

15 VISUAL AMENITY, URBAN DESIGN AND LANDSCAPE

Reid Campbell and GroundInk have undertaken an assessment of the visual, landscape and urban design impacts associated with the Proposal to address the SEARs. The Visual Impact Assessment (Reid Campbell, 2016) and the Light Spill Assessment (Arcadis, 2016) are included in Appendix R of this EIS; and the Landscape Plan (GroundInk, 2016) is provided in Appendix E of this EIS.

Table 15-1 provides a summary of the relevant SEARs, which relate to visual, landscape and urban design, and where these have been addressed in this EIS.

Table 15-1 SEARs (Visual, Landscape and Urban Design)

SEARs	Where addressed
10. Visual Amenity, Urban Design and Landscaping – including but not limited to an assessment of visual impacts. The assessment shall:	
a) include a description of the visual significance of the affected landscape including an analysis of views from key vantage points	Section 15.4 Appendix R
b) include artist's impressions of the development from key vantage points	Section 15.4 Appendix R
c) assess the visual impact of the project on the landscape character of the area, including built form (materials and finishes) and the urban design (height, bulk and scale) of the proposal including views to and from the site	Section 15.4 Appendix E and R
d) consider lighting impacts in the local area, analyse and describe the contribution and impacts of the proposed facility on light at the local scale and sensitive receivers	Section 15.4 Appendix R
e) include details of hard and soft landscaping treatment and design (including details of suitable landscaping incorporating endemic species)	Section 15.4 Appendix E
f) ensure the layout and design of the development has regard to the surrounding vehicular, pedestrian and cycling networks	Section 15.4 and 7
g) propose management/mitigation measures to address the visual impact of the proposal	Section 15.5 Appendix E and R

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to visual, landscape and urban design (refer to Table 15-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 15.1) and, more recently, for the Proposal. This section of the EIS also summarises the methodology used to assess visual, landscape and urban design-related impacts of the Proposal (section 15.2), describes the existing environment as it relates to visual, landscape and urban design (section 15.3) and provides an assessment of visual, landscape and urban design impacts associated with construction and operation of the Proposal (section 15.4). Measures to mitigate potential visual, landscape and urban design impacts where they are required have been identified in section 15.5.

15.1 Concept Plan Assessment

An *Urban Design and Landscape Report* (Reid Campbell 2012) was prepared for the Concept Plan Approval. The report found that the MPE Project would integrate into the surrounding land form and surrounding development through the use of architecturally designed structures, landscaping and select vegetation removal.

A *Visual Impact Assessment* undertaken for the Concept Plan Approval involved the preparation of a 3-dimensional massing model to inform the likely maximum and realistic visual impact at key viewpoints. The modelling was based on siting, setback, height, landscaping and general design principles described in the *Urban Design and Landscape Report* for the MPE Project.

The assessment stated that the MPE Project would generally be in keeping with the existing character of the area. However, some relatively high and/or bulky structures/equipment may increase the visibility of the MPE site beyond its current levels, with some limited and localised visual impacts. Generally, the existing development surrounding the MPE site will screen the development from most of the surrounding area.

Overall, the most prominent views of the development would occur at localised boundary points at Moorebank Avenue and Anzac Road and at potentially impacted residential properties, however these impacts are regarded as relatively low because of these areas currently have varying views of the existing industrial characteristics of the MPE site and linear infrastructure contained within the Rail Corridor which are considered reasonably compatible with the MPE Project. A number of mitigation measures including landscaping, planting and built-form screening are recommended to reduce this overall impact.

In addition to this a light spill analysis was undertaken concluding the light spill to residential properties, from the MPE Project, would be well within the required criteria as specified in Australian Standard AS4282-1997 '*Control of Obtrusive Effect of Outdoor Lighting*'.

Based on the recommendations of the *Visual Impact Assessment and the Urban Design and Landscape Report*, the Revised Statement of Commitments, included in the Response to Submissions for the Concept Plan (2014), committed to the following mitigation measures:

- *The Proponent commits to the preparation and submission of a Landscape Management Plan with the detailed applications for the three major stages of the development that address each of the objectives and design principles contained within the Urban Design and Landscape report and the following mitigation measures:*
 - *High quality landscaping throughout the site, which will reinforce and extend the surrounding natural context and ecological qualities into the site*
 - *Inclusion of an 18 metre wide corridor of screening vegetation and bio-retention swale along the Moorebank Avenue frontage, which will utilise a selection of native tree species with dense tree canopy and low screen planting*
 - *Landscape punctuation of nodal point along Moorebank Avenue*
 - *A 'boundary treatment' or 'buffer zone' along the other site boundaries consisting of existing local species in the area and providing an essential scale of planting to complement the built form including:*
 - *Southern boundary: combination of 10 metre and 20 metre wide landscape corridors and a bio-retention swale adjacent to the warehouse and distribution facilities and Intermodal Terminal*
 - *Eastern boundary: total buffer zone of 13.5 metres consisting of 2.5 metre landscape corridor, a 6 metre internal light vehicle access road and a five metre wide bio-retention swale*
- *The Proponent will use lighting which is in accordance with Australian Standard AS4282-1997 'Control of Obtrusive Effect of Outdoor Lighting', The height of the permanent light poles will a maximum of 40 metres and reduced in height, where possible, to minimise potential light spill while maintaining appropriate safety standards.*

15.2 Methodology

The following methodology was undertaken for assessment of potential visual impacts of the Proposal.

Table 15-2 Visual impact assessment method

Assessment method	Description
Visual impact assessment methodology	
Viewpoint identification	The viewpoints selected were re-created to be consistent with those represented in the Reid Campbell Visual Impact Assessment prepared for the MPE Concept Plan EIS. The viewpoints are identified further in Table 15-3 and Figure 15-1.
Site inspection	Through site inspection and desktop review, Reid Campbell has visually evaluated the existing character of the area and specifically confirmed the relevance of locations that would potentially be subject to visual impacts from the Proposal. Photographs were taken by Reid Campbell from key viewpoints using a GPS Camera for later use in visual simulations of the development.
Visualisation of the development	Based on the built form and urban design principles outlined in the MPE Concept Plan (MP10_0193) (in particular maximum height and scale), Reid Campbell created a digital 3D model using Autodesk REVIT which included the components of the development that would potentially be visible beyond the site. Computer generated views of the model matching the camera positions of photographs taken from the key viewpoints were created and combined with the photographs to create simulated massing montages of the Proposal from each of these key locations.
Assessment of visual impact	The visual impact from the key viewpoints was then assessed qualitatively on the basis of the criteria described in Table 15-4. Views at a variety of distances from the MPE site were considered, however it is noted that the MPE site is primarily surrounded by vast amounts of vegetation to the east and the MPW site to the west providing an extensive buffer to local residential areas and sensitive receivers.
Light spill assessment methodology	
Lighting concept	A lighting concept for the Proposal was developed by Arcadis, based on the operational requirements and to be compliant with Australian Standard AS4282- 1997, 'Control of Obtrusive Effects of Outdoor Lighting' for the floodlighting system. The light spill was then modelled using agi32: version 2.02 and Visual lighting design software, provided by light lab international software.

The viewpoint locations are identified in Table 15-3 and shown in Figure 15-1.

Table 15-3 Viewpoint locations

Viewpoint ID	Location	Type
View 01	West of site, Corner of Casula Road and Canberra Avenue, Casula	Residential
View 02	West of site, Rushton Place Casula	Public space
View 03	West of site, adjacent to Casula Powerhouse	Public space
View 04	West of site, Carroll Park, Casula	Public space
View 05	West of site, Carroll Park, Casula	Public space
View 06	West of site, Buckland Road, Casula	Residential
View 07	North-west of site, Adjacent to St. Andrews Boulevard, Casula	Public road/Industrial
View 08	North of site, Corner of Yulong Close and Anzac Road.	Public road/Industrial
View 09	North of site, Corner of Greenhills Road and Anzac Road	Industrial
View 10	North-East of site, Anzac Road	Residential/Industrial
View 11	North-East of site, Castlerock Court, Wattle Grove	Residential
View 12	East of site, Martindale Court, Wattle Grove	Residential
View 13	East of site, Martindale Court, Wattle Grove	Residential
View 14	East of site, Gracemere Court, Wattle Grove	Residential
View 15	East of the site, adjacent to Corryton Court, Wattle Grove	Residential
View 16	South-East of site, Somercots court, Wattle Grove	Residential
View 17	South of site, Moorebank Avenue	Road
View 18	South of site, Moorebank Avenue	Road
View 19	South of site, Moorebank Avenue	Road
View 20	West of site, Moorebank Avenue looking north	Road
View 21	North-West of site, Moorebank Avenue	Road
View 22	North of site, Corner of Moorebank Avenue and Anzac Road	Road
View 23	Corner of Moorebank Avenue and road marked as DS NNSW LMA	Road



Figure 15-1 Viewpoint locations

The visual impact of the selected viewpoints were evaluated on a qualitative basis. The visual impact of the Proposal was assessed using a range of criteria against which the relative importance of each observer location was determined, including: context, setting, site elements, site character, adjacent development, distance to view (foreground, middle-ground and background), land use, visual prominence of the development, and potential changes to the view setting.

For each viewpoint, these criteria were addressed under three categories, described in Table 15-4 below.

Table 15-4 Visual impact assessment criteria

Criteria	Description
Visual adaptation	Visual adaptation describes any significant changes to the landscape and visual amenity that is likely to occur as a result of the Proposal from a particular view point, and the ability of that view point to adapt to that change.
Visual sensitivity	Visual sensitivity refers to the likely duration of views and number of observers from a given viewpoint and is independent of the 'prominence' of the Proposal. In locations where visual amenity has a higher perceived importance, and the duration of views and number of observers is greater than surrounding areas, the resulting visual sensitivity is regarded as being higher.
Visual impact	The visual impact is a result of the visual adaptation and the visual sensitivity and is summarised on a qualitative basis.

The resulting overall visual impact rating for each viewpoint was then determined using the following assessment matrix (Table 15-5).

Table 15-5 Overall impact rating as a combination of visual sensitivity and visual adaption

		Visual Adaptation					
Visual Sensitivity		High	Moderate/ High	Moderate	Low/ Moderate	Low	Negligible
	High	High	High	Moderate/ High	Moderate/ High	Moderate	Negligible
	Moderate/ High	High	Moderate/ High	Moderate/ High	Moderate	Moderate	Negligible
	Moderate	Moderate/ High	Moderate/ High	Moderate	Moderate	Low /Moderate	Negligible
	Low/ Moderate	Moderate/ High	Moderate	Moderate	Low/ Moderate	Low/ Moderate	Negligible
	Low	Moderate	Moderate	Low/ Moderate	Low/ Moderate	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

15.3 Existing Environment

The Proposal site is located approximately 2.5 km south of the Liverpool City Centre, 800 m south of the Moorebank Avenue/M5 Motorway interchange and one kilometre to the east of the SSFL providing convenient access to and from the site for rail freight (via a dedicated freight rail line) and for trucks via the Sydney Motorway Network.

The land surrounding the Proposal site comprises:

- The MPW site, formerly the School of Military Engineering (SME), on the western side of Moorebank Avenue directly adjacent to the MPE site (subject to the MPW Concept Plan Approval), which is owned by the Commonwealth;
- The East Hills Rail Corridor to the south of the MPE site, which is owned and operated by Sydney Trains;
- The Holsworthy Military Reserve, to the south of the East Hills Rail Corridor, which is owned by the Commonwealth; The Boot Land, to the immediate east of the MPE site between the eastern site boundary and the Wattle Grove residential area, which is owned by the Commonwealth.
- The southern Boot Land, to the immediate south of the MPE site between the southern site boundary and the East Hills Rail Corridor, which is owned by the Commonwealth.

Glenfield Waste Services, south-west of the Proposal is proposing to develop a Materials Recycling Facility on land owned by the Glenfield Waste Services Group within the boundary of the current landfill site at Glenfield. The facility is proposed to recycle a maximum of 450,000 tonnes of material per year. The Glenfield Waste Services Proposal is the subject of a DA (SSD_6249) under Part 4, Division 4.1 of the EP&A Act.

A number of residential suburbs are located in proximity to the Proposal site. The approximate distances of these suburbs to the MPE Stage 2 site and the Moorebank Avenue site are provided in Table 15-6 below.

Table 15-6 Distance of the Proposal to nearby suburbs

Suburb	Distance to MPE Stage 2 site	Distance to Moorebank Avenue site
Wattle Grove	360 m to the north-east	865 m to the north-east
Moorebank	1300 m to the north	1430 m to the north
Casula	820 m to the west	760 m to the west
Glenfield	1830 m to the south-west	1540 m to the south-west

A number of other sensitive properties and land uses which have been identified in the surrounding area include, but are not limited to:

- Leacock's Reserve located approximately 1,400 m from the Stage 2 site (operational area) to the west.
- Casula Powerhouse located approximately 950 m from the Stage 2 site (operational area) to the west.
- Glenfield Farm (listed on the State Heritage Register) located approximately 1,550 m from the Stage 1 site (operational area) to the west.

The closest industrial precinct to the Proposal is at Moorebank, comprising around 200 hectares of industrial development. This area includes (but is not limited to) the

Yulong and ABB sites to the south of the M5 Motorway and the Goodman MFive Business Park and Miscellaneous industrial and commercial development to the north of the M5 Motorway. The majority of this development is located to the north of the M5 Motorway between Newbridge Road, the Georges River and Anzac Creek. The Moorebank Industrial Area supports a range of industrial and commercial uses, including freight and logistics, heavy and light manufacturing, offices and business park developments.

There are other areas of industrial development near the Proposal at Warwick Farm to the north, Chipping Norton to the north-east, Prestons to the west and Glenfield and Ingleburn to the south-west.

15.4 Potential impacts

This section includes consideration of potential visual impacts during construction, and during the operational elements of the Proposal (including lighting impacts). Visual impacts have taken into consideration the landscaping and urban design measures that would be included in the Proposal.

15.4.1 Construction

Landscape and Urban Design

The construction phase includes a number of temporary structures which would have short term and temporary impacts on the surrounding streetscape. Given the temporary nature of impacts no landscaping measures are considered necessary.

Visual

The following construction works would be likely to be visible from surrounding areas

- Vegetation clearing and building demolition
- Establishment and decommissioning of ancillary facilities, including batch plant
- Earthworks, including stockpiling of material
- Installation of drainage and utilities
- Construction of rail sidings, locomotive shifter and refuelling area
- Construction of access and egress points connecting to Moorebank Avenue, including signage and truck processing gates
- Construction of the administration offices, engineering workshops and services
- Construction of warehousing precinct (including associated infrastructure and services)

During the above works, the most visible elements would likely to be equipment, such as cranes and piling rigs. These would be likely visible from areas such as Moorebank Avenue, the nearby passenger rail lines and potentially nearby residential areas of Casula and Wattle Grove. However, given the low rise nature of construction works, it is unlikely that these works would be more intrusive than the terminal operating equipment. Furthermore, any visual impacts would be localised and temporary in nature.

Other sources of visual impact during construction, such as the establishment of hoardings and construction fencing would potentially create highly localised visual impacts primarily along Moorebank Avenue.

Based on their location and the works proposed, the visual impact during construction has been assessed for the viewpoints identified in Table 15-7 and Table 15-7 using the criteria and ratings defined in Section 15.2.

Table 15-7 Visual impacts during construction

Viewpoint location	Visual Adaptation	Visual Sensitivity	Visual Impact
View 01	Negligible	Moderate	Negligible
View 02	Negligible	Low	Negligible
View 03	Negligible	Moderate	Negligible
View 04	Low/Moderate	Moderate/ High	Moderate/ High
View 05	Moderate	Low	Low/ Moderate
View 06	Negligible	High	Negligible
View 07	Negligible	Moderate	Negligible
View 08	Low/Moderate	Low	Low/Moderate
View 09	Low	Low	Low
View 10	Low	Low/ Moderate	Low/ Moderate
View 11	Low	Moderate	Low/ Moderate
View 12	Low	Moderate	Low/ Moderate
View 13	Low	Moderate	Low/ Moderate
View 14	Negligible	High	Negligible
View 15	Negligible	High	Negligible
View 16	Negligible	High	Negligible
View 17	Negligible	Low	Low
View 18	Moderate	Low	Low/ Moderate
View 19	Moderate	Low	Low/ Moderate
View 20	Moderate	Low	Low/ Moderate
View 21	Moderate	Low	Low/ Moderate
View 22	Moderate	Low	Low/ Moderate
View 23	Moderate	Low	Low/ Moderate

As shown in Table 15-7, the viewpoint with the highest visual impact during construction would be view 04, being Carroll Park, Casula, to the west of the Proposal site. All other viewpoints would experience a visual impact of low/moderate or less.

Given the low-rise nature of the construction works and the low/moderate visual impact (or less) at the majority of viewpoints, it is unlikely that these works would be overly intrusive. Any visual impacts would be localised and temporary in nature for the duration of construction.

Other sources of visual impact during construction, such as the establishment of hoardings and construction fencing would potentially create localised visual impacts primarily along Moorebank Avenue and also in areas visible to Casula.

Light Spill

Lighting would be required during construction of the Proposal to illuminate within ancillary facilities, and on plant and equipment. The impacts of light spill during construction are expected to be minor as it would be localised and temporary in nature. The considerable separation of residential dwellings from the Proposal site would also further reduce the impact of this lighting during the construction of the Proposal. In addition, this lighting would be designed and located to minimise the effects of light spill on surrounding sensitive receivers.

15.4.2 Operation

Landscape and Urban Design

As the Proposed site is bounded to the south by areas of intact native vegetation, the landscape design for the Proposal aims to integrate the Proposed site into the broader environment.

The landscape features included within the Proposal site are described in Table 15-8.

Table 15-8 Landscape features of the Proposal

Location	Description
Main entrance	<p>The landscape of the main site entrance from Moorebank Avenue aims to provide an easily-oriented pathway for visitors and workers of the Proposal site. Vehicular, pedestrian and bicycle entry would all be integrated into one cohesive entry.</p> <p>The key nodal point along Moorebank Avenue is the primary entry point to the operational area of the Proposal at the northern corner of the Proposal site. This access point would include additional features to enhance the arrival experience through the use of a series of selected native plants and recycled materials (where possible) in built-form to create visual interest. This area would also include signage for the Proposal site to help establish a sense of arrival and coherent address. Other directional signage would be located in proximity to assist way-finding throughout the Proposal.</p> <p>Planting, once mature, would provide significant screening between the Proposal site and Moorebank Avenue. This would include a range of local species that have been selected for their unique forms, colours and textures.</p>
Administration areas	Positioned within the Moorebank Avenue screening landscape zone, the administration facility would be carefully integrated into the surrounding landscape setting.

Location	Description
Built form (warehousing and associated infrastructure)	<p>Where built form such as the warehousing and associated infrastructure presents the potential for significant visual impacts, mitigation is implemented through adaptive and considered design. Harmonious colour palettes and high quality finishes/materials allow for limited contrast, attractive design and longevity of amenity.</p> <p>The landscape and built form treatments would result in an improvement in the visual amenity of the entire Proposal site and would increase the current level of screening of the Proposal site.</p>
Moorebank Avenue (part of north-west boundary)	<p>The landscaped setback along the Moorebank Avenue frontage provides a visual screen to the Proposal site from the roadway while reinforcing the identity of the area with the use of local plantings.</p> <p>Along the Moorebank Avenue frontage, a landscaping corridor of screening vegetation would provide an informal street character. This would be reinforced with carefully selected native tree species with a dense tree canopy and lower screen planting. Further screening would be provided by security fencing that traverses the main public interface and at all site boundaries.</p> <p>Along this frontage, a “Boundary Treatment” and “Buffer Zone” would incorporate a landscape treatment consistent with existing local species in the area and provide an essential scale of planting to complement the developments built-form.</p> <p>This treatment would mitigate views from surrounding areas, and the existing tree planting (where retained) along Moorebank Avenue in conjunction with proposed screening and feature walls, would screen a large proportion of potential views from the north-west.</p>
Remainder of western, northern and southern boundaries	<p>Landscaping along the northern, western and southern boundaries visually connects the Proposal site with the greater landscape and provides a biological connection between the site and its greater landscape context.</p> <p>All planting would be informal, with groups of trees, shrubs and swathes of groundcovers. This would serve to enhance the natural characteristics of the landscape. A high diversity of species would help to integrate the Proposal site into the surrounding area.</p> <p>Landscaping would consist of mixed tree planting used to create a natural feeling through landscape zones and mixed under-storey planting consisting of native shrubs and ground covers to form a virtually impenetrable visual barrier when mature.</p> <p>Along the site boundaries, a “Boundary Treatment” and “Buffer Zone” would incorporate a landscape treatment consistent with existing local species in the area and provide an essential scale of planting to complement the developments built-form.</p>

The buildings and structures listed in the Proposal would be of a high design quality. The building colours and finishes would be compatible and blend with the surrounding land uses, including non-reflective colours. A schedule of the indicative colour palette for buildings and structures is provided in the Architectural Drawings (Appendix D of this EIS) and summarised in Table 15-9.

Table 15-9 Materials and finishes

Infrastructure	Item	Indicative Materials	Indicative colour palate
Warehouse	Roof	Metal or translucent sheeting	Mix of: <ul style="list-style-type: none"> Shale Grey
	Structural posts	Steel	<ul style="list-style-type: none"> Light Grey
	Wall	Cladding	<ul style="list-style-type: none"> Windspray
	Feature wall	Precast Panel	<ul style="list-style-type: none"> Dark Grey Highlights of: <ul style="list-style-type: none"> Yellow Dark Green Mid Green Light Green
Security Fence	Palisade fence	Steel	Dulux Black or Dulux Maximus
	Chain wire fence	Chain wire	N/A
Freight village	Roof	Metal, translucent sheeting or fritted glass	Mix of: <ul style="list-style-type: none"> Light Grey
	Windows	Aluminium framed glazing Metal framed louvres	<ul style="list-style-type: none"> Mouse Grey Mid-tone Grey Windspray
	Features	Colour backed glass	<ul style="list-style-type: none"> Dark Grey
	Structural posts	Steel	<ul style="list-style-type: none"> Highlights of: <ul style="list-style-type: none"> Red
	Walls	Aluminium composite panels	<ul style="list-style-type: none"> Light Grey Mid Grey
	Footing walls	Concrete	<ul style="list-style-type: none"> Dark Grey

The landscape and urban design features identified above would promote integration of the Proposal site with the surrounding land uses and minimise the visual impact associated with the Proposal, described below.

Visual

The extensive native bushland areas, Department of Defence facilities on neighbouring lands, the MPW site and the general pattern of industrial type development surrounding the Proposal site screen the Proposal site from much of the greater sensitive surrounding, primarily residential, areas. Furthermore, the landscape and urban design features, described above, would further screen the Proposal site as well as integrate the Proposal site with surrounding land uses, minimising the visual impact.

Potential views would occur along viewing corridors currently experienced from Moorebank Avenue and where topography provides some elevation above potential obstructions to views, such as from Casula to the west.

A summary of the visual impacts is included in Table 15-10. Where the visual and adaption and or impact has been identified as being 'negligible' this is due to there being limited views of the Proposal from that location.

