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
- **Conservation of biological diversity and ecological integrity** the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival; and
- **Improved valuation, pricing and incentive mechanisms** environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by Transport for NSW throughout the development and assessment of the Proposal. The Proposal is driven by these principles, through the formulation of the Proposal objectives and the ultimate reduction in the intensity of road use by trucks moving spoil from the M4 WestConnex project. These objectives would reduce vehicle Greenhouse Gas emissions both from trucks and other road users through the benefits associated with reduced congestion. Further social and economic benefits are achieved through reduced impacts from noise, air quality and visual amenity having environmental, social and economic benefits.

Section 3.3.1 summarises how ESD has been incorporated in the design development of the Proposal. Section 6.14 includes an assessment of the Proposal in regard to climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction and operation of the Proposal.

NSW legislation and regulations

4.1.1. Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport for NSW, which do not require development consent under Part 4 of the Act.



In accordance with Section 111 of the EP&A Act, Transport for NSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions and based on this REF, Transport for NSW has determined that no significant environmental impact is likely. As a consequence an environmental impact statement is not required, nor is the approval of the Minister for Planning and Environment.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment. Section 6 of this REF provides an environmental impact assessment of the Proposal in accordance with Clause 228. Appendix 1 specifically responds to the factors for consideration under Clause 228.

4.1.2. Other NSW legislation and regulations

Table 7 provides a list of other relevant legislation applicable to the Proposal.

Applicable Legislation	Considerations
<i>Heritage Act 1977</i> (Heritage Act)	The Heritage Act is designed to conserve the cultural heritage of NSW and is used to regulate development impacts on the state's heritage assets.
	Heritage items listed under the Heritage Act are not anticipated to be significantly impacted by the proposed works. Consideration of this Act has been undertaken in Section 6.5.
National Parks and Wildlife Act 1974 (NPW Act)	Sections 86, 87 and 90 of the NPW Act require consent from the NSW Office of Environment and Heritage (OEH) for the destruction or damage of Aboriginal objects.
	An assessment in accordance with this Section of the Act has been undertaken for the Proposal and is included in Section 6.4. It has been concluded that the proposal is unlikely to encounter any Aboriginal objects.
<i>Threatened Species Conservation Act 1995</i> (TSC Act)	The TSC Act aims to conserve and protect ecologically sustainable development including threatened species, populations and communities.
	Consideration of this Act is included in Section 6.7 which demonstrates that threatened species, populations and communities are not anticipated to be significantly impacted by the proposed works.
Contaminated Land	The aim of the CLM Act is:
<i>Management Act 1997</i> (CLM Act)	<i>"to establish a process for investigating and (where appropriate) remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment".</i>
	The CLM Act also ensures the accountability for remediation of contamination and appropriate level and qualification of auditing of such works.
	A review of the potential for contamination has been undertaken in Section 6.8 with management and mitigation measures identified. The assessment considered that the site could be made suitable for the Proposal.
Water Management Act 2000	Under the WM Act an approval is required to undertake controlled activities on waterfront land (within 40 metres of the highest bank

 Table 7: Other relevant legislation applicable to the Proposal



Applicable Legislation	Considerations
(WM Act)	of the river, the lake shore or the mean high water mark of the estuary), unless that activity is otherwise exempt (Section 91E). The <i>Water Management (General) Regulation 2011</i> sets out a number of exemptions in relation to controlled activities.
	Although the proposed works are classed as controlled activities on waterfront land (Illawarra Modal Transfer Facility is located within 40 metres of a watercourse), an Activity approval under Section 91 and a work approval under Section 90(2) of the WM Act is not required as the development is being undertaken on behalf of a public authority (Transport for NSW).

(a) Protection of the Environment Operations Act 1997 (POEO Act)

Environmental Protection Licence (EPL)

Under the POEO Act activities that require an EPL are scheduled activities and are listed in Schedule 1 of the Act. Item 42 in Schedule 1 relates to waste storage, meaning the receiving from off site and storing (including storage for transfer) of waste. The proposed activities would fall within this category and therefore would require an EPL.

It is understood that the Chullora and Port Kembla sites hold current EPLs relating to existing site activities:

- EPL 7515 is held by Sydney Trains and is applicable to the Ballast Recycling Depot, located to the west of the proposed Sydney Modal Transfer Facility. The activity type associated with the licence is for recovery of general waste and waste storage other types of waste; and
- EPL 397 is held by Bluescope Steel Limited and is applicable to the Port Kembla site. The activity types associated with the licence are metal coating and waste storage, including hazardous, restricted solid, liquid, clinical and related waste and asbestos waste.

It is also noted that an existing EPL (EPL 20734) is held for the M4 WestConnex project. The activity type associated with this licence is road construction and it is held by three contractors associated with the WestConnex M4 Project including CPB Contractors Pty Ltd, John Holland Pty Ltd and Samsung C&T Corporation.

Transport for NSW has consulted with the NSW EPA to determine the most suitable licencing requirement. At the time of preparing this REF an agreed licencing approach has not been confirmed and further consultation with the EPA would be required.

It is anticipated that the most appropriate form of licence would involve modifying an existing EPL to include the proposed activities. The existing EPL considered most suitable for modification is EPL 20734 for the M4 WestConnex Project, given that the project is the primary generator of the subject spoil, however this would be confirmed in consultation with the EPA.

Once issued, the project EPL would provide specific conditions that relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice.



VENM Classification

The spoil to be transported as a result of this Proposal would be classified as VENM as per the definition in the POEO Act, which is:

'natural material (such as clay, gravel, sand, soil or rock fines):

(a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities; and

(b) that does not contain any sulfidic ores or soils or any other waste'

VENM is typically placed immediately into truck(s) following excavation and is transported to the final deposit site. Handling and stockpiling of soil classified as VENM is generally avoided. The NSW Environment Protection Agency (EPA) does not specify limitations with respect to handling and stockpiling of VENM but allows the generator/classifying body to use their own discretion as to an acceptable practice.

The EPA specifies that material classified as VENM cannot be processed. It is noted that the Proposal involves transfer of spoil between transport mediums, truck to train and vice-versa, by use of a conveyor and or front end loaders. This transfer mechanism of the spoil is not considered to be processing.

The proposed procedure for handling and haulage of spoil throughout the Proposal is considered suitable and is not expected to compromise the validity of the VENM classification. The VENM classification would be validated throughout the proposal by developing and implementing suitable hold points and quality assurance / quality control (QA/QC) measures. Further detail regarding hold points and QA/QC measures is provided in Section 3.5.7.

4.2. State Environmental Planning Policies

4.2.1. State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) is the key environmental planning instrument which determines the permissibility of the Proposal, specifically installation the spoil transfer equipment.

Clause 94(1) allows development for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent on any land. Clause 94(2) specifies that development for the purpose of road infrastructure facilities includes a reference to development for the purposes of construction works (whether or not in a heritage conservation area), including extraction of extractive materials and stockpiling of those materials, if the extraction and stockpiling are ancillary to road construction, and if the development is in connection with a road or road infrastructure facilities. The proposed development of both modal transfer facilities and the associated operations is ancillary to road infrastructure facilities, with development consent not required. The environmental impacts of the Proposal are assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Section 5 of this REF discusses the consultation undertaken during the development of the Proposal.



It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005, State Environmental Planning Policy No 14 – Coastal Wetlands* or *State Environmental Planning Policy No 26 – Littoral Rainforest* applies. These policies are not applicable to either site. Note that *State Environmental Planning Policy (Major Development) 2005* is now called *State Environmental Planning Policy (State Significant Precincts) 2005*.

4.2.2. Other relevant State Environmental Planning Policies

The SEPPs identified in Table 8 are of relevance to this Proposal.

Applicable SEPP	Considerations	
State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP)	The aims of the SRD SEPP are;	
	(i) To identify development that is State significant development,	
	(ii) To identify development that is State significant infrastructure and critical State significant infrastructure.	
	Clause 8(1) states that development is State Significant Development (SSD) if the development is not permissible without development consent and the development is specified in Schedule 1 or 2. Schedule 1 of the SRD SEPP specifies SSD projects, including Clause 7, Extractive Industries. Subclause 3 states that SSD includes development for the purpose of extractive industry related works (including facilities for storage, loading or transporting any construction material or waste material) that is ancillary to or an extension of another SSD project, or has a capital investment value of more than \$30 million. In the case of developing the facility for the WestConnex M4 Project, the facility would be connected with an SSI project and is not therefore ancillary to an SSD project. Additionally, the works have a capital investment value of less than \$30 million. Clause 14(1) states that development is State Significant Infrastructure (SSI) if the development is permissible without development consent and the development is specified in Schedule 3 of the SRD SEPP. Whilst the development is permissible without development consent under the Infrastructure SEPP as noted above, it is not specified in Schedule 3. It is also considered that the Proposal can be designed to avoid significant impacts that would require the need for an Environmental Impact Statement to be developed in accordance with Schedule 3, Clause 1.	
State Environmental	Consequently, the Proposal is not identified as SSD or SSI.	
State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)	SEPP 55 provides a state-wide approach to the remediation of contaminated land, with the aim of promoting the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.	
	A contaminated site assessment report is required for both sites if there is the potential that contamination is present. In determining the proposed works the determining authority needs to satisfy the following requirements;	
	(iii) It has considered whether the land is contaminated, and	
	(iv) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or would be suitable, following remediation) for the purpose for which the development is proposed to be carried out, and	

Table 8: Other SEPPs applicable to the Proposal



Applicable SEPP	Considerations		
	(v) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land would be remediated before the land is used for that purpose.		
	A contamination review has been undertaken as part of this REF, with the review recommending further investigations.		
State Environmental Planning Policy (Exempt and Complying Development) 2008 (Exempt and Complying SEPP)	The Exempt and Complying SEPP provides a streamlined assessment process for developments throughout the State by applying exempt and complying codes. The proposed works require an EPL within the meaning of the <i>POEO Act</i> . Under Clause 1.18 of the Exempt and Complying SEPP this precludes the proposed works from being classified as exempt or complying development.		
State Environmental Planning Policy 71 – Coastal Protection (SEPP 71)	SEPP 71 lists a number of matters for consideration in Clause 8. SEPP 71 is not applicable to the Sydney Modal Transfer Facility, however, it does apply to the Illawarra Modal Transfer Facility, with a review of the matters for consideration at Clause 8 provided below.		
	a. The aims of this policy set out in clause 2 (of SEPP 71)		
	The proposed development is not contrary to any of SEPP 71 aims as there are no impacts on coastal access or the environment, with the site located solely on private land that does not currently provide access to the coast.		
	b. existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved		
	The proposed development would have no bearing on public access to coastal foreshores as the site is private property located within a working port. The provision of public access would incorporate a potentially conflicting use into the site and is not therefore supported.		
	 c. opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability 		
	The site is unsuitable for public access, with the provision of access incorporating a potentially conflicting use into the site as well as public safety concerns.		
	d. the suitability of development given its type, location and design and its relationship with the surrounding area		
	The development is suitable in the Port location and would maximise utilisation of the surrounding roads.		
	e. any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore		
	The Proposal would not result in any loss of views from a public place and would only result in a negligible increase in shadow within the site,		



Applicable SEPP	Considerations	
	which would have no bearing on the use of the foreshore.	
	f. the scenic qualities of the New South Wales coast, and means to protect and improve these qualities	
	The Proposal would not alter the existing scenic qualities of the coast, with the proposal located within a working port surrounded by the existing BlueScope Steel site.	
	g. measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats	
	The Green and Golden Bell Frog (GGBF) has been found within the wider site. A management plan is in place to mitigate impacts on the Frog population. Additionally, the works are located away from GGBF habitat.	
	h. measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats	
	The development would not impact fish.	
	<i>i.</i> existing wildlife corridors and the impact of development on these corridors	
	The proposal would not affect wildlife corridors, with the works located away from GGBF habitat.	
	j. the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards	
	No likely impacts are expected on the proposal from coastal processes or hazards.	
	k. measures to reduce the potential for conflict between land- based and water-based coastal activities	
	The Proposal does not conflict with coastal activities.	
	I. measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals	
	The Proposal would have no impact on Aboriginal cultural heritage as it is a heavily disturbed site. An unexpected finds protocol would be put in place to guide construction.	
	<i>m. likely impacts of development on the water quality of coastal waterbodies</i>	
	Mitigation measures would be put in place to ensure that there would not be an impact on water quality due to sediment laden runoff during construction and operation.	
	n. the conservation and preservation of items of heritage, archaeological or historic significance	
	The site has no heritage significance.	
	o. only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy	



Applicable SEPP	Considerations
	applies, the means to encourage compact towns and cities
	Not applicable.
	 p. only in cases in which a development application in relation to proposed development is determined:
	a. the cumulative impacts of the proposed development on the environment, and
	 measures to ensure that water and energy usage by the proposed development is efficient.
	The Proposal would not result in negative cumulative impacts subject to appropriate management and mitigation measures.
State Environment Planning Policy (Three Ports) 2013 (Three Ports SEPP)	The Three Ports SEPP is not applicable to the Sydney Modal Transfer Facility, however, it does apply to the Illawarra Modal Transfer Facility. The Illawarra Modal Transfer Facility falls outside the Port Lease Area as prescribed by this SEPP. This places Wollongong City Council as the consent authority for this site for works requiring development consent.
	Council consent for development within Port Kembla is not required as discussed above in regards to the Infrastructure SEPP. Development for the purpose of a road or road infrastructure facilities can be carried out by or on behalf of a public authority without consent on any land. Consequently, assessment and determination can be carried out under Part 5 of the EP&A Act.

4.3. Local environmental planning instruments and development controls

The Sydney Modal Transfer Facility is located within the Strathfield LGA, on the border with City of Canterbury-Bankstown LGA. The land is covered by the *Strathfield Local Environmental Plan 2012* (Strathfield LEP 2012) for approval under Part 4 of the EP&A Act.

The Illawarra Modal Transfer Facility is within an area covered by the *Wollongong Local Environmental Plan 2009* (Wollongong LEP 2009), with the following subsections providing a review of these LEPs.

The Infrastructure SEPP determines the permissibility of the Proposal and takes precedence over the LEPs. Consequently, while the LEPs do not provide the permissibility for the Proposal, the review has considered the key relevant provisions within the LEPs for completeness.

4.3.1. Strathfield Local Environmental Plan 2012

The site is located within the IN1 General Industrial Zone. The proposal aligns with the objective of the IN1 zone to minimise adverse effects of industry on other land uses, as the Proposal would reduce the number of heavy vehicle movements from roads between the M4 WestConnex project and various locations throughout the Illawarra region for the resultant spoil. Additionally, the Proposal would retain the existing industrial use of the site.

The Strathfield LEP 2012 identifies the closest heritage item as being approximately 700 metres to the east beyond the Hume Highway and Roberts Road. Consequently, the Proposal would not impact on the local heritage.



The Strathfield LEP 2012 identifies the site as subject to Class 5 Acid Sulfate Soils. LEP 2012 requires an Acid Sulfate Soils Management Plan to be prepared in accordance with the Acid Sulfate Soils Manual should works lower the water table by greater than 1 metre. The works would not result in the lowering of the water table. Consequently, a Management Plan is not required.

4.3.2. Wollongong Local Environmental Plan 2009

The Wollongong LEP 2009 does not apply to the site, as the site is within the bounds of Three Ports SEPP as detailed in Table 8. The SEPP notes that that site is within an area zoned IN3 Heavy Industrial.

4.4. Commonwealth legislation

4.4.1. Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires an assessment of whether the Proposal is likely to significantly impact on matters of National Environmental Significance (NES) or Commonwealth land. These matters are considered in full in Appendix 2.

Potential habitat for the vulnerable listed Green and Golden Bell Frog (GGBF) (*Litoria aurea*) occurs in close proximity to the Proposal sites. However, the sites themselves are located within a cleared/highly disturbed area away from suitable GGBF habitat and no vegetation clearing is proposed. The Proposal is unlikely to lead to a significant impact as the Proposal does not meet the threshold outlined in the significant impact guidelines (DEWHA, 2009):

- The proposal would not result in the removal or degradation of aquatic or ephemeral habitat;
- The proposal would not result in the removal or degradation of terrestrial habitat within 200 metres of suitable habitat; or
- The proposal would not result in breaking the continuity of vegetation fringing ephemeral or permanent waterways or other vegetated corridors linking habitats.

Not withstanding the above results, a GGBF management plan would be prepared and implemented and would include pre-clearance protocols such as, inspecting the spoil dump area for frogs prior to unloading trains; if frogs are found on site they should be left to make their own way away from the works area; if they are impeding works then a qualified handler should be called to removed them offsite to a suitable location etc.

The proposal would not result in the removal of any native vegetation that forms part of any listed ecological community or suitable habitat for EPBC species. Therefore, it is anticipated that there would not be any significant impact any matter of NES or Commonwealth land. Furthermore, ecological investigations have been undertaken (refer to Section 6.7), which identified that the Proposal would not create significant impacts on matters of NES. Consequently, a referral to the Commonwealth Department of Environment and Energy is not required.

5. Community and stakeholder consultation

Section 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. This chapter discusses the consultation strategy adopted for the Proposal and the consultation undertaken with stakeholders to date.

5.1. Stakeholder consultation during concept design

Consultation with key stakeholders was undertaken by Transport for NSW during development of the concept design as outlined in Table 9.

Stakeholder	Details
Sydney Motorways Corporation	Various discussions were held with Sydney Motorways Corporation (WestConnex) to understand current operations at M4 WestConnex site and how the Proposal would integrate with existing spoil management arrangements. Key considerations arising from discussion include:
	There would be a requirement for the M4 WestConnex project to update its spoil and transport management plans in accordance with its approval processes
	 M4 WestConnex requires the ability to transfer consistent quantities of spoil (tonnes per day) without interruption
Sydney Trains	Various discussions were held with Sydney Trains to understand current operations at the Chullora site, how the Proposal could integrate with existing operations and the most appropriate location for the proposal operations.
	 Initial investigations indicated the UGL site would be most suitable. However during subsequent discussions with Sydney Trains it was determined this site was not suitable due to access requirements (train would block an access road) and the potential to limit future uses of the site
	 Further investigations identified the Eastern Siding as the preferred site subject to consultation with Sydney Trains during development of the OEMP to ensure no disruption to existing operations
	 Sydney Trains identified three potential freight paths available for the Proposal rail movements.
Environment Protection Authority (EPA)	Various discussions have been held with the EPA (Sydney and Illawarra Offices) to understand Environment Protection Licence (EPL) and consultation requirements of the Proposal. Key considerations arising from discussion include:
	 Further consultation with EPA required to determine best approach for establishing EPL for the operation of the Proposal
	 Consultation with community required particularly regarding potential for stockpiles and sensitivity to type of material to be transferred
	 Requirement for implementation of controls to ensure classification of material remains as VENM without contamination
	• Key control for ensuring material is not contaminated is weighing of material either by weigh-station or other method agreed in consultation with the EPA and in accordance with the EPL.

Table 9: Stakeholder consultation during concept design



Stakeholder 5	Details	
Bluescope Steel	Various discussions have been held with Bluescope Steel regarding operation of the Proposal on Bluescope Steel owned land.	
	Bluescope Steel identified a potential location within the BlueScope Steel Commonwealth Rolling Mills Site (CRM) for the Illawarra Modal Transfer Facility. The location is currently unused but adjacent to existing Bluescope Steel industrial operations	
	 Investigations required to confirm the ability of the current access road to carry the large amount of proposed truck movements and the interactions between the proposal activities and Bluescope Steel activities 	
	 Further consultation with Bluescope required during development of the OEMP to ensure no disruption to existing operations. 	
Port Kembla Port Authority (PKCA)	Initial phone call with CEO PKCA to discuss Harbour Masterplan and identify opportunities for where spoil could be used in the Illawarra area and potential spoil management facility locations. The PKCA was reviewing the Masterplan at the time and was not in a position to discuss this proposal further.	
Port Kembla Coal Terminal (PKCT)	Various meetings through 2016 to discuss the capability of PKCT to enable the project. Key constraints in operating with PKCT included the need to manage potential contamination between VENM and coal at the site, and the requirement for a high level of investment into existing infrastructure, maintenance and operational processes to enable the receiving of VENM.	
Project Management Group	A Project Management Group was established to help guide the development of the Proposal and to provide input from relevant government organisations.	
	Membership included representatives from Transport for NSW, Roads & Maritime Services, Sydney Trains, Sydney Motorways Corporation.	
	Representatives from varied disciplines were involved including Executive/management, environment and planning, commercial, legal, safety and quality, and policy.	

5.2. Consultation requirement

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15 and 16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 10 provides consultation requirement details under the Infrastructure SEPP.

Clause	Clause particulars	Relevance to the Proposal
Clause 13 Consultation	Consultation is required where the	Whilst the increase in the number of
with Councils –	Proposal would result in:	truck movements along local roads,
development with impacts	Substantial impact on stormwater	particularly in the Illawarra, has been
on council related	management services	assessed as not having a significant
infrastructure and	 Generating traffic that would 	impact, there would be a notable
services	place a local road system under	increase in heavy vehicles in the

Table 10: Infrastructure SEPP consultation requirements



Clause	Clause particulars	Relevance to the Proposal
	 strain Involve connection to or impact on a council owned sewerage system Involve connection to and substantial use of council owned water supply Significantly disrupt pedestrian or vehicle movement Involve significant excavation to a road surface or footpath for which Council has responsibility. 	areas surrounding the modal transfer facilities. Councils will be formally notified as per the Infrastructure SEPP requirements.
Clause 14 Consultation with Councils – development with impacts on local heritage	 Where works: Substantially impact on local heritage item (if not also a State heritage item) Substantially impact on a heritage conservation area. 	There is no proposed impact to local heritage/heritage conservation area. Accordingly, consultation with Council is not required. Refer to Section 6.5.
Clause 15 Consultation with Councils – development with impacts on flood liable land	 Where works: Impact on land that is susceptible to flooding – reference would be made to Floodplain Development Manual: the management of flood liable land. 	The Proposal is located on land that is susceptible to flooding. However the proposed works would not change flood patterns by more than a minor extent. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9.
Clause 16 Consultation with public authorities other than Councils	Where development is undertaken adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> , OEH and other agencies specified by the Infrastructure SEPP where relevant.	The Proposal is not located adjacent to land reserved under the <i>National</i> <i>Parks and Wildlife Act 1974</i> . Accordingly, consultation with the OEH is not required.

5.3. Consultation strategy

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy that was developed, having regard to the requirements of the planning process ensures that stakeholders and the community are informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

- Provide accurate and timely information about the Proposal and REF process to relevant stakeholders;
- Raise awareness of the various components of the Proposal and the specialist environmental investigations;
- Ensure that the directly impacted community are aware of the Proposal and consulted where appropriate;
- Provide opportunities for stakeholders and the community to express their view about the Proposal;



- Understand and access valuable local knowledge from the community and stakeholders;
- Record the details and input from community engagement activities;
- Build positive relations with identified community stakeholders; and
- Ensure a comprehensive and transparent approach.