Table 15-10 Summary of visual impacts during operation

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
View 01	Negligible	Moderate	Negligible
View 02	Negligible	Low	Negligible
View 03	Negligible	Moderate	Negligible
View 04	Low	Moderate/high	Moderate
View 05	Low/moderate	Low	Low/moderate
View 06	Negligible	High	Negligible
View 07	Negligible	Moderate	Negligible
View 08	Low/moderate	Low	Low/moderate
View 09	Low	Low	Low
View 10	Low	Low/moderate	Low/moderate
View 11	Low	Moderate	Low/moderate
View 12	Low	Moderate	Low/moderate
View 13	Low	Moderate	Low/moderate
View 14	Negligible	High	Negligible
View 15	Negligible	High	Negligible
View 16	Negligible	High	Negligible
View 17	Negligible	Low	Negligible
View 18	Moderate	Low	Low/moderate
View 19	Low/moderate	Low	Low/moderate
View 20	Moderate	Low	Low/moderate
View 21	Moderate	Low	Low/moderate
View 22	Moderate	Low	Low/moderate
View 23	Moderate	Low	Low/moderate

Table 15-11 details the visual impact from individual key viewpoints identified through the digital viewshed analysis during daylight hours. The visual impacts have included consideration of the landscape and the urban design features described above. Night time visual impacts are discussed below as part of the light spill assessment.

As shown in Table 15-10, the viewpoint with the highest visual impact (moderate) during operation is View 04: Carroll Park and associated residential properties surrounding the park. The viewpoint allows for some visibility of the Proposal, particularly where the tops of warehouses, light poles and operational equipment protrude. Overall, as the Proposal is in keeping with the surrounding land uses and any impacts would be effectively minimised through the use of landscaping and urban design, the maximum anticipated visual impact at any viewpoint would be Moderate. The proposed landscape and built form treatments would result in an improvement in the visual amenity of the entire Proposal site and would increase the current level of screening of the site. Urban design and planning principles assist with the breakdown of the bulk and scale of the development and contribute to the creation of one cohesive landscape.

A number of viewpoints were rated with high visual sensitivity, due to their proximity to residential areas. However, the visual impact of the Proposal at these viewpoints were rated as negligible, as they do not have strong visibility of the Proposal due to proximity and adequate screening provided by existing vegetation.

Table 15-11 Operational visual impacts

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
<p>View 01</p> <p>West of site, Corner of Casula Road and Canberra Avenue, Casula</p>	<p>Negligible</p> <p>The Proposal would not be visible from this view location as it is screened by existing mature and dense vegetation as well as one and two storey residential dwellings.</p>	<p>Moderate</p> <p>Being a residential area the visual sensitivity would be relatively high. Several houses within the area are subject to some limited views of the Proposal, however due to the proximity of the viewpoint to the development site, a moderate visual sensitivity is suggested.</p>	<p>Negligible</p> <p>Limited or no visibility from this viewpoint east across the Georges River to the Proposal. Visual amenity unchanged and landscape amenity unaffected.</p>
<p>View 02</p> <p>West of site, Rushton Place Casula</p>	<p>Negligible</p> <p>The viewpoint is at a slightly higher elevation than that of the Proposal site, however views remain screened by tall trees in the background.</p>	<p>Low</p> <p>Due to the views of Casula train station as well as the large expanse of industrial zoned land in front of the Proposal, the visual sensitivity from the location would be low.</p>	<p>Negligible</p> <p>Existing built elements in the foreground dominate views screening any visibility of the Proposal.</p>
<p>View 03</p> <p>West of site, adjacent to Casula Powerhouse</p>	<p>Negligible</p> <p>The Proposal would be screened by large amounts of mature vegetation in the foreground, as well as industrial and infrastructure zoned land with existing buildings and vegetation in the background.</p>	<p>Moderate</p> <p>The viewpoint is located in an existing corridor created by the Georges River and the SSFL. It faces industrial zoned land to the west however is within proximity to a residential area.</p>	<p>Negligible</p> <p>The foreground and background are dominated by vegetation and industrial zoned land. Existing vegetation and the natural topography of the area restrict visibility beyond such screening views of the Proposal.</p>

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
<p>View 04</p> <p>West of site, Carroll Park, Casula</p>	<p>Low</p> <p>The view shows dense vegetation to the middle of the ground and background, including tall trees and medium to small bushes. There would be some clearance of vegetation on the Proposal site in the distance.</p>	<p>Moderate/High</p> <p>Being a residential area the visual sensitivity would be relatively high. Several houses within the area and users of the park land would be subject to limited views of the Proposal. Users of the park however, would only be exposed for a short duration.</p>	<p>Moderate</p> <p>There would be limited visibility from this viewpoint east across the Georges River due to the proximity of the area to the Proposal site. The elevation of the viewpoint does allow for some visibility of the Proposal, particularly where the tops of warehouses, light poles and operational equipment protrude, suggesting a moderate visual impact.</p>
<p>View 05</p> <p>West of site, Carroll Park</p>	<p>Low/moderate</p> <p>The Proposal would be partially visible where protruding above the treeline. The existing landscape areas are covered in sporadic and varying levels of vegetation. Due to the proximity of the viewpoint to the Proposal site, alteration to the existing landscape is unlikely to change the visual amenity.</p>	<p>Low</p> <p>Several houses within the area and users of the park land would be able to see the Proposal with it being quite prominent. This rating is lowered however due to the areas proximity to the Proposal site and its existing view of the industrial zoned land to the east, suggesting a low visual sensitivity. Most visible elements however would be obstructed and are quite far from the Proposal site.</p>	<p>Low/moderate</p> <p>The existing landscape amenity would change as a result of the Proposal however retained and proposed vegetation would act sufficiently to screen the majority of the Proposal with only the tops of warehouses, light poles and some operational equipment being visible.</p>
<p>View 06</p> <p>West of site, Buckland Road, Casula</p>	<p>Negligible</p> <p>The existing landscape comprises small bushes and trees in the foreground and dense vegetation in the background. The Proposal would not be likely to be visible from this location, suggesting a negligible visual adaptation.</p>	<p>High</p> <p>Being a residential area, the visual sensitivity is relatively high. Residents in the area, particularly at the top of the hill would have expansive views out towards the Proposal site.</p>	<p>Negligible</p> <p>Despite the slight elevation and clear sight lines towards the Proposal site, the Proposal would not likely be visible from this location due to the proximity of the viewpoint to the Proposal site and screening provided by existing vegetation.</p>

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
<p>View 07</p> <p>North-west of site, Adjacent to St. Andrews Boulevard, Casula</p>	<p>Negligible</p> <p>The entire development would be screened by the large amounts of existing vegetation in the background and the Proposal would not likely be visible from this location.</p>	<p>Moderate</p> <p>Being a publicly accessible park in a residential area. the visual sensitivity at this location would be high. The existing infrastructure in the foreground lowers the visual sensitivity of the area to moderate.</p>	<p>Negligible</p> <p>The Proposal would not be visible from this location. Therefore, there would be a negligible visual impact.</p>
<p>View 08</p> <p>North of site, Corner of Yulong Close and Anzac Road.</p>	<p>Low/moderate</p> <p>Elements of the Proposal including warehouses, loading docks and light poles would be highly visible from this location. However, the addition of any additional industrial development within this viewpoint would have little to no impact on the existing landscape amenity, given existing industrial elements which are already highly visible.</p>	<p>Low</p> <p>Most views from within this area looking towards the Proposal would be from existing industrial areas or from commuters travelling along Anzac Road for brief durations.</p>	<p>Low/moderate</p> <p>The Proposal would be highly prominent at this location from Anzac Road looking toward the Proposal site. However, this viewpoint is within an already established industrial precinct and therefore the impact would be low/moderate.</p>
<p>View 09</p> <p>North of site, Corner of Greenhills Road and Anzac Road.</p>	<p>Low</p> <p>The Proposal would have some prominence from this location, but would be partially screened by existing structures, such as the existing substation (Anzac Road). The addition of further industrial development within this viewpoint would result in low visual adaptation.</p>	<p>Low</p> <p>Most views from within this area looking toward the Proposal would be of an already existing built up industrial context and therefore would not likely affect the visual amenity in the area.</p>	<p>Low</p> <p>From this viewpoint the Proposal would be partially visible due to the proximity to the site and the existing DJLU facility in the foreground. However, the DJLU facility screens most views of the Proposal site in the background.</p>

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
View 10 North-East of site, Anzac Road	Low The viewpoint is facing the DJLU which completely obstructs views beyond. The tops of warehouse, light poles and other operational equipment may be partially visible from this location, although additional industrial elements would not change the existing landscape amenity.	Low/moderate The visual sensitivity would be relatively high as the view location is siting along Anzac Road within a low density residential zone. However, the viewpoint faces towards existing industrial land and the established industrial precincts.	Low/moderate Changes from this location to the visual amenity would be minimal due to the proximity from the Proposal site and the current urban context of the DJLU and surrounding industrial precinct.
View 11 North-East of site, Castlerock Court, Wattle Grove	Low Due to thick vegetation in the foreground and viewing distance, there would not likely be any major views of the Proposal from this viewpoint. Any inclusion of visible industrial elements would not likely change the existing landscape amenity.	Moderate The visual sensitivity would be relatively high as the view location is within a low density residential area. However, this rating is decreased to moderate due to the close proximity to an established industrial precinct.	Low/Moderate The Proposal would not be likely to be visible at this location. Any introduction of additional industrial elements to the Proposed site would not change the visual amenity in this area.
View 12 East of site, Martindale Court, Wattle Grove	Low Due to thick vegetation in the foreground and viewing distance, there would not be likely to be any major views of the Proposal from this viewpoint. Any inclusion of visible industrial elements would not be likely to change the existing landscape amenity.	Moderate The visual sensitivity would be relatively high as the view location is within a low density residential area. However, this rating is decreased to moderate due to the close proximity to an established industrial precinct.	Low/Moderate The Proposal would not be likely to be visible at this location. Any introduction of additional industrial elements to the Proposed site would not change the visual amenity in this area.
View 13 East of site, Martindale Court, Wattle Grove	Low Due to thick vegetation in the foreground and viewing distance, there would not be likely to be any major views of the Proposal from this viewpoint. Any inclusion of visible industrial elements would not be likely to change the existing landscape amenity.	Moderate The visual sensitivity would be relatively high as the view location is within a low density residential area. However, this rating is decreased to moderate due to the close proximity to an established industrial precinct.	Low/Moderate The Proposal would not be likely to be visible at this location. Any introduction of additional industrial elements to the Proposed site would not change the visual amenity in this area.

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
View 14 East of site, Gracemere Court	Negligible The Proposal is entirely screened by the vast amounts of vegetation in the foreground and there would be no change to the landscape.	High The viewpoint is located in a residential area adjacent infrastructure zoned land covered in dense vegetation, suggesting a high visual sensitivity.	Negligible There would be no change to the visual amenity at this location, therefore this would result in a negligible visual impact.
View 15 East of the site, adjacent to Corryton Court, Wattle Grove	Negligible The Proposal is entirely screened by the vast amounts of vegetation in the foreground and there would be no change to the landscape.	High The viewpoint is located in a residential area adjacent infrastructure zoned land covered in dense vegetation, suggesting a high visual sensitivity.	Negligible There would be no change to the visual amenity at this location, therefore this would result in a negligible visual impact.
View 16, South-East of site, Somercotes court, Wattle Grove	Negligible The Proposal would not likely be visible from this location, as it is entirely screened by the vast amounts of heavy vegetation in the foreground.	High The viewpoint is located in a residential area adjacent infrastructure zoned land covered in dense vegetation.	Negligible There would be no change to the visual amenity at this location.
View 17 South of site, Moorebank Avenue	Negligible The Proposal is entirely screened by the heavy vegetation, despite the viewpoint being elevated above the site. The Proposal is further north on Moorebank Avenue, and is not visible from this location due to the distance from the Proposal site and large trees that screen the Proposal.	Low The visual sensitivity of the area is low as the viewpoint is located on infrastructure zoned land with the majority of users only being exposed temporarily while travelling.	Negligible There would be no change to the visual amenity at this location, suggesting a negligible visual impact.

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
<p>View 18</p> <p>South of site, Moorebank Avenue</p>	<p>Moderate</p> <p>The addition of further industrial development within this viewpoint would not alter the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible. However, the addition of the Proposal would not detract from the urban context.</p>	<p>Low</p> <p>Most users of the area would be travelling through an established industrial precinct, only being exposed for a short period of time.</p>	<p>Low/moderate</p> <p>The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.</p>
<p>View 19</p> <p>South of site, Moorebank Avenue</p>	<p>Low/moderate</p> <p>The addition of further industrial development within this viewpoint would not alter the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible. However, the addition of the Proposal would not detract from the urban context.</p>	<p>Low</p> <p>Most users of the area would be travelling through an established industrial precinct, only being exposed for a short period of time.</p>	<p>Low/moderate</p> <p>The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.</p>
<p>View 20</p>	<p>Moderate</p> <p>From this location the Proposal would be highly prominent. A moderate visual adaptation is suggested as the existing context is industrial use. Any addition to such would not greatly change the view amenity.</p>	<p>Low</p> <p>Most users of the area would be travelling through an established industrial precinct, only being exposed for a short period of time.</p>	<p>Low/moderate</p> <p>The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.</p>

Viewpoint ID	Visual Adaptation	Visual Sensitivity	Visual Impact
View 21 North-West of site, Moorebank Avenue.	Moderate From this location the Proposal would be highly prominent. A moderate visual adaptation is suggested as the existing context is industrial use. Any addition to such would not greatly change the view amenity.	Low Most users of the area would be travelling through an established industrial precinct, only being exposed for a short period of time.	Low/moderate The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.
View 22 North of site, Corner of Moorebank Avenue and Anzac Road	Moderate From this location the Proposal would be highly prominent. A moderate visual adaptation is suggested as the existing context is industrial use. Any addition to such would not greatly change the view amenity.	Low Most users of the area would be travelling through an established industrial precinct, only being exposed for a short period of time.	Low/moderate The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.
View 23	Moderate From this location the Proposal would be highly prominent. A moderate visual adaptation is suggested as the existing urban context is of industrial use. Any addition to such would not negatively impact the visual amenity	Low Users would be travelling through an established industrial precinct, only being exposed for a short period of time	Low/moderate The Proposal would be highly prominent at this location. However, the compatibility of the existing urban context would mean that any additional industrial elements would not detract from the visual amenity of the viewpoint.

This section provides simulated views of the Proposal site from the selected viewpoints where visual impact is likely (Views 4, 5, 8, 9, 10 11, 12,13, 18, 19, 20 21, 22 and 23) (refer to Table 15-10 and Table 15-11, above). For viewpoints that encompass the MPW Stage 2 site and / or the MPE Stage 1 site (subject to a separate approvals), the relevant areas have been highlighted.



Figure 15-2 View 04 – west of site, Carroll Park Casula - Existing view



Figure 15-3 View 04 – west of site, Carroll Park Casula - Simulated view



-  MPW Stage 2 (subject to separate approval)
-  MPE Stage 1 (subject to separate approval)



Figure 15-4 View 05 - west of Carroll Park Casula - Existing view



Figure 15-5 View 05 - west of site, Carroll Park Casula - Simulated view

- MPW Stage 2 (subject to separate approval)
- MPE Stage 1 (subject to separate approval)



Figure 15-6 View 08 - north of site corner of Yulong Close and Anzac Road - Existing view



Figure 15-7 View 08 - north of site corner of Yulong Close and Anzac Road - Simulated view



Figure 15-8 View 09 - north of site corner of Greenhills Road and Anzac Road - Existing view



Figure 15-9 View 09 - north of site corner of Greenhills Road and Anzac Road - Simulated view



Figure 15-10 View 10 - north-east of site Anzac Road - Existing view



Figure 15-11 View 10 - north-east of site Anzac Road - Simulated view



Figure 15-12 View 11 - north-east of site Castlerock Court, Wattle Grove - Existing view



Figure 15-13 View 11 - north-east of site Castlerock Court, Wattle Grove - Simulated view



Figure 15-14 View 12 - east of site Martindale Court, Wattle Grove - Existing view



Figure 15-15 View 12 - east of site Martindale Court, Wattle Grove - Simulated view



Figure 15-16 View 13 - east of site Martindale Court, Wattle Grove - Existing view




Figure 15-17 View 13 - east of site Martindale Court, Wattle Grove - Simulated view



Figure 15-18 View 18 - south of site Moorebank Avenue - Existing view



Figure 15-19 View 18 - south of site Moorebank Avenue - Simulated view

 MPW Stage 2 (subject to separate approval)

----- MPE Stage 1 (subject to separate approval)



Figure 15-20 View 19 - south of site Moorebank Avenue - Existing view



Figure 15-21 View 19 - south of site Moorebank Avenue - Simulated view



-  MPW Stage 2 (subject to separate approval)
- MPE Stage 1 (subject to separate approval)



Figure 15-22 View 20 – west of site Moorebank Avenue looking north - Existing view



Figure 15-23 View 20 – west of site Moorebank Avenue looking north - Simulated view

 MPW Stage 2 (subject to separate approval)

----- MPE Stage 1 (subject to separate approval)



Figure 15-24 View 21 - north-west of site Moorebank Avenue - Existing view



Figure 15-25 View 21 - north-west of site Moorebank Avenue - Simulated view


-  MPW Stage 2 (subject to separate approval)
- MPE Stage 1 (subject to separate approval)



Figure 15-26 View 22 - north of site Moorebank Avenue and Anzac Road - Existing view



Figure 15-27 View 22 - north of site Moorebank Avenue and Anzac Road - Simulated view



-  MPW Stage 2 (subject to separate approval)
- MPE Stage 1 (subject to separate approval)



Figure 15-28 View 23 – west of site Moorebank Avenue looking south - Existing view



Figure 15-29 View 23 – west of site Moorebank Avenue looking south - Simulated view

 MPW Stage 2 (subject to separate approval)

----- MPE Stage 1 (subject to separate approval)

Light Spill

The Proposal is defined as a 'commercial area' according to AS4282-1198 and the illuminance, luminous intensities and threshold increments have been assessed according to the standard's post curfew hours:

- Boundary 1.0 – Residential area in dark surrounds – recommended maximum vertical illuminance of 1lx and a luminous intensity emitted by luminaires of 500cd.
- Boundary 2.0 – At the boundary of commercial and residential areas – recommended maximum vertical illuminance of 4lx and a luminous intensity emitted by luminaires of 2,500cd.

The lighting has been designed to minimise any direct light spill by selecting luminaires with a horizontal front glass for the warehouse yard and internal roads. The lighting along the proposed perimeter road along Moorebank Avenue and Anzac Road will consist of traditional road lighting fixtures with side throw to maximise the light distribution along the site and minimise backwards light spill.

The sites pole heights have been limited to 13.5m to provide consistent lighting throughout the MPE Project. The maximum pole height of 13.5 metres provides a consistent level with the MPE Stage 1 lighting design and an even lighting spread across the internal roads and carparks.

The results of the assessment are represented in Figure 15-30, which shows that the combination of the lighting design, luminaire selection, positioning and aiming produce results that are in compliance with the requirements of AS4282-1997.

Lighting associated with mobile transitory lighting (such as forklifts and vehicles) will generally not be of concern since it has fixed downward aiming lighting which is generally close to the ground, unlike the elevated pole mounted and warehouse mounted luminaires. For this reason mobile transitory lighting was considered to have no additional light spill impacts and excluded from the assessment.

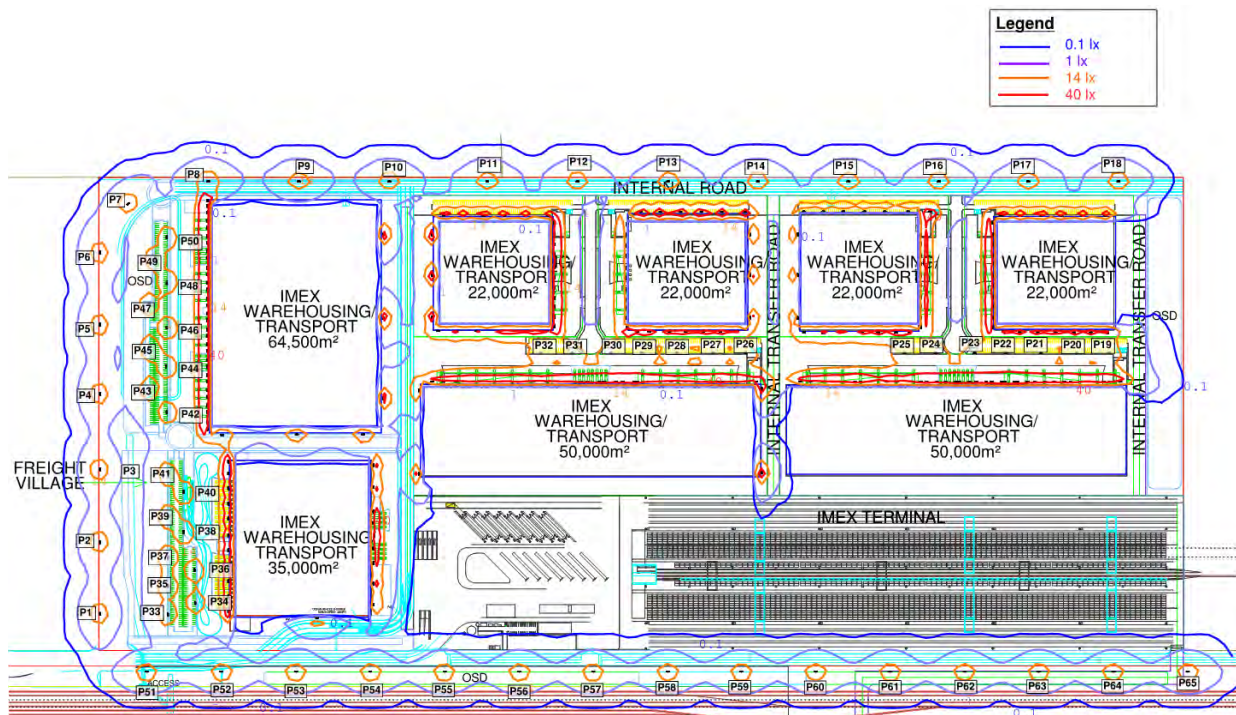


Figure 15-30
to the site

General site layout showing light spill isolux curves both external and internal

15.5 Mitigation Measures

15.5.1 Construction

- The following mitigation measures would be implemented, where reasonable and feasible, to minimise the visual impacts of the Proposal:
 - Existing vegetation around the perimeter of construction sites would be retained
 - The early implementation of landscape planting would be considered in order to provide visual screening during the construction of the Proposal
 - Elements within construction sites would be located to minimise visual impacts, e.g. setting back large equipment from site boundaries
 - Construction lighting, on both ancillary facilities and plant and equipment, would be designed and located to minimise the effects of light spill on surrounding sensitive receivers, including residential areas and the proposed conservation area
 - Design of site hoardings would consider the use of artwork or project information
 - Regular maintenance would be undertaken of site hoardings and perimeter areas including the prompt removal of graffiti
 - Re-vegetation/landscaping would be undertaken progressively
 - Where required for construction works, cut-off and directed lighting would be used and lighting location considered to ensure glare and light spill are minimised.
- Light for the Proposal would be designed to minimise any direct light spill and would comply with the requirements of *Australian Standard AS4282-1997- Control of the Obtrusive Effects of Outdoor Lighting*.

15.5.2 Operation

- The following mitigation measures would be implemented, where reasonable and feasible, for the landscaping of the Proposal:
 - Use of native shrubs and ground covers to form a screening barrier when mature.
 - A landscaping corridor of screening vegetation to provide informal street character along Moorebank Avenue.
 - Use of local species as understory planting to support and enhance local habitat values
 - Use of seeds collected within the local area for planting to reinforce the genetic integrity of the region, where possible.
- Light for the Proposal would be designed to minimise any direct light spill and would comply with the requirements of *Australian Standard AS4282-1997- Control of the Obtrusive Effects of Outdoor Lighting*.

16 INDIGENOUS HERITAGE

Artefact Heritage have undertaken an assessment of Indigenous heritage impacts associated with the Proposal to address the SEARs. The *Indigenous Heritage Assessment Report* for the Proposal is provided in Appendix S of this EIS.

Table 16-1 provides a summary of the relevant SEARs, which relate to Indigenous heritage, and where these have been addressed in this EIS.

Table 16-1 SEARs (Aboriginal Heritage)

SEARs	Where addressed
10. Heritage	
<i>An assessment of the heritage impacts of the proposal. The assessment shall:</i>	
<i>a) consider impacts to Aboriginal heritage (including cultural and archaeological significance), in particular impacts to Aboriginal heritage sites identified within or near the project should be assessed. The identification of cultural heritage values should be guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW 2000). Where impacts are identified, the assessment shall demonstrate effective consultation with Aboriginal communities in determining and assessing impacts and developing and selecting options and mitigation measures (including the final proposed measures) in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW); and</i>	Section 16.4
<i>b) describe attempts to avoid impacts to cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.</i>	Section 16.5

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to Indigenous heritage (refer to Table 16-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 16.1) and, more recently, for the Proposal. This section of the EIS also summarises the methodology used to assess Indigenous heritage-related impacts of the Proposal (section 16.2), describes the existing environment as it relates to Indigenous heritage (section 16.3) and provides an assessment of Indigenous heritage impacts associated with construction and operation of the Proposal (section 16.4). Measures to mitigate potential Indigenous heritage impacts where they are required have been identified in section 16.5.

16.1 Concept Plan Assessment

An *Aboriginal Cultural Heritage Assessment* was prepared by Archaeological and Heritage Management Solutions (AHMS, 2012) as part of the EA for the MPE Concept Plan Approval, and an *Aboriginal Heritage Impact Assessment* (AHMS, 2015) was prepared as part of the MPE Stage 1 Project EIS.

A site survey of areas identified through the predictive model as potentially containing Aboriginal cultural heritage value was undertaken in conjunction with Registered Aboriginal Parties (RAPs) as part of the MPE Concept Plan Approval (refer to Figure 16-1).

The MPE Concept Plan and MPE Stage 1 Aboriginal heritage assessments identified the following key characteristics relating to the identified Aboriginal heritage significance at the Project site and within the surrounding area:

- No Aboriginal places are registered within the MPE site, predominantly due to the extensive earthworks and development that has historically been undertaken to accommodate the previous DNSDC activities. Further, the RAPs that were involved in these previous assessments indicated that they did not consider the site (MPE site or Stage 1 site¹) to have any Aboriginal heritage value.
- A number of artefacts and potential archaeological deposits (PADs) were identified on and around the MPE site, including one identified artefact (isolated artefact 1, refer to item 1 on Figure 16-1 for indicative location) within the south-eastern corner of the Proposal site. The results of previous Aboriginal heritage field surveys are shown on Figure 16-1.

¹ The Stage 1 site does not include the Rail link proposed in the Stage 1 Proposal.

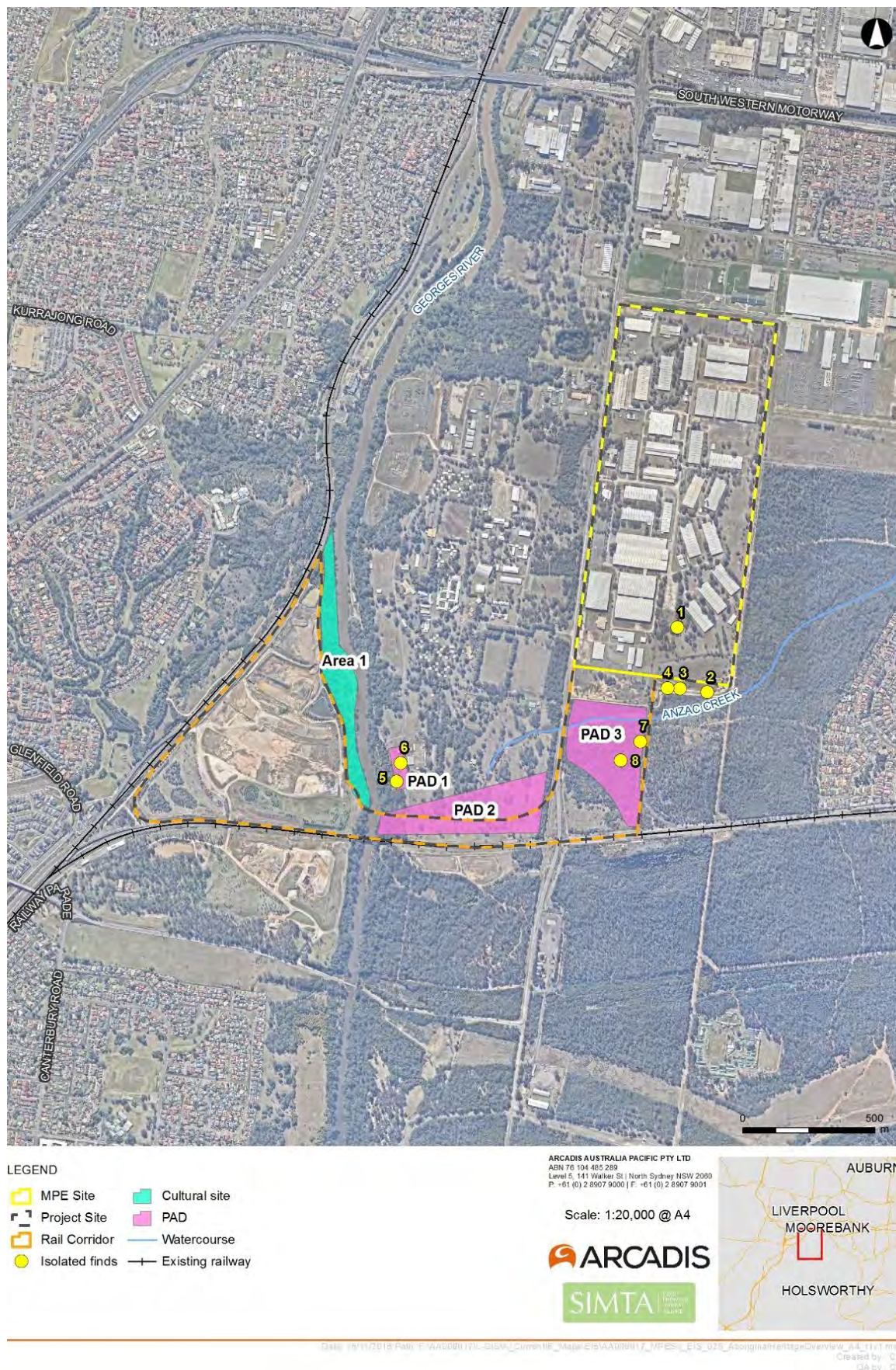


Figure 16-1 Results of Aboriginal heritage field survey for Stage 1 (identified archaeological findings)
 (Source: AHMS, 2012a)

The *Aboriginal Cultural Heritage Assessment* (2012) undertaken for the MPE Concept Plan Approval included the preparation of an archaeological predictive model, informed by a detailed background analysis of previous archaeological investigations in the region. The *Aboriginal Heritage Impact Assessment* (AHMS, 2015) prepared for the Stage 1 Proposal also utilised a similar model.

Aboriginal consultation was undertaken for the MPE Concept Plan Approval with the following Registered Aboriginal Parties (RAPs):

- Tharawal Local Aboriginal Land Council (LALC)
- Cubbitch Barta Native Title Claimants
- Darug Tribal Aboriginal Corporation
- Darug Aboriginal Cultural Heritage Assessments
- Tocomwall
- Darug Land Observations.

16.2 Methodology

The indigenous heritage assessment was undertaken having regard to the site context, potential impacts of the proposal on heritage value, consideration of statutory requirements and identification of appropriate mitigation measures to be implemented to avoid any significant impacts.

16.2.1 Heritage register search

An Aboriginal Heritage Information Management Systems (AHIMS) extensive search was conducted on 19 July 2016 with a buffer of 200m around the study area.

16.2.2 Site survey

A site survey was undertaken in conjunction with the non-Aboriginal heritage assessment on 21 June 2016 focussing on the MPE Stage 2 study area. During the site visit no additional Aboriginal artefacts were identified. It was established that Isolated Artefact 1 (refer to item 1 on Figure 16-2 for indicative location) previously identified by AHMS (2012) was not relocated at the coordinates provided, as had been recommended by AHMS (2012).

16.2.3 Review of previous reports

To inform this assessment, a review of previously prepared assessments authored by AHMS was undertaken to gather background information relevant to the Proposal. The assessments reviewed include the following:

- MPE Concept Plan EIS Aboriginal Cultural Heritage Assessment (AHMS 2012); and
- MPE Stage 1 EIS Aboriginal Heritage Impact Assessment (AHMS, 2015).

16.2.4 Consultation

Aboriginal consultation was undertaken as part of the MPE Concept Plan Approval in 2011-2012 by AHMS. Due to the extended period of time between the consultation for the Aboriginal heritage assessment for the Concept Plan EA and the preparation of the MPE Stage 1 EIS, it was deemed necessary to undertake further consultation as part of the MPE Stage 1 Project to engage with any previous and potential additional members of the Aboriginal community.

AHMS were commissioned to conduct consultation as part of the Aboriginal Heritage Impact Assessment prepared to support the SSD application for the MPE Stage 1 project. A newspaper advertisement was published in the Liverpool Champion on the 26 November 2014 to engage any additional Aboriginal stakeholders whom did not previously register an interest during the MPE Concept Plan Approval. On the 3 December 2014 notification of the MPE Stage 1 Project was sent to relevant Registered Aboriginal Parties (RAP), which included an invitation to register an interest, the draft methodology for the archaeological investigation works proposed to be undertaken for the Stage 1 Project.

Consultation was undertaken with the following Aboriginal parties whom registered interest in the MPE Stage 1 Project:

- Tharawal Local Aboriginal Land Council (LALC)
- Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC)
- Darug Tribal Aboriginal Corporation (DTAC)
- Darug Aboriginal Cultural Heritage Assessments (DACHA)
- Tocomwall
- Darug Land Observations (DLO)
- Darug Custodian Aboriginal Corporation (DCAC)
- Darug Aboriginal Landcare Inc (DALI).

All registered stakeholders were given the opportunity to participate in a site survey during the 2012 and 2015 assessments which comprised the Proposal site. No areas of cultural value were identified from the site surveys within the Proposal area.

The Aboriginal Heritage Impact Assessment Report provided in Appendix S of this EIS will be provided to the RAPs listed above for their review and comment. Any comments will be included in the final report. This approach is considered appropriate as there will be no impacts to known items of Aboriginal heritage as a result of the Proposal. A finalised copy of the Aboriginal Heritage Impact Assessment for the Proposal will be lodged with the NSW DP&E, Aboriginal Heritage Information Management Systems (AHIMS), and each of the Aboriginal stakeholders.

16.3 Existing environment

16.3.1 Study area

The 'Aboriginal study area' comprises the construction and operational footprint of the Proposal, as shown in Figure 16-2. For the purpose of the assessment of Aboriginal heritage impacts, the Aboriginal study area is herein referred to as the Proposal site.

The construction phase of the proposal will include the demolition of existing warehouses on the Proposal site, and adjust the building formation levels to facilitate stormwater and drainage. The Proposal site will be used predominantly for warehousing and distribution facilities and incorporate associated infrastructures and facilities which

would involve undertaking earthworks and the provision of landscaping, as well as the Moorebank Avenue upgrade.

16.3.2 Environmental context

The Proposal is situated along the upper Georges River, in a transitional area between Wianamatta Shale and Hawkesbury Sandstone zones. Wianamatta Shale terrain is typical of the Cumberland Plain Woodland located to the west of the Proposal site. The majority of the Proposal site is capped by Tertiary alluvial clayey quartz sands, salty sands and clays and forms part of the Berkshire Park Soils Group (Hazleton and Bannerman, 1990).

The Berkshire Park Soils landscape is mapped on the Penrith sheet as being developed on the Tertiary terraces of the Hawkesbury/Nepean River System. Landforms on the east side of the Georges River are lower in altitude than on the west, so flooding incidence is much higher (NOHC 2014).

The modern geomorphology, hydrology and wetland habitats of the Georges River reflect disturbance throughout the catchment which has occurred since European settlement (NOHC 2014).

16.3.3 Aboriginal ethno-historic context

Aboriginal people traditionally lived in small family or clan groups that were associated with particular territories or places. The language groups occupying the region surrounding the Proposal site are thought to have been the Dharawal, the Darug and the Gundungurra (Attenbrow 2010:221, 222). The Dharawal language group was largely coastal and is thought to have extended from the Shoalhaven River, north to Botany Bay and then inland to Camden (Attenbrow 2002:34). The Darug language group occupied much of the Cumberland Plain between the Blue Mountains and the coast, with the language being divided into coastal and hinterland dialects (Attenbrow 2002:34).

British colonisation had a profound effect on the Aboriginal population of the Sydney region. In the early days of the colony Aboriginal people were disenfranchised from their land as the British claimed areas for settlement and agriculture. The colonists, often at the expense of the local Aboriginal groups, also claimed resources such as pasture, timber, fishing grounds and water sources.

In the early 1800s relationships between the Aboriginal people of the area and the European settlers were generally amicable. Grace Karskens notes several examples of close relationships between land owners and local Aboriginal people, including Charles Throsby who gave the Dharawal protection on his Glenfield Estate during later not so peaceful times (Karskens 2010).

Relations between Aboriginal people and colonists did not remain amicable. A sustained drought during 1814 and 1815, and continued disenfranchisement lead to tensions between farmers and Aboriginal people who remained to the southwest of Sydney. The Aboriginal people were accused of stealing corn and potatoes and spearing cattle. A number of farmers were killed on their properties.

In 1816 the tensions culminated in the Appin massacre when Aboriginal people were pursued by a detachment led by Captain James Wallis. Although the numbers of Aboriginal people in the area decreased as settlers and farmers moved into the locality, communities remained living at Camden Park and along the Georges River near Liverpool (Liston 1988).

16.3.4 Items of known Aboriginal heritage

AHIMS extensive search results

A search of the AHIMS database revealed 36 sites of known Aboriginal heritage in the vicinity of the Proposal; however, none of these sites are located within the study area.

A summary of the Aboriginal heritage features identified in the AHIMS extensive search is provided in Table 16-2 below.

Table 16-2 Frequency of Aboriginal heritage features in the AHIMS extensive search results

Site Feature	Frequency	Percentage (%)
Artefact	20	55
Artefact, PAD	6	17
PAD	2	6
Modified Tree (Carved or Scarred)	8	22

Isolated Artefact 1, recorded by AHMS (2012) was not identified in the AHIMS search and has not been registered with AHIMS (refer to Section 16.1 for more information).

Further, no places of Aboriginal significance are located within the Proposal site. The closest Aboriginal place is Collingwood Aboriginal place located approximately 1.5 kilometres to the north-west of the Proposal site.

Aboriginal sites recorded in previous site investigations

Three isolated artefacts previously recorded by AHMS as part of the Aboriginal heritage impact assessment prepared to support the Concept Plan EA are located within the Proposal site:

- Isolated Artefact 1 – a mudstone flake, located within the south-eastern portion of the MPE site
- Isolated Artefact 3 – Red/ black silcrete, possible core with one negative flake scar, located near the vehicle access track in mud, to the south of the MPE site
- Isolated Artefact 4 - Chert core with eight negative flake scars, located near the vehicle access track in mud

Isolated Artefact 2, consisting of a possible mudstone, flaked core was also located near the vehicle access track in mud, however, this artefact is located outside the Proposal site.

The location of these isolated artefacts relative the Proposal site is shown on Figure 16-2.

As discussed in Section 16.2.2, Isolated Artefact 1 was recorded by AHMS within the Proposal site in the south-eastern portion of the MPE site; by AHMS in 2015; however, it was assessed as having low archaeological significance. The site was not recorded on the AHIMS register and no site card is available. The artefact was not located during the site visit undertaken as part of this assessment. The search was informed by information presented in the AHMS assessment report.

As the artefact could not be relocated and the site has not been registered, it is recommended that no additional assessment or management of the site is required.

The location of Aboriginal heritage sites previously recorded within and surrounding the Proposal is shown in Figure 16-2.

Previous assessments for the MPE Concept Plan also concluded that there is no Aboriginal heritage significance potential on the MPE site, predominantly due to the extensive earthworks and development that has historically been undertaken within the Proposal site to accommodate the former DNSDC site and the development of Moorebank Avenue.

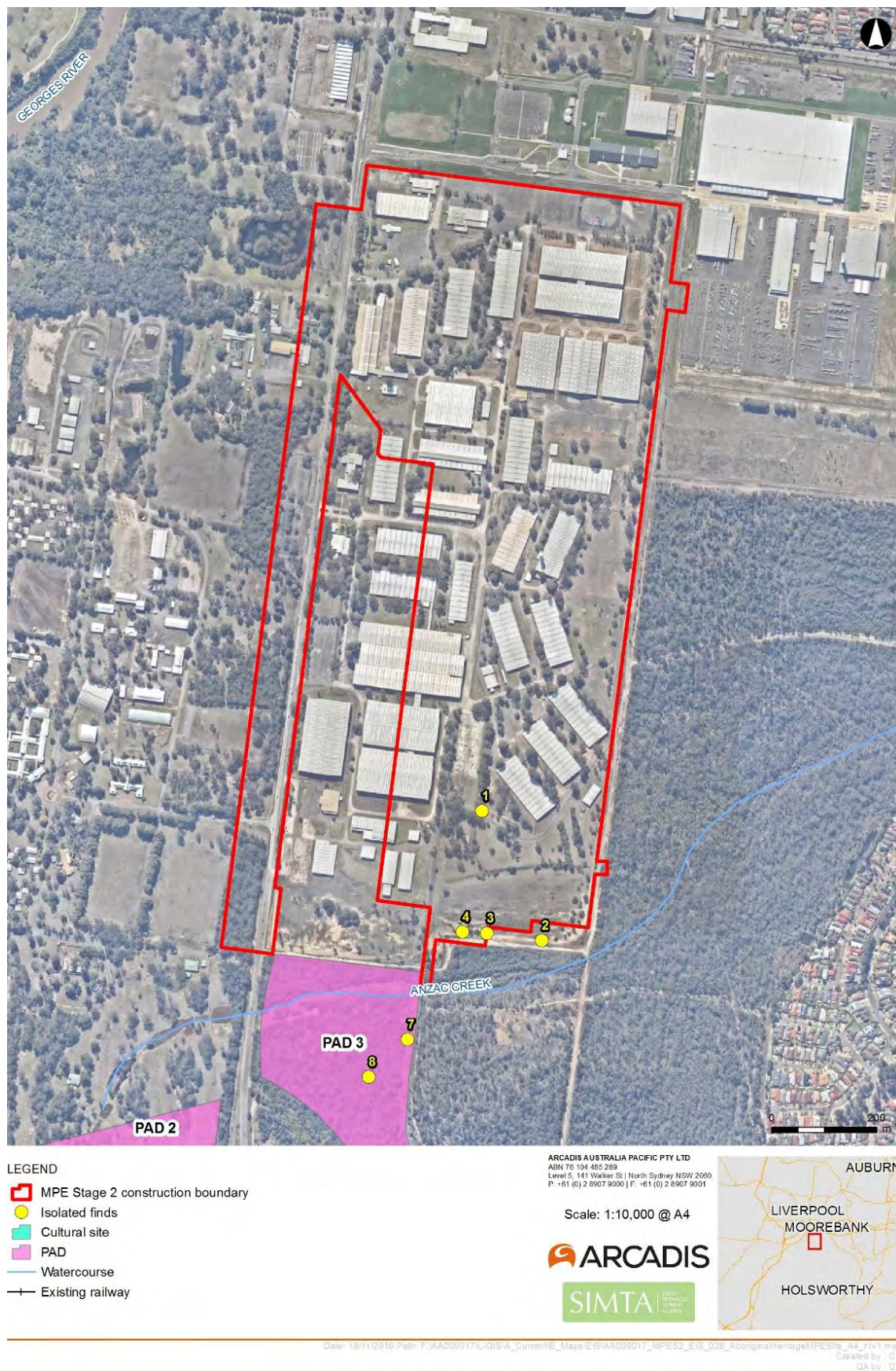


Figure 16-2 Items of Aboriginal heritage previously recorded within and near the Proposal site

16.4 Potential impacts

16.4.1 Construction

The Proposal involves the construction and operation of warehouses and distribution facilities on the MPE site and the upgrade of Moorebank Avenue. The majority of the Proposal site would be subject to complete re-development to facilitate the construction and operation of warehousing and the road upgrade.

As discussed above, the portion of the MPE site included in the Proposal site has been assessed as highly disturbed and modified and as such it is highly unlikely that intact unidentified archaeological deposits will occur in the area or be unearthed as a result of the construction activities. There were no areas of PAD identified within the Proposal site and overall the site is considered to have low to nil potential to contain intact archaeological deposits.

Construction of the Proposal has the potential to result in impacts to three isolated artefacts located within the construction footprint, being Isolated Artefact 1, Isolated Artefact 3 and Isolated Artefact 4.

MPE Isolated Artefact 1 was recorded by AHMS in 2015 and was assessed as having low archaeological significance. The site was not recorded on the AHIMS register and no site card is available. The Artefact was unable to be located during the site visit for this assessment. As the artefact appears to no longer be present and the site has not been registered, it is recommended that no additional assessment or management of the site is required.

Isolated Artefacts 3 and 4 (previously recorded by AHMS as part of the Aboriginal heritage impact assessment prepared to support the Concept Plan EA) would be located within the construction footprint of the Proposal (refer to Figure 16-2 for location relative to the Proposal site). During construction and operation of the Proposal and exclusion zone would be provided around these Isolated Artefacts to avoid accidental damage or disturbance.

Isolated Artefact 2 is located adjacent to the Proposal to the south, outside of the construction footprint, and is not anticipated to be impacted by construction.

The Proposal would not impact any areas of archaeological potential or any Aboriginal sites of high, moderate or unknown archaeological and cultural significance.

16.4.2 Operation

Operation of the Proposal is not expected to impact on known items of Aboriginal heritage.

16.5 Mitigation measures

16.5.1 Construction

- An exclusion zone would be provided around previously identified MPE Isolated Artefacts 2, 3 and 4 (refer to Figure 16-2) to avoid potential disturbance of these artefacts during construction of the Proposal.
- Management of Aboriginal heritage would be included in the CEMP for the Proposal. Information within the CEMP would include:
 - A summary of the findings of the Aboriginal Heritage Impact Assessment Report (provided at Appendix S of this EIS)
 - Guidance on unexpected archaeological and cultural finds (including human remains)
- All relevant personnel and contractors involved in the design and construction of the Proposal would be advised of the relevant heritage considerations, legislative requirements and recommendations in the Aboriginal Heritage Impact Assessment Report (provided at Appendix S of this EIS).

16.5.2 Operation

Operation of the Proposal is not expected to impact on known items of Aboriginal heritage; therefore, no mitigation measures related to impacts to Aboriginal heritage are required for the operation of the Proposal.