5.4. Consultation tools and activities

The REF consultation strategy adopts a range of consultation mechanisms, including:

- Public display of the REF;
- Distribution of a notification to stakeholders, Council and the community outlining the Proposal and inviting feedback on the REF;
- Advertisement of REF public display in local newspapers with a link to the Transport for NSW website that includes a summary of the Proposal and information on how to provide feedback; and
- Consultation with key stakeholders, including those stakeholders who have provided input into the development of the concept design.

5.5. Public display period

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of two weeks.

The REF would be placed on public display at the following locations:

- City of Canterbury-Bankstown at Bankstown Customer Service Centre, Upper Ground Floor, Civic Tower, 66-72 Rickard Road, Bankstown;
- Bankstown Library and Knowledge Centre, 80 Rickard Road, Bankstown;
- Wollongong City Council, 41 Burelli Street, Wollongong; and
- Warrawong District Library, Level 1, 67-71 King Street, Warrawong.

REF available The would also be on the Transport for NSW website transport.nsw.gov.au/projects. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email at projects@transport.nsw.gov.au. During this time feedback is invited. Following consideration of feedback received during the public display period, Transport for NSW would determine whether to proceed with the Proposal and what conditions would be imposed on the Proposal should it be determined to proceed.

5.6. Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the Proposal area plus a 50 metre buffer. No sites of Aboriginal heritage were identified within 50 metres of the Proposal. The AHIMS search results are presented in Appendix 8.

The extensive landscape modification that has occurred across the Proposal study areas suggest that intact evidence of Aboriginal land use is unlikely to occur within the Proposal footprint. Similarly, the high level of disturbance would suggest that the archaeological



potential of the area is low. Therefore it was not considered necessary to undertake specific Aboriginal consultation.

5.7. Ongoing consultation

At the conclusion of the public display period for this REF, Transport for NSW would acknowledge receipt of feedback from each respective respondent. The issues raised by the respondents would be considered by Transport for NSW before determining whether to proceed with the Proposal (refer to Figure 1).

Should Transport for NSW determine to proceed with the Proposal, the determination report would be made available on the Transport for NSW website and would summarise the key impacts identified in this REF, demonstrate how Transport for NSW considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal.

Should Transport for NSW determine to proceed with the Proposal, the project team would keep the community, Councils and other key stakeholders informed of the process, identify any further issues as they arise, and implement mitigation measures to minimise the impacts of the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Plan to be developed prior to the commencement of construction.



6. Environmental impact assessment

Section 6 of this REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

This environmental impact assessment has been undertaken in accordance with Clause 228 of the EP&A Regulation. A checklist of Clause 228 factors and how they have been specifically addressed in this REF is included at Appendix 1.

6.1. Traffic and transport

Traffic and transport activities have been reviewed and assessed to ensure the Proposal at both the Sydney and Illawarra modal transfer facilities would not result in unacceptable impacts.

Impacts in terms of road network capacity have been reviewed via physical surveys and intersection performance has been modelled to assess the impacts from the proposed additional vehicles and trucks on the road network transporting the spoil from the M4 WestConnex project to the Sydney Modal Transfer Facility at Chullora, and from the Illawarra Modal Transfer Facility at Port Kembla to construction projects in the Illawarra region.

A Traffic Impact Assessment (TIA) undertaken by Cardno (2016b) for the Proposal is included in Appendix 3. The original traffic and transport assessment undertaken for the UGL site has been used for this assessment. It is still considered applicable as it assessed the surrounding road network to access the Chullora site at the same point as currently proposed for the Eastern Siding site.

It is noted that there may be opportunities to transport spoil to certain work sites by rail from the facility to other rail depots in the Illawarra region, though this has not been considered as part of this traffic assessment.

Train movements would be scheduled as appropriate with Sydney Trains to ensure a sufficient rail pathway capacity is available for the proposed additional train movements. In order to manage additional train movements associated with the Proposal, train movements would be addressed within an Operational Environmental Management Plan (OEMP).

6.1.1. Existing environment

(a) Sydney Modal Transfer Facility

The land surrounding the Chullora Rail Yard is characterised by industrial land uses, with a rail corridor situated directly to the north of the site. The Hume Highway, a State owned Primary Road, runs along the south eastern boundary of the site and later connects to the Western Motorway (M4) via Centenary Drive (Primary Road). Worth Street, a local road, is situated to the south of the site. Fleet Serve Pty Ltd buildings, Australia Post and associated warehouses are located along Worth Street.

Established entrance and exit roadways and security gates for the Chullora Rail Yard are located on Worth Street. Access to Worth Street from the Hume Highway is via an existing signalised intersection with turn in and out lanes. There are a number of potential cleared laydown areas and established car parking facilities available at this location that could be utilised during the construction and operational phases of the Proposal.



Figure 2 shows the location of the Sydney Modal Transfer Facility within the regional context and Figure 5 provides a site plan with proposed development areas.

(b) Illawarra Modal Transfer Facility

The surrounding land of the CRM Rail Depot is characterised by predominately industrial land uses, with the Port Kembla Steelworks situated directly to the north west. The site is relatively flat and of low elevation, at less than 5 metres above sea level with predominately hardstand facilities, rail sidings, offices and warehouses present. The major rail corridor accessing the site is in the form of a loop that surrounds the site and an existing rail spur line runs through the proposed area of development which would provide direct rail access for material unloading operations.

Established entrance and exit roadways to the CRM Rail Depot are located within the site boundary and are accessible via Old Port Road (Arterial Road) through an existing intersection. There are a number of cleared laydown areas and established car parking facilities available at this location that can be utilised during the construction and operational phases of the Proposal.

Figure 2 shows the location of the Illawarra Modal Transfer Facility within the regional context while Figure 6 shows the proposed site layout.

6.1.2. Potential impacts

(a) Construction phase

The construction phase would be limited to haulage road construction and the installation of train loading/unloading equipment at each site. The works at each site would require a construction period of approximately three weeks. The numbers of heavy and light vehicles travelling to the sites during construction are expected to be minimal and would utilise existing roadways surrounding Chullora and the CRM site.

The main access roads to Chullora would include the Hume Highway and Worth Street. Due to the minor increase in vehicle movements compared to the existing vehicle numbers along the Hume Highway, the Proposal is not anticipated to have a significant impact on the traffic movements through the area during the construction phase.

The main access roads to the Port Kembla facility are Five Islands Road, Flinders Street and Old Port Road. Based on the minimal number of vehicles required during construction the Proposal is not anticipated to have a significant impact on traffic and access to the CRM site.

The actual number of vehicle movements would be assessed during detailed design and should be outlined in the CEMP.

The construction activities have the potential to impact on existing or proposed operational activities within the Sydney Trains Chullora Yard and to a lesser extent, on Bluescope's activities at CRM Rail Depot. Transport for NSW would schedule construction activities in consultation with affected operators at the site to minimise any potential timing or activity conflicts and ensure impacts are minimised. Deliveries would be timed to occur outside of peak periods, particularly for large or oversized deliveries where possible.



(b) Operational phase

M4 WestConnex Project work site truck route to Sydney Modal Transfer Facility

Spoil transport routes from the M4 WestConnex project to the Sydney Modal Transfer Facility would be facilitated by the project itself. Movements would be approved via that project's specific spoil and transport management plan.

For the purposes of this traffic assessment it is assumed that all spoil removal trucks would enter and exit the work sites to and from Centenary Drive. Therefore travel to and from Centenary Drive is outside the scope of this Proposal. If an alternative route is proposed this should be addressed in the relevant extraction projects traffic management plan which would include mitigation measures to avoid additional impacts. All trucks travelling from the M4 WestConnex project work sites to the Sydney Modal Transfer Facility would travel along the following routes as illustrated in Figure 9:

- From M4 Motorway, all trucks would travel southbound along Centenary Drive towards Hume Highway;
- At the Centenary Drive and Hume Highway intersection, all trucks would turn right and travel westbound towards Worth Street;
- At the Hume Highway and Worth Street intersection, all trucks would turn right onto Worth Street;
- From Worth Street, spoil removal trucks would then turn into the Chullora Rail Yards to deliver the payload; and
- All trucks are then to return to the M4 work sites following the same route.

The entry and exit into the Sydney Modal Transfer Facility has an existing signalised intersection, dedicated turn in and out lanes, roundabout and formalised site entrance which would help to ensure that impacts to traffic flows are minimised.

All spoil delivered to the Sydney Modal Transfer Facility would be transported to the Illawarra Modal Transfer Facility via rail, as illustrated in Figure 2.

Three trains per day would travel between the two model transfer facilities. The timing of these movements would be scheduled to fit into available slots in network usage to ensure there are no impacts to other commuter and freight trains using the rail line. Sydney Trains would provide assistance to ensure communications and signalling requirements are provided to ensure safe and secure train movements within the existing rail network.

Truck routes from Illawarra Modal Transfer Facility to wider Illawarra region

All trucks travelling from the Illawarra Modal Transfer Facility to construction projects in the Illawarra region would travel along the following routes as illustrated in Figure 10:

- From the CRM rail depot, all trucks are expected to turn left onto Old Port Road and then travel along Flinders Street to approach the Five Islands Road and Flinders Street intersection;
- From Five Islands Road and Flinders Street intersection, all trucks travelling to the southern areas of the Illawarra region are expected to travel southbound along Five Islands Road and then onto King Street;
- From Five Islands Road and Flinders Street intersection, all trucks travelling to the western and south-western areas of Illawarra region is expected to travel northbound along Five Islands Road and turn left onto Princes Motorway;



- From the Five Islands Road and Flinders Street intersection, all trucks travelling to the northern areas of the Illawarra Region would need to travel northbound along Five Islands Road and turn right either onto Springhill Road or Princes Motorway subject to its destination; and
- All trucks are then to return to the Illawarra Modal Transfer Facility following the same route.

It is assumed that 50 percent of trucks would travel southbound along Five Islands Road and the other 50 percent of trucks would travel northbound along Five Islands Road. Further, all outbound trucks are assumed to return to their origin following the same route.

A review of the proposed travel route from the transfer facility to the wider Illawarra region has also been undertaken in reference to the Restricted Access Vehicle (RAV) map published on Road and Maritime's website. This review indicates Old Port Road, Flinders Street, Five Islands Road, King Street, Springhill Road and Princes Motorway are all gazetted as 25/26m B-double routes and are therefore appropriate paths available for distribution of materials to the surrounding region.

Proposed Truck Types and Sizes

The total number of truck movements (one-way) would comprise 255 truck movements per day at each modal transfer facility, undertaken in three daily campaigns to coincide with train arrivals as follows:

- Early Morning: 85 truck movements;
- Midday: 85 truck movements; and
- Late Afternoon: 85 Truck movements.

Average and Maximum Hourly, Daily and Weekly truck movements

Each daily campaign would comprise a three hour shift and all outbound truck movements are expected to return to their origin in the same hour. Accordingly, the expected number of additional truck movements during the AM and PM peak hour would be approximately 28 trips in each direction and therefore a total of 56 trips per day during the peak periods.

The truck fleet would likely comprise 14 truck and dogs in total, and has been conservatively assumed to correspond to 3.6 passenger car units (pcu) which is normally adopted for B-Double vehicles.

The increase in traffic volumes along the proposed travel routes is generally less than a 2 percent increase in the total traffic volumes, and therefore could not be expected to have any tangible negative impacts in terms of road network capacity.

A detailed review of four key intersections was undertaken to assess impacts from the Proposal along the proposed travel route using SIDRA 7.0 modelling software, revealing that:

- There would be minimal impact on the Hume Highway and Worth Street intersection, where the intersection would continue to operate at a satisfactory level of service;
- The Hume Highway and Centenary Drive and Roberts Road intersection would continue to operate at the same level of service as the existing situation. The intersection currently operates at an unsatisfactory level of service, however it is noted that the total increase in traffic volumes as a consequence of the Proposal is generally less than 2 percent and is not the primary factor contributing to the poor service levels at this intersection;



- There would be minimal impact on the Five Islands Road and Flinders Street intersection, where the intersection would continue to operate at satisfactory level of service;
- There would be minimal impact on the Old Port Road and Bis Industries Access and CRM Access intersection, where the intersection would continue to operate at satisfactory level of service.

The proposed access and egress to and from Old Port Road to the CRM Rail Depot poses some alignment constraints and would require some modifications to the entry design to ensure adequate signage, line markings and site distance safety considerations are met. Further assessment would be carried out during detailed design to ensure safe access can be maintained for the duration of operations.

The Proposal would not require any long term traffic closures or detours to existing roadways and therefore impacts to existing traffic flows would be minimal. The proposed truck transport routes would follow pre-approved B-Double (articulated truck consisting of a towing vehicle and two semi-trailers) routes, however the movement of heavy vehicles into and out of the CRM Rail Depot should preference Old Port Road to the north rather than Darcy Road and Five Islands Road to the south where possible to minimise potential traffic related impacts to the community of Port Kembla.

The Proposal would be managed during the operational phases to ensure service disruption impacts do not occur to existing commuter and freight operations. During the implementation and delivery the project would continue to liaise with Sydney Trains, BlueScope, Pacific National and other key stakeholders to ensure potential impacts are managed.





Figure 9: Truck route from excavation sites to Sydney Modal Transfer Facility





Figure 10: Truck routes from Illawarra Modal Transfer Facility to the wider Illawarra region



6.1.3. Mitigation measures

The following mitigation measures are proposed to minimise and manage potential traffic and transport impacts:

- A traffic management plan (TMP) would be prepared outlining the approved haulage routes and would be reviewed and updated as appropriate. The TMP would be compiled in coordination with the M4 WestConnex project work sites where the spoil is being hauled. This may be in the form of an update to the existing M4 WestConnex project's TMP and Spoil Management Plan. The Plans would consider vehicle movements at both transfer facility sites and would aim to identify suitable haulage routes and minimise potential impacts resulting from vehicle movements;
- All vehicle drivers shall be inducted to the project. Training shall include but not be limited to behavioural expectations whilst working on public and private roads and approved haulage routes to and from each site;
- Transport for NSW, via the project, shall continue liaison with Sydney Trains, BlueScope Steel, Pacific National and any other relevant stakeholders involved in managing rail and transport movements at both the Sydney and Illawarra modal transfer facilities;
- Traffic management would be required to assist truck's entering and exiting the Illawarra Modal Transfer Facility from Old Port Road. Options for traffic management at this location include use of a Roads and Maritime accredited Traffic Controller on an ongoing basis, or alternatively further detailed investigation to determine a long term intersection management solution which may require:
 - o Intersection realignment; and/or
 - Intersection signalisation.
- Site specific signage would be installed to ensure site safety and security by promoting way-finding and orientation for personnel and delivery vehicles.

6.2. Urban design, landscape and visual amenity

Due the geographically separated nature of this Proposal the assessment below has been split into two discrete sites to cover both the Sydney Modal Transfer Facility in Chullora and the Illawarra Modal Transfer Facility in Port Kembla. The assessment has used aerial photographs, site inspections, site photographs and Geographic Information System (GIS) technology to determine the visual character of the areas and provide an assessment of impacts from the Proposal.

The connecting rail infrastructure between these two sites is existing and already operational allowing the efficient transportation of commuter and freight trains (with similar wagons proposed as part of this Proposal) and therefore the urban design, landscape and visual amenity impacts along the rail corridor would not change as a result of the Proposal. Therefore it has been determined that the rail movement component of the proposal does not require any further urban design, landscape and visual amenity assessment in this section of the REF.



6.2.1. Existing environment (Sydney Modal Transfer Facility)

Existing Visual Character

The Chullora Rail Yard is bounded by the Hume Highway to the south-east, Worth Street to the south and the Chullora railway line to the north. The surrounding land is characterised by industrial, commercial and residential land uses, along with road and rail infrastructure. A stand of remnant vegetation is located at the western boundary of the rail yard which connects to a portion of bushland to the west and north within the rail corridor. A line of vegetation is also present along the boundary of the rail yard with the Hume Highway.

The historic use of the yard has resulted in a highly modified environment with many large scale warehouse buildings and associated rail sidings and related storage areas, which form the main visual features of the yard. The yard experiences frequent train movements into and out of the area.

The proposed Sydney Modal Transfer Facility is primarily positioned within the eastern portion of the Chullora Rail Yard and the land is currently owned and managed by Sydney Trains. The proposed site is used by Sydney Trains for the loading of large freight trains and provides access to the fuelling station. The wider Chullora Rail Yard site provides rail sidings, storage and rail ballast recycling facilities.

The site is visible from a section of the Hume Highway as can be seen in Figure 11. Visual buffering for the northern portion of the site is provided by the existing vegetation between the Hume Highway when viewed looking south west as can be seen below in Figure 12.

There is also an overhead powerline which can be seen running between the Hume Highway and the site, with a pedestrian footpath running along the southern side of the highway. Light sources in the vicinity of the Proposal include the street lighting and a variable message sign along Hume Highway and street lighting along Marlene Crescent.



Figure 11: Photo looking North East from Hume Highway towards the proposed Sydney Modal Transfer Facility





Figure 12: Photo looking South West from Hume Highway towards the proposed Sydney Modal Transfer Facility

Sensitive Visual Receivers

The nearest residential receivers are located approximately 50 metres to the south east of the proposed operational areas of the Sydney Modal Transfer Facility on the opposite side of the Hume Highway in Greenacre. An existing pedestrian pathway is also situated along the southern side of the Hume Highway. This residential area, and the surrounding public areas, are separated from the eastern siding site by busy roadways and vegetation. Views into the Eastern Siding site are possible from the residences and the Hume Highway for a 150 metre stretch of the highway, between Lawford and Murray Streets, where vegetation is patchy views are transient in nature for passer-by's as they travel along the Hume Highway. Furthermore, the existing vegetation serves to prevent views into the site area at the more northern location.

Another area of residential development, within proximity to the site and associated regular train movements, is situated approximately 70 metres to the east at Marlene Crescent in Greenacre. These properties are located closest to the rail lines where the trains would be loaded in the Northern Loading Area. Properties at this location are comprised of low rise residential apartments that back onto a narrow strip of sparsely planted greenspace which separates the residences from the existing rail lines at Chullora and the site of the proposed activities.

The receivers to the north of the site, beyond the Chullora Rail Yard area, comprise Rookwood Cemetery and Strathfield Golf Club.

6.2.2. Potential impacts (Sydney Modal Transfer Facility)

(a) Construction phase

Existing roadways to and from the site as well as within the site would be utilised for access during construction, thus eliminating the need to significantly modify internal roadways and



any site entry or exits. Heavy and light vehicles used for construction would also utilise existing roadways and the Hume Highway to access the site and therefore visual amenity impacts from the site transport requirements would not be significant during construction.

The Sydney Trains Chullora Yard is fenced from surrounding sites and land uses to provide security. Site specific signage would be installed to ensure site safety and security during construction and to promote way-finding and orientation for construction workers and delivery vehicles. The installation of signage and other safety measures, including barriers and line marking, would be limited to internal areas of the Chullora Yard and therefore would not present a visual change to the surrounding area.

Trimming of trees and vegetation is not anticipated during construction. However if it is determined that vegetation trimming or removal is required, additional approval from the Transport for NSW environmental representative would be required. No vegetation would be removed around the Chullora Yard boundary.

(b) Operational phase

The operational areas of the Proposal would be partially screened by vegetation along the Hume Highway and the sparely planted greenspace which separates the residences on Marlene Crescent from the existing rail lines.

The nearest residential receivers along the southern side of the Hume Highway to the south east of the site currently front onto the busy Hume Highway and overlook the existing Chullora Rail Yard. The proposed activities at the site, such as material transfer and handling, are similar to rail support activities which already exist and therefore the potential for impact to the residential receivers or users of the pedestrian pathway and the Hume Highway is considered low. Existing vegetation along the eastern boundary of the site would also assist in reducing visual impacts from this location (refer Figure 12).

Additional truck movements to and from the site would occur as a result of the Proposal. However given the existing high volume of traffic on the Hume Highway and the existing regular truck movements at the Chullora Rail Yard, the additional movements are not expected to have a significant impact on the visual amenity of the area.

The existing residential area at Marlene Crescent is zoned R3 Medium Density and currently contains a range of multi-storey flat buildings (up to 3 storeys high). There is potential that residents in the second and third floor apartments overlook the rail yards and that the proposed activity would be visible to them. However, as the proposed activities are similar to those that already occur, the visual change caused by the train loading within the context of the existing rail yard, would present a minor impact to these residents.

The sites to the north, beyond the Chullora Rail Yard area, comprise Rookwood Cemetery and Strathfield Golf Club which have extensive vegetated buffers along their southern boundaries which would mitigate any visual impacts from the Proposal.

No trimming of trees and vegetation is required to accommodate operational plant and equipment. If it is determined that vegetation trimming or removal is required, additional approval from the Transport for NSW environmental representative would be required. Vegetation impacts would be kept to a minimum to ensure existing visual buffers are maintained. Strategic planting of vegetation would be considered to provide additional or enhanced visual buffers if required.

The design, procurement and use of any permanent lighting fixtures on the site during operations would need to consider the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting.



Security measures comprise of existing security fencing. Additional site specific signage would be installed to ensure site safety, security and to promote way-finding and orientation for operational phase workers and material delivery vehicles. These aspects are not considered to introduce any significant visual impacts.

6.2.3. Existing environment (Illawarra Modal Transfer Facility)

Existing Visual Character

The Illawarra Modal Transfer Facility is located approximately 100 metres to the south west of Port Kembla Harbour on Old Port Road, within the Port Kembla Precinct, an industrial area. The surrounding land is characterised by predominately heavy industrial and port related land uses. Vegetated areas are scattered throughout the site, with the remainder comprising hardstand facilities, rail sidings, offices and warehouses. A major rail balloon loop corridor also surrounds the site with a connecting rail spur running through the site.

Considering the historic and current uses at the site and surrounds, it has been highly modified for the existing industrial and rail uses. The site contains many large scale industrial warehouse buildings and associated rail siding and related storage areas. Operational trains and vehicles to support the existing use move about the site regularly. The proposed site is partially visible from the Five Islands Road in Port Kembla as can be seen below in Figure 13. However the dominant features are the existing warehouses and steelworks situated further to the north, and views to the south would be transient in nature as motorists drive along the road.

The surrounding visual context comprises a range of existing industrial development, port related container storage and power distribution infrastructure as can be seen below in Figure 14.



Figure 13: Photo looking North West towards the Illawarra Modal Transfer Facility from Five Islands Road Port Kembla





Figure 14: Photo looking South from Flinders Street towards the CRM site (NearMap, 2017)

Sensitive Visual Receivers

The nearest residential dwellings are located approximately 350 metres to the south of the CRM site at Wentworth Street Port Kembla.

Views to the site are limited due to the low lying nature of the site and the surrounding built features that include large scale warehouses, workshops, port facilities, rail yards and steelworks. The site is partially visible from some higher elevation areas and viewpoints situated to the south within the suburb of Port Kembla. Locations include Robertson Street and surrounding areas that are at elevations higher than the site. These vantage points are situated approximately 900 metres from the site and the views tend to be buffered by sections of existing vegetation and industrial buildings. Therefore, the risk of significant visual impact is considered low.

6.2.4. Potential impacts (Illawarra Modal Transfer Facility)

(a) Construction phase

Existing roadways with the ability to handle B-Double trucks to and from the site would be utilised for access during construction. The existing site entry/exit adjacent to the Bis Industries site on Old Port Road would require further design review to ensure safe access is available (refer to Section 6.1 for more details). The CRM site boundary is fenced to provide security and site specific signage would be installed to ensure site safety and security during construction and to promote way-finding and orientation for construction workers and delivery vehicles. The installation of signage and other safety measures, including barriers and line marking, would be limited to internal areas of the CRM site and therefore would not present a visual change to the surrounding area.