This page has been left blank intentionally

17 NON-INDIGENOUS HERITAGE

Artefact have undertaken an assessment of the non-Indigenous heritage impacts associated with the Proposal to address the SEARs. The *Non-Aboriginal Heritage Assessment* (Artefact, 2016) is provided in Appendix T of this EIS.

Table 17-1 provides a summary of the relevant SEARs which relate to non-Indigenous heritage and where these have been addressed in this EIS.

Table 17-1 SEARs (Non-Indigenous Heritage)

SEARs	Where addressed
9. Historic Heritage	
<p><i>The EIS shall consider the impacts to historic heritage. For any identified impacts, the assessment shall:</i></p> <p><i>Include a statement of heritage impact</i></p> <p><i>Be undertaken by a suitably qualified heritage consultant(s)</i></p> <p><i>Outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the measures). Mitigation measures should include (but not be limited to) photographic archival recording and adaptive re-use of buildings or building elements on site</i></p> <p><i>Note: Where historical excavation is proposed, the heritage consultant undertaking the assessment must meet the NSW Heritage Council's Excavation Director criteria.</i></p>	Sections 17.4 and 17.5

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to non-Indigenous Heritage (refer to Table 17-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 17.1) and, more recently, for the Proposal. This section of the EIS also summarises the methodology used to assess non-Indigenous heritage-related impacts of the Proposal (section 17.2), describes the existing environment as it relates to non-Indigenous heritage (section 17.3) and provides an assessment of non-Indigenous heritage impacts associated with construction and operation of the Proposal (section 17.4). Measures to mitigate potential non-Indigenous heritage impacts where they are required have been identified in Section 17.5.

17.1 Concept plan assessment

A *Non-Indigenous Heritage Assessment* (Artefact, 2013) was prepared for the Concept Plan Approval and recommended a set of actions be implemented to mitigate the potential impacts on non-indigenous heritage. These actions were considered as part of the Proponent's Revised Statement of Commitments and included:

- Preparing a Statement of Heritage Impact (SoHI) for submission to the Minister of Planning and Infrastructure as part of staged planning applications at State level
- Commencing discussions with the appropriate heritage bodies regarding the potential listing of the DNSDC site on the National Heritage List or the State Heritage Register

- Development of an overall mitigation strategy for the DNSDC site, which may be based on Table 3 of the *Non-Indigenous Heritage report* (Artefact, 2013).
- Undertaking further archaeological assessment and investigation or monitoring, where required in areas designated as having archaeological potential that would be impacted by the Proposal.
- If any archaeological deposit or item of heritage significance is located within the study area and is at risk of being impacted, the NSW Heritage Council should be notified and a heritage consultant/archaeologist should be engaged to assess the item to determine its heritage significance.

17.2 Methodology

The *non-Aboriginal Heritage Assessment* (Artefact, 2016) (Appendix T of this EIS) undertaken for the Proposal builds upon the Non-Indigenous Heritage Assessment (Artefact, 2013) prepared for the Concept Plan Approval and the Non-Indigenous Heritage Assessment (Artefact, 2015) prepared for the MPE Stage 1 EIS.

The assessment was undertaken having regard to the site context, potential impacts of the proposal on heritage value, consideration of statutory requirements and identification of appropriate mitigation measures to be implemented to avoid any significant impacts. The non-Indigenous heritage assessment for the Proposal included the following key components:

- Heritage register search
- Documentary research and report review
- Site survey
- Significance assessment
- Heritage impact assessment.

17.2.1 Heritage register search

Searches of relevant non-Indigenous heritage registers and databases were undertaken to confirm that the non-Indigenous heritage items identified in the Concept Plan EIS were still relevant to the Proposal, and to identify if there have been any additional items of non-Indigenous heritage significance included on any of these registers that should be considered as part of the assessment.

Searches were undertaken of the following registers:

- National Heritage List.
- Commonwealth Heritage List.
- State Heritage Register.
- State Heritage Inventory.
- Section 170 Registers.
- Liverpool Local Environmental Plan 2008.
- Liverpool Development Control Plan 2008.

17.2.2 Documentary research report and reviews

Documentary research was conducted to investigate the general history of the locality, as well as the history of the non-indigenous study area itself, and of identified heritage items on-site and within the surrounds. A number of libraries and archives were consulted, including:

- Liverpool Library
- National Library of Australia
- Department of Lands
- National Archives of Australia
- Australian War Memorial digital collection.

In addition, a review of previously prepared reports prepared by Artefact Heritage for the MPE Project was undertaken to gather background information relevant to the Proposal. Reports that were reviewed included:

- MPE Concept Plan EA Non-Indigenous Heritage Assessment (Artefact Heritage dated 5 June 2013)
- MPE Stage 1 EIS Non-Indigenous Heritage Assessment (Artefact Heritage dated 17 April 2015).

17.2.3 Site survey

A site survey was undertaken on 21 June 2016 focussing on the Proposal site. Internal access to WWII-era buildings was restricted during the site survey and as such, the inspections were based on the external features of buildings within the Proposal site. Photographs were taken throughout the Proposal site as part of the site survey (external aspects only, internal areas not accessible). These photographs are provided in Appendix T of this EIS

As part of the construction of the MPE Stage 1 Proposal, five local heritage listed structures would be demolished. The heritage listed buildings to be demolished in MPE Stage 1 are: three WWII timber post and beam stores buildings (Building No. 6, 10 and 11) and two WWII crane serviced composite timber and steel stores buildings (Building No. 7 and 9). The non-Indigenous heritage impacts associated with the demolition of these structures was assessed in the *SIMTA Intermodal Terminal Facility Stage 1 Non-Indigenous Heritage Assessment* (Artefact Heritage, 2015). It is therefore assumed for the purpose of this non-Indigenous heritage assessment that these buildings are no longer present on the Proposal site, and as a result will not be assessed as part of this non-Indigenous heritage assessment.

17.2.4 Heritage impact assessment

A Statement of Heritage Impact (SoHI) evaluates and explains how a proposed development, rehabilitation or land use change affects the heritage value of non-Indigenous heritage sites and/or places. A SoHI addresses how the non-Indigenous heritage value of a site/place can be conserved or maintained, or enhanced by the proposed works.

The non-Indigenous heritage impact assessment for the Proposal has been prepared in accordance with the NSW Heritage Office and Department of Urban Affairs and Planning's *NSW Heritage Manual* and the *NSW Heritage Office's Statements of Heritage Impact* (NSW Heritage Office, 2002). These guidelines include a series of questions which have been used in this assessment to aid in the consideration of impacts to heritage items in the vicinity of the Proposal.

17.3 Existing environment

17.3.1 Study area

The study area identified in the Non-Aboriginal Heritage Assessment (Artefact, 2016) (Appendix T of this EIS) includes the Proposal site, mostly contained within Lot 1 DP1048263, as shown in Figure 17-1 and Figure 17-2.

The majority of the construction and operational footprint of the Proposal site is situated within the former Defence National Storage Distribution Centre (DSNDC) (Lot 1, DP 1048263), a local heritage item listed under Schedule 5 of the *Liverpool Local Environmental Plan 2008* (LEP).

The Proposal site shares a boundary with the Australian Army Engineers Group/School of Military Engineering (SME), also a local heritage item listed under the Liverpool LEP and is within the view shed of Glenfield Farm which is listed on the LEP and State Heritage Register (SHR). There are a number of other heritage listed items in the vicinity of the Proposal site. These items have been assessed in the MPE Concept Design and MPE Stage 1 heritage assessment and as they will not be impacted by the Proposal they are not considered in this report.

17.3.2 Historical background

A detailed description of background context information relating to the Proposal site is summarised in Table 17-2.

Table 17-2 Historical background summary for the Proposal site

Year	Occupation	Details
Early to late 1800s	Early Settlement	The first road connecting the area to Sydney was completed in 1813 which promoted the spread of small scale agriculture. This led to larger scale activities including orchards, dairy farms and vineyards
Early 1900s	Pre-World War I	During the 1900s the area north of the MPE site hosted several military training camps and by 1907 a military camp had been established on the eastern side of the Georges River.
1913 – 1930s	World War I and Interwar	By 1913 the Liverpool camp accommodated 2,000 troops and was the main training centre in NSW. To the east of the camp was an area marked 'Stores' which encompassed the northern part of the current MPE site. To the east (outside of the MPE site) was a rifle range. Between 1917 and 1918 a new railway line was constructed to service the Liverpool camp.

Year	Occupation	Details
1939 - 1945	World War II	The School of Military Engineering was established south of the Liverpool camp in 1939. By 1943 the area of Liverpool camp between Georges River and Moorebank Av accommodated the Armoured Fighting Vehicle Trade Training Centre and the Australian Electrical and Mechanical Engineers. A sub-depot was also established on the southern corner of Moorebank Av and Anzac Rd to the north-west of the MPE site. In 1944 the first four storehouses of what would become the DNSDC were constructed.
Late 1940's to 1990s	Late 20 th century	Based on aerial images there was little change at the MPE site between the late 1940s and early 1990s. In the early 1990s the site became the DNSDC and five of the original 20 store buildings were demolished and replaced with larger modern buildings. The 15 remaining WWII store buildings were retained and reclad around this time.
Early 21 st century	Recent times	Defence's lease of the DNSDC has ceased and they have vacated the site which is now owned by SIMTA. As this is the case the site has lost its Commonwealth Heritage listing and is no longer protected under the EPBC Act.

17.3.3 Heritage listings

Statutory registers provide legal protection for heritage items and include the Commonwealth and National Heritage Lists, State Heritage Register (SHR), Section 170 Heritage and Conservation Registers and heritage schedules of Local Environment Plans (LEPs).

The former DNSDC site, upon which the Proposal is located, was formally listed on the Commonwealth Heritage List. However, upon termination of Defence's lease of the site this listing is no longer applicable.

There are no sites included on the National Heritage List which would be impacted by the Proposal.

No Section 170 listed items were identified within the Proposal site.

There are no sites on the State Heritage Register (SHR) within the Proposal site. The closest site is Glenfield Farm, which is located south-west of the Proposal site on the western side of the Georges River. Glenfield Farm is also listed on the Liverpool LEP as an item of State significance.

The Liverpool LEP lists the former DNSDC (within the Proposal site) and the School of Military Engineering (SME - to the west of Moorebank Avenue), as being of local significance. The SME is also known as the Australian Army Engineers Group.

These listed heritage items are shown in Figure 17-1.

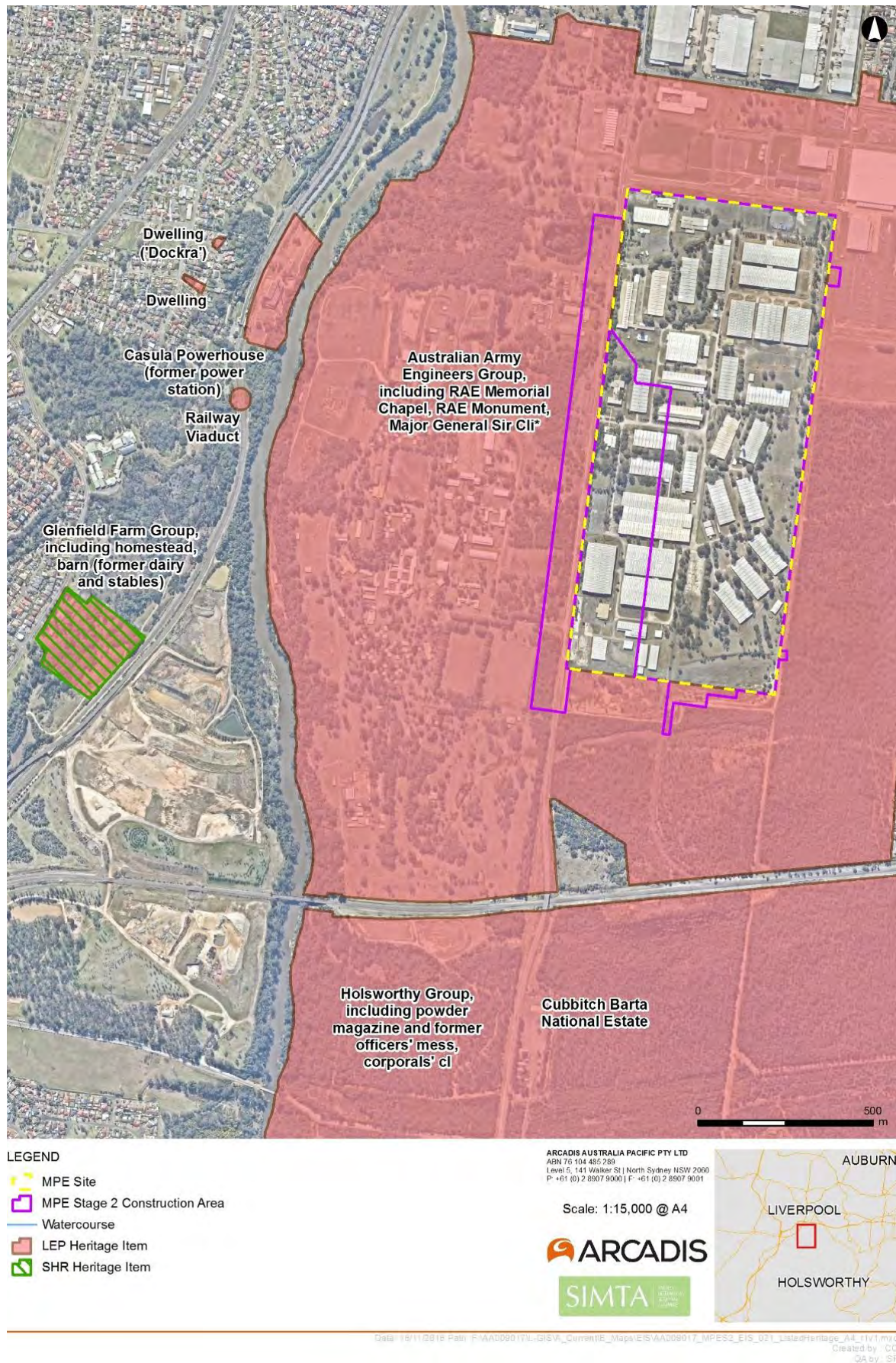


Figure 17-1 Listed Heritage items (Source: Artefact, 2016)

17.3.4 Heritage values

The sites which are considered relevant to the Proposal are:

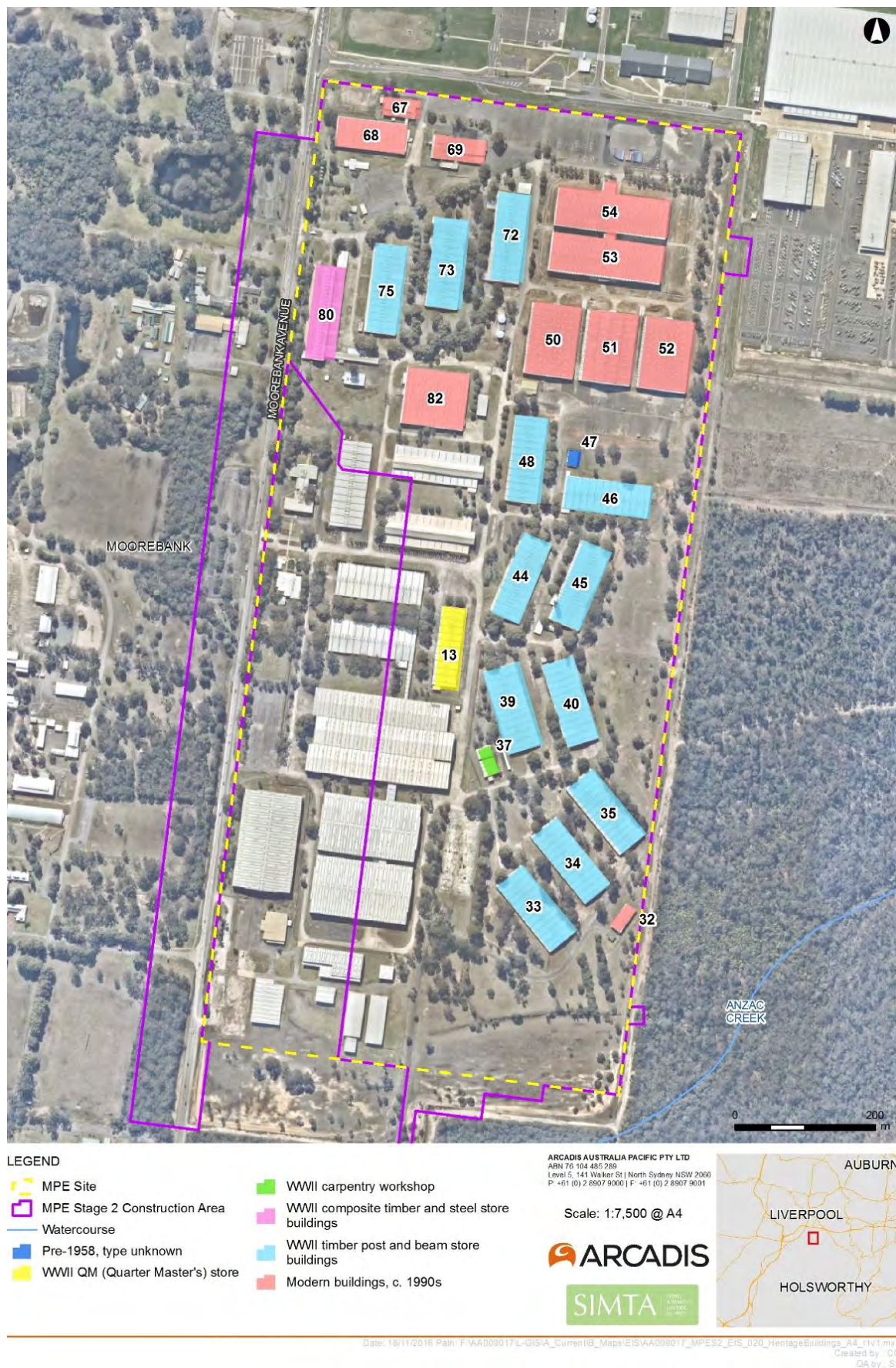
- Former DNSDC site
- School of Military Engineering (SME)
- Glenfield Farm.

Defence National Storage and Distribution Centre

Buildings within the Proposal site comprised within the former DNSDC site that are subject to the non-indigenous heritage assessment are summarised in Table 17-3 and shown in Figure 17-2.

Table 17-3 Structures within the Proposal site

Building Number	Constructed	Type	Modifications
33 – 35 39 – 40 44 – 46 48 72 – 73 75	WWII	Timber post and beam store buildings	Modern profile steel sheeting, gutters and downpipes, and new concrete floors c. 1990.
80	WWII	Composite timber and steel store building	Modern profile steel sheeting, gutters and downpipes c. 1990.
13	WWII	Quarter Masters store – timber post and beam building	Modern profile steel sheeting, gutters and downpipes. Later brick work visible at lower level.
37	WWII	Carpentry Workshop – timber post and beam building	Modern profile steel sheeting, gutters and downpipes. Extended on both length and width.
50 – 52	c. 1990	Large, modern steel-framed warehouse	N/A
53 – 54	c. 1990	Large, modern steel-framed warehouse Connected	N/A
68 – 69	c. 1990	Modern facilities	N/A
82	c. 1990	Large, modern steel framed warehouse	N/A



School of Military Engineering (SME)

The main complex of the SME (item 57 on the Liverpool LEP) covers approximately 220 hectares east of the Georges River as well as most of the land surrounding the former DNSDC site between the East Hills Rail Corridor and Anzac Road. The listing includes the Royal Australian Engineers (RAE) Memorial Chapel, RAE Monument, Major General Sir Clive Steele Memorial Gates, and The Cust Hut.

Land listed under this item also includes the Boot Land and associated bushland. As this land was part of Liverpool's military precinct from 1915, and has remained undeveloped since the 1940s, it is possible that archaeological evidence of military activities survives there.

Glenfield Farm

Glenfield Farm is listed on the SHR and is of historical significance as one of the few surviving rural farm complexes in NSW dating from the original land grant of 1810 and still capable of use for family living and limited farming activities. The buildings on the property are located within the western part of the listed area on top of a ridge and contain a 14 room homestead, a dairy, coach house and privy. The land on which the house is located includes former rural pastures and the original site fencing (State Heritage Inventory listing "Glenfield Farm"). The curtilage of the item extends down to the Southern Railway Line and is outside of the Proposal site boundary.

17.3.5 Archaeological value

Any archaeological remains on the Proposal site dating to WWII have the potential to be of research significance as features of a military depot that has been of local and state importance. However, the archaeological resource at the site is considered limited in nature and is unlikely to be of high research significance.

Fourteen potential archaeological deposit (PAD) sites were assessed as part of the Proposal, the majority have been assessed as unlikely to meet the threshold for local significance. This is due to a number of factors including ground disturbance levels, the availability of documentary information on the former buildings and that the site was used for storage, as opposed to residential, so the archaeological record is expected to be limited. However, two PADs (PAD V and W, refer to Appendix T of this EIS) could potentially meet the threshold for local archaeological significance, in both cases the PADs related to WWII ancillary or administrative structures.

17.4 Potential impacts

The construction and operation of the Proposal would result in a number of direct and indirect impacts to non-Indigenous heritage, including:

- The removal of all heritage values from the former DNSDC site and the loss of its heritage significance
- More specifically, direct impacts to 15 WWII era store buildings, comprising one composite timber and steel store (Building 80), 13 timber post and beam stores including the Quarter Master's store (Buildings 33-35, 39-40, 44-46, 48, 72-73, 75 & 13) and the carpentry workshop (Building 37)
- The removal of original roads and open drain alignments running through the Proposal site
- Impacts to potential archaeological material associated within former structures located within the Proposal site
- Impacts to underground water mains and sewerage lines within the Proposal site, as visible on a 1958 plan of the site, which probably date to the 1940s
- Impacts to the curtilage of the SME site to the west as a result of Moorebank Avenue upgrade
- Some cumulative visual impacts of the Proposal with the MPW and MPE Stage 1 Proposals on heritage view sheds to and from Glenfield Farm.

Additional details regarding these impacts to non-Indigenous heritage are provided in the following sections.

17.4.1 Construction

Defence National Storage and Distribution Centre

The demolition of all existing structures would be required as they do not adhere to modern engineering and safety standards, and would not meet the operational requirements of the Proposal. The buildings to be removed on the Proposal site have also undergone a number of modifications throughout their service life which have altered elements of their original historical fabric. The former DNSDC site has been subject to demolition of original structures and construction of a large number of modern warehouses in the 1990s. These changes have resulted in some impacts to the context and setting of the item as a whole.

Demolition of the remaining 15 WWII store buildings would be undertaken within the Proposal site, which would result in significant impacts to the collective significance of the former DNSDC site.

Construction and landscape modification through the installation of proposed utilities within the Proposal site is likely to have a possible impact on the heritage significance of the underground water mains and sewerage line which are both likely to date back to the 1940s.

School of Military Engineering (SME)

The SME site is located adjacent to all boundaries of the MPE site. Construction of the Proposal would extend into some areas within the SME including a road corridor on Moorebank Avenue and the eastern and northern boundaries of the Proposal site. Construction work would have minor impacts (noise and visual) on the heritage significance of the items located on this site. It is noted that as a result of the MPW Project a number of heritage items within the SME would be demolished/removed.

A summary of the potential impacts of construction of the Proposal on the SME site, relative to each boundary of the Proposal site is summarised in Table 17-4 below.