Trimming of trees and vegetation is not anticipated during construction, however if it is required, additional approval from the Transport for NSW environmental representative would be required. All activities would be contained within the CRM site and therefore there would be minimal visibility of construction activities from areas external to the site. The



exception to this would be a limited number of residents and business located of the rise to the south of the site. These premises already overlook the CRM site. As the proposed activity is in line with the existing industrial nature of the site, it is considered that the change in use at the site would present a negligible visual impact.

(b) Operational phase

The operational areas of the Proposal, where transfer of materials from rail to trucks and use of a material surge pile (refer Figure 6), would be partially shielded by existing warehouse buildings and remnant vegetation along the edge of Five Islands Road, thus reducing the visual impact of the operational areas of the proposal.

The nearest residential receivers are situated along the southern side of Five Islands Road to the south of the site. The Proposal is unlikely to introduce any significant visual impacts to these residential receivers or to users of the existing pedestrian pathway along the southern side of the road as there is limited change expected from additional trucks using the road or from additional material transfer and handling activities within the existing industrial, railway sidings and logistics site. Existing vegetation along the southern boundary of the site would also assist in reducing visual impacts from this location (refer Figure 12). Visual impacts from areas to the east, north and west are limited as the existing land uses in these locations are similar heavy industrial and port related areas of operations and have no direct views into the site.

Additional truck movements to and from the site would occur as a result of the Proposal. However the movement of heavy vehicles would use Old Port Road and avoid Five Islands Road where possible to reduce impacts on nearby Port Kembla residents. The additional movement of trucks within the site would be undertaken on existing roadways and in designated areas only.

The design, procurement and use of any permanent lighting fixtures on the site during operations would need to consider the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

Security measures comprise of existing security fencing and site specific signage would be installed to ensure site safety, security and to promote way-finding and orientation for operational phase workers and material delivery vehicles.

The site operating facilities would be managed and regularly maintained to ensure a safe, comfortable and tidy work environment is provided.

6.2.5. Mitigation measures

The following mitigation measures are proposed to minimise and manage potential urban design, landscape and visual impacts:

- No vegetation is to be trimmed or removed without prior approval from the Transport for NSW environmental representative;
- The detailed engineering design would consider existing vegetated visual buffers to ensure they are maintained where possible. Strategic planting of vegetation would be considered to provide additional or enhanced visual buffers if required;
- The site operating facilities would be actively managed, monitored and regularly maintained to ensure a safe, comfortable and tidy work environment is provided;

- Site specific signage would be installed to ensure site safety and security by promoting way-finding and orientation for personnel and delivery vehicles. Signage would be installed in a manner that is neat and tidy and would avoid the creation of visual pollution through the minimisation of signage where safe;
- The design, procurement and use of any lighting on the site would comply with the relevant requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting;
- Heavy vehicles should use Old Port Road and avoid Five Islands Road where possible to reduce potential amenity impacts to nearby Port Kembla residents; and
- The use of CCTV to monitor access to the site during operations may be considered to enhance security, public safety and operational management requirements.

6.3. Noise and vibration

Noise and vibration assessments were undertaken by Pacific Environment Limited for the Proposal at the Sydney Modal Transfer Facility at Chullora (2016a) and the Illawarra Modal Transfer Facility at Port Kembla (2016b) and are included in Appendix 4. For both sites, the assessments were conducted by quantitative modelling with consideration of the following policies and guidelines:

- Industrial Noise Policy (INP) (EPA, 2000);
- Road Noise Policy (RNP) (DECCW, 2011);
- Interim Construction Noise Guidelines (ICNG) (DECC, 2009);
- Assessing Vibration: A Technical Guideline (DEC, 2006); and
- Construction Noise Strategy (TfNSW, 2016).

To determine noise impacts, modelling has been undertaken using the CadnaA 4.5 acoustic modelling package.

The noise modelling takes into consideration the sound power level of the proposed site operations, activities and equipment, and applies adjustments for attenuation from geometric spreading, acoustic shielding from intervening ground topography, ground effect, meteorological effects and atmospheric absorption.

The original noise assessment undertaken for the UGL site at Chullora has been used in this assessment. It is still considered applicable to the Proposal as it provides information on the existing acoustic environment and provides an indication of the likely noise impacts from the Proposal. Further noise modelling would be undertaken during the detailed design phase of the Proposal to ensure appropriate mitigation measures are designed to effectively minimise noise impacts at this location.

6.3.1. Existing environment (Sydney Modal Transfer Facility)

The proposed Sydney Modal Transfer Facility site is located off Worth Street, Chullora. The suburbs around the site include Greenacre to the south east and Strathfield to the north east. The nearest residential receivers to the facility have been grouped into two noise catchment areas (NCA):

- NCA A in the suburb of Strathfield; and
- NCA B in the suburb of Greenacre.


Figure 15 shows the site location, noise catchment areas, receivers and background monitoring locations. The UGL project boundary is shown on the figure as the original noise assessment was undertaken for this site. The location of sensitive receivers shown on Figure 15 are also considered appropriate for the noise assessment of the proposed Eastern Siding site. The receiver locations were chosen for the purpose of assessing noise impacts from the proposed Sydney Modal Transfer Facility as they are the closest potentially affected receiver locations to the Proposal.



Figure 15: Sensitive receiver locations in proximity to UGL site (modified from Pacific Environment, 2016a)

(a) Monitoring

The existing acoustic environment was characterised by a combination of long term and short term noise measurements.

Unattended background noise monitoring was undertaken at location BG01, as shown in Figure 15, for the period 22 November and 2 December 2016. Short term (attended) noise measurements, over 15 minute intervals, were also carried out at several locations in the



vicinity of the Proposal. Attended noise measurements were completed on 22 and 29 November 2016 and on 5 December 2016.

Noise monitoring indicated a typical urban noise environment influenced by traffic noise sources at each of the monitoring locations. NCA B was influenced by nearby traffic, whilst NCA A was influenced by distant traffic with both areas considered to have an 'urban hum'. Noise levels followed typical diurnal patterns with increased levels of traffic and community noise influence during the day time hours and lower ambient noise levels during the night time hours. Traffic noise was the primary influence on noise levels. Industrial and fauna noise were almost inaudible at the logging locations due to traffic noise.

(b) Assessment Criteria

Operational and Construction Noise

The project specific noise levels (PSNL) for the Proposal are presented in Table 11. The operational PSNL are based on the requirements of the INP and the project specific construction noise management levels are based on the requirements of the ICNG.

Receiver/Land Use	Descriptor	Operation dB(A)	onal Noise	Criteria ,	Construction Noise Management Level, dB(A)
		Day	Evening	Night	Standard Hours Monday to Friday 7am to 6pm Saturday 8am to 1pm
Residential (NCA A)	L _{Aeq} , 15min	49	49	45	54
Residential (NCA B)	L _{Aeq} , 15min	61	58	56	66
School Classroom – external (when in use)	L _{Aeq, 15min}	45	45	45	50*
Commercial premises	L _{Aeq, 15min}	65	65	65	70

Table 11: Project specific noise levels

* External noise level based on an outside to inside correction of 10 dB(A), in accordance with the INP

In accordance with the World Health Organisation (WHO) guidelines for Community Noise (1999), the sleep disturbance criteria of L_{Amax} 55 dB(A) has been used for this Proposal.

The RNP states that any increase in the total traffic noise level from development at existing sensitive land uses, should be limited to 2 dB above the existing road traffic noise level without the development. The RNP application notes states that this limit should be applied wherever the noise level without the development is within 2 dB of or exceeds the noise assessment criterion.

Vibration

Impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives.

The EPA administered guideline entitled "Assessing Vibration: A Technical Guideline," provides acceptable values for continuous and impulsive vibration in the range 1-80Hz. Where vibration is intermittent, such as for construction sources, a vibration dose is calculated and acceptable values are shown in Table 3.7 of Appendix 4.

German Standard DIN 4150-3-1999 "Structural Vibration – Part 3 Effects of vibration on structures" provides methods for evaluating the effects of vibration on structures in the



absence of an Australian Standard. The recommended limits (guide values) from DIN 4150 for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically below in Appendix 4.

6.3.2. Potential impacts (Sydney Modal Transfer Facility)

(a) Construction phase

The duration of the site preparation and related construction phase works for the Proposal is estimated to be three to four weeks.

For the noise assessment at the UGL site the following construction stages were modelled:

- Scenario 1: Landform, earthworks and clearing;
- Scenario 2: Protection of heritage rail assets; and
- Scenario 3: Extension of rail line.

It is noted that construction works at the Eastern Siding site would not require the protection of heritage rail assets (Scenario 2) nor the extension of the rail line (Scenario 3). As such, Scenario 1 is of relevance to the current Proposal and is documented below.

The construction equipment which was used in the modelling of Scenario 1, is a tree mulcher, chain saw, excavator, crane and a lorry 4 axle truck.

Construction activities would be carried out during standard hours: Monday to Friday 7am to 6pm and Saturday 8am to 1pm. No work on Sundays or Public Holidays.

Construction Noise Modelling Results

The noise modelling results for Scenario 1 for all receivers are shown in Table 12. Results show that for all construction scenarios, construction noise levels at the most sensitive receivers would be below the noise management criteria. The exceptions are in Marlene Crescent as follows:

- Bottom floor receiver at R5; and
- Elevated receivers at R2 R 6.

No receivers are predicted to be highly noise affected (noise levels of 75 dB(A) or above) for the construction scenarios modelled.

It is noted that this assessment was undertaken for the UGL site which is located in the centre of the Chullora Rail Yard site. The proposed Eastern Siding site is located closer to the residential receiver locations, and as such further noise exceedances would be expected during construction. Further noise modelling would be undertaken during the detailed design phase of the Proposal to ensure appropriate mitigation measures are designed to effectively manage potential noise impacts.

	Criteria L _{Aeq} , _{15min} dB(A)	Predicated Noise Level L _{Aeq} ,15min dB(A)		Criteria L _{Aeq,15min} dB(A)	Predicated Noise Level L _{Aeq,15min} dB(A)
NCA A			NCA B		
R1	54	46	R7	66	43
R2	54	50	R8	66	52

Table 12: Predicted Construction noise levels

	Criteria L _{Aeq} , _{15min} dB(A)	Predicated Noise Level L _{Aeq,15min} dB(A)		Criteria L _{Aeq,15min} dB(A)	Predicated Noise Level L _{Aeq,15min} dB(A)
R3	54	54	R9	66	56
R4	54	46	R10	66	53
R5	54	55	R11	66	60
R6	54	52	R12	66	61
R1.1	54	54	R13	66	61
R2.1	54	56	R14	66	60
R3.1	54	56	R15	66	60
R4.1	54	57	R16	66	58
R5.1	54	58	R17	66	59
R6.1	54	57	R18	66	60
Schools			Commercial		
S1	50	<25	C1	70	63
S2	50	46	C2	70	60

Results exceeding the construction noise criteria are shaded grey

Construction Vibration Results

Construction vibration impacts are not expected at residential locations. Short term vibration impacts from excavation and compaction may need to be considered during earthworks for the rail load out plant.

Based on the Construction Noise and Vibration Guidelines (RMS, 2016) it is anticipated that the construction works can occur up to 5 metres from buildings and comply with safe working distances for sensitive receivers.

(b) Operational phase

The site would be active for an estimated 9 hours per day throughout a 24 hour period, seven days per week. On average, the 9 hours of activity would be broken into three periods of three hours. The modelling has assumed a conservative 15 minute scenario representative of the proposed operations.

Two scenarios have been developed to represent typical operational activities:

- Scenario 1: Train Loading including material delivery via truck; and
- Scenario 2: Spoil delivery only excluding train loading.

During train loading operations the primary noise sources are the locomotives. To represent loading conditions it has been assumed that locomotives would be idling for 50 percent of the time and moving at a low speed for the other 50 percent of time.

The sound pressure levels (SPLs) and sound power levels (SWLs) used in the operational noise assessment are presented in Table 13.



Table 13: Modelled Sound Power Levels

Item	Overall SWL dB(A)	Units, Scenario 1	Units, Scenario 2
Trucks on access road	106	7	7
Truck Idling	95	4	4
Dumping spoil	102	1	1
Front end loader	104	1	1
Train locomotive low speed	102	1	-
Train locomotive Idling	100	1	-
Conveyor (line source)	79/m	1	-
Spoil dump to rail wagon	105	1	-
Conveyor drives	98	1	-

Operational Noise Modelling Results

Predicted noise levels for all receivers are presented in Table 14 for Scenarios 1 and Scenario 2. The resulting noise contours plots are provided in Appendix A.



Table 14: Predicted operational noise levels

Receivers	Scenario	o 1			Scenario	o 2			Sleep D	isturbance		
	Predicte	d Noise Leve	l _{LAeq} , 15n	nin dB(A)	Predicte	ed Noise Leve	l _{LAeq} , 15n	nin dB(A)	Predicte	ed Noise Leve	I _{LAMax} , dB	6(A)
	Day		Evening	/Night	Day		Evening	/Night	Scenari	01	Scenario	o 2
									Evening	/Night	Evening	/Night
	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing
NCA A		-	-		-				-			
PSNL	49	49	49/45	49/45	49	49	49/45	49/45	55	55	55	55
R1	34	36	34	37	26	29	26	31	39	43	38	42
R2	37	39	37	40	30	34	31	35	43	47	42	47
R3	39	41	39	42	33	36	33	38	47	51	46	50
R4	37	38	37	38	26	29	26	30	40	43	37	41
R5	41	43	41	44	34	38	35	39	49	53	48	52
R6	39	41	39	41	31	35	32	36	46	49	45	49
R1.1	39	41	39	42	33	37	33	38	47	51	47	51
R2.1	41	43	41	44	35	39	36	40	48	52	48	52
R3.1	41	43	42	44	36	40	37	41	49	53	48	53
R4.1	42	44	42	45	36	40	36	41	50	54	49	53
R5.1	43	45	44	46	37	41	38	42	50	54	50	54
R6.1	43	45	43	46	37	41	37	41	50	54	49	54
NCA B			•						•			
PSNL	61	61	58/56	58/56	61	61	58/56	58/56	55	55	55	55
R7	38	40	38	40	31	35	32	36	44	48	43	47
R8	39	41	40	42	33	36	34	38	46	50	45	49



Receivers Scenario 1 Predicted Noise Level LAeq, 15min dB(A)		Scenario Predicte	o 2 ed Noise Leve	l _{LAeq} , 15m	nin dB(A) /Night	Sleep Disturbance Predicted Noise Level LAMax, dB(A) Scenario 1 Scenario 2						
	Day		Lvening	/Nigitt	Day		Lvening	/Nigitt	Evening	/Niaht	Evening	/Niaht
	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing
R9	42	44	42	45	37	40	37	41	50	53	49	53
R10	44	46	44	47	39	42	39	44	52	55	51	55
R11	47	49	47	49	41	45	42	46	54	57	53	57
R12	48	50	48	50	42	46	43	47	55	58	54	58
R13	49	51	50	52	43	46	44	47	56	59	55	59
R14	53	54	53	55	47	50	48	51	60	63	59	62
R15	53	54	53	55	48	50	48	51	60	63	59	62
R16	53	54	53	55	49	51	49	52	60	63	59	63
R17	52	54	53	55	50	52	50	53	59	63	59	62
R18	51	53	52	54	50	52	50	53	52	54	51	54
Schools				·		·	·			·	·	
PSNL	45	45	45	45	45	45	45	45				
S1	21	23	21	23	11	15	11	16				
S2	36	39	36	40	35	38	35	39				
Commercial												
PSNL	65	65	65	65	45	45	45	45				
C1	52	54	53	54	52	53	52	54				
C2	49	50	49	50	41	44	41	45				

Results exceeding the evening residential criteria are presented as **bold**, noise levels exceeding the night time criteria are shaded grey



Modelling results indicate:

- Potential noise exceedance at the two nearest elevated receivers in NCA A during the night time period by 1 dB during Scenario 1; and
- Noise levels from Scenario 2 were below the day, evening and night time criteria for all residential, school and commercial receivers.

Sleep disturbance events have the potential to be caused by short high level noise events from operations. These can be caused by a number of activities and equipment items including trucks being loaded, engine start-ups and revving, tonal reversing alarms, warning and system alarms. A conservative noise level of L_{Amax} 120 dB(A) has been assumed to represent typical maximum noise level events from a truck air break release or similar peak noise events.

Maximum noise levels are predicted to exceed relevant sleep disturbance criteria at the nearest residential receivers in NCA B as shown in Table 15. However as the L_{Aeq} average ambient noise level are already significantly higher, the sleep disturbance is considered low risk at these locations and impacts can be managed through mitigation measures.

It is noted that this assessment was undertaken for the UGL site which is located in the centre of the Chullora Rail Yard. The proposed Eastern Siding site is located closer to the sensitive receivers. As such further noise exceedances would be expected during operation. Further noise modelling would be undertaken during the detailed design phase of the Proposal to ensure appropriate mitigation measures are designed to effectively manage potential noise impacts.

Operational Vibration

Due to the separation distances between the Proposal and the nearest sensitive receivers, no significant operational vibration impacts are anticipated.

Road Traffic Nosie

The Sydney Modal Transfer Facility is expected to generate traffic due to the number of heavy vehicles required to haul spoil. Negligible light vehicles trips would occur during operation from operations staff requirements. The projected heavy vehicle trip generation resulting from operation of the Proposal are:

- Early Morning 85 truck movements;
- Midday 85 truck movements; and
- Late Afternoon 85 truck movements.

Heavy vehicle movements are expected to occur at a constant rate throughout three x three hour shifts.

The assessment has considered the increased traffic volumes arising from the Proposal in context of the existing traffic travelling along the closest road, the Hume Highway. This has been done for daytime and night time periods.

A summary of the existing traffic volumes on the Hume Highway is provided in Table 15. Annual daily traffic volumes were referenced from the Traffic Impact Assessment included as Appendix 4 (Cardno, 2016b).

Table 15: Existing Traffic Movements



	Day time 7 am -	– 10pm	Night Time 10pm – 7am		
Road Section	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles	
Hume Hwy East Bound	14,426	796	4387	242	
Hume Hwy West Bound	17,839	1212	3570	242	

Traffic volumes associated with the Proposal have been added to the existing traffic volumes listed and the traffic noise impacts calculated utilising the method described in Section 6.1. No additional road network traffic growth has been included giving a conservative estimate of traffic noise increase.

A review of predicted increase in traffic noise levels (refer to Appendix 4) shows that the predicted worse case in total traffic noise level increases as a result of the Proposal for the maximum anticipated traffic flow scenario would increase existing levels by less than 1 dB which is below the 2 dB relative increase criteria. Therefore, traffic noise increases associated with the proposal are considered to be acceptable.

Mitigation measures recommended in Section 6.3.5 would ensure noise emission levels are minimised and managed appropriately to reduce potential impacts on the surrounding residential receivers.

6.3.3. Existing environment (Illawarra Modal Transfer Facility)

The site location, noise catchment areas, sensitive receivers and locations where background noise was recorded are identified below in Figure 16. The discrete sensitive receiver locations were chosen for the purpose of assessing noise impacts from the Proposal. These locations are the closest potentially affected receiver locations to the proposed Illawarra Modal Transfer Facility at Port Kembla.

Receivers in Port Kembla are considered to be located in an urban area. This was identified during noise monitoring where the catchment areas were influenced by nearby and distant traffic noise and industry. The monitoring location was considered as having an 'urban hum'. These descriptions of the background levels are consistent with the description applied to urban environments in the INP.





Figure 16: Sensitive receiver locations in proximity to Illawarra Modal Transfer Facility.

(a) Monitoring

The existing acoustic environment was characterised by a combination of long term and short term noise measurements.

Background noise monitoring was undertaken in the suburb of Port Kembla from 19 November to 29 November 2016. The unattended background noise monitoring was carried out at the location shown on Figure 16 during this monitoring period.

Short term (attended) noise measurements were also carried out over a 15 minute period at the background monitoring location on Wentworth Street.



Noise monitoring indicated an urban noise environment influenced by industrial, traffic and train noise sources. Noise levels followed typical diurnal patterns with increased levels of traffic and community noise influence during the day time hours and lower ambient noise levels during the night time hours. Traffic noise was the primary influence on the L_{Aeq} noise descriptor. Industrial noise was audible at the logging location in the background during lulls in existing traffic noise.

The L_{A90} noise level recorded during the logging period can be considered as an estimate of constant industrial noise sources from industry in the local area. This is because traffic noise is the primary contributor to the L_{Aeq} descriptor.

(b) Assessment Criteria

Operational and Construction Noise

The project specific noise levels (PSNL) for the Proposal are presented in Table 16. The operational PSNL are based on the requirements of the INP and the project specific construction noise management levels are based on the requirements of the INCG.

Receiver/Land Use	Descriptor	Operation dB(A)	onal Noise	Criteria,	Construction Noise Management Level, dB(A)
		Day	Evening	Night	Standard Hours Monday to Friday 7am to 6pm Saturday 8am to 1pm
Residential (NCA A) Intrusive	L _{Aeq} , 15min	55	52	48	60
Residential (NCA A) Amenity	L _{Aeq, 15min}	60	44	37	
Commercial	L _{Aeq, 15min}	65	65	65	70
Industrial	L _{Aeq, 15min}	70	40	70	75

Table 16: Project specific noise levels

* External noise level based on an outside to inside correction of 10 dB(A), in accordance with the INP

In accordance with the World Health Organisation (WHO) guidelines for Community Noise (1999), the sleep disturbance criteria of L_{Amax} 55 dB(A) has been used for this Proposal.

At existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, the RNP states that any increase in the total traffic level should be limited to 2 dB above the road traffic noise level without the development. The RNP application notes states that this limit should be applied wherever the noise level without the development is within 2 dB of or exceeds the noise assessment criterion.

Vibration

Impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives



6.3.4. Potential impacts (Illawarra Modal Transfer Facility)

(a) Construction phase

The duration of the site preparation works for the Proposal is estimated to be three to four weeks. The site preparation works required would include:

- Access gate Improvements boom gate installation;
- Signage and road Improvements internal to the CRM site minor works;
- Excavation of pit for the rail unloading equipment; and
- Transfer and installation of unloading equipment to site.

Activities proposed for the site preparation works would involve excavations, foundation construction, and heavy vehicle haulage of equipment.

For noise assessment purposes the construction stages are:

- Scenario 1: Access route improvements and excavation; and
- Scenario 2: Transfer and installation of unloading equipment to site.

The indicative equipment that would be used in each modelling scenario is; excavator, roller and road trucks for Scenario 1 and a crane and road trucks for Scenario 2.

All construction activities are anticipated to be complete between the recommended standard hours: Monday to Friday 7am to 6pm and Saturday 8am to 1pm. No work on Sundays or Public Holidays.

Construction Noise Modelling Results

The noise modelling results for all receivers are shown in Table 17. Results show that for both construction scenarios, construction noise levels at the all sensitive receivers would be below the noise management criteria.

No receivers are predicted to be highly noise affected (noise levels of 75 dB(A) or above) for the construction scenarios modelled.

Sensitive	Criteria	Predicated Noise Le	vel L _{Aeq,15min} dB(A)
Receiver	L _{Aeq} , _{15min} dB(A)	Scenario 1	Scenario 2
NCA A			
R1	60	36	25
R2	60	36	26
R3	60	34	27
R4	60	35	28
R5	60	35	27
R6	60	36	27
R7	60	40	28
R8	60	39	27
R9	60	40	26

Table 17: Predicted Construction noise levels



Sensitive	Criteria	Predicated Noise Le	vel L _{Aeq,15min} dB(A)
Receiver	L _{Aeq} , _{15min} dB(A)	Scenario 1	Scenario 2
R10	60	35	26
R11	60	35	27
R12	60	35	30
R13	60	34	31
R14	60	34	31
R15	60	34	31
Industrial			
116	70	38	32
Commercial			
C17	70	35	31

Construction Vibration Results

Construction vibration impacts are not expected at any residential locations. Short term vibration impacts from excavation and compaction may need to be considered during earthworks for the rail load out plant.

Based on the Construction Noise and Vibration Guidelines (RMS 2016) it is anticipated that the construction works can occur up to 5 metres from buildings and comply with safe working distances for sensitive receivers.

(b) Operational phase

The noise impact modelling has assumed a conservative 15 minute scenario representative of the proposed operations. To represent the most accurate operational activities on the site a number of scenarios have been developed:

The modelled scenarios have been assessed for day, evening and night time periods:

- Scenario 1: Trucks entering the site and loading from surge stockpile; and
- Scenario 2: Unloading train.

The SPL/SWLs used in the operational noise assessment are presented in Table 18.

Item	Overall SWL dB(A)	Units, Scenario 1	Units, Scenario 2
Trucks on access road	106	7	-
Truck Idling	95	4	7
Dumping spoil	102	-	1
Front end loader	104	1	1
Excavator	104	1	1
Train locomotive low speed	102	-	1

Table 18: Modelled Sound Power Levels



Item	Overall SWL dB(A)	Units, Scenario 1	Units, Scenario 2
Locomotive idling	100	-	1
Conveyors	79/m	-	3
Conveyor drives	98	-	3

During train unloading operations the primary noise sources are the locomotives, including through wagon bunching. To represent unloading conditions it has been assumed that the locomotives would be idling for 50 percent of the time and moving at a low speed for the remaining 50 percent of time.

Operational Noise Modelling Results

Predicted noise levels for all receivers are presented in Table 19 for Scenarios 1 and Scenario 2. The resulting noise contours plots are provided in Appendix A.



Table 19: Predicted operational noise levels

Receivers Scenario 1 Predicted Noise Level LAeq, 15min dB(A)			Scenario 2 Predicted Noise Level _{LAeq} , 15min dB(A)				Scenario 2 Predicted Noise Level _{LAeq} , 15min dB(A)			
	Day		Evening/Night		Day		Evening/Night		Evening/Night	
	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing
NCA A										
PSNL	55	55	44/37	44/37	55	55	44/37	44/37	55	55
R1	27	31	28	32	42	43	42	43	42	44
R2	27	31	28	32	41	42	41	42	42	44
R3	28	32	29	33	41	42	41	43	42	44
R4	29	33	29	33	42	44	42	44	43	45
R5	28	32	28	32	43	44	43	44	43	45
R6	28	32	29	33	43	45	43	45	44	46
R7	29	33	30	33	44	46	44	46	45	47
R8	29	32	29	33	44	46	44	46	45	47
R9	29	33	30	33	43	45	44	45	44	46
R10	29	33	29	33	40	42	40	42	42	44
R11	29	33	30	34	40	42	40	42	42	46
R12	31	35	31	35	42	44	42	44	43	46
R13	32	36	32	36	41	43	41	43	43	46
R14	32	36	32	37	41	43	41	43	43	46
R15	32	36	33	37	40	42	40	43	43	46
Industrial										



Receivers	Receivers Scenario 1 Predicted Noise Level LAeq, 15min dB(A)			Scenario 2 Predicted Noise Level _{LAeq} , 15min dB(A)				Scenario 2 Predicted Noise Level _{LAeq} , 15min dB(A)		
	Day		Evening/Night		Day		Evening/Night		Evening/Night	
	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing	Neutral	Noise Enhancing
PSNL	70	70	70	70	70	70	70	70		
116	32	36	33	37	46	47	46	47		
Commercial										
PSNL	65	65	65	65	65	65	65	65		
C17	31	35	32	35	42	44	42	45		

Results exceeding the evening residential criteria are presented as **bold**, noise levels exceeding the night time criteria are shaded grey



Modelling results indicate noise levels from Scenario 1 were below the noise management criteria for day, evening and night time periods for all residential receivers.

Scenario 2 results indicate potential noise exceedance at residential receivers during the evening and night time period. Review of the noise model source contributions indicate that the locomotives are the primary noise source contributing to the noise exceedances. The locomotives when operating off idle at lower notch (lower speed) settings can also potentially result in an annoying low frequency noise impact which would require a 5 dB penalty as per the INP. The 5dB penalty relates to the addition of 5dB to the predicted noise levels due to the type of noise being emitted. A summary of the Scenario 2 results are presented in Table 20.

The predicted maximum noise level results at the sensitive residential receivers are presented for Scenario 2 in Table 20, and were below the sleep disturbance criteria at all residential receivers.

Operational Vibration

No significant operational vibration sources are anticipated to impact on the nearest residential areas from operations at the facility.

Road Traffic Noise

The Illawarra Modal Transfer Facility is expected to generate heavy vehicle movements to and from the site with the collection of fill material and return of empty trucks. The projected heavy vehicle trip generation resulting from operation of the Proposal are:

- Early morning: 85 truck movements;
- Midday: 85 truck movements; and
- Late afternoon; 85 truck movements.

Heavy vehicle movements are expected to occur at a constant rate throughout the three by three hour shifts.

The assessment has modelled the impact to account for the maximum number of vehicles on Five Islands Road during the daytime and night time periods.

A summary of the existing traffic volumes on the Five Islands Road is provided in Table 20.

	Day time 7 a	am – 10pm	Night Time 10pm – 7am		
Road Section	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles	
Five Islands Road East Bound	14,115	978	2,069	143	
Five Islands Road West Bound	16,153	934	2,980	172	

Table 20: Existing Traffic Movements

Traffic volumes associated with the Proposal have been added to the existing traffic volumes listed and the traffic noise impacts calculated utilising the method described in Section 6.1. No additional road network traffic growth has been included giving a conservative estimate of traffic noise increase.

A review of predicted increase in traffic noise level shows that the predicted worse case in total traffic noise level increases as a result of the Proposal for the maximum anticipated traffic flow scenario would increase existing levels by less than 1 dB which is below the 2 dB



relative increase criteria. Therefore, traffic noise increases associated with the proposal are considered to be acceptable.

Mitigation measures recommended in Section 6.3.5 would ensure noise emission levels are minimised and managed appropriately to reduce potential impacts on the surrounding residential receivers.

6.3.5. Mitigation measures

Noise management is required to ensure that the Proposal operates within the criteria and to reduce the potential for increased noise emissions to occur. A Noise Management Plan (NMP) would be developed for both the Sydney and Illawarra modal transfer facilities to ensure potential impacts are mitigated.

Detailed Design

Operational noise modelling would be undertaken during the detailed design phase of the Proposal for the Chullora site to ensure that adequate mitigation measures are included in the design. Based on the above assessment it is believed that acceptable noise levels can be achieved.

Construction Noise and Vibration Management

Construction noise should be effectively managed to minimise potential impacts. This would include development of noise and vibration management requirements within the NMP prior to commencement of works onsite. This would utilise more detailed information in relation to the proposed construction methodology, activities, durations and equipment type and numbers.

It is envisaged that the NMP would consider the following, at a minimum, in accordance with the Construction Noise Strategy (TfNSW, 2016):

- The nearby residences and other sensitive land uses;
- The noise management levels identified in this assessment;
- Address the potential impact from the proposed construction methods through the use of strategies including:
 - Construction would be carried out during standard working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods;
 - Orientating noise emitting plant away from sensitive receivers and locating louder machinery away from sensitive receivers where possible;
 - Use quieter and less vibration emitting construction methods where feasible and reasonable;
 - Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site;
 - A monitoring program to assess performance against relevant noise and vibration criteria; and
 - Construction works can occur up to 5 metres from buildings and comply with safe working distances for sensitive receivers.



- Develop reactive and proactive strategies for dealing with any noise complaints including:
 - Notification of nearby receivers; and
 - Set up the use of a complaints hotline
 - o Identify a site contact person to follow up complaints.

Operational Noise and Vibration Management

An Operational Noise and Vibration Review is to be undertaken during detailed design to ensure that potential impacts arising during operation are identified and mitigated to the largest extent possible. To minimise noise impacts during operations the following measures are recommended:

- Ensure plant and equipment are selected and maintained to achieve the sound power levels outlined in the acoustic assessment report;
- Use non-tonal reversing alarms in place of traditional beeper reversing alarms;
- Route material trucks through the load area in a forward direction only;
- Ensure plant and equipment is well maintained and not generating excessive noise;
- Avoid the use of horns and alarms;
- Trains shall be powered off when not in use;
- Use of material to construct a noise barrier berm to shield receivers to the south of the Illawarra Modal Transfer Facility site. This mitigation measure has been incorporated into the noise modelling; and
- Where possible night time unloading of material at the Illawarra Modal Transfer Facility should be avoided.

Road Traffic Noise Management

The road traffic assessment did not identify any significant increase to the existing traffic noise levels. However in order to manage noise from road traffic associated with the Proposal, road traffic noise management should also be included as part of an OEMP. These management plans would identify routes associated with the Proposal.

Measures to assist in the management of road traffic noise should include staff and contractor education and training of road traffic noise impacts during site inductions for both the construction and operational phases of the Proposal. The education should include educating drivers on appropriate driving behaviours to minimise noise generation. This would include adhering to posted speed limits, turning off the engine when not in use and avoiding aggressive acceleration and driving styles.

6.4. Indigenous heritage

A desktop assessment was undertaken of the Proposal sites to determine the level of heritage significance at the site and to determine any potential impacts to indigenous heritage as a result of the proposed works. The desktop investigation was undertaken in accordance with the "Due diligence code of practice for the protection of Aboriginal Objects in New South Wales" (DECCW, 2010) and the "Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW" (OEH, 2011b).



6.4.1. Existing environment (Sydney Modal Transfer Facility)

The proposed Sydney Modal Transfer Facility is located within the existing Sydney Trains Chullora Rail Yard, a highly modified industrial complex which is frequently used for the operation and maintenance of heavy machinery such as trains. The proposed loading and surge pile areas are defined mostly by large flat areas with evidence of the area being used for storage of rail related equipment. The access road is an existing, formalised road and all vegetation has been cleared from the site. The frequency of tyre tracks identifiable across the areas in current aerial imagery suggests a frequent current use of the area by a range of heavy vehicles.

A search of the Aboriginal Heritage Information Management System (AHIMS) for the site (including a 50 metre buffer) was undertaken on the 20 December 2016 and is included in Appendix 8. The search indicated that there are no listed Aboriginal sites or places registered in or near the search location. Based on these results and in consideration of the highly modified nature of the site, as well as the low level of ground disturbance required for the works, the potential for the occurrence of sites or objects of Aboriginal heritage significance occurring within the site is considered to be low.

6.4.2. Existing environment (Illawarra Modal Transfer Facility)

The proposed Illawarra Modal Transfer Facility is located within the BlueScope Steel CRM Site, which is within the wider Port Kembla Port precinct, which is also highly modified. The Port precinct has a long history of heavy industrial use dating back to the 1920's with the site likely developed through the emplacement of fill to level the site.

A search of the AHIMS for this site (including a 50m buffer) was undertaken on the 20 December 2016. The search indicated that there are no listed Aboriginal sites or places registered in or near the search location. Based on these results and in consideration of the highly modified nature of the site, the potential for the occurrence of sites or objects of Aboriginal heritage significance occurring within this site is also considered to be low.

6.4.3. Potential impacts

(a) Construction phase

Based on the low potential for sites or places of Aboriginal significance at either of the Proposal sites, the potential for impact as a result of the construction works is considered to be low. However, in accordance with Section 87(2) of the *National Parks and Wildlife Act 1974*, an unexpected find protocol has been included within the mitigation measures for the Proposal, in the event a site or object is encountered during construction.

(b) Operational phase

Due to the nature of the proposed activity, the operational phase of the Proposal is not anticipated to impact on any Aboriginal items, sites or conservation areas.

6.4.4. Mitigation measures

The following mitigations measures are proposed:

• All construction staff would receive basic training in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to both the Aboriginal



and non-Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites; and

• If unexpected Aboriginal objects or sites are located during works, all works must stop in the vicinity of the find, and the Transport for NSW environmental representative would be notified who would then notify other relevant parties including OEH, the Local Aboriginal Land Council (LALC) and an archaeologist. Works would not recommence at the location until notification is provided by the Transport for NSW environmental representative. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit (AHIP) would be obtained before works recommence.

6.5. Non-indigenous heritage

The non-indigenous heritage significance of both sites was considered as part of this assessment.

As the wider Chullora Railway Workshop precinct is identified as containing a number of items of heritage significance a heritage assessment and statement of heritage impact was prepared by Biosis (2016) for the UGL site (refer Appendix 5). This report, in combination with a desktop assessment were considered appropriate to assess the impacts at the Eastern Siding site.

The Illawarra Modal Transfer Facility is located within a cleared area adjacent to the BlueScope Steelworks and has been assessed by Biosis through a desktop review.

6.5.1. Existing environment (Sydney Modal Transfer Facility)

The Chullora Railway Workshop precinct contains railway workshops developed within the early 1900's. These workshops played a role in the conversion of the rail industry from steam to electric propulsion and required overhaul of the rail infrastructure to support this change. The development of the Chullora workshops was originally put on hold in 1920 due to World War I, with construction officially completed in 1926.

The outbreak of World War II saw the conversion of the site to military uses such as aircraft manufacturing, tank assembly and the development of base plates for use in artillery shells. At the end of World War II, the workshops returned to being used for railway purposes. The workshops were progressively closed in the latter half of the 20th century and in the mid 1980's the workshops were divided into four maintenance centres.

A search of the following heritage databases was undertaken to determine the presence of heritage items and places within the Chullora Rail Yard:

- National Heritage List (NHL);
- Commonwealth Heritage List (CHL);
- State Heritage Register (SHR);
- Section 170 Registers;
- Bankstown, Auburn and Strathfield LEPs;
- National Trust of Australia; and
- Register of National Estate (RNE).



With exception of the RailCorp Section 170 Register, the search did not yield any results within the Chullora Rail Yard. The proposed works are not located within the s170 heritage curtilage, however the access road runs adjacent to the boundary. A number of local and state listed items were recorded in close proximity to the rail yard. The heritage items in the vicinity of the site are shown on Figure 3 and summarised in Table 21.

Table 21: Details of heritage listed items located in the Chullora Rail Yard and surrounding area

Place Name	Address	Listing	Distance and Direction
Chullora Railway Workshops	Beaufort Place, Chullora	RailCorp Section 170 Heritage and Conservation Register	Adjacent to proposed works location within Chullora Rail Yard
Site of 'Royal Arms Inn' (A2)	2–2A Hume Highway, Chullora	Bankstown LEP 2015	70m to the south west
Rookwood Cemetery and Necropolis (00718)	Bounded by East and Railway Streets	Auburn LEP 2010 State Heritage Register	550m to the north west
Pressure Tunnel No 1 and associated infrastructure	189 Rockwood Road, Chullora	Bankstown LEP 2015 State Heritage Register	350m to the west

A Conservation Management Plan (CMP) has been prepared for the Chullora Rail Yard. The CMP identifies a number of heritage items for the 'Chullora Railway Workshop' heritage item. The items are located within the 'Locomotive Workshop Precinct' curtilage as defined by the CMP. These items are shown on shown on Figure 3 and include:

- 16 Office Building;
- 17 -Training Room;
- 18 Locomotives Store Building (Igloo);
- 19 Stores Building;
- 20 Locomotive Workshop;
- 21.2 Aircraft Annex (East);
- 22 Tank Annex;
- 32 Admin Building (demolished);
- 33 Cafeteria (Demolished);
- F39 Bowling Green;
- F43 Avenue of Mature Trees (Adjacent to Loco Yard);
- F46 Loco Yard; and
- F50 Locomotive Workshop Gardens (East and West).



Four sites: 21.2 - Aircraft Annex (East); F43 Avenue of Mature Trees; F46 - Loco Yard and F50 Locomotive Workshop Gardens (East and West) are located along the proposed haul road into the southern and northern loading areas.

6.5.2. Potential impacts (Sydney Modal Transfer Facility)

(a) Construction phase

An assessment of the potential impacts to the heritage of the area is provided in Table 22.

Site	Impact			
21.2 - Aircraft Annex (East)	No impacts are anticipated to this building.			
F43 - Avenue of Mature Trees	No impacts are anticipated as vegetation clearing and trimming is not required for the Proposal. However, if it is determined that vegetation trimming or removal is required			
F50 - Locomotive Workshop Gardens (East and West)	additional approval from the Transport for NSW environmental representative would be required.			
F46 - Locomotive Yard	The Proposal would utilise the existing haul road which traverses through the locomotive yard. As this road is currently used for heavy vehicles, additional impacts to this heritage item are not anticipated.			

Table 22: Proposed impacts to heritage items within the study area

The proposed works are unlikely to have a negative impact on the overall heritage significance of the Chullora Railway Workshops.

(b) Operational phase

Due to the primary changes to the site occurring within the construction phase, operational impacts are expected to be negligible. Site operators would be made aware of the heritage sensitives of the site and works outside the Proposal footprint would be prevented to ensure ongoing impacts do not occur. It is noted that the Proposal would result in the adaptive reuse of the site for rail receival yards, a purpose that this area was originally intended for, which helps to retain the ongoing use and maintenance of the site.

6.5.3. Existing environment (Illawarra Modal Transfer Facility)

The Illawarra Modal Transfer Facility is located within a cleared area adjacent to the BlueScope Steelworks and has been assessed by Biosis through a desktop review.

A search of the relevant heritage databases identified that the Illawarra Modal Transfer Facility is listed under Section 31 of the *State Environmental Planning Policy (Three Ports) 2013* as the Commonwealth Rolling Mill Plant and Gardens (CRM) (Lot 1 DP190251). The item is identified as possessing a local level of significance as an "*excellent and rare example of Art Deco factory architecture*". No other heritage items were identified in database searches.

The former rolling mills, office building and gardens were constructed in the late 1930s. There is limited information concerning the item which is contained within its listing on the NSW Heritage Inventory, therefore the following history has been sourced from Hoogendoorn (1999). The rolling mills were constructed by John Lysaght and opened on 24 April 1939. The mills supplied the United Kingdom with 41,000 tons of galvanised sheets of

sufficient steel to construct the 125,000 shelters required to provide emergency housing after the blitz on London. The mills also produced sheet metal during the Second World War for car bodies, non-magnetic armour for the Royal Australian Navy, portable aircraft hangars, tank parts and the Owen gun.

Following the war production became more domestically orientated with sheet metal being produced for electrical appliances, car bodies, fencing and roofing. During the post war years the CRM plant was upgraded through the installation of cold reduction mills which significantly increased production to half a million tonnes annually by 1958. The mills became integrated into the Flat Products Division of BHP Steel and by the mid 1900's, much of its production had been taken up by other parts of the Port Kembla works, with other groups such as BHP Transport moving into the buildings and warehouses.

6.5.4. Potential impacts (Illawarra Modal Transfer Facility)

An assessment of the potential heritage impacts resulting from the Proposal has been undertaken and is discussed below.

(a) Construction phase

Areas which may be impacted include the rail siding constructed c.1918 and 1943 which is traversed by the access track. As this access track is already existing and would merely be formalised by the proposal, additional impacts to those existing are considered negligible. The proposed access is also located in close proximity to the northern elevation of one of the former Rolling Mills. The former office building and other warehouses are located away from the proposed development and would not be impacted.

Given that the impacts from the development are situated away from the main CRM buildings, no impact to the architectural significance of the listed item is expected to occur. The only potential impacts are to a small section of the railway siding and visual impacts to views from the northern and western portions of the CRM site. This is anticipated to be negligible, and reversible and the proposed changes are consistent with the original usage.

(b) Operational phase

Due to the primary changes to the site occurring within the construction phase, operational impacts are expected to be negligible. Site operators would be made aware of the heritage sensitives of the site and works outside the Proposal footprint would be prevented to ensure ongoing impacts do not occur.

6.5.5. Mitigation measures

To ensure the sites cultural significance is retained through the reuse of the site, the following mitigation measures would be employed:

- Impacts to the Avenue of Mature Trees and the Locomotive Workshop Gardens at the Chullora Rail Yard would be avoided to preserve them in their current setting. However, if the trimming or removal of vegetation is required, additional approval from the Transport for NSW environmental representative would be required, and would be undertaken in accordance with the Conservation Management Plan;
- A site inspection and archival record shall be undertaken during detailed design for the Proposal to identify any physical remains requiring mitigation and record changes to aesthetic impacts to the CRM site. The archival recording is to include information collected prior to construction and at the completion of the Proposal;



- All workers would be provided with an environmental induction prior to commencing work on-site to be made aware of the heritage sensitives of the site;
- Avoid direct impacts where possible to elements of heritage significance identified during the site inspection;
- No works or activities are to occur outside of the Proposal site, or which may impact on heritage items without prior consultation with a heritage specialist regarding the potential impacts of this work and approval from Transport for NSW. Works outside the Proposal footprint would be prevented by delineation of the works area;
- If previously unidentified non-Indigenous heritage/archaeological items are uncovered during construction works, all works in the vicinity of the find shall cease, the Transport for NSW environment manager notified, and appropriate advice shall be sought by from a suitably qualified heritage consultant (and in consultation with the OEH Heritage Branch where appropriate). Works in the vicinity of the find shall not re-commence until clearance has been received from the heritage consultant.

6.6. Socio-economic impacts

A socio-economic assessment has been undertaken to gain an understanding of the potential social and economic impacts arising from the construction and operation of the Proposal. The assessment included consideration of the existing social environment, identifying potential impacts from the construction and operation of the Proposal. These potential impacts include noise, air quality, traffic, water quality and visual.

The existing social and economic environment in the vicinity of the Proposal relates to the wider Chullora region comprising the Canterbury-Bankstown and Strathfield LGAs; and the Illawarra region, comprising the Wollongong and Shellharbour LGAs. The demographic and economic characteristics of these areas are discussed below.

6.6.1. Existing environment

(a) Sydney Modal Transfer Facility – Canterbury-Bankstown LGA

The combined Canterbury-Bankstown LGA had a population of 335,940 at the 2011 census, with the council projecting the population to grow in the area by 15.81% over the next 20 years (Australian Bureau of Statistics, 2011).