Table 17-4 Summary of impacts to the SME site during construction of the Proposal

Proposal site boundary	Potential heritage impacts to SME during construction of the Proposal
North	The construction footprint of the Proposal would be wholly within the northern boundary of the MPE site, therefore only minor short term visual impacts would be experienced at the SME site during construction.
East	<p>Construction of the Proposal would result in some permanent, physical impacts to the SME site to the east of the MPE site. These impacts would be to facilitate drainage connection at Outlet B and would result in some minor vegetation clearance (refer to section 11 of this EIS for more information regarding impacts to biodiversity).</p> <p>Some minor, short term visual impacts would also be experienced along this section of the SME site during construction of the Proposal</p>
South	<p>Construction of the Proposal would result in some permanent, physical impacts to the SME site to the south of the MPE site boundary. These impacts would be to facilitate drainage works and would result in some minor vegetation clearance (refer to section 11 of this EIS for more information regarding impacts to biodiversity).</p> <p>Some minor, short term visual impacts would also be experienced along this section of the SME site during construction of the Proposal</p>
West	Impacts to the heritage value of the SME site to the west of the Proposal site would be negligible as a result of construction of the Proposal. Impacts to heritage significance within this section of the SME site have been considered as part of the MPW project.

Glenfield Farm

The Proposal is a notable distance from Glenfield Farm (approximately 1,700m) and construction impacts (visual, noise and air) would therefore be minor and temporary in nature.

17.4.2 Operation

Defence National Storage and Distribution Centre

Following construction of the Proposal all buildings and structures on the site would have been removed, therefore the operation of the Proposal would have no impact to the collective significance of the former DNSDC.

School of Military Engineering (SME)

Given the approved development of the MPW Project and the associated change in setting of the SME, the operation of the Proposal would have minor visual impacts on the remaining SME heritage items. The Proposal would utilise appropriate vegetation buffer zones where it interacts with the SME site to assist in limiting visual impacts from the surrounding environment.

A summary of the potential impacts to the SME site as a result of the operation of the Proposal, relative to each boundary of the Proposal site is summarised in Table 17-5 below.

Table 17-5 Summary of impacts to the SME site during operation of the Proposal

Proposal site boundary	Potential heritage impacts to SME during operation of the Proposal
North	Some minor, visual impacts to the SME site to the north of the Proposal would be experienced along this section of the SME site during construction of the Proposal
East	Some minor, visual impacts to the SME site to the east of the Proposal would be experienced along this section of the SME site during construction of the Proposal
South	Some minor, visual impacts to the SME site to the south of the Proposal would be experienced along this section of the SME site during construction of the Proposal
West	Impacts to the heritage value of the SME site to the west of the Proposal site would be negligible as a result of the operation of the Proposal. Impacts to heritage significance within this section of the SME site have been considered as part of the MPW project.

Glenfield Farm

Direct visual impacts of the Proposal on Glenfield Farm would be limited by the approved redevelopment of the adjoining MPW site as this development is situated between the MPE site and Glenfield Farm. Although the recommended conservation management for Glenfield Farm emphasises the need to retain views to the east over the railway line, these vistas have already been considerably compromised by the creation of the Glenfield Waste Disposal facility, the construction of the Southern railway line and the erection of a concrete flyover to carry vehicles over the Southern railway line. Based on this, the Proposal would not impact further on the existing setting of Glenfield Farm. Additional information regarding cumulative impacts of the Proposal is provided in section 19 of this EIS.

17.5 Mitigation measures

17.5.1 Construction

Conservation and/or adaptive reuse were considered as mitigation options however major conversions would have been required to meet the safety and engineering requirements of the Proposal, meaning that any heritage significance would be significantly diminished. Relocation was also considered however the loss of their original setting and the alterations that would be required to ensure they could be safely transported would ultimately result in little significance being conserved.

Given the constraints regarding conservation, relocation and/or adaptive reuse the following mitigation measures would be required to be undertaken for the construction of the Proposal:

- A Heritage Management Plan in adherence to NSW Heritage Council guidelines would be prepared as part of the CEMP for the Proposal.
- Archaeological monitoring and recording would be conducted at PADs V and W, which have the potential to contain archaeological remains of local significance. Monitoring and recording would be undertaken by a suitably qualified archaeologist, who would assess the likely significance of any archaeological deposits encountered, and provide advice regarding appropriate further action. If highly significant remains were identified during monitoring, it would be appropriate to conduct further monitoring for additional sites of former structures or test excavations.
- A Heritage Interpretation Strategy should be prepared prior to the commencement of construction, outlining appropriate interpretive measure for the Proposal site in the context of the MPE site as a whole.
- If unexpected finds are located during works an archaeological consultant would be engaged to assess the significance of the finds and the NSW Heritage Council notified.

17.5.2 Operation

Impacts to the SME site and Glenfield Farm are assessed to be minor. Proposed landscaping around the MPE site will mitigate potential visual and noise impacts for these sites and no further mitigation measures are required.

This page has been left blank intentionally

18 GREENHOUSE GAS AND CLIMATE CHANGE RISK

Arcadis has undertaken an assessment of the greenhouse gas (GHG) and climate change impacts associated with the Proposal to address the SEARs. The GHG and climate change risk assessment for the Proposal are provided in Appendix V of this EIS.

Table 18-1 provides a summary of the relevant SEARs, which relate to GHG and climate change, and where these have been addressed in this EIS.

Table 18-1 SEARs (Greenhouse Gas and climate change)

SEARs	Where addressed
3. Air Quality	
a) A review of direct and indirect greenhouse gas emissions arising from this development and associated impact mitigation requirements, in reference to the Concept Plan greenhouse gas assessment	Section 18.3 and 18.1.1 Appendix V of this EIS

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to GHG and climate change (refer to Table 18-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 18.1) and, more recently, for the Proposal. This section of the EIS also describes the existing environment as it relates to GHG and climate change (section 18.2) and provides an assessment of GHG and climate change impacts associated with construction and operation of the Proposal (section 18.3). Measures to mitigate potential GHG and climate change impacts where they are required have been identified in section 18.4.

18.1 Concept Plan Assessment

The MPE Concept Plan EA included an assessment of GHG emissions and climate change risk assessment for the MPE Project (*Greenhouse Gas Assessment*, Hyder Consulting, 2013). The assessment identified that the project would generate approximately 16,597 tonnes of carbon dioxide equivalent tCO₂-e during site preparation and construction, 196,201 tCO₂-e embodied within construction materials and would generate 53,668 tCO₂-e per annum during operation.

The climate change risk assessment undertaken as part of the MPE Concept Plan Approval identified a total of eight priority (those rated as 'extreme' and 'high') climate change risks. Adaption measures were identified as part of the assessment which would give rise to low to moderate risk in relation to the identified climate change risks.

Based on the recommendations of the GHG Assessment, the Revised Statement of Commitments committed to the following actions:

- *The Proponent commits to the preparation of a Greenhouse Gas Management Plan for the three major stages of the development in accordance with the provisions of the Greenhouse Gas Assessment.*
- *The Proponent will where applicable implement the controls and mitigation measures summarised in the Climate Risk Assessment report and include:*
 - *Incorporate climate change sensitivity analyses for 20 per cent increase in peak rainfall and storm volumes into flood modelling assessment to determine system performance*
 - *Incorporate appropriate flood mitigation measures, where practical within the design to limit the risk to acceptable levels*
 - *Consider the impacts of climate change on system performance, and where practical incorporate adaptive capacity measures within the design to limit the risk to acceptable levels*
 - *Use of appropriate materials and engineering design capable of withstanding potential impacts posed by storm damage*
 - *Incorporate appropriate strategic protection zones, including asset protection zones into design to limit bushfire risk to acceptable levels, where required*
 - *Control of performance of hot works on total fire ban days during construction and operation, particularly within any defined asset protection zones*
 - *Maintain track stability through regular maintenance, use concrete sleepers in place of wooden ones and use preventative measures in the event of heatwaves (e.g. speed restrictions, warehouse ventilation for improved heat removal)*
 - *Consider further assessment of Marginal Abatement Cost Curves to assess commercial opportunities of reducing reliance on single energy source*

18.2 Existing Environment

Existing accounts of GHG provided by the Commonwealth Department of the Environment (DoE) estimate that approximately 549.4 Mega tonnes (Mt) of carbon dioxide equivalent (CO₂-e) were emitted in Australia during the 2012–13 financial year (DoE, 2016a).

The transport sector accounted for around 70 per cent (92.9 MtCO₂-e) of Australia's GHG emissions in 2014 and 71.5 per cent of total GHG emissions in NSW (DoE, 2016a). Approximately 85 per cent of emissions produced by the transport sector are attributable to the road transport subsector. Commercial and institutional industries contributed just 1.31 per cent of the energy sector in Australia in 2014 (DoE, 2016a).

In September 2013, the Intergovernmental Panel on Climate Change (IPCC) Working Group I released its Fifth Assessment Report (AR5) on climate change. The AR5 stated that warming of the climate system is unequivocal and, since the 1950s, many of the observed changes have been unprecedented compared to historical climate records over decades to millennia. The atmosphere and oceans have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of GHG have increased. Furthermore, the AR5 stated that it is extremely likely (95 to 100 per cent confidence) that human influence has been the dominant cause of the observed warming since the mid-20th century (IPCC 2014).

18.3 Potential Impacts

This GHG and Climate Change Impact Assessment (Arcadis, 2016x) has been prepared in accordance with the following general principles and procedures:

- The World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard Revised Edition* (WRI/WBCSD, 2004)
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (DoE, 2014a)
- The Department of Environment (DoE) *National Greenhouse and Energy Reporting System Measurement: Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia* (DoE, 2014b)
- *National Greenhouse Accounts (NGA) Factors* (DoE, 2016b).

A quantitative assessment of the potential Scope 1, Scope 2 and Scope 3 GHG emissions of the Proposal, and a qualitative assessment of the potential impacts of the emissions on the environment have been undertaken to assess these key issues, in accordance with the Revised Statements of Commitments from the MPE Concept Plan Approval.

Quantification of potential emissions from the Proposal has been undertaken in relation to carbon dioxide (CO₂) and other non-CO₂ GHG emissions, including methane (CH₄), nitrous oxide (N₂O) and refrigerant HFC-134a (CH₂FCF₃). All emissions are reported as carbon dioxide equivalents (CO₂-e).

A number of potential Scope 1, Scope 2 and Scope 3 emissions sources have been identified for the Proposal during the construction and operational phases. Construction would be undertaken in seven works periods including various activities and durations over approximately a 24 month period, and would predominantly generate emissions as a result of fuel combustion in machinery, electricity consumption, transportation of materials to and from the site, vegetation clearing and embodied energy within construction materials.

The operation of the Proposal would generate emissions associated with transport of freight as energy use, and fuel consumption from facilities and machinery within the warehousing.

The effects of climate change may pose a number of risks to the Proposal. These risks need to be understood and managed, where practicable to avoid impacts on customers, service reliability, environmental values, safety, project capital and operating costs. The purpose of assessing risks posed by climate change is to build adaptive capacity and resilience of the Proposal to potential hazards and risks associated with a changing climate.

The risk assessment was undertaken in accordance with:

- Risk management approach set out in AS/NZ 31000:2009 Risk Management – Principles and Guidelines
- Australian Standard AS5334 – Climate Change Adaptation for Settlements and Infrastructure

It is important to note that a preliminary climate change risk assessment (Hyder Consulting, 2013) was undertaken as part of the Concept Approval EA for the MPE Project. The current climate risk assessment builds on the findings of this earlier study supported by current climate change projection data.

The following steps were undertaken to complete this risk assessment:

- Determine the climate change context in accordance with AS5334:
 - Define the GHG emission scenarios
 - Define future time horizons for the assessment
 - Define the climate variables
 - Select climate data for the assessment
 - Obtain past meteorological record
- Identify relevant climate risks and evaluate the likelihood and consequence of each risk
- Identify adaptation responses.

18.3.1 Construction

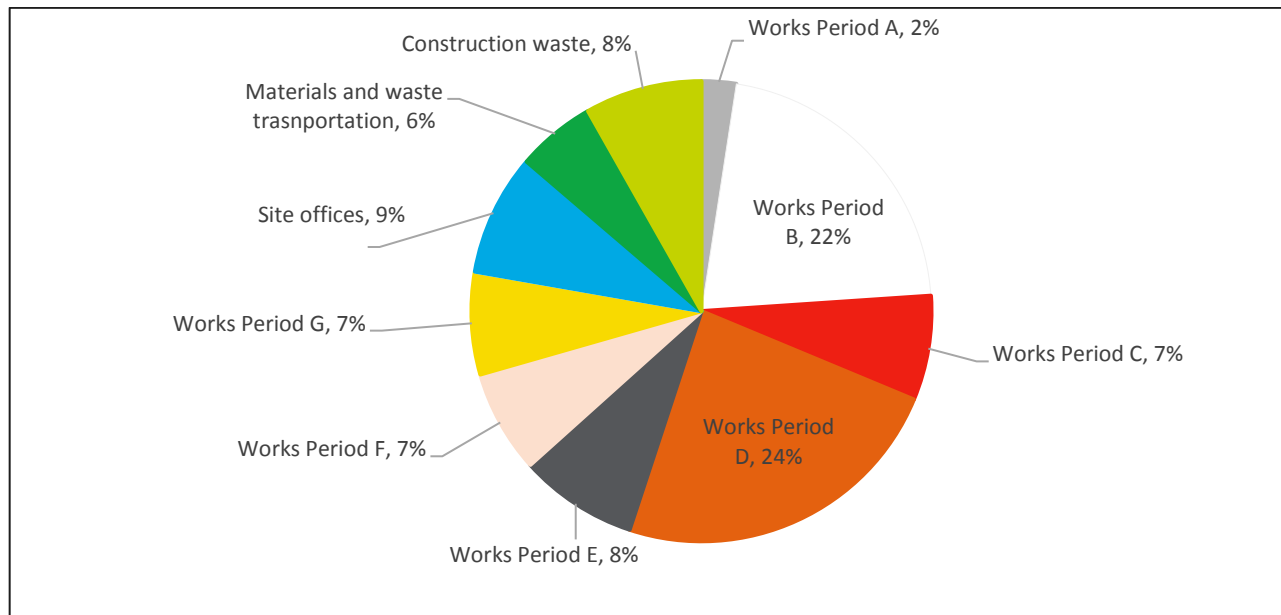
Construction of the Proposal would be undertaken in seven key periods over a 24-36 month period. Primarily, construction would include the transport of materials on and off the Proposal site, civil works and construction of warehouses and buildings. These activities require the use of fuels and electricity which would result in associated GHG emissions.

Construction of the Proposal is proposed to take between 24 and 36 months, commencing in the final quarter of 2017, with the completion of construction in the third quarter of 2019 (should construction take 24 months). The final construction program would depend on the market demand for warehouses to be constructed on the site. The construction works have been divided into seven 'works periods' which are interrelated and would potentially overlap (refer Section 4 for more information regarding the construction methodology for the Proposal).

Construction of the Proposal would generate approximately **8,884** tCO₂-e over the 24 month construction period. Scope 1 emissions would generate **73** per cent of total emissions, with Works Period D generating the greatest proportion of emissions (refer Figure 18-1 and Figure 18-2). Table 18-2 provides a summary of total GHG emissions generated by the construction of the Proposal.

Table 18-2 Total Construction GHG emissions (tCO₂-e)

Emissions source	Scope 1 emissions (tCO ₂ -e)	Scope 2 emissions (tCO ₂ -e)	Scope 3 emissions (tCO ₂ -e)
Works Period A – Pre Construction Stockpiling	201	-	15
Works Period B – Site preparation activities	1,853	-	66
Works Period C – Construction of Moorebank Avenue Diversion Road	609	-	46
Works Period D – Bulk Earthworks	1,973	-	148
Works Period E – Pavement works along Moorebank Avenue	689	-	52
Works Period F – Warehouse construction and internal fit out	598	-	45
Works Period G – Miscellaneous construction and finishing works	597	-	45
Site offices	-	664	95
Waste decomposition	-	-	732
Materials and waste transportation			457
TOTAL	6,519	664	1,700

Figure 18-1 Summary of construction GHG emissions by Works Period (tCO₂-e)

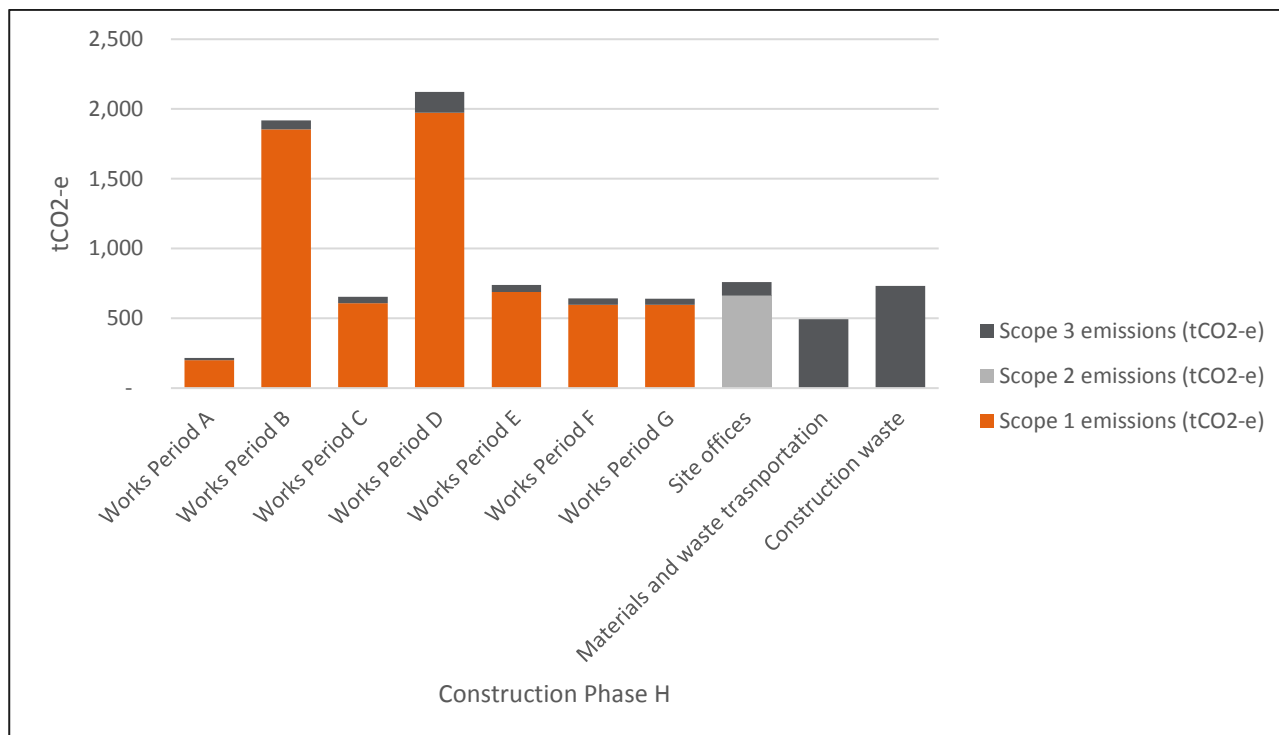


Figure 18-2 Summary of construction GHG emissions by emissions Scope (tCO2-e)

Embodied GHG emissions associated with the key construction materials will generate **137,774 tCO2-e**, or approximately **15.5** times the emissions generated during the construction phase. Embodied GHG emissions, however, represent a full life cycle emission generation across the entire operational life of the Proposal. Figure 18-3 shows the embodied emissions from key construction materials that would be used for the Proposal, indicating that cement, if comprising 100 per cent Portland cement would comprise the majority (**64** per cent) of total embodied emissions. The warehouses would contain the majority of cement and steel, and would consequently comprise the greatest proportion of embodied energy (as shown in Figure 18-4); producing approximately **79** per cent of the total embodied energy emissions. A number of alternate materials may be used as substitutes to conventional concrete, such as asphalt, pavers or post-tension concrete. The use of any of these materials would reduce the embodied emissions associated with pavement construction works within the Proposal site. Furthermore, the concrete assumed for this assessment (40Mpa) has a higher embodied energy content than alternate concrete mixes (such as fly ash and/or slag mixes) that could be used for the Proposal. Similarly, the assessment has assumed that all steel would be virgin steel. The majority of steel produced in Australia already contains recycled steel, typically comprising 20 per cent (World Steel Association, 2016). Consequently this assessment represents a 'worst case' scenario for embodied energy with regards to construction materials.

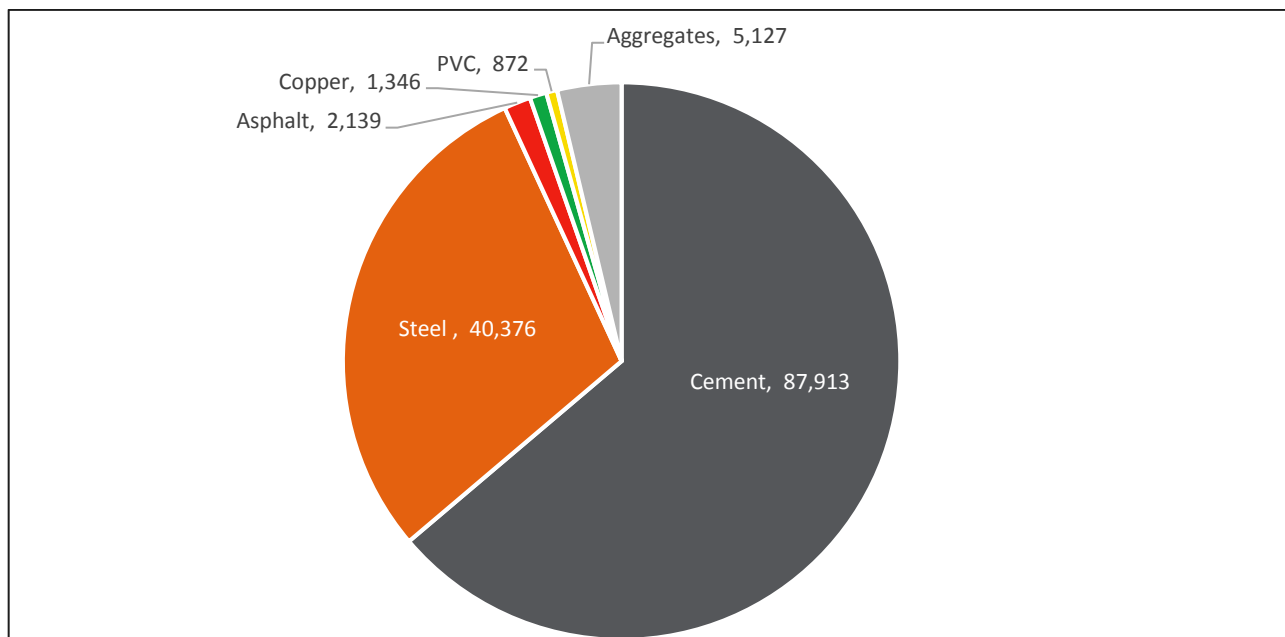


Figure 18-3 Embodied GHG emissions (tCO₂-e) from key construction materials

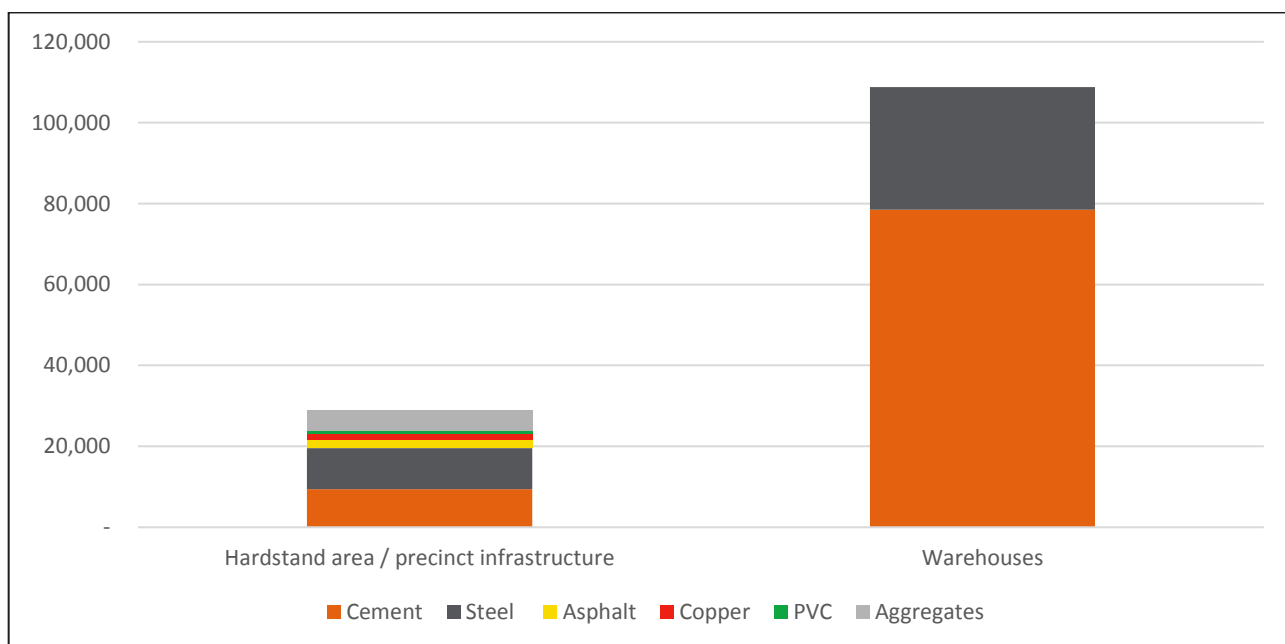


Figure 18-4 Embodied GHG emissions (tCO₂-e) from key Proposal components

18.3.2 Operation

The operation of the Proposal would generate approximately **118,733** tCO₂-e per annum, including **16,202** tCO₂-e of Scope 1 emissions, **72,799** tCO₂-e of Scope 2 emissions and **29,733** tCO₂-e of Scope 3 emissions. Table 18-3 shows a summary of the GHG emissions that would be generated as a result of the operation of the Proposal, indicating that electricity demand within the warehouses and freight village would be the single largest contributor to GHG emissions, accounting for **70** per cent of total operational emissions.