The existing population profile of the Canterbury-Bankstown LGA is defined by a younger population compared to the NSW average, with a median age of 31 for the area in 2011, compared to the NSW median age of 37.6. This younger population is evident in the 2011 population profile, with 13.7 percent of the area's population aged 60 or older, compared to the NSW average of 20.37 percent. Younger generations aged 20 to 39 years are in greater numbers than the NSW average, with this age bracket containing 33.2 percent of the area's population, compared to the NSW average of 27.17 percent.

The major industries in the area include manufacturing, retail, health and social assistance.

(b) Illawarra Modal Transfer Facility – Illawarra Region

The Illawarra Region had a population of 385,250 people at the 2011 Census, with population predictions from Department of Planning and Environment (DP&E) identifying that the Region would grow by 65,050 people by 2031. This represents a population growth rate of 0.86 percent per annum.



The existing population profile of the Region is defined by an older population compared to the NSW average, with the median age of the region at 38.5 in 2011, compared to the NSW median age of 37.6. This older population is evident in the 2011 population profile, with 24.12 percent of the Region's population aged 60 or older, compared to the NSW average of 20.37 percent. Younger generations aged 20 to 39 years are less represented compared to the NSW average, with this age bracket containing 23.73 percent of the Region's population, compared to the NSW average of 27.17 percent.

DP&E has identified that to support the predicted growth of 65,050 people, the Region would need to create 32,150 new jobs up to 2031. DP&E in 2014 noted that jobs growth in the Illawarra has been slowing over the past 10 years, with growth rates at 1.7 percent per annum. A primary cause of this declining jobs growth has been the reduction of traditional industrial jobs, with many of these located in industries directly linked to the port of Port Kembla. Despite this, the *Draft Illawarra Regional Growth and Infrastructure Plan* (DP&E, 2014) and subsequent *Illawarra Shoalhaven Regional Plan* (DP&E, 2016) identified the Port as one of the main economic drivers of the Region moving forward. Other growth industries included health care and social assistance, tourism, education and ICT and knowledge services.

6.6.2. Potential impacts

(a) Construction phase

The construction phase of the Proposal has the potential to result in short term socioeconomic impacts on the surrounds by way of increased truck and plant movements leading to increased noise and congestion, as well as reduced air quality and visual amenity. The modal transfer facilities are located within industrial areas, with a commensurate level of amenity. Furthermore, the construction works are consistent with existing and historic logistics and intermodal activities within the area. The short duration of construction (approximately three to four weeks) in conjunction with the local context and the implementation of mitigation measures ensures that while there would be impacts resulting from construction, these impacts are acceptable. The mitigation measures identified by the individual assessments undertaken throughout Section 6 are consolidated in Section 7.2.

The construction phase would result in economic benefits for both the Sydney and Illawarra regions through short term job creation and would positively contribute to road safety.

(b) Operational phase

The operational phase of the Proposal has the potential to result in socioeconomic impacts on the surrounds by way of increased truck and rail movements leading to increased noise and congestion, as well as reduced air quality and visual amenity. These impacts would be partially mitigated by the location of the modal transfer facilities within industrial areas, with a commensurate level of amenity. Furthermore, the intermodal use is generally consistent with existing and historic activities within the area.

The implementation of mitigation measures ensures that while there may be impacts resulting from the Proposal, these impacts are acceptable. The mitigation measures identified by the individual assessments undertaken throughout Section 6 are consolidated in Section 7.2.

The operations would result in economic benefits for both the Sydney and Illawarra regions through on going job creation within industrial areas that are underutilised. The creation of job opportunities is particularly beneficial to the Illawarra Region, which has undergone a period of decline in manufacturing employment. The Proposal is consistent with the *Draft*

Illawarra Regional Growth and Infrastructure Plan (DP&E, 2014) and subsequent *Illawarra Shoalhaven Regional Plan* (DP&E, 2016), which identifies the Port as one of the key current and future economic drivers of the region.

The significant reduction in the truck distance travelled to remove material from the M4 WestConnex sites would result in economic and social benefits through reduced congestion, improving the efficiency of the road network, reducing stress associated with traffic congestion, while reducing journey times with potential productivity and worker and road safety benefits.

6.6.3. Mitigation measures

Specific mitigation measures associated with socioeconomic impacts are not proposed, with the mitigation measures identified within Section 7.2 appropriate to address the wider impacts.

6.7. Biodiversity

The Sydney Modal Transfer Facility site was assessed for the potential to impact biodiversity by reviewing the Atlas of NSW Wildlife, (accessed: 6 June 2017) and regional scale vegetation mapping (*The Native Vegetation of the Sydney Metropolitan Area*, Version 3, OEH 2016). In addition, an ecological assessment with a field survey was conducted for the UGL site, adjacent to the Eastern siding site (EcoPlanning 2016, Appendix 6).

The Illawarra Modal Transfer Facility site was reviewed through the use of the NSW Wildlife Atlas, regional scale vegetation mapping and the use of existing ecological information for the subject site provided by BlueScope.

A review of the existing Green and Golden Bell Frog (GGBF) Management Plans for the areas was also undertaken (DECC, 2007 and BlueScope, 2017).

This desktop level of assessment was undertaken at the sites due to the expectation that no vegetation removal would occur at either location.

6.7.1. Existing environment (Sydney Modal Transfer Facility)

A review of the Atlas of NSW Wildlife identified 36 threatened species within a five kilometre radius of the subject site including 22 fauna and 15 flora species. The closest faunal records to the subject site were the Grey-headed Flying-fox which is listed as vulnerable under the TSC Act and EPBC Act, and GGBF which is listed as endangered under the TSC Act and vulnerable under the EPBC Act. The closest flora records to the subject site were the Tadgell's Bluebell (*Wahlenbergia multicaulis*) which is listed as an endangered population, and Downy Wattle (*Acacia pubescens*) which is vulnerable under the TSC Act and EPBC Act. No threatened species have been identified or considered likely to occur within the subject site.

Site surveys taken adjacent to the Eastern Siding site identified that most of the vegetation at the Chullora Rail Yard consisted of planted trees and shrubs, either growing in strips of grassland or in garden beds and in containers. Common species consisted of introduced and non-endemic natives (refer Appendix 6). Two threatened species were identified, *Eucalyptus scoparia* and *Eucalyptus nicholii*, however these are not indigenous to Sydney and did not require further impact assessment as planted individuals are not protected under the *National Parks and Wildlife Act 1974* in accordance with clause 118(e).



Whilst the Proposal would only be situated on cleared/disturbed lands, a small patch of vegetation is located in the centre of the Eastern Siding site, at the disused bridge structure (refer Figure 5). The vegetation is mapped as 'urban exotic' and does not constitute an endangered ecological community (EEC). A small patch of Castlereagh/Cooks River Ironbark Forest is mapped adjacent to the eastern corner of the Eastern Siding site. The vegetation is likely to have self-recruited from propagules from the adjacent bushland. This vegetation is listed as an EEC under the TSC Act and Critically Endangered Ecological Community (CEEC) under the EPBC Act. No threatened plant species were recorded during the field survey undertaken by EcoPlanning (2016).

Fauna habitat at the site is limited to the vegetation in the centre of the site, however it may provide habitat refuge for birds, lizards, amphibians and ground-dwelling mammals. Also, the subject site is located within the GGBF key population of Greenacre area as listed in the TSC Act.

GGBF inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis spp.*). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), has a grassy area nearby and diurnal sheltering sites available. Whilst GGBF habitat occurs in close proximity to the site, the site itself is located on cleared/highly disturbed area away from suitable GGBF habitat. Additionally, it is noted that all the GGBF records in close proximity to the site are from the mid-1960s. Despite this, a range of mitigation measures would be implemented to ensure the protection of the GGBF as outlined below.

6.7.2. Potential impacts (Sydney Modal Transfer Facility)

(a) Construction phase

Given that the vegetation at this site is cleared/disturbed, impacts to flora and fauna would be minor. Through avoiding the use of surrounding vegetated areas and the use of mitigation measures, it was determined that there is no potential for 'significant impacts' and a referral to the Commonwealth Government in accordance with the EPBC Act or a Species Impact Statement under the TSC Act would not be required.

The Proposal CEMP would include mitigation measures to ensure the protection of flora and fauna such as the GGBF in the event that an individual is identified within the site. This would incorporate existing measures outlined in the existing site GGBF management plans, including pre-clearance protocols such as, inspecting spoil dump area for frogs prior to unloading trains; if frogs are found on site they should be left to make their own way away from the works area; if they are impeding works then a qualified handler should be called to remove them offsite to a suitable location etc. Therefore, this species is unlikely to be significantly impacted by the proposal and the preparation of a Species Impact Statement or Referral to the Commonwealth (refer Section 4.4.1) are not required.

(b) Operational phase

The operational phase would be contained within the construction footprint and as such no additional impacts are likely to occur as a result of the proposed works. The project OEMP would include mitigation measures to ensure the protection of fauna such as the GGBF in the event that an individual is identified within the site. Similarly to the construction phase, the current GGBF management plan would be used to inform the OEMP.



6.7.3. Existing environment (Illawarra Modal Transfer Facility)

The Illawarra Modal Transfer Facility site is characterised by a largely cleared area with mostly emergent weedy vegetation such as grass species. A drainage channel is located between the CRM facility and the Proposal site which holds the potential for habitat for faunal species such as amphibians and birds.

A search of the Atlas of NSW Wildlife identified 68 species within a 10 kilometre radius of the site, five flora and 63 fauna. Of these, one record was located within the site, the GGBF. The nearest threatened plant species, *Wahlenbergia multicaulis*, was located approximately two kilometres away from the site.

The site is located within the GGBF key population of Port Kembla area as listed in the TSC Act. Recent records occur in close proximity to the subject site and the drainage line would likely provide suitable habitat for GGBF.

6.7.4. Potential impacts (Illawarra Modal Transfer Facility)

(a) Construction phase

Due to the highly disturbed nature of the site, the proposed construction works are not likely to result in any significant impacts to threatened flora and fauna. No vegetation removal would occur at this location and all activities would be carried out in an area that is cleared and stabilised with crushed rock. No works are proposed within the drainage channel, however due to the potential for GGBF to migrate through this location mitigation measures would be required to ensure the protection of frog habitat and individual species that enter the site.

(b) Operational phase

No additional impacts are likely to occur during operations. As with the construction phase, suitable mitigation measures are required to ensure the protection of fauna in the event fauna interact with the project site. The project OEMP would include mitigation measures to ensure the protection of fauna such as the GGBF in the event that an individual is identified within the site. Similarly to the construction phase, the current GGBF management plan would be used to inform the OEMP.

6.7.5. Mitigation measures (Sydney and Illawarra Modal Transfer Facility)

The following mitigation measures are proposed for the Sydney and Illawarra modal transfer facilities:

- A Fauna Management Plan (FMP) would be developed with consideration of the appropriate existing GGBF management plans to ensure there is no harm to GGBF and other fauna. Mitigation measures may include:
 - Fenced and signposted exclusion zones to prevent access into surrounding habitats;
 - Installation of frog proof fencing were appropriate;
 - Pre-construction surveys;
 - Pre-clearance protocols such as, inspecting spoil dump areas for fauna prior to unloading trucks and trains;



- Response protocol in the event fauna is found within the work area, including a nominated ecologist for the site;
- Frog handling procedure in accordance with guidelines; and
- Where necessary fauna fencing to deter access to the work area.
- All workers would be provided with an environmental induction prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures outlined in the FMP to be implemented to protect biodiversity and penalties for breaches and would be developed in accordance with the appropriate existing management plans;
- No vegetation would be disturbed as part of the Proposal. Should vegetation trimming or removal be required then approval from the Transport for NSW environmental representative would be required;
- If weed species are impacted by the proposed works, removal would be undertaken in accordance with appropriate management standards to avoid their spread within the surrounding area. Weed containment during the construction phase of the project should comprise the management and disposal of the following weeds that are known to occur within the rail corridor:
 - Exotic perennial grasses, such as *Chloris gayana, Melinis repens* and *Pennisetum clandestinum;*
 - Exotic vines, such as Asparagus aethiopicus, Asparagus asparagoides, Hedera helix, Ipomoea indica and Tradescantia fluminensis; and
 - Noxious weeds of Adenophora, Tenuifolia, asparagoides, Lantana camara and Rubus fruticosus, in accordance with the Noxious Weeds Act 1993.
- Vehicles and other equipment to be used on site would be cleaned to minimise seeds and plant material entering the site to prevent the introduction of further exotic plant species.

6.8. Contamination, landform, geology and soils

6.8.1. Existing environment

(a) Contamination

The assessment of contamination at each modal transfer facility was based upon a desktop review of information readily available from the internet and information provided by representatives from each site (where available).

Sydney Modal Transfer Facility

The Sydney Modal Transfer Facility is situated in a predominantly industrial setting and therefore it is likely that residual legacy contamination associated with historic site use exists in soil and/or groundwater beneath the site.

Environmental reports relevant to the Sydney Modal Transfer Facility were unavailable at the time of this assessment so the specific nature of contamination (if any) is not known. However, contamination risk associated with previous industrial activities at the site and railway corridors would be typical of industrial, railway corridors. Common sources of contaminants in these sorts of areas include asbestos, petroleum hydrocarbons and heavy metals. These contaminants may be present at the site as a result of historic rail activities.



Due to the nature of the proposed works, which involves minimal ground disturbance, within the context of the potentially low levels of common contaminants, the site is considered suitable for the Proposal. Contamination testing should take place during the geotechnical testing to determine appropriate control measures during construction and operation.

Illawarra Modal Transfer Facility

The Illawarra Modal Transfer Facility is situated on land historically utilised for heavy industry and therefore it is likely that residual legacy contamination associated with historic site use exists in soil and/or groundwater beneath the site. The site is owned by Bluescope Steel and operates under EPL 397 which permits metal coating and waste storage, including hazardous, restricted solid, liquid, clinical and related waste and asbestos waste.

It is understood that the site has undergone substantial historic environmental assessments including assessment and remediation of contamination. A representative from Bluescope Steel provided information pertaining to a groundwater monitoring well, CRM 28, which is located approximately 90 metres north-west of the area of interest for this project. Key information provided by Bluescope Steel is summarised below:

- Groundwater well CRM 28 was installed on 14/01/2015;
- Groundwater is expected to exist between 2 to 5 metres below ground level;
- Notification triggers were exceeded for soil samples from this location including zinc (140 mg/kg) and fluoride (170mg/kg); and
- Notification triggers were exceeded for groundwater samples from this location including copper (0.002mg/l) and nickel (0.008mg/l).

In addition to the contamination risk associated with previous and current heavy industry activities at the site, railway corridors are also common sources of contaminants including asbestos, petroleum hydrocarbons and heavy metals. These contaminants may be present at the site as a result of historic rail activities.

Whilst the information provided does indicate the presence of contaminants including heavy metals, the data was collected from a location that is a considerable distance from the area of interest for the Proposal. The soil and groundwater conditions may differ between the two locations and as such contamination testing at the Illawarra Modal Transfer Facility is recommended.

Due to the nature of the proposed works within the context of the potentially low levels of common contaminants, the site is considered suitable for the Proposal. Contamination testing should take place during the geotechnical testing to assess the potential risk posed to environmental and human receptors and determine appropriate control measures during construction and operation.

(b) Landform, geology and soils

Sydney Modal Transfer Facility

The 1:100 000 Sydney Basin geology map 9130 (NSW Department of Mineral Resources 1983) indicates that the surface geology of the study area primarily consists of Bringelly Shale of the Wianamatta Group, specifically comprising of shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone and rare coal. The map indicates that the Bringelly Shale is underlain by Hawksbury Sandstone which comprises medium to coarse-grained quartz stone, very minor shale and laminite lenses.



The Australian Soil Resource Information System indicates that the Sydney Modal Transfer Facility is situated in an area with no known occurrence of acid sulfate soils (ASS).

The Sydney Modal Transfer Facility is situated within Western Sydney and consequently it is possible that soils at the site are impacted by salinity.

Illawarra Modal Transfer Facility

The 1:100 000 Wollongong-Port Hacking geology map 9029-9129 (NSW Department of Mineral Resources 1985) indicates the surface geology of the study area primarily consists of quartz and lithic "fluvial" sand, silt and clay.

Wollongong City Council map 450-COM-ASS-010-070507 indicates that the Illawarra Modal Transfer Facility site would be situated on or in close proximity to an area of ASS. The CRM site has an approximate elevation of 5 metres Australian height datum (AHD) and is situated approximately 600 metres from the ocean. Considering the site locality it is highly likely that soils at the site would be affected by ASS or potential ASS (PASS).

Spoil Source Site – M4 East WestConnex

Spoil intended for transport to the Illawarra for reuse would be transported as Virgin Excavated Natural Material (VENM) and would be classified as per the NSW EPA requirements prior to leaving the source site. The VENM would primarily be comprised of tunnel spoil sourced from the M4 East WestConnex project, which is situated in the inner west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield local government areas. The Environmental Impact Statement (EIS) prepared for the M4 East WestConnex project (AECOM and GHD, 2015) notes that the predominant geological group through which the tunnelling work is proposed is characterised by Hawkesbury Sandstone.

Surficial soils at the origin site would not be classified as VENM and consequently would not be subject to haulage as part of the project.

The Environmental Impact Statement (EIS) identifies ASS within the footprint of the WestConnex project, however the ASS is limited to shallower soils and is not expected to pose a risk to virgin rock.

6.8.2. Potential impacts

(a) Construction

Construction activities would comprise formalisation of haulage roads and surge pile areas and the installation of surface equipment including conveyors at both sites. The Illawarra site also requires the construction of a wagon dump which involves a notable amount of excavation (dimensions to be determined during detailed design). With these activities, there is the potential to encounter contamination in the upper ground layers. Management of potentially contaminated spoil would be in accordance with the specified mitigation measures to avoid potential impacts.

Soils at the Illawarra site would need to be tested for ASS to ensure the designed infrastructure is adequate and soils around the infrastructure are treated adequately. If managed in accordance with the mitigation measures, ASS would not present a potential impact as a result of this proposal.

Contamination risk associated with construction is expected to be sufficiently managed through implementation of mitigation measures as described below in Section 6.8.



(b) Operational

The operational aspect of the proposal with respect to potential contamination impacts primarily relate to management of the EPL requirements and VENM classifications, material reconciliation and QA/QC measures which are discussed in Sections 4.1.2, 3.5.6 and 3.5.7, respectively.

A description of the key potential contamination risks associated with the proposal operation are summarised below:

Spoil, classified as VENM as per the NSW EPA definition, is proposed to be excavated from the M4 projects, which would be classified prior to excavation and haulage. Considerate of the VENM classification the spoil itself has a low risk of contamination assuming that an accurate and representative classification has been provided.

One primary source of contamination risk is the cross contamination of the VENM during material handling and haulage. A number of opportunities exist for cross contamination to occur including from residual materials located in the truck and train wagons, contact with uncontrolled ground surfaces during surge piling and from equipment used for loading and unloading. Contamination from these sources would likely be limited to traces of unclassified spoil. Cross contamination impacts can be efficiently managed and avoided through the implementation of the mitigation measures specified in this section. Therefore the potential likelihood and risk from cross contamination is considered low.

Surface contaminants may be present at the surge pile area due to settling of air borne particles from Bluescope activities. As the surge pile area would be covered prior to use and surge piles would be in place for only short periods of time, this is not considered to present an impact to the proposal.

Contamination risk associated with operational activities is expected to be sufficiently managed through implementation of mitigation measures as described below in Section 6.8.3.

6.8.3. Mitigation measures

The contamination risk associated with the Proposal could be satisfactorily managed through implementation of the following mitigation measures:

- During detailed design, a contamination assessment should be completed for soil disturbance associated with construction activities at both modal facilities. The contamination assessment should be completed by a suitably qualified environmental consultant and prepared in accordance with the Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011a) and the National Environment Protection (Assessment of Site Contamination) Measures 1999, as amended 2013 (NEPC, 2013);
- Areas of contamination identified during the proposal requiring remediation should be undertaken in accordance with *State Environmental Planning Policy No* 55 *Remediation of Land (SEPP* 55);
- Any surplus spoil excavated during construction and/or improvements at either modal facility should be assessed for suitability for reuse in accordance with the NEPM (NEPC, 2013). Any material intended for offsite disposal should be assessed in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014);



- The Sydney Modal Transfer Facility is situated on land that may be impacted by salinity. As such, any areas of ground disturbance should be assessed for salinity in accordance with the Site Investigations for Urban Salinity (OEH, 2002);
- The Illawarra Modal Transfer Facility is situated on land that may be impacted by ASS. As such, any areas of ground disturbance should be assessed for ASS in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998);
- The location of temporary surge piles at the Sydney and Illawarra modal transfer facilities could be capped with a layer of material that would reduce the likelihood of cross contamination occurring. A suitable capping layer could be VENM that has been crushed and compacted. At the completion of the facilities useful life, the capping layer would be classified as per the NSW EPA guidance and disposed of offsite at a suitably licenced facility;
- An unexpected finds protocol (UFP) should be developed for the proposal. The UFP would prescribe a procedure for managing unexpected finds of potentially contaminated material and dangerous conditions. Site employees would be educated on the implementation of the UFP;
- An EPL would be issued by the NSW EPA for the operation of the proposal. The proponent should liaise with the EPA to confirm if the EPL would be a modification to existing EPL(s) or a stand-alone Proposal EPL;
- The requirements and conditions provided in the EPL (once issued) would be complied with throughout the proposal;
- A suitable material reconciliation procedure would be developed for the proposal. The procedure should be developed in consideration of Section 3.5.6 and the EPL (once issued).
- Suitable construction and operational QA/QC procedures would be implemented including:
 - VENM spoil should be visually inspected when excavated and loaded into trucks for haulage to the Sydney Modal Transfer Facility and during subsequent movements. Machine operators and supervisors should be competent at identifying indications of contamination such as odours, staining and anthropogenic waste including asbestos;
 - Material suspected of not satisfying the NSW EPA definition of VENM and/or the geological description of the spoil material as provided in the VENM classification report should be segregated in a separate stockpile and classified by a suitably qualified environmental consultant;
 - Temporary surge pile areas are expected to be established at the interchange of spoil transfer mediums at the Sydney and Illawarra modal transfer facilities. A surge pile would be established at the Sydney Modal Transfer Facility when delays occur in the transfer of spoil from truck to train and at Illawarra Modal Transfer Facility when delays occur in the transfer of spoil from train to truck;
 - Surge piles would be established at approved locations only, which would be situated away from potential contamination sources (such as chemical and fuel storage facilities) and potentially sensitive receivers (such as endangered ecological communities and community areas);
 - A procedure would be established to ensure that train wagons are in suitable condition for receipt of VENM at the Sydney Modal Transfer

Facility. A wagon considered to be in suitable condition would be one that does not pose a risk of cross contamination;

- The site supervisor at Sydney Modal Transfer facility should undertake a 'spot check' of wagons prior to loading, for example one in five, to ensure that wagons do not contain significant quantities of residual load that would not satisfy the NSW EPA definition of VENM;
- The logistics coordinator for the proposal should ensure that trains engaged for haulage of VENM spoil have not, on their prior haul, hauled potentially contaminated or contaminating material such as restricted solid waste, hazardous waste or material impacted by acid sulfate soils;
- Wagons that are identified as unsuitable should be appropriately cleaned to eliminate cross contamination risk or excluded from haulage of VENM;
- Plant and machinery, including excavators and loaders, should be inspected prior to use to ensure that the bucket does not contain residual material that would not satisfy the NSW EPA definition of VENM; and
- Wagons that are identified as unsuitable should be appropriately cleaned to eliminate cross contamination risk or an alternate item of plant used.

6.9. Hydrology and water quality

6.9.1. Sydney Modal Transfer Facility

(a) Existing environment

Waterways

The Cooks River is the closest waterway to the Eastern siding site and is located about 250 metres to the north of the proposed works and about 200 metres north of the closest rail movement pathway associated with the proposed activity. The river flows in a south easterly direction before discharging into Botany Bay approximately 16 kilometres downstream. A number of rail sidings and a rail corridor lies between the proposed site and the waterway, thereby acting as a buffer and negating any potential impacts to the waterway as a result of the proposed activity.

As a consequence of the heavily urbanised nature of its catchment, water quality in the Cooks River is relatively poor, which is typical of such catchments. In these environments, higher levels of suspended particulates, dissolved metals, nutrients and faecal indicator bacteria are regularly observed, related to a number of point and non-point pollution sources.

Flooding

A catchment wide flood study was developed by Bewsher Consulting Pty Ltd and BMT WBM Pty Ltd in 2009 for the Greenacre Park stormwater catchment (GPFS). The study was undertaken to assess and define the flood behaviour within the study area under current conditions.

The flood behaviour was assessed using hydrological and hydraulic computer modelling. Sensitivity analyses were carried out to verify the parameters adopted and assumptions made in the development of the hydraulic model. The flood information obtained from the analysis was presented in terms of peak flood depths, levels and velocities for events ranging from the 20 year Average Recurrence Interval (ARI) storm event up to and including



the Probable Maximum Flood (PMF). The GPFS also presents flood risk precincts for the catchment. The GPFS has been used to inform this report.

Flood depths relevant to the subject site are presented in Figure 17 for the 100 year ARI and PMF events. It can be seen that the potential surge pile/staging area and the proposed entry/roadway are inundated in both events. Flood depths in the 100 year ARI event are typically up to 0.5 metres. Flood depths are in excess of 1 metre throughout the majority of the site during the PMF event.





100 year ARI event flood depths

PMF event flood depths

Figure 17: Flood depths at Sydney Modal Transfer Facility (GPFS, 2009)

Flow velocities throughout the site typically remain below 0.6 metres per second in the 100 year ARI event (refer Figure 18). In the PMF event, flows could exceed 0.8 metres per second across the site, with flows along the proposed roadway in excess of 2 metres per second in some locations.



100 year ARI event flood depths

PMF event flood depths

Figure 18: Flood velocities at Sydney Modal Transfer Facility (GPFS, 2009)

BMT WBM calculated provisional hazards based on the criteria provided in the NSW Floodplain Development Manual (OEH, 2005) which were used to derive Flood Risk Precincts (FRPs) for the catchment (refer Figure 19) based on the following descriptions (GPFS, 2009):


- High FRP Land below the 100 year flood that is either subject to a high hydraulic hazard (ie provisional hazard in accordance with the Floodplain Development Manual) or where there are significant evacuation difficulties.
- Medium FRP Land below the 100 year flood level that is not subject to high hydraulic hazard and where there are no significant evacuation difficulties.
- Low FRP -Comprises all remaining areas of the floodplain (defined as the limit of inundation in a PMF) but not identified as either a high flood risk or medium flood risk precinct, and where the risk of damages is low for most land uses.

The majority of the site lies within the low to medium FRPs, with some regions located within the high FRP (refer Figure 19).



Figure 19: Flood Risk Precincts at Sydney Modal Transfer Facility (GPFS, 2009).

(b) Potential Impacts

The operation of the facility would be weather dependent, thereby limiting the potential impacts of flooding across the site. During heavy rainfall, trains would not be operating in the area, limiting the amount of material entering the site. Additionally, the amount of material within the surge pile is anticipated to be minimal (limited to one delivery worth of material, i.e. 3,000 tonnes). However, should any material be located in the surge pile areas during a storm event, this material does have the potential to become a flood hazard, as do any vehicles on-site during the storm. It is noted that the proposed surge piles are located within the medium FRP which represents a low hydraulic hazard. This would reduce the risk of surge pile displacement during a flood event.

Any works across the site that would change the existing surface level and quantity of impermeable surface area have the potential to change the flood characteristics. Changes to surface levels are not proposed as a part of these works and new impermeable surface areas would be very minor. Should surface works in the future change the permeable land area it is recommended that a flood study be undertaken to determine the nature and extent of flooding for the developed scenario.

Due to the proposed high level of control over spoil movements, along with the implementation of appropriate mitigation measures and the absence of any waterways or



major drainage lines within 150 metres downstream of the site, no significant impacts are anticipated to occur as a result of this Proposal.

(c) Mitigation measures

The following mitigation measures are proposed for the Sydney Modal Transfer Facility:

- Sediment and erosion control measures should be installed in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004). Measures would be installed prior to the commencement of any construction works and should include silt fencing downstream of the works to prevent the movement of sediment off site and checking and maintenance of the controls on a regular basis.
- During detailed design, options for site bunding is to be considered to allow 'catch points' where materials can be prevented from leaving the site during both construction and operation.
- Conditions under which activities would cease would be included in the CEMP and OEMP including when sheet flow is observed across the access road or if the width of storm flows within gutters exceeds 1.5 metres. Measures are to be included that require regular weather forecast checks and operational management measures to be implemented when large storm events or heavy rainfall is expected.
- This work cessation plan would prevent the amount of potential floating debris on site, as well as preventing danger to human life. Safe evacuation from the site, or to a level above the PMF flood extents, should also be considered. It is recommended that a Flood Emergency Evacuation Plan (FEEP) is provided for the site during subsequent design phases.
- Storage and handling of fuels and chemicals would comply with Australian Standard AS1940. All fuels, chemicals and liquids would be stored in an impervious bunded area. An emergency response spill kit should be kept on site at all times in a quickly accessible location.
- Any refuelling is to occur as far from sensitive areas as possible, within a designated zone.

6.9.2. Illawarra Modal Transfer Facility

(a) Existing environment

Waterways

The closest waterway runs through the proposed works area and would be located between the wagon dump station/rail line and the surge pile/truck loading area. This creek line flows a short distance (approximately 700m) directly into Port water. The proposed works would be set up on either side of the creek line with the conveyor crossing over the top. Construction works would not take place immediately adjacent to or within the creek.



Flooding

A flood study was developed by Cardno in 2012 for the CRM site (CRMFS) to assess and define the flood behaviour within the study area under current conditions.

The flood behaviour was assessed using hydrological and hydraulic computer modelling. The flood information obtained from the analysis was presented in terms of peak flood depths, levels and extents for events ranging from the 1 year ARI event up to and including the PMF. It is noted that Council's blockage policy was applied to all modelled scenarios in accordance with Chapter E14 of Development Control Plan (DCP 2009), which requires all structures with a diagonal opening less than 6 metres to be 100 percent blocked. Since completion of this study, however, Council has updated this blockage policy to account for partial blockage to more accurately reflect flood levels.

The proposed unloading area and existing train line are situated directly adjacent (west) to a natural watercourse, and are both inundated in all modelled storms, ranging from the 1 year ARI event to the PMF event (refer Figure 20). The proposed surge pile /staging area remains flood free in all storm events up to the 100 year ARI event, however this area is subject to flood depths of less than 0.25 metres in the PMF event.

The implementation of Council's blockage policy has likely produced overly conservative flood extents (particularly in the smaller storm events) due to the culvert located near the proposed unload station being modelled as 100 percent blocked. Updating the flood model with Council's latest blockage policy (i.e. partial blockage) would likely show reduced extents in most storms.

The CRMFS determined the critical storm duration in the 1 year ARI to 100 year ARI events to be 2 hours across the site, and 45 minutes in the PMF event. These durations are representative of flash flooding and require work cessation and evacuation plans to be enacted promptly (refer Section 6.9.2 (c)).



1 year ARI event flood depths



100 year ARI event flood depths





Flood Depth (m) 0 - 0.25 0.25 - 0.50 0.50 - 0.75 0.75 - 1.00 1.00 - 1.25 1.25 - 1.50 >1.50

PMF event flood depths

Figure 20: Flood depths at Port Kembla site (CRMFS, 2012).

(b) Potential Impacts

The existing trackwork is currently inundated in all modelled storms, i.e. the 1 year ARI event up to and including the PMF event, as is the proposed unloading area and conveyor belt location. Flooding of the tracks themselves is not considered to represent a significant flood hazard, however, any additional infrastructure critical to future operations, e.g. the conveyance system and unloading area, should be able to withstand frequent flooding.

It is understood that the amount of material within the surge pile would be minimal (limited to one delivery worth of material, i.e. 3,000 tonnes). Additionally, the surge pile area is shown to be flood free in all modelled storms, excluding the PMF event, in which shallow sheet flows are expected. Material within the surge pile is therefore not expected to represent a significant flood hazard in any storm event.

There is the potential for impacts to occur to the existing waterway including from spills and leaks associated with the operation of plant and equipment and vehicles. This can be managed through the implementation of bunding and fuelling measures and therefore it is unlikely that the proposed works would present a significant impact to the waterway.

Runoff from the surge pile into the creek could occur if a heavy rainfall event occurred while a surge pile was in place. The installation of a permanent sedimentation fence and management of operations to ensure surge piling does not occur prior to a forecasted storm event would make this impact unlikely to occur. Careful operational plans would ensure that measures are in place to manage storm and flooding events.

(c) Mitigation Measures

The following mitigation measures are proposed for the Illawarra Modal Transfer Facility:

• Sediment and erosion control measures should be installed in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004). Measures would be installed prior to the commencement of any construction works



and should include silt fencing downstream of the works to prevent the movement of sediment off site and checking and maintenance of the controls on a regular basis.

- During detailed design, options for site bunding is to be considered to allow 'catch points' where materials can be prevented from leaving the site during both construction and operation.
- It is understood that the proposed equipment, while mobile in its nature, is not feasible to be removed during storm events due to the time needed to cease operations and the possible lack of warning of an oncoming storm. The equipment would therefore remain in place during such an event. The equipment to be installed would likely be able to withstand some minor flooding, however, damage to equipment during larger storm events from floating debris or electrical issues may arise. Consideration should therefore be given to the flood compatibility of components to be installed in this area. Should these components require flood immunity, it is recommended that the flood model is updated to better represent existing conditions and to investigate potential mitigation measures. The excavated pit beneath the unloading conveyor would likely experience frequent nuisance flooding and may require regular pumping out to remove flood waters.
- It is understood that the operation of the facility is weather dependent and would therefore cease during heavy rainfall. It is recommended that works cease on site should any sheet flow be present across the access road, or if the gutter flow width exceeds 1.5 metres in order to reduce danger to human life and the amount of potential floating debris and flood hazards. Safe evacuation from the site, or to a level above the PMF flood extents, should be considered. Due to the elevated level of the staging/stockpiling area, a stay-in-place approach is considered acceptable for any trucks remaining on site (in the loading and surge pile area) when work cessation is implemented. It is recommended that a Flood Emergency Evacuation Plan (FEEP) is provided for the site during subsequent design phases.
- If required, equipment would be refuelled within fully bunded areas with a spill kit available in a quickly accessible location. Any refuelling is to occur as far from sensitive areas as possible, within a designated zone.
- Placement of equipment should be as far from the creek line as possible and no works or equipment are to occur within two metres of either side of the creek banks. The conveyor shall not stand within the creek.

6.10. Air quality

The proposed modal transfer facility sites were reviewed by Pacific Environment Limited (2017c, Appendix 7) in order to assess potential air quality impacts from site construction and operations. The assessment included a review of the air emission potential of the Proposal including a qualitative assessment for the Sydney Modal Transfer Facility and a quantitative assessment for the Illawarra Modal Transfer Facility. A quantitative assessment for the Sydney Modal Transfer Facility as not considered necessary due to the sheltered geographical setting of the site compared to the coastal setting of the Illawarra modal transfer facility at Port Kembla. The original assessment undertaken for the UGL site has been used for this assessment. It is still considered applicable due to the wide dispersion nature and broad area of impact generally associated with air quality emissions.

Key pollutants for the Proposal

Pacific Environment Limited (2017c) identified the key pollutants for the Proposal would be those associated with material transfer and freight activities which include particulate matter.



Particulate matter has the potential to affect human health, with exposure having effects on the respiratory and cardiovascular system (WHO, 2011). The size of the particles determine their behaviour in the respiratory system and how far the particles can penetrate into the body and therefore particulate matter is categorised by size and/or chemical composition. Particulate size ranges are commonly described as Total Suspended Particulate (TSP), particles with equivalent aerodynamic diameters of less than 10 micrometres (PM_{10}) and particles with equivalent aerodynamic diameters of less than 2.5 micrometres ($PM_{2.5}$) (refer Table 23).

Table 23: Potential particulate sources for the assessed particulate size range (Pacific Environment Limited, 2017c)

Pollutant	Potential Source
PM _{2.5}	Combustion processes i.e. Vehicle emissions or burning wood.
PM ₁₀	Mechanical processes resulting in the suspension of coarse particles i.e. Dust, pollen and spores.

The assessment was based on a conventional approach generally following the procedures outlined in the EPA document titled *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2005), hereafter referred to as the *Approved Methods*. The *Approved Methods* (DEC, 2005) specify air quality criteria for the total dust burden in the air (refer Table 24), therefore consideration of background dust levels was included in the analysis for the Proposal (refer Table 25) to ensure the potential impact could be appropriately identified.

Table 24: NSW air quality criteria/standards for particulate matter concentrations (summarised from Pacific Environment Limited, 2017c)

Pollutant	Standard	Averaging Period	Source
PM ₁₀	50 μg/m³ 30 μg/m³	24-Hour Annual	DEC, 2005
PM _{2.5}	25 μg/m³ 8 μg/m³	24-Hour Annual	NEPC, 2016
TSP	90 µg/m³	Annual	DEC, 2005

Note: µg/m³ represents micrograms per cubic metre.

Table 25: NSW criteria for dust suspension (summarised from Pacific Environment Limited, 2017c)

Pollutant	Average Period	Maximum Increase	Maximum Total
Deposited Dust	Annual	2 µg/m³	4 µg/m²/month

Note: µg/m²/month represents grams per square metre per month

An Atmospheric Dispersion Modelling system (AERMOD) assessment of the Illawarra Modal Transfer Facility was undertaken following the *Approved Methods* (DEC, 2005) to assess the dispersion of the identified pollutants and their impact upon nearby sensitive receivers.

Site emission estimates

Emissions from the following activities were identified as relevant to the assessment of air quality impacts for the Proposal:

- Locomotive operations (train loading and unloading exhaust emissions);
- Material transfer operations (dust from loading and unloading);



- Surge piles (dust); and
- Hauling on unsealed roads (dust).

A detailed estimate of particulate matter emissions for the above operational activities was prepared for each of the proposed sites and are summarised below in Table 26. These estimates indicate surge piles would make up a small portion of the total emissions with hauling on unsealed roads (TSP and PM_{10}) and locomotives ($PM_{2.5}$) comprising the majority of emissions.

	Emission Rate (kg/day)		
Emission Source	TSP	PM ₁₀	PM _{2.5}
Sydney Modal Transfer Facility			
Material transfer operations	4.4	2.1	0.32
Locomotive operations	0.71	0.71	0.71
Wind erosion from surge piles	0.24	0.12	0.02
Total	5.4	2.9	1.1
Illawarra Modal Transfer Facility	/		
Material transfer operations	4.4	2.1	0.32
Locomotive operations	0.48	0.48	0.48
Hauling on Unsealed Roads	14.8	4.5	0.45
Wind erosion from surge piles	0.24	0.12	0.02
Total	19.9	7.2	1.3

Table 26: Summary of emission estimates (Pacific Environment Limited, 2017c)

6.10.1. Existing environment

(a) Sydney Modal Transfer Facility

The annual average maximum and minimum temperatures recorded at the Bureau of Meteorology (BoM) Canterbury Racecourse weather station are 23.0°C and 12.3 °C respectively. The OEH Chullora Air Quality Monitoring Station (AQMS), located approximately 1 kilometre to the west of the site boundary was used to assess the background ambient air quality. The annual average statistics are presented in Table 27. This AQMS is the closest monitoring station to the site, located approximately 1 kilometre to the west of the site boundary.

Table 27: Annual average statistics for $PM_{2.5}$ and PM_{10} at OEH Chullora AQMS (Pacific Environment Limited, 2017c)

Pollutant	Annual Average	Units
PM2.5	8.0	µg/m³
PM10	17.5	µg/m³

Annual and seasonal wind roses indicate a high proportion of calm conditions that would be inefficient in dispersing pollutants (Pacific Environment Limited 2017c). The site is located approximately 50 metres from the nearest industrial and residential receptors which are



situated in a medium density suburban neighbourhood along the Hume Highway (refer Figure 7.4 of Appendix 7).

(b) Illawarra Modal Transfer Facility

The local climate for the Illawarra Modal Transfer Facility is relatively mild with the annual average maximum and minimum temperatures recorded at the Bellambi station as 21.3°C and 14.7 °C respectively.

The potential dispersion and transportation of pollutants is primarily influenced by wind speed, wind direction, temperature and humidity. Site specific dispersion meteorology was prepared and incorporated into an AERMOD dispersion model with the annual and seasonal wind roses for the BlueScope operated Flagstaff St Air Quality Monitoring Station (AQMS).

Background air quality data was sourced for the BlueScope operated Flagstaff St AQMS (PM_{10} , TSP and Deposited Dust), OEH Kembla Grange AQMS (PM2.5) and OEH Wollongong AQMS (PM2.5) which are located within four kilometres of the site (See Figure 6.2 of Appendix 7 for the location of the stations in relation to the site). This data was adopted as representative of the air pollutant levels within the modelling domain (refer Table 28).

Pollutant	Annual Average	Units	Source/Data Availability
PM _{2.5}	6.7	µg/m³	OEH Kembla Grange (72.9 percent), Wollongong (25.7 percent)
PM ₁₀	17.4	µg/m³	BlueScope Flagstaff Road (90 percent) OEH Kembla Grange (10 percent)
TSP	32.7	µg/m³	BlueScope Printing Services Building (56 x one in six day measurements)
Deposited Dust	1.8	g/m²/month	BlueScope Printing Services Building (12 monthly measurements)

 Table 28: Summary of adopted background air quality levels for the Illawarra Modal

 Transfer Facility (Pacific Environment Limited, 2017c).

Site operations at the Illawarra Modal Transfer Facility are located at a distance of approximately 300 metres from both industrial (with the exception of the Bluescope Steel CRM site) and residential receptors (see Table 6.3 and Figure 6.4 of Appendix 7).

6.10.2. Potential impacts

(a) Construction

Emissions to air for the construction phase at both of the proposed sites were considered for a construction period of three weeks. Air quality emissions would be limited to minor levels of localised dust during site set-up and road formalisation and minimal exhaust emissions during equipment delivery. In both instances, emission levels would be negligible and would quickly disperse into the atmosphere prior to causing an impact on surrounding receivers. Pacific Environment Limited (2017) consider the potential air quality impacts of construction to be minor and manageable through standard mitigation measures.



(b) Operation

The Air Quality Impact Assessment (AQIA) prepared by Pacific Environment Limited (2017c) for the Sydney and the Illawarra modal transfer facilities determined the following conclusions in regards to the Proposal:

- With regard to offsite air quality at the Illawarra Modal Transfer Facility, the modelling analysis has predicted compliance with regulatory impact assessment criteria which are endorsed by NSW EPA as being protective of adverse air quality outcomes; and
- It is estimated that particulate matter emissions would be significantly lower at the Sydney Modal Transfer Facility than at the Illawarra Modal Transfer Facility due to the absence of unsealed haul roads and would therefore comply.

Sydney Modal Transfer Facility

Given the similarity of the Illawarra and Sydney modal transfer operations, it is considered likely that air quality impacts would be of a similar nature to those predicted near to the Illawarra Modal Transfer Facility.

An estimate of the daily particulate matter emissions for the Sydney Modal Transfer Facility was prepared based on the implementation of the same level of controls applied at the Illawarra Modal Transfer Facility (refer Table 28). This analysis found the relative overall scale of emissions at the Sydney Modal Transfer Facility would be reduced when compared to the Illawarra Modal Transfer Facility (refer Table 7.3 of Appendix 7) due to the absence of unsealed roads and shorter duration in train loading time at the Sydney Modal Transfer Facility.

Whilst there is a reduced overall scale of emissions at the Sydney Modal Transfer Facility, the closer proximity of sensitive receptors (50 metres as compared to 300 metres) implies a similar level of pollution potential. Pacific Environment Limited (2017c) noted winds from the north west are primarily confined to winter periods which may reduce the influence of the Proposal's emissions on the nearest sensitive receptors to the south east of the Chullora Site. Also of potential importance is the higher prevalence of calm conditions at Chullora, relative to Port Kembla. This would likely be associated with an increase in near field pollutant levels in the vicinity of the Chullora site.

Illawarra Modal Transfer Facility

The results of the dispersion modelling prepared for the Illawarra Modal Transfer Facility determined the potential for the Proposal to result in adverse air quality impacts is considered to be low, with the maximum PM_{10} concentration recorded at sensitive receiver R1 (refer Figure 6.8 of Appendix 7) with a value of 5 µg/m³. Pacific Environment Limited (2017c) noted that maximum 24-hour average PM_{10} predictions were of greatest significance to the identified sensitive receivers, comprising approximately 10 percent of impact assessment criteria. The predictions have been shown to be minor in the context of the existing background levels (refer Table 28), and were assessed to not generate additional exceedances of the 24-hour criteria (refer Table 29). The assessment also indicated the annual average predictions ($PM_{2.5}$, PM_{10} , TSP and Dust Deposition) were minor constituting less than 5 percent of both regulatory criteria and existing background levels in all cases (refer Table 28).

As shown in Table 29, emissions from haul roads, and material handling form a key contribution to peak predictions, whilst surge pile operations and locomotives form a lesser contribution.

Table 29: Analysis of source contribution for peak 24 hour average PM₁₀ predictions (Pacific Environment Limited, 2017c)

Source Group	Peak 24-hour average PM ₁₀ Prediction (µg/m³)	Percentage of 'All Sources' Prediction
Material handling during train unloading	1.4	29 percent
Unsealed Haul Roads	2.7	55 percent
Surge piles and wheeled loader operation	0.7	14 percent
Locomotive engines	0.4	8 percent
All Sources	4.9	-

With regard to offsite air quality, the modelling analysis has indicated that particulate matter emissions are of a scale that is manageable with the implementation of effective air quality management strategies. Appropriate mitigation measures have been provided at Section 6.10.3.