The Proposal would generate **0.02** per cent of Australia's total GHG emissions, and **0.1** per cent of NSW total emissions. This would equate to **0.13** per cent of the transport sector across Australia.

Table 18-3 GHG emissions generated from the operation of the warehousing and freight village (tCO₂-e per annum)

Emissions source	Scope 1 emissions (tCO ₂ -e)	Scope 2 emissions (tCO ₂ -e)	Scope 3 emissions (tCO ₂ -e)
Transportation (internal)	44	-	3
Transportation external)	-	-	11,640
Warehouse electricity demand	-	68,251	9,750
Freight village electricity demand	-	4,548	650
Refrigerant leakage	167	-	-
Machinery use	15,990	-	1,303
Waste decomposition and transportation	-	-	6,377
TOTAL	16,202	72,799	29,733

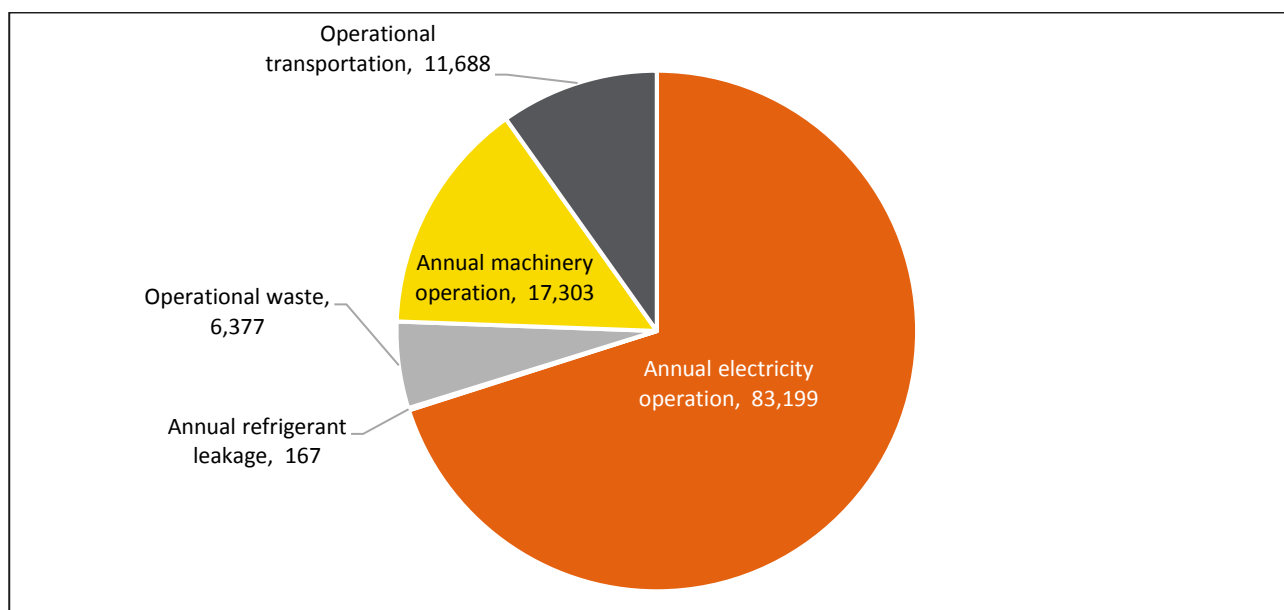


Figure 18-5 Annual operational GHG emissions (tCO₂-e/year)

A Marginal Abatement Cost (MAC) analysis has been undertaken in accordance with Statement of Commitment requirements to determine the feasibility of implementing additional mitigation and abatement opportunities. The results of this analysis are presented in Appendix V of this EIS. The analysis of the GHG emissions reductions achievable by different energy efficiency measures for the Proposal identified theoretical costs associated with reducing emissions. This analysis then identified the theoretical cost per year to reduce GHG emissions by 27 per cent – to align with current Federal Government reduction targets. This analysis identified that an average saving of **\$273** can be achieved per tCO₂-e abated.

Climate change risk and adaption

A climate change risk and adaptation assessment for the Proposal was undertaken to assess the risk posed by climate change and to identify adaptation strategies to mitigate these risks. Different elements of the MPE Project would have different design life spans. Elements such as communications systems would have a relatively short design life (20 years), steel structures and operational equipment would have a moderate design life (30-40 years), while structural elements and embankments would have a long term design life (100 years). To identify short term and long term risks, two time periods (2030 and 2090) were selected to facilitate the climate change risk and adaptation assessment. The projections have been considered for the periods 2030 and 2090 under intermediate and high emission scenarios. Under the worst case scenario (high emissions scenario) for the long-term time period (2090) the assessment identified a total of 13 key climate change risks for the Proposal, which include:

- Temperature Increases
- Increased rainfall intensity
- Reduced annual rainfall
- Storms, hail and wind events
- Increased frequency of bushfire
- Other risks.

The assessment provided an analysis of the potential impacts of these risks on the Proposal in an unmitigated and mitigated scenario, summarised in Table 18-4. If these risks are unmitigated the assessment identified a total of 13 climate change risks for the Proposal, including two high, ten medium, and one low risks by 2090 as a result of potential climate change impacts. A range of adaptive responses for treatment of the climate change risks identified would be incorporated into the design and operation of the Proposal to promote resilience to projected future climate change. Once implemented the engineering design and procedural responses for treatment of priority climate change risks would result in lower residual risk levels, such that no high risks remained (refer Table 18-4). For the year 2090, following the implementation of adaptation measures the Proposal would not be subject to any high climate change risks, whereby six moderate risks and seven low risks remain. These are considered to be within the threshold of acceptable risk levels.

Table 18-4 Climate change risks and adaptation for the Proposal for the year 2090

Risk Title	Uncontrolled Risk (209)	Adaptation Response	Mitigated Risk (2090)
Temperature Increases			
<i>Power outages</i>	Moderate	High priority electrical systems would consider diversity and redundancy in the electrical systems design.	Moderate
<i>Loss of structural component integrity</i>	Moderate	Areas most vulnerable to heat related impacts would be subject of regular inspection and maintenance.	Moderate
<i>Failure of and reduced functionality of electrical systems</i>	Moderate	Any communications and safety management equipment rooms would be air-conditioned.	Low
<i>Stop work events</i>	High	Develop heatwave response procedure for the Proposal for inclusion within the OEMP as required	Moderate
Increased rainfall intensity			
<i>Flooding of site impacting asset lifecycle</i>	Moderate	Facilities are designed based on a 100 year average recurrence interval (ARI) event (i.e. a flood which would occur once every 100 years), plus an additional 20 per cent increase in peak rainfall and storm volumes to provide a nominal allowance for potential impacts due to climate change.	Low
<i>Stormwater infrastructure failure</i>	Moderate		Low
<i>Appropriateness of design for flood mitigation structures</i>	Moderate		Low
<i>Ground stability issues</i>	Moderate		Low

Risk Title	Uncontrolled Risk (209)	Adaptation Response	Mitigated Risk (2090)
<i>Off-site impacts on local watercourses</i>	Moderate	Water-sensitive urban design (WSUD) controls (e.g. swales, biofiltration systems) have been incorporated into the Proposal stormwater system design and system performance has been found to meet water quality objectives.	Low
Reduced annual rainfall			
<i>Impacts on landscaping plant species</i>	Low	Plant species selected for landscaping have been selected based on their ability to tolerate projected climate change	Low
Storms, hail and wind events			
<i>Storm, hail and wind events impacting site infrastructure</i>	Moderate	Appropriate setback for trees and other vegetation would ensure vegetative debris would not disrupt services, whilst maintaining visual aesthetics and soil stability.	Moderate
<i>Storm, hail and wind impacts on site operation</i>	Moderate	The Proposal has been designed through aspects such as incorporating intense rainfall projections into the design of stormwater infrastructure and the selection of appropriate materials to minimise potential impacts associated with storm damage.	Moderate
Increased frequency of bushfire			
<i>Bushfire damage to site infrastructure, health and safety impacts</i>	High	Buildings and structures have been designed to be fire resistant in accordance with relevant standards. Asset protection zones have been incorporated into the layout of the Proposal to limit bushfire risk to acceptable levels.	Moderate

18.4 Mitigation Measures

As per the Concept Plan conditions of Approval, a GHG Management Plan will be prepared for each of the three major stages of the MPE Project. Appendix V of this EIS provides the context and updated GHG assessment for the GHG Management Plan for the Proposal. The mitigation measures and management strategies identified for the Proposal are provided below. In addition, a number of additional potential abatement opportunities have been identified, including the marginal cost of abatement (refer Section 9 of Appendix V of this EIS).

18.4.1 Construction

The mitigation measures, management strategies and abatement opportunities presented in this report will be reviewed and considered where appropriate for incorporation into the CEMP. The following actions will be implemented, where reasonable and feasible, for mitigation of GHG emissions during construction:

- Energy efficiency design aspects would be investigated, where practicable as part of the detailed design process in order to reduce energy and fuel consumption.
- Project planning would be undertaken to ensure that the site vehicle movements and construction activities are efficient, to avoid double handling of materials and unnecessary fuel use where possible.
- Fuel efficiency of the construction plant/equipment will be assessed prior to selection, and where practical, equipment with the highest fuel efficiency and which uses lower GHG intensive fuel (e.g. biodiesel) will be used.
- Consideration will be given to material substitution where reasonable and feasible to reduce embodied energy of construction materials.
- Where possible locally sourced materials will be used to reduce GHG emissions associated with transport during construction.
- Waste would be diverted from landfill, including diversion of spoil, construction and demolition waste, and commercial and industrial waste, where reasonable and feasible. The management of waste would be considered as part of the preparation of the CEMP for the Proposal, detailing the appropriate procedures for waste management.
- Implement adaptation measures to address medium and high rated risks detailed in the climate change risk assessment presented above and Climate Change Risk Assessment (Appendix V of this EIS).

18.4.2 Operation

The mitigation measures, management strategies and abatement opportunities presented in this report will be reviewed and considered where appropriate for incorporation into the Operational Environmental Management Plan (OEMP). The following actions will be implemented, where reasonable and feasible, for mitigation of GHG emissions during the operation of the Proposal:

- Fuel efficiency of the operation plant/equipment will be assessed prior to selection, and where practical, equipment with the highest fuel efficiency and which uses lower GHG intensive fuel (e.g. biodiesel) will be used during operation.
- Implement adaptation measures to address medium and high rated risks detailed in the climate change risk assessment presented above and Climate Change Risk Assessment (Appendix V of this EIS).

19 CUMULATIVE IMPACTS

Arcadis have undertaken an assessment of the cumulative impacts associated with the Proposal to address the SEARs.

Table 19-1 provides a summary of the relevant SEARs which relate to cumulative impacts and where these have been addressed in this EIS.

Table 19-1 SEARs (Cumulative Impacts)

SEARs	Where addressed
General Requirements	
Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include: <ul style="list-style-type: none"> Consideration of potential cumulative impacts due to other development in the vicinity 	Section 19

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to cumulative impacts (refer to Table 19-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 19.1) and, more recently, for the Proposal. This section of the EIS also summarises the methodology used to assess cumulative impacts-related impacts of the Proposal (section 19.2), describes the existing environment as it relates to cumulative impacts (section 19.3) and provides an assessment of cumulative impacts associated with construction and operation of the Proposal (section 19.4). Measures to mitigate potential cumulative impacts where they are required have been identified in section 19.5.

In addition to the issues that require consideration or assessment of cumulative impacts in the SEARs, this section also provides a discussion of the cumulative impacts of the Proposal associated with several additional environmental aspects, which have the potential to result in cumulative impacts when considering other potential developments in the vicinity of the Proposal site:

- Traffic and transport
- Noise and vibration
- Air quality
- Human health
- Biodiversity
- Hazard and risk
- Visual amenity, urban design and landscape.

19.1 Concept Plan Assessment

An assessment of potential cumulative impacts was undertaken of the MPE Project and the MPW Project as part of the Concept Plan Approval. The assessment took into consideration the ultimate catchment demand of 1 million TEU throughput (IMEX) per annum shared between the MPW and MPE Projects. The cumulative assessment considered the impacts of the relocation of the DNSDC from the MPE site, to the site to the north. An overall summary of the potential cumulative impacts of the MPE Project and MPW Project, as identified in the Concept Plan, are outlined in Table 19-2.

Table 19-2 Cumulative impacts identified for key issues in the Concept Plan assessment

Issue	Cumulative impacts identified in the Concept Plan
Traffic and access	<p>As the modelled catchment demand for freight arriving/departing from Moorebank is 1,000,000 TEU (IMEX) throughput per annum by 2025, the development of the MPW Project would mean that both IMTs would operate below their maximum throughput capacity. The volume of rail and road vehicles and associated transport impacts would be consistent with the MPE Project operating at maximum capacity and servicing the whole catchment of an IMT operating at Moorebank. Accordingly, the traffic impacts outlined in the Concept Plan are an assessment of the cumulative traffic and transport impacts which could be generated by IMTs (IMEX only) servicing the Moorebank IMEX catchment.</p> <p>Traffic modelling undertaken for the Concept Plan also took into consideration the new traffic signal on Moorebank Avenue, south of the traffic signal on Anzac Road, which forms part of the relocated DNSDC development. It found that, the traffic lights did not change the outcomes of the predicted traffic impacts associated with the MPE Project and regional traffic growth</p>
Noise and vibration	<p>Noise modelling undertaken for the MPE Project assessed the ultimate 1,000,000 TEU throughput per annum of the IMEX freight catchment demand for Moorebank. The effect of the development of the MPW Project would be to distribute this total freight volume between the two sites and would result in a diffusion of noise generation sources over a greater area. The assessment found that the distribution of activities between the two sites, along with development of warehousing on both sites, which would act to provide a noise barrier to noise emissions, would meet the established noise criteria.</p>
Biodiversity	<p>There is potential for cumulative impacts to arise from the MPE Project and MPW Project on threatened flora and fauna species and Endangered Ecological Communities (EECs). The presence of any threatened flora and fauna or EECs on the MPW Project site and the need for their removal would increase the overall reduction in the size and distribution of these values in the immediate area. Combined biodiversity offset considerations for each development would seek to restore and likely enhance the area of habitat available within the immediate vicinity of the operations. However, ecological value of the MPW Project was unknown at the time of the MPE Concept Plan Approval, hence a detailed assessment of cumulative impacts could not be performed.</p> <p>It was determined that the relocation of the DNSDC, to the north of the MPE site, would require clearing of a significant portion of existing vegetation on the site to allow construction of the new warehousing, a portion of which has been mapped as EEC Shale Gravel Transition Forest. As part of the DNSDC relocation, it was proposed to regenerate Anzac Creek within the eastern boundary of the site, including revegetation works. It was determined that the relocation of the DNSDC</p>

Issue	Cumulative impacts identified in the Concept Plan
	<p>was likely to reduce and further fragment fauna habitat within the local area.</p>
Hazards and risk	<p>The MPE and MPW Projects would cater for similar types of freight, which could include hazardous and dangerous goods transport, handling and storage. Each facility would need to have its own risk assessment and implement risk management procedures particular to their respective sites and to the types of goods transported, handled and stored. The separation distance between the two operations significantly reduces the potential for any hazards associated with hazardous or dangerous goods to be exacerbated by the concurrent operation of both facilities.</p> <p>Bushfire risk is not increased by the operation of both the MPE and MPW Projects, assuming standard controls are implemented at both sites during construction and operation, particularly associated with the performance of hot works during declared bushfire seasons and on total fire ban days.</p> <p>The demolition of buildings containing asbestos on the MPE and MPW sites has the potential to cause human health impacts if not handled, transported and disposed of in an appropriate manner. However, these works would be undertaken as per State and Federal guidelines and legislative requirements, and would be undertaken over a short period of time. Accordingly, the potential cumulative impact is considered likely to be low.</p>
Contamination	<p>The soils overlaying the MPE Project site have undergone significant modifications as a result of substantial filling operations, and this is likely to be similar at the MPW site. Cumulative construction impacts associated with exposed soils are expected to be negligible. Operational areas for both sites are predominately hardstand and surface capping, avoiding cumulative impacts for soil management.</p>
Stormwater and flooding	<p>Both the MPE and MPW Projects would be required to maintain stormwater controls during construction and operation in accordance with local, State and Federal regulations. The cumulative impacts of the proposal would be negligible as each party would be required to manage stormwater appropriately.</p> <p>As both sites are already developed, it is unlikely that the developments would result in a change to the overall erosion and sedimentation across the sites. The stormwater controls that have been identified in this environmental assessment are expected to be replicated at the MPW site. Implementation of these controls would reduce the risk of exposed surface sediments being mobilised and deposited in riparian habitats or watercourses during construction and operation phases of the two developments.</p> <p>Consideration was given to the potential cumulative impacts of a separate Georges River bridge crossings to access the MPE site and the MPW site. As no details of the MPW Project bridge were available at the time of the assessment it was determined that the MPW Proposal bridge would follow similar design considerations and statutory processes as adopted by the MPE Project, and would seek to minimise upstream and downstream flooding impacts to the greatest extent practicable.</p>

Issue	Cumulative impacts identified in the Concept Plan
Air quality	<p>During construction potential cumulative impacts with regard to air quality would predominately be the generation and deposition of dust and particulate matter from the following construction activities, which could include:</p> <ul style="list-style-type: none"> • Vegetation clearing/earthworks during site preparation and access road construction • Handling of spoil • Demolition of existing structures • Movement of heavy plant and machinery within the site on unsealed roads • Grader/scrappers working access road construction • Construction of rail connection(s) • Wind erosion from exposed surfaces. <p>However, it is anticipated that the scheduled timing for the construction of the two developments will avoid any major cumulative impacts with regard to air quality.</p> <p>The cumulative air quality assessment in the Concept Plan was based on the ultimate one million TEU throughput per annum catchment demand for an IMT facility located at Moorebank. Dispersion of emission sources between the MPE and MPW Projects during operations would represent a reduction in the intensity of potential emissions from the MPE site and is expected to result in increased dispersion of any particulates. As the activities of the DNSDC site and their intensity was not known, it was not possible to undertake an assessment of the cumulative impact of its relocation.</p>
Indigenous heritage	<p>The previous and existing activities on the MPE site have resulted in a high level of disturbance to the site. It is likely that this would also be the case for the MPW site. The introduction of fill would have caused significant detrimental impact to any existing land surface and/or soil profile (and any associated Aboriginal objects) that may have been present within the area of the two projects.</p> <p>Overall, it is concluded that the cumulative impacts on indigenous heritage of the MPE Project and the MPW Project will be negligible, subject to the future compliance with the recommended mitigation measures.</p>
Non-indigenous heritage	<p>Construction of the MPE and MPW Projects would result in loss of heritage structures and subsequent loss of heritage context in place on both sites. The MPE Concept Plan committed to consultation with Department of Defence during the approvals process to align both the MPE and MPE Projects in the management of non-indigenous heritage items as far as practicable.</p> <p>Works on the MPE site would be aligned to any divestment strategy of the Department of Defence during their relocation from the MPE site, taking into consideration all heritage items with the MPE site and the vicinity of the MPE site, and maintaining the heritage significance through the development options and possible mitigation measures.</p>

Issue	Cumulative impacts identified in the Concept Plan
Visual and urban design	<p>The visual cumulative impact of both the MPE Project and MPW Project will be dependent on the design of the MPW site, which was not available at the time of the Concept Plan Approval assessment.</p> <p>It was assessed that both the MPW and relocated DNSDC proposals may have a potentially high visual impact on surrounding existing residential areas and developments due to the proximity of their land boundaries to residential areas. These developments may create a 'visual shield' to the bulk of the MPE Project, potentially negating (or reducing) any direct visual impact arising from the MPE Project.</p>
Utility servicing	<p>Throughout the staged development of the MPE and MPW projects utility agencies will be consulted with to confirm the ongoing demands of the staged developments. Consultation will continue during the design and construction phases to ensure minimal disturbance to utility usage across the area</p>

It should be noted that at the time of the Concept Plan the MPW Project (or MIC Proposal as it was previously known) was to be delivered by the Moorebank Intermodal Company and therefore not all information on the proposal was available. Since the preparation of the cumulative impacts for the MPE Concept Plan was completed, an agreement has been reached between MIC and SIMTA that means that the MPW Project is also going to be delivered by SIMTA (on behalf of MIC). In addition, the public exhibition of the MPW Concept Project has also concluded and Approval granted. Both of these items have mean that SIMTA has been able to access further details for the MPW Project, and an accurate assessment of the cumulative impacts across the two projects has been undertaken, the results of this assessment are discussed in Sections 19.4 and 19.5. The DNSDC relocation has also occurred since, and the assessment of impacts contained in this EIS have taken into consideration the operation of the DNSDC, to the greatest extent practicable.