6.10.3. Mitigation measures

The following mitigation measures are proposed for both the Sydney modal and Illawarra modal transfer facilities:

- The project CEMP would incorporate air quality management requirements in the CEMP for each site including:
 - The potential for contamination to be present in excavations, and associated (offsite) air quality management requirements.
 - Measures for the control of dust from excavation and emplacement of fill as outlined in the Air Quality Management Plan (AQMP) mitigation measure below
 - Maintenance of unsealed areas of the site in a condition that minimises potential for soil erosion (e.g. undisturbed crusted gravel materials and vegetation).
- A Proposal specific Air Quality Management Plan (AQMP) should be prepared that addresses the following control measures:
 - Haul truck operations:
 - Maintenance and cleaning of internal sealed road surfaces.
 - Application of vehicle speed limits.
 - Ensuring that vehicles are restricted to designated vehicle paths with the objective of minimising areas of erodible surface material; properly maintained and operating efficiently and not left with engines idling for extended periods.
 - Maintenance of unsealed areas of the site in a condition that minimises potential for soil erosion (e.g. undisturbed crusted gravel materials and vegetation).
 - Maintaining visual awareness of vehicle movements with the objective of identifying and addressing the presence of visible dust emissions.



- Use of wheel wash for vehicles exiting unsealed areas of the Site.
- Inspection and additional cleaning of undercarriage where required.
- Ensuring that all trucks transporting soil are covered when exiting the Site.
- Ensuring that vehicle tailgates are properly sealed, such that loose material is not deposited onto road surfaces.
- Unloading/unloading of spoil:
 - Maintenance of material moisture content of spoil where practical and feasible.
 - Maintenance of material handling equipment to operate in a proper and efficient manner.
 - Enclosure of conveyor transfer/drop points.
 - Use of height adjustable (or suitably positioned) loading arms.
- Surge pile operations:
 - Minimisation of surge pile areas.
 - Periodic watering of surge pile areas to promote crusting of surge pile surfaces and to prevent uncontrolled emissions
 - Application of sprays to surge piles where high winds are expected and/or present.
- Wind erosion from the general site:
 - Maintenance of clean road surfaces (where sealed).
 - Restriction of vehicles to designated vehicle paths.

6.11. Climate change and sustainability

6.11.1. Greenhouse gas emissions

A high level greenhouse gas (GHG) assessment has been undertaken to compare the GHG impacts associated with two spoil removal options:

- Option A all spoil from the WestConnex M4 project is removed from site via road to the potential spoil reuse sites nominated in the WestConnex M4 Construction Spoil Management Plan; and
- Option B spoil from the WestConnex M4 project is taken to the Sydney Modal Transfer Facility to be transported via rail to the Illawarra Modal Transfer Facility via freight train and then transported via road to a final reuse location.

The Proposal (Option B) has inherent sustainability benefits associated with removing trucks from the roads. It is estimated that using freight trains to transport 9,000 tonnes of spoil associated with the M4 WestConnex project per day (approximately 25 per cent of the spoil associated with the M4 WestConnex project) from the Sydney Modal Transfer Facility to the Illawarra Modal Transfer Facility would result in a saving of approximately 1,942 tonnes of GHG emissions (tCO2-e) as shown in Figure 21.









Figure 22: Breakdown of GHG emissions for Option B.



Table 30 below provides a summary of key assumptions used for the high level GHG assessment.

Table 30: GHG assessment assumptions.			
GHG Assessment Assumptions			
Option A and B shared assumptions	• Emissions calculations are based off 25 percent of spoil to be reused offsite (561750 cubic metres). Note it excludes the Spoil to be reused onsite (60000 cubic metres), spoil not suitable for reuse (47000 cubic metres) and the 75% (1685250 m3) of spoil to be reused at other locations as nominated in the WestConnex M4/M5 Construction Spoil Management Plan.		
	• Truck capacity is assumed to be 12.8 cubic metres.		
	 Truck fuel efficiency of 26 litres per 100 kilometres or 7.2 litres per 100 kilometres. 		
	One cubic metre of spoil is 1.6 tonnes.		
	All vehicles (freight and truck) travel from site full and return empty.		
	Excludes loading and unloading of spoil.		
Assumptions associated with Option A only	• Distance of 44.9 kilometres in one direction for all spoil reuse (this is an average distance from the Northcote spoil removal site to sites identified as potential offsite spoil reuse locations within the WestConnex M4/M5 spoil management plan).		
Assumptions associated with Option B only	• Distance of 12.5 kilometres (average distance of spoil generating sites to Chullora) for the 25 percent of spoil to be transported to Port Kembla via freight.		
	• Freight transport distance of 98 kilometres one way.		
	Three freight trains would transport 9000t of spoil per day.		
	• Freight train fuel use of 5.6 litres per kilometre when full.		
	Freight train fuel use of 3.8L/km when empty		
	Distance of 20 kilometres (one way from Port Kembla Illawarra Modal Transfer Facility to potential Lendlease reuse site).		

Table 30: GHG assessment assumptions.



6.12. Cumulative impacts

Cumulative impacts relate to the compounding effects of individual environmental impacts resulting from developments proposed or operating within the locality at a similar time. Together these impacts can affect the natural or built environment. Consideration of cumulative impacts ensures that environmental impacts from the proposal are not viewed in isolation from surrounding developments.

Consideration of the cumulative impacts is primarily achieved by each specific environmental assessment within this REF, with each assessment that has the potential to affect offsite locations (i.e. hazard and risk, air quality, noise and vibration, health and traffic) undertaken in the context of the heavy industrial environment within which the modal transfer facility sites would operate. This approach ensures that both off-site impacts from the Proposal and those existing impacts within the surrounding environment are considered.

6.12.1. Existing environment

Sydney Modal Transfer Facility

Developments considered to contribute to cumulative environmental impacts in conjunction with the Sydney Modal Transfer Facility are those activities within the immediate vicinity of the Chullora Rail Yards.

Environmental impacts from the following developments, either as existing background or predicted future emissions, have been considered (where appropriate) by the environmental assessments in this REF including:

- Existing uses within the Sydney Trains Chullora Yards;
- Fleet Serve Pty Ltd;
- Australia Post Depot; and
- Proposed Warehouse and Distribution Facility, 2 and 12 Hume Highway Chullora.

Illawarra Modal Transfer Facility

Developments considered to contribute to cumulative environmental impacts in conjunction with the Illawarra Modal Transfer Facility are those activities within the immediate vicinity of the CRM site within the operating port of Port Kembla.

Environmental impacts from the following developments, either as existing background or predicted future emissions, have been considered (where appropriate) by the environmental assessments in this REF including:

- BlueScope Steel;
- Car Carriers (Patrick Autocare, PrixCar Services, CIVA, AutoNexus); and
- Bis Industries Manufacturers.

6.12.2. Potential impacts

The individual environmental assessments within Section 6 of this REF identify the associated impacts of the Proposal. The individual impact assessments demonstrate that the



Proposal, in conjunction with existing and known future developments, would not have a significant level of impact.

Air quality and noise assessment undertaken for the Proposal considered the cumulative effects that the Proposal would have on the surrounding environment and community. The investigations concluded that the proposed development would have no acute or chronic impacts on the environment or health of the surrounding community subject to appropriate mitigation and management.

Traffic modelling undertaken identified that the Hume Highway / Worth Street intersection would continue to operate at satisfactory level of service during operation. The traffic modelling identified that the access and egress point for the Illawarra Modal Transfer Facility would require upgrades to ensure safe operations, with these upgrades considered in the future design. Based on this result, the proposed additional traffic volume from the Proposal would not result in additional cumulative impacts on the wider road network requiring an upgrade of the road infrastructure.

Overall, the construction and operation of the proposal would not result in a cumulative impact within the surrounding areas.

6.12.3. Mitigation measures

The individual environmental assessments within Section 6 of this REF identify the mitigation and management measures required to address the potential environmental impacts. A summary of these mitigation measures is included in Section 7.2.

Once construction timing has been determined, a search of projects proposed at the same time would be undertaken and, if necessary, coordination between projects would be discussed between the appropriate project teams.

6.13. Impacts on existing operations

Both the proposed modal transfer facilities are located on sites currently used for industrial operations, comprising freight, logistics and manufacturing. There is the potential for the Proposal to impact on, or be impacted by existing operations. To avoid these impacts occurring Transport for NSW has consulted with the land owners and operators, being Sydney Trains for the Sydney Modal Transfer Facility and BlueScope Steel for the Illawarra Modal Transfer Facility. Transport for NSW would continue to consult with all parties during the design development to ensure that the existing site uses can co-exist with the Proposal.

6.13.1. Existing environment

The Sydney Modal Transfer Facility is currently used for the loading of long freight trains on the eastern side of the site and there are a number of active rail lines to the west of the site which are used by Pacific National to access a fuelling station. The site contain areas of underutilised cleared land which would be utilised for the proposed loading and surge pile areas. The wider Chullora site is used for a variety of purposes including track repair and maintenance, storage of infrastructure and memorabilia, stabling of wagons and ballast recycling.

The Illawarra Modal Transfer Facility is currently used for the storage and distribution of rolled steel that is manufactured by BlueScope Steel on site. The site contains a rail spur and large area of underutilised hardstand with a crushed rock base.



6.13.2. Potential impacts

(a) Construction phase

There are potential impacts at both sites during construction, with the construction works likely to require the temporary closure of sections of track while limited upgrades and retrofitting is carried out. The Illawarra Modal Transfer Facility would require the taking up of track and relaying while the drop bins are installed.

Vehicle and plant movements may result in limited disruption to the internal road network during construction. however, this can be managed by appropriate traffic control and liaison between existing and proposed site uses to ensure adequate notice is provided to allow temporary revisions to operations, if required.

(b) Operational phase

Transport for NSW would liaise with Sydney Trains and BlueScope Steel to establish operational protocols to limit impacts on existing operations.

All operational activities would be in accordance with agreements with the existing landowners and operators.

Loading of train wagons via front end loader both north and south of the existing bridge at the Eastern Siding site is feasible. However assuming the main rail entrance to the whole Chullora Rail Yard cannot be blocked, five wagons under the bridge would not be able to be loaded. Consultation with Sydney Trains would be undertaken to discuss the possibility of blocking the main entrance for short periods (approximately 20 minutes) to facilitate final loading of the train wagons.

6.13.3. Mitigation measures

Transport for NSW would liaise with Sydney Trains and BlueScope during the design development to ensure that the proposed design aligns with current operations on site. Any measures required to guide construction or operations of the Proposal would be brought into the relevant CEMP or OEMP.

6.14. Sustainability

In addition to the environmental and economic sustainability benefits discussed above there are social sustainability aspects associated with the removal of trucks from roads including:

- Reduced traffic congestion;
- Reduced diesel particulate emissions; and
- Reduced truck kilometres.

Sustainability initiatives that are being considered for the Proposal include:

- Reusing existing freight trains and wagons that would otherwise be redundant as opposed to procuring new ones;
- Using some of the spoil material in capping parts of both modal transfer facilities; and



• Using spoil material as fill for land development projects, saving the transfer of material to landfill and reducing movements associated with cutting material at other sites to then use on these land development projects.



7. Environmental management

This section of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures. Section 7.2 lists the proposed mitigation measures identified in Section 6 to minimise the impacts of the Proposal.

7.1. Environmental management plans

7.1.1. Construction management

A CEMP for the construction phase of the Proposal would be prepared by the construction contractor appointed for the Proposal. The CEMP must be approved by the Transport for NSW environmental representative prior to the commencement of works. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP document would incorporate the following as a minimum:

- Transport for NSW Environmental Management System (EMS);
- Recommendations and mitigation measures outlined in Section 7.2 this REF;
- Any conditions from licences, permits or other approvals issued by government authorities for the Project, all relevant legislation and regulations, and accepted best practice management
- *Guideline for the Preparation of Environmental Management Plans* (Department Infrastructure, Planning and Natural Resources, 2004);
- AS/NZS ISO 14001 Environmental Management Systems; and
- A process for demonstrating compliance with such mitigation measures and conditions.

It is expected that a CEMP would be prepared for construction phase of works prior to works commencing. An outline of the specific CEMP requirements is provided below to assist in the preparation of the final CEMP. Transport for NSW would ensure that the requirements prescribed within the CEMP and any additional environmental management documentation for the Proposal would also:

- Include an Environmental Policy;
- Clearly define the purpose, objectives and scope of the CEMP;
- List any relevant approvals, conditions and any other documents incorporated into approvals or commitments relating to the environment or relevant legislation;
- Assess any environmental risks and prescribe appropriate mitigation and control measures to reduce or eliminate risks;
- Include measures used to control the occurrences of any pollution incident;
- Ensure effective emergency response equipment (in the form of spill kits, personnel protective equipment) is located in areas of potential hazard;



- Minimise and manage the disturbance area and protect vegetation and soil outside of the disturbance area during construction;
- Ensure appropriate measures are in place to control stormwater and silt runoff during construction. Measures include the installation, monitoring and maintenance of silt fencing and clean water diversion drains;
- Details of the stormwater drainage and erosion control features proposed would be incorporated into the Erosion and Sediment Control Plan in the CEMP. Compliance with all such protection measures outlined in the Soil and Water Management Plan and CEMP would be mandatory;
- Manage noise, vibration and dust impacts during construction;
- Manage traffic movements during construction;
- Manage any Aboriginal artefacts or non-Aboriginal relics discovered during construction;
- Manage air quality impacts during construction including dust suppression;
- Manage impacts to flora and fauna, including the GBBF and the management of weeds;
- Ensure waste streams are identified and that they are appropriately managed;
- Follow the measures to be provided in the Pollution Incident Response Plan to be developed for the Proposal as part of the CEMP and OEMP;
- Contain detailed baseline data and the relevant limits, or performance measures, or criteria to allow judgement of performance and to provide a guide for the implementation of any management measures that may be required;
- Provide a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
- Provide a program to monitor and report on the impacts and environmental performance of the Proposal; as well as the effectiveness of any management measures;
- Provide a program to investigate and implement ways to improve the environmental performance of the Proposal over time;
- Establish and implement a protocol for managing and reporting any environmental incidents, complaints, non-compliance with statutory requirements and/or exceedance of safety/impact performance criteria and to periodically review the plans that are in place;
- Ensure effective communications are provided to all staff in the form of inductions, operating procedures, training sessions and signage to inform personnel of operational hazards, controls and emergency response planning, preparedness and response; and
- Standard construction hours would be utilised for the duration of construction works to reduce noise impacts, and should any work outside these standard hours be required then the Contractor would ensure appropriate controls are in place, i.e. the noise does not exceed noise affected RBL + 5dBA, and that the work does not create any significant impacts to surrounding residents.



7.1.2. Operations Management

An OEMP would be prepared to provide an overarching environmental management strategy for the Proposal. The OEMP would incorporate a range of management plans and procedures to ensure impacts to the environment, community and adjoining operations are managed and to ensure ongoing compliance with relevant legislation, approvals, licences, permits and any other commitments.

The OEMP document shall be prepared in accordance with the following:

- Transport for NSW EMS;
- Recommendations and mitigation measures outlined in this REF;
- Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004); and
- AS/NZS ISO 14001 Environmental Management Systems.

Transport for NSW would ensure the requirements prescribed within the OEMP and any additional environmental management documentation and procedures for the Proposal would:

- Clearly define the purpose, objectives and scope of the OEMP;
- List any relevant approvals, conditions and any other documents incorporated into approvals or commitments relating to the environment or relevant legislation;
- Assess any environmental risks and prescribe appropriate mitigation and control measures to reduce or eliminate risks;
- Include measures used to control the occurrences of any pollution incident;
- Ensure effective emergency response equipment (in the form of spill kits, personnel protective equipment) is located in areas of potential hazard;
- Manage noise, vibration and dust impacts during operations;
- Manage traffic movements and behaviours during operations;
- Contain detailed baseline data and the relevant limits, or performance measures, or criteria to allow judgement of performance and to provide a guide for the implementation of any management measures that may be required;
- Provide a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
- Provide a program to monitor and report on the impacts and environmental performance of the Proposal; as well as the effectiveness of any management measures;
- Provide a program to educate and inform all personnel working on site as to any significant environmental aspects (i.e. Green and Golden Bell frogs), hazards, risks and emergency response requirements to pollution events and to familiarise them with any associated management plans;
- Provide a program to investigate and implement ways to improve the environmental performance of the proposal over time;
- Establish and implement a protocol for managing and reporting any environmental incidents, complaints, non-compliance with statutory requirements and/or



exceedance of safety/impact performance criteria and to periodically review the plans that are in place;

- Manage activities in accordance with existing operational requirements onsite;
- Effective communications shall be provided to all staff in the form of inductions, operating procedures, training sessions and signage to inform personnel of operational hazards, controls and emergency response planning, preparedness and response; and
- Ensure there is a location available for the spoil to be transported to within the Illawarra prior to loading the train in Sydney.

7.2. Mitigation measures

Mitigation measures for the Proposal are listed in Table 31 below. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Section 6, should the Proposal proceed.

Table 31: Proposed mitigation measures

Mitigation Measures

General

Preparation of Construction Environment Management Plan, including all requirements detailed in section 7.1.1.

Preparation of Operation Environment Management Plan, including all requirements detailed in section 7.1.2.

Traffic and site access

A traffic management plan (TMP) would be prepared outlining the approved haulage routes and would be reviewed and updated as appropriate. The TMP would be compiled in coordination with the M4 WestConnex project work sites where the spoil is being hauled. This may be in the form of an update to the existing M4 WestConnex project's TMP and Spoil Management Plan. The Plans would consider vehicle movements at both transfer facility sites and would aim to identify suitable haulage routes and minimise potential impacts resulting from vehicle movements.

All vehicle drivers shall be inducted to the project. Training shall include but not be limited to behavioural expectations whilst working on public and private roads and approved haulage routes to and from each site.

Transport for NSW shall continue liaison with Sydney Trains, BlueScope Steel, Pacific National and any other relevant stakeholders involved in managing rail and transport movements at both the Sydney and Illawarra modal transfer facilities.

A Roads and Maritime accredited Traffic Controller would be required to assist truck's entering and exiting the Illawarra Modal Transfer Facility from Old Port Road, or alternatively further detailed investigation would be required to determine a long term intersection management solution which may require:

- Intersection realignment; and/or
- Intersection signalisation.

Site specific signage would be installed to ensure site safety and security by promoting wayfinding and orientation for personnel and delivery vehicles.

Urban design, landscape and visual amenity

No vegetation is to be trimmed or removed without prior approval from the Transport for NSW environmental representative.



The detailed engineering design would consider existing vegetated visual buffers to ensure they are maintained where possible. Strategic planting of vegetation would be considered to provide additional or enhanced visual buffers if required;

The site operating facilities would be actively managed, monitored and regularly maintained to ensure a safe, comfortable and tidy work environment is provided.

Site specific signage would be installed to ensure site safety and security by promoting wayfinding and orientation for personnel and delivery vehicles. Signage would be installed in a manner that is neat and tidy and would avoid the creation of visual pollution through the minimisation of signage where safe.

The design, procurement and use of any lighting on the site would comply with the relevant requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

Heavy vehicles should use Old Port Road and avoid Five Islands Road where possible to reduce potential amenity impacts to nearby Port Kembla residents.

The use of CCTV to monitor access to the site during operations may be considered to enhance security, public safety and operational management requirements.

Noise and vibration

Construction

It is envisaged that the NMP would consider the following at a minimum in accordance with the Construction Noise Strategy (TfNSW, 2016):

- The nearby residences and other sensitive land uses.
- The noise management levels identified in this assessment.
- Address the potential impact from the proposed construction methods through the use of strategies including:
 - Construction would be carried out during standard working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
 - Orientating noise emitting plant away from sensitive receivers and locating louder machinery away from sensitive receivers where possible.
 - Use quieter and less vibration emitting construction methods where feasible and reasonable.
 - Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site.
 - A monitoring program to assess performance against relevant noise and vibration criteria
 - Construction works can occur up to 5 metres from buildings and comply with safe working distances for sensitive receivers.
- Develop reactive and proactive strategies for dealing with any noise complaints including:
 - Notification of nearby receivers
 - Set up the use of a complaints hotline Identify a site contact person to follow up complaints.

<u>Operation</u>

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An Operational Noise and Vibration Review is to be undertaken during detailed design to ensure that potential impacts arising during operation are identified and mitigated to the largest extent possible. To minimise noise impacts during operations the following measures are recommended:

- Ensure plant and equipment are selected and maintained to achieve the sound power levels outlined in the acoustic assessment report;
- Use non-tonal reversing alarms in place of traditional beeper reversing alarms;



- Route material trucks through the load area in a forward direction only;
- Ensure plant and equipment is well maintained and not generating excessive noise.
- Avoid the use of horns and alarms;
- Trains shall be powered off when not in use;
- Use of material to construct a noise barrier berm to shield receivers to the south of the Illawarra Modal Transfer Facility site. This mitigation measure has been incorporated into the noise modelling; and
- Where possible night time unloading of material at the Illawarra Modal Transfer Facility should be avoided.

Road Traffic Noise

In order to manage noise from road traffic associated with the Proposal, road traffic noise management should also be included as part of the OEMP. These management plans would identify routes associated with the Proposal.

Measures to assist in the management of road traffic noise should include staff and contractor education and training of road traffic noise impacts during site inductions for both the construction and operational phases of the Proposal. The education should include educating drivers on appropriate driving behaviours to minimise noise generation. This would include adhering to posted speed limits, turning off the engine when not in use and avoiding aggressive acceleration and driving styles.

Indigenous heritage

All construction staff would receive basic training in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to both the Aboriginal and non-Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.

If unexpected Aboriginal objects or sites are located during works, all works must stop in the vicinity of the find, and the Transport for NSW environmental representative would be notified who would then notify other relevant parties including OEH, Local Aboriginal Land Council (LALC) and an archaeologist. Works would not recommence at the location until notification is provided by the Transport for NSW environmental representative. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.

Non-indigenous heritage

Impacts to the Avenue of Mature Trees and the Locomotive Workshop Gardens at the Chullora Rail Yard would be avoided to preserve them in their current setting. However, if the trimming or removal of vegetation is required, additional approval from the Transport for NSW environmental representative would be required, and would be undertaken in accordance with the Conservation Management Plan;

A site inspection and archival record shall be undertaken during detailed design for the Proposal to identify any physical remains requiring mitigation and record changes to aesthetic impacts to the CRM site. The archival recording is to include information collected prior to construction and at the completion of the Proposal;

All workers would be provided with an environmental induction prior to commencing work on-site to be made aware of the heritage sensitives of the site;

Avoid direct impacts where possible to elements of heritage significance identified during the site inspection;

No works or activities are to occur outside of the Proposal site, or which may impact on heritage items without prior consultation with a heritage specialist regarding the potential impacts of this work and approval from Transport for NSW. Works outside the Proposal footprint would be

prevented by delineation of the works area;

If previously unidentified non-Indigenous heritage/archaeological items are uncovered during construction works, all works in the vicinity of the find shall cease, the TfNSW environment manager notified, and appropriate advice shall be sought by from a suitably qualified heritage consultant (and in consultation with the OEH Heritage Branch where appropriate). Works in the vicinity of the find shall not re-commence until clearance has been received from the heritage consultant.

Biodiversity

A Fauna Management Plan (FMP) would be developed with consideration of the appropriate existing GGBF management plans to ensure there is no harm to GGBF and other fauna. Mitigation measures may include:

- Fenced and signposted exclusion zones to prevent access into surrounding habitats;
- Installation of frog proof fencing were appropriate;
- Pre-construction surveys;
- Pre-clearance protocols such as, inspecting spoil dump areas for fauna prior to unloading trucks and trains;
- Response protocol in the event fauna is found within the work area, including a nominated ecologist for the site;
- Frog handling procedure in accordance with guidelines; and
- Where necessary fauna fencing to deter access to the work area.