19.2 Methodology

19.2.1 Surrounding developments identified

MPE Stage 1 Proposal

The first Development Application (DA) has been submitted under the Concept Plan for the MPE Project (the Stage 1 Proposal) for approval by the NSW Planning Assessment Commission (PAC) as delegate of the Minister for Planning and Environment Approval for the Stage 1 Proposal is anticipated in late 2016. The Stage 1 Proposal is seeking approval, under Part 4, Division 4.1 of the EP&A Act, for the construction and operation of an IMT, including the necessary infrastructure to support a container freight road volume of 250,000 TEU throughput per annum. Specifically, the Stage 1 Proposal includes the following key components, which together comprise the IMT:

- Truck processing, holding and loading areas with an entrance and exit point from Moorebank Avenue
- Rail loading and container storage areas including the installation of four rail sidings with an adjacent container storage area serviced initially by manual handling equipment and progressive installation of overhead gantry cranes
- An administration facility and associated car parking with light vehicle access from Moorebank Avenue

- The Rail link, located within the Rail Corridor and including a connection to the IMT facility, traversing Moorebank Avenue, Anzac Creek and Georges River and connecting to the SSFL
- Ancillary works including vegetation clearance, remediation, earth works, utilities installation/connection, signage and landscaping.

MPW Concept Approval

Concept Approval (SSD 5066) for an IMT facility at Moorebank, NSW (the Moorebank Precinct West Project (MPW Project)) was received on 3 June 2016 from the NSW Department of Planning and Environment (DP&E). The Concept for the MPW Project involves the development of an IMT facility, including a Rail link connection, warehousing area with ancillary offices, a freight village (ancillary site and operational services), stormwater, landscaping, servicing, associated works on the western side of Moorebank Avenue, Moorebank.

Stage 1 (Early Works) of the MPW Project has recently commenced and is to be substantially completed/completed at the commencement of operations for the MPE Stage 2 Proposal. As the activities would be ramping down, or completed, when the MPE Stage 2 Proposal the potential cumulative impact is considered negligible and therefore has not been included within this cumulative assessment.

MPW Stage 2 Project

The MPW Stage 2 Project (SSD 5066) involves the construction and operation of Stage 2 of the MPW Concept Approval comprising of the following components:

- Intermodal Terminal Facility, including:
 - Infrastructure to support a container freight throughput volume of 500,000 TEUs per annum
 - Installation of nine rail sidings and associated locomotive shifter
 - Capacity to receive trains up to 1800 m in length
 - Truck processing, holding and loading areas
 - Container storage area serviced by manual handling equipment
 - Administration facility, engineer's workshop and associated car parking.
- Rail link including:
 - Construction of the Rail link connection, which links the sidings within the IMT facility to the Rail link (which would be constructed as part of the MPE Stage 1 Proposal)
 - The operation of the Rail link connection and the Rail link (from the Rail link connection to the SSFL)
- Warehousing area – construction of approximately 215,000 m² GFA of warehousing, plus ancillary offices, with associated warehouse access roads
- Upgraded intersection on Moorebank Avenue, which would provide site access and egress and construction of an internal road
- Ancillary works – including vegetation clearing, earth works (including the importation of 1,600,000 m³ fill), utilities installation/connection, signage and landscaping.

Glenfield Landfill

This proposed SSD (SSD - 13_6249) involves the development of a Materials Recycling Facility within the bounds of the current landfill site at Glenfield. The proposal has been put forward by Glenfield Waste Services (GWS) and is on land owned by the GWS Group.

The proposal would involve expanding and relocating the existing recycling facility to unfilled (virgin) land on the southern portion of the Glenfield Waste Facility site, south of the East Hills Rail Corridor. The proposal will be located across approximately five hectares in four differentiated but adjoining areas, and positioned to avoid existing landfill cells.

The facility would have capacity to process and/or recycle approximately 450,000 tonnes per annum (tpa) of non-putrescible waste, consisting primarily of commercial and industrial, and construction and demolition waste for reuse in secondary markets. Traffic access to the facility would utilise the existing main southern entry of the Glenfield Waste Facility site off Cambridge Avenue. Trucks would enter via Cambridge Avenue to an inspection point and then proceed to a receival area.

The SEARs for the proposal were issued in December 2013.

19.2.2 Assessment Approach

This assessment considers both construction and operational cumulative scenarios associated with the Proposal and surrounding developments identified above (namely, the MPE Stage 1 Proposal and the MPW Stage 2 Project). The construction cumulative scenario has taken account of activities overlapping within the vicinity of the Proposal site according to scheduling information.

The operational cumulative impact scenario considers the operation of the Proposal combined with the MPE Stage 1 Proposal and MPW Stage 2 Project operating at 250,000 TEU and 500,000 TEU throughput respectively, incorporating a total of 750,000 TEU throughput for the two sites running concurrently. This operational cumulative assessment also considers the operation of 300,000m² of warehousing included within the Proposal and operation of 215,000m² of warehousing as part of the MPW Stage 2 Proposal and other associated development (freight village and ancillary facilities).

The Glenfield Recycling Facility (Materials Recycling facility) Proposal was issued with SEARs in December 2013 (SSD 13_6249). Cumulative assessment modelling has considered the constraints presented by this development where applicable.

Traffic and Transport

To assess cumulative impacts associated with traffic and transport, separate construction and operational cumulative scenarios were selected to best represent worst-case conditions. The cumulative scenarios for both construction and operation identified the traffic impacts of the concurrent construction / operation of the Proposal with the MPE Stage 1 Proposal and the MPW Stage 2 Project, utilising the best available information at the time of writing this EIS.

The cumulative construction traffic scenario assessed potential cumulative construction impacts during peak construction of the Proposal. The cumulative construction scenario assumed that the peak construction period would occur concurrently with construction of the MPE Stage 1 Proposal, MPW Stage 1/Early Works Project and MPW Stage 2 Project in 2018. It is assumed that access to the Proposal site would via the MPE Stage 2 Site Access from the Moorebank Avenue diversion road. SIDRA modelling was used to identify predicted delays and LoS for relevant intersections and access points for the existing traffic conditions (without the Proposal) and was compared with delays and LoS for the peak construction period in 2018.

The cumulative operational traffic assessment assessed traffic impacts associated with the concurrent operation of the Proposal with the MPE Stage 1 Proposal and MPW Stage 2 Project for the opening year (2019) and 10 year horizon (2029) at key intersections in the study area during the AM and PM peak. The baseline data used for the operational assessments focussed on the estimated network performance of the surrounding area based on an approach of “no-worsening of the without Proposal intersection performance”. Intersection modelling was undertaken using traffic analysis software (SIDRA V.7) and the LoS criteria as outlined in greater detail in Section 7.2 and Appendix K of this EIS.

Other aspects affecting traffic distribution, including hours of operation for this assessment are consistent with those outlined within Section 7.2 and Section 4 of this EIS.

Noise and Vibration

A cumulative noise and vibration assessment for the Proposal was carried out by Wilkinson Murray (Appendix N of this EIS) for both construction and operational scenarios.

The cumulative construction noise scenario accounted for the cumulative predicted noise impacts associated with Proposal construction activities, MPW Early Works activities, MPE Stage 1 and MPW Stage 2 construction works. The highest predicted LAeq, 15min construction noise levels at sensitive receivers during relevant phases for each concurrent project were used for the assessment to attain a worst-case construction cumulative scenario to assess against the NMLs established for the Proposal.

The cumulative operational noise assessment included the concurrent operation of the Proposal with the MPE Stage 1 and MPW Stage 2 Projects. As is noted in Section 8.4.2 of this EIS, The LAeq, period noise levels at sensitive receivers due to the concurrent operation of the Proposal site, the MPE Stage 1 site, and the MPW Stage 2 site have been predicted by combining the computer noise models developed for each proposal, and assessed against the relevant amenity criteria.

Due to the large separation distances between the Proposal and nearby sensitive receivers, construction and operational vibration impacts are considered unlikely. Further detail regarding vibration impacts created as part of the Proposal are outlined in Section 8.2.2 of this EIS.

Air Quality

A cumulative impact assessment of air quality for both the construction and operation of the Proposal has been undertaken by Ramboll (2016) (Appendix M of this EIS). Cumulative impacts for air quality were assessed by combining the air emission impacts generated from the Proposal in isolation with the following sources¹:

- The existing ambient air quality environment, based on baseline monitoring data collected for the Proposal (refer to Section 9.3.3 and 9.3.4 of this EIS)
- Approved future emission sources of air emissions near the Proposal, including the predicted air quality impacts from the construction and operation of the MPE Stage 1 Proposal and the MPW Stage 2 Project.

The key air pollutants of concern during the construction phase of the Proposal are fugitive dust or particulate matter (PM), generated during demolition, site clearing and earthworks. During operations, the key emissions are associated with the combustion of diesel and other fossil fuels.

The air quality goals for the Proposal (in accordance with NSW EPA impact assessment criteria and the AAQ NEPM National Reporting Standard) are commonly assessed against cumulative emissions values (rather than incremental impacts). These impact assessment criteria are outlined in Section 9.2.2 of this EIS. Sensitive receptors, baseline ambient air quality data, emissions inventory data and dispersion modelling data outlined in Sections 9.3 and 9.4 of this EIS were used to carry out both the construction and operational cumulative assessments.

Human Health

A cumulative operational health impact assessment has been undertaken by Ramboll Environ (2016) (Appendix N of this EIS) to assess the changes in health outcomes due to air and noise emissions due to the concurrent operation of the Proposal with MPE Stage 1 and MPW Stage 2.

Construction phase impacts for the Proposal would be temporary in nature and effectively controlled and therefore were not assessed in detail. Guidelines and standards outlined in Section 10 of this EIS were used for the cumulative assessment.

For the air quality cumulative component of the assessment, key assumptions, chemicals of potential concern, health endpoints and exposure-response functions outlined in Section 10.2.1 of this EIS were used, along with the modelling data generated as part of the Air Quality Impact Assessment (Appendix M of this EIS). It is generally accepted by regulatory agencies that an increase in risk between 1×10^{-6} (1 in a million) and 1×10^{-5} (1 in 100,000) of the health end point assessed is low risk and within acceptable criteria.

For cumulative noise related health impacts, the WHO guideline values, sensitive receivers, key information and assessment parameters described in Section 10.2.2 of this EIS remain appropriate. Consistent with WHO guidelines, the approach included an assessment of total noise generated by the cumulative Proposal (including rail noise) plus the existing ambient background noise.

¹ It is noted that the Glenfield Waste Services (GWS) site, located to the southwest of the Proposal site, has a current SSD application for a Material Recycling Facility, capable of processing up to 450,000 tonnes per annum of general solid waste. An Air Quality Assessment prepared for the application (SLR, 2015) indicates that concentrations of PM_{2.5} from the facility would be minor (annual average < 0.2 µg/m³). As PM_{2.5} is the key limiting pollutant for the operation of the Proposal, no further cumulative consideration of the GWS site is considered.

Biodiversity

An assessment of cumulative impacts arising from the Proposal, the MPE Stage 1 and MPW Stage 2 Projects and the Glenfield Waste Facility was undertaken by Arcadis (2016) (Appendix O of this EIS). The assessment is based on the information provided for the “Moorebank Precinct West – Stage 2 Proposal, Biodiversity Assessment Report” undertaken by Arcadis (2016) and the Biodiversity Assessment Report provided in Appendix O of this EIS. The assessment methodology outlined in Chapter 11 of this EIS for Biodiversity was followed where relevant for the cumulative impact assessment.

Hazard and Risk

A qualitative assessment of the cumulative hazard and risk impacts of the Proposal and the MPE Stage 1 and MPW Stage 2 Projects has been undertaken, which considered hazardous materials and dangerous goods handling, and bushfires.

Visual Amenity

A qualitative cumulative visual assessment was undertaken to identify any potential increase to visual sensitivity and impact to the surrounding area as a result of the Proposal and surrounding developments, over and above the Proposal.

19.3 Existing Environment

With respect to the key aspects covered in this cumulative assessment, the existing environment is discussed in detail in the following sections:

- Traffic and Transport: Section 7 of this EIS
- Noise and Vibration: Section 8 of this EIS
- Air Quality: Section 9 of this EIS
- Human Health: Section 10 of this EIS
- Biodiversity: Section 11 of this EIS
- Hazard and Risk: Section 14 of this EIS
- Visual Amenity: Section 15 of this EIS.

19.4 Potential impacts

19.4.1 Traffic and Transport

Construction

Table 19-3 and Table 19-4 provides a summary of the intersection performance at key locations near the Proposal in the cumulative construction scenario for the AM and PM peak periods respectively and compares this performance to intersection performance without the Proposal and with construction of the Proposal only.

Under the cumulative construction scenario, the performance of intersections near the Proposal are expected to generally operate at a level of service similar to the operation of these intersections without construction and with construction of the Proposal only in 2018. All modelled intersections near the Proposal would operate at an acceptable level of service during the AM and PM peak during peak construction.

Under the cumulative construction scenario, it is assumed that the Moorebank Avenue / Anzac Road intersection has been upgraded to include traffic signals and a fourth leg, providing signalised access into the MPW site.

Table 19-3 Comparison of intersection performance during construction of the Proposal – AM peak

Intersection	Without the Proposal			With construction of the Proposal only*			Cumulative construction		
	Intersection Configuration	Average delay (seconds)	LoS	Intersection Configuration	Average delay (seconds)	LoS	Intersection Configuration	Average delay (seconds)	LoS
Moorebank Avenue / MPE Stage 2 Site Access Road	Existing Layout	7	A	Existing Layout	12	A	Existing Signal	12	A
Moorebank Avenue / DJLU Access Road	Existing Layout	N/A^	N/A^	Existing Layout	4	A	Existing Signal	4	A
Moorebank Avenue / Anzac Road	Existing Layout	18	B	Existing Layout	31	C	Upgraded Signal with 4 th leg providing access to MPW site	39	C
M5 Motorway / Moorebank Avenue	Existing Signal	24	B	Existing Signal	31	C	Existing Signal	34	C

*Assessed against the peak construction period.

^The existing conditions of the Moorebank Avenue / MPE Stage 2 Site Access intersection has not been modelled as the intersection is not currently operational.

Table 19-4 Comparison of intersection performance during construction of the Proposal – PM peak

Intersection	Without the Proposal			With construction of the Proposal only*			Cumulative construction		
	Intersection Configuration	Average delay (seconds)	LoS	Intersection Configuration	Average delay (seconds)	LoS	Intersection Configuration	Average delay (seconds)	LoS
Moorebank Avenue / MPE Stage 2 Site Access Road	Existing Layout	6	A	Existing Layout	10	A	Existing Signal	10	A
Moorebank Avenue / DJLU Access Road	Existing Layout	N/A^	N/A^	Existing Layout	5	A	Existing Signal	5	A
Moorebank Avenue / Anzac Road	Existing Layout	17	B	Existing Layout	23	B	Upgraded Signal with 4 th leg providing access to MPW site	44	D
M5 Motorway / Moorebank Avenue	Existing Signal	30	C	Existing Signal	31	C	Existing Signal	39	C

*Assessed against the peak construction period. Refer to Section 7.4 for more information

^The existing conditions of the Moorebank Avenue / MPE Stage 2 Site Access intersection has not been modelled as the intersection is not currently operational.

Operation

In the cumulative operational scenario (i.e operation of the Proposal concurrently with the MPE Stage 1 Proposal and MPE Stage 2 Project), approximately 2,540 truck trips (2-way) and 6,808 car trips (2-way) are estimated to travel to and from the combined sites each weekday.

Table 19-5 and Table 19-6 provides a comparison of the intersection performance at key locations near the Proposal in the cumulative operational scenario during the AM and PM peak periods with intersection performance without the Proposal in 2019 (opening year) and 2029 (10 year horizon).

As part of the cumulative operational assessment, intersection performance has been considered in two scenarios:

- The 'do minimum' scenario, which includes committed / planned road network upgrades by the State government on the wider road network
- The 'with assumed network upgrades' scenario, which includes network upgrades which are recommended to minimise the impacts of background traffic growth and traffic from the cumulative operation of the Proposal. The proposed network upgrades and the indicative timing for these upgrades are described in more detail in Section 7.6 and Appendix K of this EIS, and include upgrades to the following intersections:
 - Moorebank Avenue / Anzac Road
 - M5 Motorway / Moorebank Avenue
 - M5 Motorway / Hume Highway
 - Moorebank Avenue / Newbridge Road
 - Moorebank Avenue / Heathcote Road
 - M5 Motorway / Heathcote Road.

Network improvements are required to mitigate the impacts of the cumulative operational scenario at key intersections within the study area, and these are either directly as a result of the cumulative development scenario, or to cater for background traffic growth.

As these upgrades are not directly a result of the Proposal, they have been nominated as assumed network upgrades and adopted to complete the modelling for the operational traffic and transport impact assessment (refer to Section 7 and Appendix K of this EIS for more information).

The performance of intersections at locations where the assumed network upgrades have been adopted are expected to perform satisfactorily, after the upgrades were adopted in the modelling, with the addition of cumulative operational traffic in 2019 and 2029 in the AM and PM peak periods.

Opening year (2019)

In 2019 during the AM peak, intersection performance at key intersections near the Proposal would operate at an acceptable LoS without the cumulative development, and with the cumulative development in the do-minimum scenario, with the exception of:

- The M5 Motorway / Hume Highway intersection, which would operate at a LoS F
- Moorebank Avenue / Heathcote Road, which would operate at a LoS E, indicating that it is near capacity in this scenario.

However, in 2019 during the AM peak and with the implementation of assumed network upgrades, intersection performance at all key intersections near the Proposal modelled as part of this assessment would operate at an acceptable LoS.

In 2019 during the PM peak, intersection performance at key intersections near the Proposal would operate at an acceptable LoS without the cumulative development, and with the cumulative development in the do-minimum scenario, with the exception of the M5 Motorway / Moorebank Avenue intersection. With the operation of the cumulative development in the 'do-minimum' scenario, the M5 Motorway / Moorebank Avenue intersection would operate at a LoS E, indicating that is close to capacity.

In 2019 during the PM peak and with the implementation of assumed network upgrades, intersection performance at all key intersections near the Proposal modelled as part of this assessment would operate at an acceptable LoS.

Horizon year (2029)

In 2029 during the AM Peak, a number of intersections would be operating near or at or capacity (ie LoS E or LoS F), without the cumulative development and with the cumulative development in the do-minimum scenario including:

- M5 Motorway / Hume Highway, which would operate at a LoS F
- Moorebank Avenue / Heathcote Road, which would operate at a LoS E
- M5 Motorway / Heathcote Road, which would operate at a LoS F.

In the 2029 AM peak, the performance of the Moorebank Avenue / Anzac Road intersection would deteriorate from a LoS E without the cumulative development of the Proposal to a LoS F with the cumulative development of the Proposal in a do-minimum scenario.

Similarly, in the 2029 AM Peak, the cumulative operation of the Proposal under a do-minimum scenario would result in the intersection performance of the Moorebank Avenue / JLU Access deteriorating from a LoS D to LoS E, indicating that this intersection would be at or near capacity in this scenario.

With the implementation of assumed network upgrades, intersection performance at all key intersections near the Proposal modelled as part of this assessment in 2029 during the AM peak would operate at an acceptable LoS, with the exception of:

- Moorebank Avenue / Anzac Road, which would continue to operate at a LoS F, although the average delay would be reduced
- Moorebank Avenue / DJLU Access, which would continue to operate at a LoS E, although the average delay would be reduced.

Although these intersections would operate at a LoS E or LoS F, the performance of these intersections is no worse than the performance expected at these intersections in 2029 without the cumulative operation of the Proposal in the AM Peak.

In 2029 during the PM Peak all intersections would operate near or at or capacity (ie LoS E or LoS F), without the cumulative development and with the cumulative development in the do-minimum scenario.

In the 2029 PM peak, the cumulative operation of the Proposal under a do-minimum scenario would result in the performance of the Cambridge Avenue / Glenfield Road and Cambridge Avenue / Canterbury Road intersections deteriorate from a LoS E to a LoS F during the PM peak.

With the implementation of assumed network upgrades, intersection performance at all key intersections near the Proposal modelled as part of this assessment in 2029 during the AM peak would operate at an acceptable LoS, with the exception of:

- Moorebank Avenue / Heathcote Road, which would operate at a LoS E indicating that it is operating near capacity. Although this intersection would continue to operate at or near capacity, the implementation of the assumed network upgrades at this location would improve the performance of this intersection, which would operate at a LoS F with the cumulative operation of the Proposal under the 'do-minimum' scenario.
- M5 Motorway / Heathcote Road, which would continue to operate at a LoS F, although the average delay would be reduced.

Although these intersections would operate at a LoS E or LoS F, the performance of these intersections is no worse than the performance expected at these intersections in 2029 without the cumulative operation of the Proposal in the AM Peak.

Table 19-5 Intersection Level of Service with and without Cumulative Development Scenario – 2019

ID	Intersection*	AM peak						PM peak					
		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)*		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)	
		Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS
I-1	Moorebank Avenue / Anzac Road	16	B	41	C	42	D	15	B	47	D	44	D
I-2	M5 Motorway / Moorebank Avenue	24	B	25	B	20	B	25	B	57	E	34	C
I-3	M5 Motorway / Hume Highway	86	F	107	F	45	D	37	C	53	D	39	C
I-4	Moorebank Avenue / Newbridge Road	36	C	37	C	28	C	34	C	40	C	34	C
I-5	Moorebank Avenue / Heathcote Road	56	E	63	E	50	D	42	D	46	D	37	C
I-6	M5 Motorway / Heathcote Road	50	D	49	D	38	C	37	C	56	D	39	C
I-7	Cambridge Avenue / Glenfield Road	10	A	9	A	8	A	15	B	15	B	14	B
I-8	Cambridge Avenue / Canterbury Road	11	A	9	A	8	A	7	A	6	A	6	A
I-A	Moorebank Avenue / JLU Access Road Existing Layout	9	A	5	A	5	A	8	A	6	A	6	A

MPE Stage 2 Proposal - Environmental Impact Statement

ID	Intersection*	AM peak						PM peak					
		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)*		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)	
		Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS
I-B	Moorebank Avenue / MPE Stage 2 Site Access	Existing signalised intersection is not operational		9	A	9	A	Existing signalised intersection is not operational		13	A	13	A

*refer to Section 7.6 of this EIS for more information regarding assumed network upgrades

Table 19-6 Intersection Level of Service with and without Cumulative Development Scenario - 2029

ID	Intersection*	AM peak						PM peak					
		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)*		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)	
		Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS
I-1	Moorebank Avenue / Anzac Road	56	E	74	F	51	D	105	F	421	F	46	D
I-2	M5 Motorway / Moorebank Avenue	53	D	58	E	34	C	141	F	297	F	51	D
I-3	M5 Motorway / Hume Highway	148	F	156	F	98	F	124	F	276	F	44	D
I-4	Moorebank Avenue / Newbridge Road	39	C	40	C	37	C	73	F	115	F	36	C
I-5	Moorebank Avenue / Heathcote Road	65	E	59	E	56	D	146	F	259	F	63	E
I-6	M5 Motorway / Heathcote Road	131	F	140	F	68	E	190	F	283	F	100	F
I-7	Cambridge Avenue / Glenfield Road	11	A	8	A	7	A	61	E	109	F	8	A
I-8	Cambridge Avenue / Canterbury Road	19	B	15	B	15	B	60	E	90	F	7	A
I-A	Moorebank Avenue / JLU Access Road	53	D	83	F	25	B	155	F	455	F	7	A

MPE Stage 2 Proposal - Environmental Impact Statement

ID	Intersection*	AM peak						PM peak					
		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)*		Without the Cumulative Development (Do-Minimum)		With the Cumulative Development (Do-Min)		With the cumulative Development (With assumed network upgrades)	
		Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS	Avg delay (secs)	LoS
I-B	Moorebank Avenue / MPE Stage 2 Site Access	Existing signalised intersection is not operational		51	D	20	B	Existing signalised intersection is not operational		307	F	12	A

19.4.2 Noise and Vibration

Construction

The cumulative construction noise levels for each of the selected receivers (worst-case) are presented in Table 19-7. The results show that cumulative construction noise levels are predicted to comply with the NML at all receivers, except for the most sensitive receivers in Casula, where cumulative construction noise levels may exceed NML by up to 2dB. This is considered a negligible exceedance.