All workers would be provided with an environmental induction prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures outlined in the FMP to be implemented to protect biodiversity and penalties for breaches and would be developed in accordance with the appropriate existing management plans.

No vegetation would be disturbed as part of the Proposal. Should vegetation trimming or removal be required then approval from the Transport for NSW environmental representative would be required.

If weed species are impacted by the proposed works, removal would be undertaken in accordance with appropriate management standards to avoid their spread within the surrounding area. Weed containment during the construction phase of the project should comprise the management and disposal of the following weeds that are known to occur within the rail corridor:

- Exotic perennial grasses, such as *Chloris gayana, Melinis repens* and *Pennisetum clandestinum;*
- Exotic vines, such as Asparagus aethiopicus, Asparagus asparagoides, Hedera helix, Ipomoea indica and Tradescantia fluminensis; and
- Noxious weeds of Adenophora, Tenuifolia, asparagoides, Lantana camara and Rubus fruticosus, in accordance with the Noxious Weeds Act 1993.

Vehicles and other equipment to be used on site would be cleaned to minimise seeds and plant material entering the site to prevent the introduction of further exotic plant species.

Contamination, landform, geology and soils

A contamination assessment should be completed for soil disturbance associated with construction activities at both modal facilities. The contamination assessment should be completed by a suitably qualified environmental consultant and prepared in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011a) and the *National Environment Protection (Assessment of Site Contamination) Measures 1999*, as amended 2013 (NEPC, 2013).

Areas of contamination identified during the Proposal requiring remediation should be undertaken

in accordance with State Environmental Planning Policy No 55 - Remediation of Land (SEPP 55).

Any surplus spoil excavated during construction and/or improvements at either modal facility should be assessed for suitability for reuse in accordance with the NEPM (NEPC, 2013). Any material intended for offsite disposal should be assessed in accordance with the NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014).

The Sydney Modal Transfer Facility is situated on land that may be impacted by salinity. As such, any areas of ground disturbance should be assessed for salinity in accordance with the *Site Investigations for Urban Salinity* (OEH, 2002).

The Illawarra Modal Transfer Facility is situated on land that may be impacted by ASS. As such, any areas of ground disturbance should be assessed for ASS in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998).

The location of temporary surge piles at the Sydney and Illawarra modal transfer facilities could be capped with a layer of material that would reduce the likelihood of cross contamination occurring. A suitable capping layer could be VENM that has been crushed and compacted. At the completion of the project the capping layer would be classified as per the NSW EPA guidance and disposed of offsite at a suitably licenced facility.

An unexpected finds protocol (UFP) should be developed for the proposal. The UFP should prescribe a procedure for managing unexpected finds of potentially contaminated material and dangerous conditions. Site employees should be educated on the implementation of the UFP.

An EPL would be issued by the NSW EPA for the operation of the proposal. The proponent should liaise with the EPA to confirm if the EPL would be a modification to existing EPL(s) or a stand-alone Proposal EPL.

The requirements and conditions provided in the EPL (once issued) would be complied with throughout the proposal.

A suitable material reconciliation procedure would be developed for the proposal. The procedure should be developed in consideration of Section 3.5.6 and the EPL (once issued).

Suitable construction and operational QA/QC procedures including:

- VENM spoil should be visually inspected when excavated and loaded into trucks for haulage to the Sydney Modal Transfer Facility. Machine operators and supervisors at the source site should be competent at identifying indications of contamination such as odours, staining and anthropogenic waste including asbestos.
- Material suspected of not satisfying the NSW EPA definition of VENM and/or the geological description of the spoil material as provided in the VENM classification report should be segregated in a separate stockpile and classified by a suitably qualified environmental consultant.
- Temporary surge piles areas are expected to be established at the interchange of spoil transfer mediums at the Sydney and Illawarra modal transfer facilities. A surge pile would be established at the Sydney Modal Transfer facility when delays occur in the transfer of spoil from truck to train and at Illawarra Modal Transfer Facility when delays occur in the transfer of spoil from train to truck.
- Surge piles would be established at approved locations only, which would be situated away from potential contamination sources (such as chemical and fuel storage facilities) and potentially sensitive receivers (such as endangered ecological communities and community areas).
- VENM spoil should be inspected when deposited to a surge pile. The site supervisor at the Sydney and Illawarra modal transfer facilities should be competent at identifying indications of contamination such as odours, staining and anthropogenic waste including asbestos.



- Material suspected of not satisfying the NSW EPA definition of VENM and/or the geological description of the spoil material as provided in the VENM classification report should be segregated in a separate stockpile and classified by a suitably qualified environmental consultant.
- A procedure would be established to ensure that train wagons are in suitable condition for receipt of VENM at the Sydney Modal Transfer Facility. A wagon considered to be in suitable condition would be one that does not pose a risk of cross contamination.
- The site supervisor at Sydney Modal Transfer Facility should undertake a 'spot check' of wagons prior to loading, for example one in five, to ensure that wagons do not contain significant quantities of residual load that would not satisfy the NSW EPA definition of VENM.
- The logistics coordinator for the proposal should ensure that trains engaged for haulage of VENM spoil have not, on their prior haul, hauled potentially contaminated or contaminating material such as restricted solid waste, hazardous waste or material impacted by acid sulfate soils.
- Wagons that are identified as unsuitable should be appropriately cleaned to eliminate cross contamination risk or excluded from haulage of VENM.
- Plant and machinery, including excavators and loaders, should be inspected prior to use to ensure that the bucket does not contain residual material that would not satisfy the NSW EPA definition of VENM.
- Wagons that are identified as unsuitable should be appropriately cleaned to eliminate cross contamination risk or an alternate item of plant used.

Hydrology and water quality

Sediment and erosion control measures should be installed in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004). Measures would be installed prior to the commencement of any construction works and should include silt fencing downstream of the works to prevent the movement of sediment off site and checking and maintenance of the controls on a regular basis.

During detailed design, options for site bunding is to be considered to allow 'catch points' where materials can be prevented from leaving the site during both construction and operation.

It is understood that the proposed equipment, while mobile in its nature, is not feasible to be removed during storm events due to the time needed to cease operations and the possible lack of warning of an oncoming storm. The equipment would therefore remain in place during such an event. The equipment to be installed would likely be able to withstand some minor flooding, however, damage to equipment during larger storm events from floating debris or electrical issues may arise. Consideration should therefore be given to the flood compatibility of components to be installed in this area. Should these components require flood immunity, it is recommended that the flood model is updated to better represent existing conditions and to investigate potential mitigation measures. The excavated pit beneath the unloading conveyor would likely experience frequent nuisance flooding and may require regular pumping out to remove flood waters.

It is understood that the operation of the facility is weather dependent and would therefore cease during heavy rainfall. It is recommended that works cease on site should any sheet flow be present across the access road, or if the gutter flow width exceeds 1.5 metres in order to reduce danger to human life and the amount of potential floating debris and flood hazards. Safe evacuation from the site, or to a level above the PMF flood extents, should be considered. Due to the elevated level of the staging/stockpiling area, a stay-in-place approach is considered acceptable for any trucks remaining on site (in the loading and surge pile area) when work cessation is implemented. It is recommended that a Flood Emergency Evacuation Plan (FEEP) is provided for the site during subsequent design phases.

If required, equipment would be refuelled within fully bunded areas with a spill kit available in a quickly accessible location. Any refuelling is to occur as far from sensitive areas as possible,



within a designated zone.

Placement of equipment should be as far from the creek line as possible and no works or equipment are to occur within two metres of either side of the creek banks. The conveyor shall not stand within the creek.

Air quality

The project CEMP would incorporate air quality management requirements in the CEMP for each site including:

- The potential for contamination to be present in excavations, and associated (offsite) air quality management requirements.
- Measures for the control of dust from excavation and emplacement of fill as outlined in the AQMP mitigation measure below
- Maintenance of unsealed areas of the site in a condition that minimises potential for soil erosion (e.g. undisturbed crusted gravel materials and vegetation).

A Proposal specific Air Quality Management Plan (AQMP) should be prepared that addresses the following control measures:

- Haul truck operations:
- Maintenance and cleaning of internal sealed road surfaces.
- Application of vehicle speed limits.
- Ensuring that vehicles are restricted to designated vehicle paths with the objective of minimising areas of erodible surface material; properly maintained and operating efficiently and not left with engines idling for extended periods.
- Maintenance of unsealed areas of the site in a condition that minimises potential for soil erosion (e.g. undisturbed crusted gravel materials and vegetation).
- Maintaining visual awareness of vehicle movements with the objective of identifying and addressing the presence of visible dust emissions.
- Use of wheel wash for vehicles exiting unsealed areas of the Site.
- Inspection and additional cleaning of undercarriage where required.
- Ensuring that all trucks transporting soil are covered when exiting the Site.
- Ensuring that vehicle tailgates are properly sealed, such that loose material is not deposited onto road surfaces.

Unloading/unloading of spoil:

- Maintenance of material moisture content of spoil where practical and feasible.
- Maintenance of material handling equipment to operate in a proper and efficient manner.
- Enclosure of conveyor transfer/drop points.
- Use of height adjustable (or suitably positioned) loading arms.

Surge pile operations:

- Minimisation of surge pile areas.
- Periodic watering of surge pile areas to promote crusting of surge pile surfaces and to prevent uncontrolled emissions
- Application of sprays to surge piles where high winds are expected and/or present.

Wind erosion from the general site:

- Maintenance of clean road surfaces (where sealed).
- Restriction of vehicles to designated vehicle paths.



Cumulative impacts

Once construction timing has been determined, a search of projects proposed at the same time would be undertaken and, if necessary, coordination between projects would be discussed between the appropriate project teams.

Construction impacts

Transport for NSW would liaise with Sydney Trains and BlueScope Steel during the design development to ensure that the proposed design aligns with current operations on site, with any measures required to guide construction or operations of Proposal brought into the relevant CEMP or OEMP.

Construction environmental management

A CEMP for the construction phase of the Proposal would be prepared by the construction contractor appointed for the Proposal. The CEMP must be approved by the Transport for NSW environmental representative prior to the commencement of works. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP document would incorporate the following as a minimum:

- Transport for NSW Environmental Management System (EMS);
- Recommendations and mitigation measures outlined in Section 7.2 this REF;
- Any conditions from licences, permits or other approvals issued by government authorities for the Project, all relevant legislation and regulations, and accepted best practice management
- Guideline for the Preparation of Environmental Management Plans (Department Infrastructure, Planning and Natural Resources, 2004);
- AS/NZS ISO 14001 Environmental Management Systems; and
- A process for demonstrating compliance with such mitigation measures and conditions.

It is expected that a CEMP would be prepared for construction phase of works prior to works commencing. An outline of the specific CEMP requirements is provided below to assist in the preparation of the final CEMP. Transport for NSW would ensure that the requirements prescribed within the CEMP and any additional environmental management documentation for the Proposal would also:

- Include an Environmental Policy;
- Clearly define the purpose, objectives and scope of the CEMP;
- List any relevant approvals, conditions and any other documents incorporated into approvals or commitments relating to the environment or relevant legislation;
- Assess any environmental risks and prescribe appropriate mitigation and control measures to reduce or eliminate risks;
- Include measures used to control the occurrences of any pollution incident;
- Ensure effective emergency response equipment (in the form of spill kits, personnel protective equipment) is located in areas of potential hazard;
- Minimise and manage the disturbance area and protect vegetation and soil outside of the disturbance area during construction;
- Ensure appropriate measures are in place to control stormwater and silt runoff during construction. Measures include the installation, monitoring and maintenance of silt fencing and clean water diversion drains;
- Details of the stormwater drainage and erosion control features proposed would be incorporated into the Erosion and Sediment Control Plan in the CEMP. Compliance with all such protection measures outlined in the Soil and Water Management Plan and CEMP would



be mandatory;

- Manage noise, vibration and dust impacts during construction;
- Manage traffic movements during construction;
- Manage any Aboriginal artefacts or non-Aboriginal relics discovered during construction;
- Manage air quality impacts during construction including dust suppression;
- Manage impacts to flora and fauna, including the GBBF and the management of weeds;
- Ensure waste streams are identified and that they are appropriately managed;
- Follow the measures to be provided in the Pollution Incident Response Plan to be developed for the Proposal as part of the CEMP and OEMP;
- Contain detailed baseline data and the relevant limits, or performance measures, or criteria to allow judgement of performance and to provide a guide for the implementation of any management measures that may be required;
- Provide a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
- Provide a program to monitor and report on the impacts and environmental performance of the Proposal; as well as the effectiveness of any management measures;
- Provide a program to investigate and implement ways to improve the environmental performance of the Proposal over time;
- Establish and implement a protocol for managing and reporting any environmental incidents, complaints, non-compliance with statutory requirements and/or exceedance of safety/impact performance criteria and to periodically review the plans that are in place;
- Ensure effective communications are provided to all staff in the form of inductions, operating procedures, training sessions and signage to inform personnel of operational hazards, controls and emergency response planning, preparedness and response; and
- Standard construction hours would be utilised for the duration of construction works to reduce noise impacts, and should any work outside these standard hours be required then the Contractor would ensure appropriate controls are in place, i.e. the noise does not exceed noise affected RBL + 5dBA, and that the work does not create any significant impacts to surrounding residents.



8. Conclusion

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This REF has been prepared in accordance with the provisions of Section 111 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following key benefits:

- Reduce the number of heavy vehicle kilometres travelled on NSW roads generated through road infrastructure construction leading to reduced congestion and vehicle emissions; and
- Improve road safety outcomes for NSW through a reduction in the number of heavy vehicle kilometres travelled.

The key likely impacts of the Proposal are as follows:

- Heavy vehicle movements generated in proximity to the modal transfer facilities (shifted away from areas of existing activity);
- Noise impacts associated with the proposed transport movements, along with the movement and transfer of material; and
- Impacts on the current operations undertaken at the modal transfer facilities.

This REF has considered and assessed these impacts in accordance with Clause 228 of the EP&A Regulations and the requirements of the EPBC Act (refer to Section 6, Appendix 1 and Appendix 2). Should the Proposal proceed, these impacts would be effectively managed through the Proposal specific CEMP and mitigation measures (refer to Section 7.2) and in accordance with the CoA. As a result, these environmental impacts are not considered to be significant. Accordingly an EIS is not required.

The Proposal has also taken into account the principles of ESD (refer to Section 4.1). These would be considered further during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit of the community, is cost effective and minimises any adverse impacts on the environment.



References

- AECOM and GHD, 2015. *M4 East WestConnex EIS*. WestConnex Delivery Authority, Sydney, NSW
- ASSMAC, 1998. Acid Sulphate Soils Assessment Guidelines. ASSMAC, Wollongbar, NSW
- Australian Bureau of Statistics, 2011. 2011 Census QuickStats Canterbury, viewed 16 December 2016, http://www.abs.gov.au/census
- Bewsher and BMT, 2009. *Greenacre Park Stormwater Catchment Flood Study*. Bankstown City Council, Epping, NSW
- Bluescope, 2016. Management of Threatened Species, the Green and Golden Bell Frog, Litoria aurea Plan. BlueScope, Wollongong, NSW
- Biosis. 2016. Chullora Railway Workshops: Heritage Assessment and Statement of Heritage Impact, Sydney, NSW
- Cardno, 2016a. Spoil Management Feasibility Project, Wollongong, NSW
- Cardno, 2016b. Technical Memorandum Spoil Management Pathway Project Traffic Assessment, Sydney, NSW
- Department of Planning and Environment, 2015. *Illawarra Shoalhaven Regional Plan.* NSW Government, November 2015.
- DEWHA, 2009. Significant impact guidelines for the vulnerable green and golden bell frog (Litoria aurea). Nationally threatened species and ecological communities EPBC Act policy statement. Department of the Environment, Water, Heritage and the Arts.
- Department of Premier and Cabinet, 2011. *NSW 2021: A Plan to Make NSW Number One.* Department of Premier and Cabinet, September 2011.
- Ecoplanning, 2016. Assessment of Environmental Constraints, Chullora Rail yard, Sydney, NSW
- EPA, 2000. NSW Industrial Noise Policy, EPA, Sydney, NSW
- EPA, 2014. Waste Classification Guidelines. NSW EPA, Sydney, NSW
- OEH, 2002. Site Investigations for Urban Salinity. OEH, Sydney, NSW
- OEH, 2005. Floodplain Development Manual; The management of flood liable land. OEH, Sydney, 2005.
- OEH, 2011a. Guidelines for Consultants reporting on Contaminated sites. OEH, Sydney, NSW
- OEH, 2011b. Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW. OEH, Sydney, NSW.
- OEH, 2016. *Atlas of NSW Wildlife,* accessed at *http://www.environment.nsw.gov.au/atlasapp/Default.aspx?a=1*
- DEC, 2005. Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW. DEC, NSW.
- DEC, 2006. Assessing Vibration: a technical guideline. DEC, Sydney, NSW
- DECC, 2007. Management plan for the Green and Golden Bell Frog Population at Greenacre. DECC, Sydney, NSW
- DECCW, 2009. Interim Construction Noise Guidelines. DECC, Sydney, NSW



DECCW, 2010. Due diligence code of practice for the protection of Aboriginal objects in New South Wales. DECCW, Sydney, NSW

DECCW, 2011. NSW Road Noise Policy. DECCW, Sydney, NSW

- DPC, 2011. NSW 2021: A plan to make NSW number one. DPC, Sydney, NSW
- DP&E, 2013. NSW Freight and Ports strategy. DP&E, Sydney, NSW
- DP&E, 2014. Draft Illawarra Regional Growth and Infrastructure Plan. DP&E, Sydney, NSW
- DP&E, 2016. Illawarra Shoalhaven Regional Plan. DP&E, Sydney, NSW
- Greater Sydney Commission, 2016. Draft South District Plan. Co-creating a Greater Sydney. Greater Sydney Commission, November 2016.
- GSC, 2016. Draft South District Plan. GSC, Sydney, 2016
- Transport for NSW, 2012. *NSW Long Term Transport Master Plan*. Transport for NSW, Sydney, NSW, December 2012
- Transport for NSW, 2013. NSW Ports and Freight Strategy. Transport for NSW, Sydney, NSW, November 2013Transport for NSW, 2016. *Construction Noise Strategy (7TP-ST-157/2.0)*, Transport for NSW, Sydney, NSW
- Pacific Environment Limited, 2017a. Spoil Management Pathway Chullora Rail Yard– Noise and Vibration Assessment, Sydney, NSW
- Pacific Environment Limited, 2017b. Spoil Management Pathway Commonwealth Rolling Mills – Noise and Vibration Assessment, Sydney, NSW
- Pacific Environment Limited, 2017c. Spoil Management Pathway Air Quality Impact Assessment, Sydney, NSW
- Hoogendoorn W (Ed) (1999). Roadstead to World Class Port Celebrating the Port's Centenary of service to the Illawarra 1898 - 1998. Port Kembla Port Corporation, Port Kembla NSW.
- WHO (2011). World Health Organization Air Quality and Health Fact Sheet Number 313 viewed 12 December 2017 http://www.who.int/mediacentre/factsheets/fs313/en/index.html



Appendix 1 – Consideration of Clause 228 factors

The table below demonstrates Transport for NSW's consideration of the specific factors identified within Clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
Any environmental impact on a community?	□ nil
The Proposal is not likely to generate unacceptable impacts on	⊠ minor
during construction, however mitigation measures have been identified to minimise these impacts.	□ significant
Any transformation of a locality?	⊠ nil
The Proposal is not likely to transform a locality. The proposed use is	□ minor
consistent with existing uses.	significant
Any environmental impact on the ecosystem of the locality?	⊠ nil
The Proposal is not likely to impact on the ecosystems of the locality	□ minor
provided the specified mugation measures are implemented.	□ significant
Any reduction of the aesthetic, recreational, scientific or other	🗆 nil
environmental quality or value of a locality? The Proposal is unlikely to reduce the aesthetic recreational scientific or	⊠ minor
other environmental quality or value of the locality once operational.	significant
Any effect on a locality, place or building having aesthetic,	🗆 nil
anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or	☑ minor
future generations?	significant
The Proposal is not likely to have a negative impact on a locality, place or building which have aesthetic, anthropological, archaeological	
architectural, cultural, historical, scientific or social significance or any	
Any impact on the habitat of protected fauna (within the meaning of	⊠ nil
the National Parks and Wildlife Act 1974)?	
Impacts are not expected with the implementation of the specified mitigation measures	
Any endangering of any species of animal plant or other form of life	
whether living on land, in water or in the air?	
The assessment has found that no species would be endangered as a result of the Bronesal	
Any long torm officite on the environment?	
It is unlikely that there would be long term effects on the environment. The	⊻ mi
Proposal would have an overall long term benefit by decreasing truck	
movements and decreasing GHG emissions.	
Any degradation of the quality of the environment?	🗆 nil
measures would avoid these impacts.	⊠ minor
· ·	□ significant
Any risk to the safety of the environment?	⊠ nil



Factor	Impacts
The Proposal would improve the safety by removing heavy vehicles from the road petwork	□ minor
	□ significant
Any reduction in the range of beneficial uses of the environment?	⊠ nil
It is unlikely that there would be a reduction in the range of beneficial uses of the environment.	□ minor
	significant
Any pollution of the environment?	🗆 nil
Safeguards are to be implemented which would minimise any pollution of the environment	☑ minor
	□ significant
Any environmental problems associated with the disposal of waste?	□ nil
Safeguards and mitigations measures are proposed. It is not expected that there would be any problems associated with the disposal of waste.	☑ minor
	□ significant
Any increased demands on resources (natural or otherwise) that are,	⊠ nil
or are likely to become, in short supply?	□ minor
Demand on resources is not expected.	□ significant
Any cumulative environmental effect with other existing or likely	🗆 nil
There is unlikely to be current or future cumulative effects with existing or	☑ minor
future activities.	□ significant



Appendix 2 – Consideration of matters of national environmental significance

The table below demonstrates Transport for NSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to the Commonwealth Department of the Environment and Energy.

Factor	Impacts
Any impact on a World Heritage property?	⊠ nil
The Proposal is not located near a World Heritage property.	□ minor
	significant
Any impact on a National Heritage place?	⊠ nil
The Proposal is not located hear a National Heritage place.	□ minor
	significant
Any impact on a wetland of international importance?	⊠ nil
importance.	□ minor
	significant
Any impact on a listed threatened species or communities?	🗹 nil
habitats.	□ minor
	significant
Any impacts on listed migratory species?	⊠ nil
habitats.	□ minor
	□ significant
Any impact on a Commonwealth marine area?	⊠ nil
The Proposal is not located hear a Commonwealth manne area.	□ minor
	significant
Does the Proposal involve a nuclear action (including uranium mining)?	⊠ nil
The Proposal does not involve a nuclear action.	□ minor
	significant
Additionally, any impact (direct or indirect) on Commonwealth land?	⊠ nil
No direct of indirect impact to Commonwealth land is expected.	□ minor
	significant



Appendix 3 – Traffic Impact Assessment


Appendix 4 – Noise and Vibration Assessment



Appendix 5 – Statement of Heritage Impact



Appendix 6 – Assessment of Ecology Constraints



Appendix 7 – Air Quality Assessment



Appendix 8 – Aboriginal Heritage Information Management System Search