Table 19-7 Worst-case cumulative construction noise levels

Receiver	Predicted $L_{Aeq, 15min}$ Noise Levels					NML	Exceedance
	MPE Stage 2 Proposal	MPW Early Works	MPW Stage 2	MPE Stage 1	Cumulative		
Wattle Grove	49	38	37	40	50	52	0 dB
Wattle Grove North	45	38	37	27	46	46	0 dB
Casula	47	44	50	40	53	51	2 dB
Glenfield	35	40	36	32	43	54	0 dB
S1	44	49	49	39	53	55	0 dB
S2	42	49	48	37	52	55	0 dB

Operation

The cumulative operational noise levels (L_{eq} , period) were calculated and assessed against amenity criteria at various times throughout the day (day, evening and night) at key selected noise receivers, as detailed in Table 19-8.

The results show that the cumulative operational noise levels at sensitive receivers, due to the concurrent operation of the Proposal and the MPE Stage 1 and MPW Stage 2 projects, would comply with the relevant amenity criteria at all times of the day.

It is also noted that the Glenfield Waste Services are proposing to develop a Materials Recycling Facility on a parcel of land south-west of the Proposal. This facility is understood to operate during working hours only, for which the cumulative assessment of the Proposal operation was more than 10 dB below the relevant daytime amenity criteria at all sensitive receivers. It is therefore considered unlikely that this would contribute to any exceedance of daytime amenity criteria.

Table 19-8 Predicted cumulative operational noise levels

Receiver	Predicted $L_{Aeq, period}$ Noise Level (dBA)				Criteria (dBA)			Exceedance
	Day ₁	Evening ₁	Night ₁		Day ₁	Evening ₁	Night ₁	
			Calm ₂	Adverse ₃				
Wattle Grove	27	27	25	29	55	45	40	0 dB
Wattle Grove North	30	30	29	33	60	50	45	0 dB
Casula	33	33	32	36	55	45	40	0 dB
Glenfield	22	22	22	27	55	45	40	0 dB
S1	29	29	29	34	45 (external, when in use)			0 dB
S2	26	26	25	29	45 (external, when in use)			0 dB
I2 (DJLU)	56	56	56	57	70 (external, when in use)			0 dB
I3 (ABB)	52	52	48	50	70 (external, when in use)			0 dB

19.4.3 Air Quality

Construction

The cumulative construction scenario for the Proposal included emissions generated from Proposal's construction, combined with the adopted ambient air quality concentrations (refer to Table 9-10 of this EIS) and emissions generated from the construction of the MPE Stage 1 Proposal and the adjacent MPW Stage 2 Project. Air quality goals established for the Proposal are measured against the cumulative construction scenario, the results of which are included below in Table 19-9.

The modelling results indicate that dust, TSP, PM₁₀ and PM_{2.5} emissions at sensitive receivers around the Proposal comply with all relevant impact assessment criteria. The annual average background concentrations of PM_{2.5} already exceeds the NEPM AAQ reporting standard, meaning that cumulative predictions are also above the standard at all receptors. It is noted, however, that the incremental increases in PM_{2.5} emissions created from the Proposal and MPE Stage 1 and MPW Stage 2 result in relatively minor increases to the annual average when compared to background concentration levels.

Table 19-9 Summary of dust and particulate matter modelling predictions at most affected sensitive receptors for the cumulative construction scenario

Pollutant	Period	Air quality goal criteria	Receptor maximum
PM ₁₀ (µg/m ³)	24 hour maximum	50 µg/m ³	49.6 µg/m ³
	Annual average	30 µg/m ³	21.0 µg/m ³
PM _{2.5} (µg/m ³)	24 hour maximum	25 µg/m ³	24.6 µg/m ³
	Annual average	8 µg/m ³	8.8 µg/m ³
TSP (µg/m ³)	Annual average	90 µg/m ³	50.6 µg/m ³
Dust deposition	Annual average	4g/m ² /m	3.1 g/m ² /m

Operation

The cumulative operational scenario included the cumulative operation of the Proposal combined with the operation of the MPE Stage 1 Proposal and MPW Stage 2 Project, incorporating a total of 750,000 TEU (250,000 TEU and 500,000 TEU respectively) and 515,000m² GFA of warehousing (215,000 m² and 300,000 m²). The key pollutants assessed were those primarily resulting from diesel and fossil fuel combustion, including:

- PM₁₀ and PM_{2.5}
- Oxides of nitrogen (NO_x)
- Sulphur dioxide (SO₂)
- Carbon monoxide (CO)
- Speciated HC/VOCs – benzene, 1-3-butadiene and PAHs.

Key assumptions, detailed activity data, equipment types, emissions factors and fuel usage estimates were used to predict emissions levels for the Proposal (outlined in Section 9.4.2 of this EIS) and were used for the cumulative operational assessment. Modelling results for air pollutants PM₁₀ and PM_{2.5} are provided in Table 19-10 below².

As shown in Table 19-10, predicted concentrations of PM₁₀ and PM_{2.5} for the operational cumulative scenario are compliant with air quality goals, except for the annual average PM_{2.5} concentrations, which, as earlier discussed, are already in exceedance of criteria and are not significantly influenced as a result of incremental cumulative emissions generated by both Proposals.

Table 19-10 Summary of cumulative PM₁₀ and PM_{2.5} modelling predictions at most affected sensitive receivers

Pollutant	Period	Air quality goal criteria	Receptor maximum
PM ₁₀ (µg/m ³)	24 hour maximum	50 µg/m ³	48.5 µg/m ³
	Annual average	30 µg/m ³	20.0 µg/m ³
PM _{2.5} (µg/m ³)	24 hour maximum	25 µg/m ³	24.4 µg/m ³
	Annual average	8 µg/m ³	8.8 µg/m ³

² For cumulative 24-hour average PM₁₀ and PM_{2.5} concentrations, the results exclude days where the background is already in exceedance of the criteria.

Predictive operational concentrations of NO₂³, CO and SO₂ are presented in Table 19-11. Cumulative NO₂ results were derived by combining the background concentration levels established in Section 9.3.3 of this EIS with those calculated for the MPE Stage 1 Proposal and MPW Stage 2 Project to the NO_x concentrations predicted for the Proposal. The cumulative 1-hour NO₂ is derived by pairing each 1-hour average modelling prediction for the MPE Stage 1 Proposal, the MPW Stage 2 Project and the Proposal with the corresponding background for that hour.

Cumulative concentrations presented for CO and SO₂ (1 hour, 8 hour and 24-hour) were derived by adding the maximum predicted short term concentrations (for the Proposal, MPE Stage 1 and MPW Stage 2) to the maximum background concentration established in Section 9.3.3.

As demonstrated below in Table 19-11, all predicted concentrations of air pollutants investigated were well below the impact assessment criteria at the most affected receivers.

Table 19-11 Summary of cumulative NO₂, CO and SO₂ modelling predictions at most affected sensitive receivers

Pollutant	Period	Air quality goal criteria	Receptor maximum
NO ₂ (µg/m ³)	1 hour maximum	246 µg/m ³	187.7 µg/m ³
	Annual average	62 µg/m ³	37.4 µg/m ³
CO (mg/m ³)	1 hour maximum	30 mg/m ³	5.1 µg/m ³
	8 hour maximum	10 mg/m ³	3.1 µg/m ³
SO ₂ (µg/m ³)	1 hour maximum	570 (µg/m ³)	75.4 µg/m ³
	24 hour maximum	228 (µg/m ³)	13.8 µg/m ³
	Annual average	60 (µg/m ³)	2.7 µg/m ³

In summary, the modelling results shown in Table 19-10 and Table 19-11 indicate that the risk of adverse air quality impacts generated by the Proposal are low, and that incremental increases in key pollutants at surrounding residential receivers would be largely indistinguishable from the existing background and the Proposal.

19.4.4 Human Health

Air quality

Health End Points

The evaluated increase in annual health endpoints for cumulative exposure to air quality parameters PM₁₀, PM_{2.5}, NO₂, SO₂, and CO for each suburb are presented in Table 19-12, Table 19-13, Table 19-14, Table 19-15 and Table 19-16. These results were derived using the methodology summarised in Section 10.2.1 of this EIS.

³ NO₂ concentrations are based on the conservative assumption that 100% of NO is converted to NO₂, both for short-term and annual average predictions. This simplified (and conservative) conversion method can be applied in this case because predictions are well below the relevant impact assessment criteria.

Table 19-12 shows that the most sensitive health end point for PM₁₀ emissions is asthma, and the cumulative Proposal could be expected to contribute an additional 0.1 asthma-related emergency department visits per year among 1-14 year olds in Wattle Grove.

Table 19-12 Summary of increased annual incidence associated with exposure to PM₁₀ from the cumulative Proposal

Health endpoint	Exposure period	Increased annual incidence (case per year)			
		Casula	Glenfield	Moorebank	Wattle Grove
All-cause mortality 30+ years	Annual Average	0.07	0.04	0.07	0.07
All-cause mortality all ages	24-Hour Average	0.04	0.01	0.03	0.04
Mortality cardiovascular disease all ages	24-Hour Average	0.01	0.004	0.009	0.01
Hospital admissions respiratory disease 65+ years	24-Hour Average	0.05	0.02	0.05	0.02
Hospital admissions cardiac disease 65+ years	24-Hour Average	0.06	0.03	0.06	0.03
Hospital admissions pneumonia and bronchitis 65+ years	24-Hour Average	0.006	0.003	0.006	0.003
Hospital admissions respiratory disease 15-64 years	24-Hour Average	0.06	0.02	0.05	0.06
ED visits asthma 1-14 years	24-Hour Average	0.09	0.03	0.07	0.1

Abbreviations: ED: Emergency Department. PM: Particulate Matter

Table 19-3 shows that PM_{2.5} emissions could be expected to result in an additional 0.1 incidence of premature mortality per year in Casula, Moorebank and Wattle Grove due to all causes or cardiopulmonary disease among 30+ year-olds (equivalent to one additional incidence of premature mortality every 10 years). There could also be an additional 0.2 hospital admissions per year associated with cardiac disease among 65+ year-olds in Casula or Moorebank (equivalent to two additional hospital admissions per 10 years), attributed to daily exposure to emissions of PM_{2.5} from the operation of the cumulative Proposal.

Table 19-13 Summary of increased annual incidence associated with exposure to PM_{2.5} from the cumulative Proposal

Health endpoint	Exposure period	Increased annual incidence (case per year)			
		Casula	Glenfield	Moorebank	Wattle Grove
All-cause mortality 30+ years	Annual Average	0.1	0.05	0.1	0.09
Cardiopulmonary mortality 30+	Annual Average	0.1	0.06	0.1	0.1
Mortality ischemic heart disease 30+ years	Annual Average	0.03	0.01	0.03	0.02
Mortality lung cancer 30+ years	Annual Average	0.008	0.004	0.008	0.007
All-cause mortality all ages	24-Hour Average	0.04	0.02	0.03	0.04
Mortality cardiovascular disease- all ages	24-Hour Average	0.007	0.003	0.005	0.007
Hospital admissions respiratory disease 65+ years	24-Hour Average	0.06	0.03	0.06	0.03
Hospital admissions cardiac disease 65+ years	24-Hour Average	0.2	0.08	0.2	0.08
Hospital admissions cardiovascular disease 65+ years	24-Hour Average	0.09	0.05	0.09	0.05
Hospital admissions ischemic heart disease 65+ years	24-Hour Average	0.05	0.02	0.05	0.02
Hospital admissions COPD 65+ years	24-Hour Average	0.02	0.01	0.02	0.01
Hospital admissions pneumonia and bronchitis 65+ years	24-Hour Average	0.02	0.01	0.02	0.01
Hospital admissions respiratory disease 15-64 years	24-Hour Average	0.06	0.02	0.05	0.06
ED visits asthma 1-14 years	24-Hour Average	0.009	0.003	0.007	0.01

Abbreviations: COPD: Chronic Obstructive Pulmonary Disease. ED: Emergency Department. PM: Particulate Matter

Regarding the results for NO₂ exposure outlined in Table 19-14, the increased incidences for the cumulative Proposal were slightly above one case per year for three health end points in Casula and Moorebank, as well as one health end point in Wattle Grove. The most sensitive health end point was all-cause mortality 30+ years that may cause an additional 1.4 incidences of premature mortality per year in Casula and Moorebank, and an additional 1.2 incidences of premature mortality per year in Wattle Grove. It is however important to note that calculations made were based on the conservative assumption that all NO_x is converted to NO₂. Based on monitoring data from the Liverpool Air Monitoring station, the ratio of NO₂ to NO_x is 0.7 (i.e. NO₂ is 70% of the monitored NO_x levels). When applied to the data presented in Table 19-14, increased annual incidence would be reduced to <1.0 cases per year for the most sensitive end point (refer to the numbers in parentheses in Table 19-14). It is also noted that cumulative NO₂ levels for all relevant averaging periods would be below current NEPM air quality standards (refer to Section 18.4.3 of this EIS).

Table 19-14 Summary of increased annual incidence associated with exposure to NO₂ from the cumulative Proposal

Health endpoint	Exposure period	Increased annual incidence (case per year) (values in brackets assume ambient ratio of NO ₂ to NO _x of 0.7)			
		Casula	Glenfield	Moorebank	Wattle Grove
All-cause mortality 30+ years	Annual Average	1.4 (1)	0.8 (0.5)	1.4 (1)	1.2 (0.9)
Cardiovascular mortality 30+ years	Annual Average	0.4 (0.3)	0.2 (0.1)	0.4 (0.3)	0.3 (0.2)
Respiratory mortality 30+ years	Annual Average	0.07 (0.05)	0.04 (0.02)	0.07 (0.05)	0.06 (0.04)
All-cause mortality all ages	24-Hour Average	0.5 (0.4)	0.2 (0.1)	0.4 (0.3)	0.5 (0.3)
Mortality respiratory disease	24-Hour Average	0.1 (0.08)	0.04 (0.03)	0.09 (0.06)	0.1 (0.07)
Mortality cardiovascular disease all ages	24-Hour Average	0.1 (0.1)	0.06 (0.04)	0.1 (0.09)	0.1 (0.1)
Hospital admissions respiratory disease 65+ years	24-Hour Average	1.3 (0.9)	0.7 (0.5)	1.3 (0.9)	0.6 (0.4)
Hospital admissions cardiovascular disease 65+ years	24-Hour Average	1.3 (0.9)	0.7 (0.5)	1.3 (0.9)	0.6 (0.4)
Hospital admissions respiratory disease 15-64 years	24-Hour Average	0.6 (0.4)	0.2 (0.2)	0.5 (0.3)	0.6 (0.4)
ED visits asthma 1-14 years	24-Hour Average	0.1 (0.07)	0.03 (0.02)	0.08 (0.06)	0.12 (0.08)

Abbreviations: ED: Emergency Department, NO₂: Nitrogen Dioxide

The annual increased incidence of selected health endpoints for the cumulative proposal for SO₂ related emissions were all well below one case per year, as shown above in Table 19-15. For the most sensitive health endpoint, there could be an additional 0.008 asthma-related emergency department visit per year among 1-14 year-olds in Wattle Grove (equivalent to one additional emergency department visits per 1,000 years), which may be attributed to daily exposure to emissions of SO₂ from the operation of the cumulative Proposal.

Table 19-15 Summary of increased annual incidence associated with exposure to SO₂ from the cumulative Proposal

Health endpoint	Exposure period	Increased annual incidence (case per year)			
		Casula	Glenfield	Moorebank	Wattle Grove
All-cause mortality all ages	24-Hour Average	0.002	0.0006	0.001	0.002
Mortality respiratory disease- all ages	24-Hour Average	0.0003	0.0001	0.0003	0.0003
Mortality cardiovascular disease- all ages	24-Hour Average	0.0006	0.0002	0.0006	0.0006
Hospital admissions respiratory disease 65+ years	1- Hour Maximum	0.006	0.002	0.005	0.006
ED visits asthma 1-14 years	24-Hour Average	0.007	0.002	0.006	0.008

Abbreviations: ED: Emergency Department. SO₂: Sulfur Dioxide

The annual increased incidence of selected health endpoints for the cumulative proposal for CO related emissions were all well below one case per year, as shown above in Table 19-16. For the most sensitive health endpoint, there would be an additional 0.002 hospital admission per year associated with cardiac disease among 65+ year-olds in Casula or Moorebank (equivalent to two additional hospital admissions per 1,000 years), which may be attributed to 8-hour exposure to emissions of CO from the operation of the Proposal or cumulative Proposal.

Table 19-16 Summary of increased annual incidence associated with exposure to CO from the cumulative Proposal

Health endpoint	Exposure period	Increased annual incidence (case per year)			
		Casula	Glenfield	Moorebank	Wattle Grove
All-cause mortality 30+ years	8-Hour Average	0.0003	0.0002	0.0003	0.0003
Hospital admissions cardiac disease 65+ years	8-Hour Average	0.002	0.0009	0.002	0.0009
Hospital admissions cardiovascular disease 65+ years	8-Hour Average	0.0001	0.00006	0.0001	0.00006

Abbreviations: CO: Carbon Monoxide. ED visits asthma 1-14 years

Based on the estimated increased annual incidence for multiple health endpoints contributing to mortality and morbidity shown above, there are no significant adverse health effects expected in relation to short-term exposure to PM₁₀, PM_{2.5}, NO₂, SO₂ or CO from the cumulative Proposal in the surrounding local area.

Excess Lifetime Cancer Risk

Table 19-17 shows that excess lifetime cancer risks associated with cumulative Proposal related exposure to benzene, 1,3-butadiene, PAHs (as BaP TEQ) and DPM were all within the acceptable risk range of 10⁻⁶ to 10⁻⁴. Therefore, no unacceptable cancer risks are expected in relation to long-term exposure to VOCs, DPM and PAHs in the surrounding local area.

Table 19-17 Summary of excess lifetime cancer risks associated with exposure to Benzene, 1,3-Butadiene, PAHs, and DPM from the operation of the cumulative Proposal

Chemical	Excess lifetime cancer risk at maximum exposed receptor		
	Residential/School	Recreational	Commercial/Industrial
Benzene	5.1E-07	2.6E-08	1.0E-07
1,3-Butadiene	1.0E-06	5.3E-08	2.0E-07
DPM	9.1E-05	4.5E-06	1.7E-05
PAHs (as BaP TEQ)	6.4E-09	2.2E-10	1.1E-09

Abbreviations: BaP: Benzo(a)pyrene. DPM: Diesel Particulate Matter. PAH: Polycyclic Aromatic Hydrocarbon. TEQ: Toxicity Equivalent

Noise

A review of noise impacts for the cumulative Proposal at sensitive receivers, as shown in Table 19-18, indicates that hazard quotients for annoyance, sleep disturbance and cognitive impairment were less than or equal to one (1) at all residential and educational receivers. This indicates that the operational noise from the cumulative Proposal does not pose an unacceptable risk to the health of these communities. Noise from the cumulative Proposal would result in a predicted hazard quotient of greater than 1 for annoyance and cognitive impairment at the nearest industrial receiver, however, this is considered acceptable given the hazard quotients for existing ambient noise at this receiver already exceed 1 for these health effects.

Table 19-18 Hazard quotients for cumulative operational noise from the cumulative Proposal

Receiver/Suburb	Annoyance	Sleep Disturbance		Cognitive Impairment
	L _{Aeq, period}	L _{Aeq, period}	L _{Amax}	L _{Aeq, period}
Casula	0.7	0.9	0.8	0.7
Glenfield	0.4	0.6	0.4	0.3
Wattle Grove	0.5	0.6	1.0	0.5
All Saints Senior College (S1)	0.5	NA	NA	0.5
Casula Powerhouse (S2)	0.5	NA	NA	0.5
DJLU (I2)	1.3	NA	NA	1.3

Total noise levels were also analysed as part of the HRA as the WHO community guidelines are designed to be applied under these conditions. This equates to the total noise generated by the cumulative Proposal (including rail noise) plus the existing ambient background noise.

The data presented in Table 19-19 shows the difference between the total noise level and the existing ambient noise levels for each of the key catchment areas. As the data in Table 19-19 shows, there is no recognisable difference between the existing ambient and total noise levels in each of the three noise catchments, indicating that the cumulative Proposal would have little impact on the local area, and that the existing ambient noise is the major contributor to the total noise.

Table 19-19 Predicted total noise levels from cumulative operation of the Proposal, rail noise and existing ambient background noise

Suburb	Daily L _{Aeq, period} (dBA)		
	Operational + Rail noise	Existing Ambient	Total (Proposal + Existing Ambient)
Casula	50	55	55
Glenfield	43	48	48
Wattle Grove	41	55	55

19.4.5 Biodiversity

The development of the three adjoining sites (MPW, MPE and Glenfield Waste facility) would reduce or remove a range of biodiversity values, including available fauna habitat (roosting, nesting and foraging habitat), potential threatened fauna habitat, threatened plant species, *Threatened Species Conservation Act* 1995 (TSC Act) listed Threatened Ecological Communities (TECs), local provenance plant species and potential seedbanks.

Only one plant community type (PCT) was identified on the Proposal site, the MPE Stage 1 and the MPW site. The total impacts to native vegetation, including TECs, are detailed in Table 19-20.

Table 19-20 Cumulative impacts to native vegetation from the Proposal, MPE Stage 1 and MPW Stage 2

Plant Community Type	Equivalent TEC	Conservation status	Area impacted by the Proposal	Area impacted by MPW Stage 2	Area impacted by MPE Stage 1	Total area of impact
Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion	Cooks River – Castlereagh Ironbark Forest in the Sydney Basin Bioregion	Endangered (TSC Act) Critically Endangered (EPBC Act)	0.05 ha	0	0	0.05 ha
Hard-leaved Scribbly Gum – Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin	Castlereagh Scribbly Gum Woodland in the Sydney Basin bioregion	Vulnerable (TSC Act) Endangered (EPBC Act)	0.1 ha	15.51 ha	0.74 ha	16.35 ha
Parramatta Red Gum woodland on moist alluvium of the Cumberland Plain, Sydney Basin	Castlereagh Swamp Woodland	Endangered (TSC Act)	0	0.92 ha	0.05 ha	0.97 ha
Forest Red Gum – Rough-barked	River-flat Eucalypt Forest on Coastal	Endangered (TSC Act)	0	30.62 ha	0.42 ha	31.04 ha

Plant Community Type	Equivalent TEC	Conservation status	Area impacted by the Proposal	Area impacted by MPW Stage 2	Area impacted by MPE Stage 1	Total area of impact
Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin	Floodplains of the NSW North Coast, Sydney Basin and South-east Corner bioregions					
Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion	Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner bioregions	Endangered (TSC Act)	0	0	0.03 ha	0.03 ha
Total area of native vegetation cleared			0.15 ha	47.05 ha	1.24 ha	48.44 ha

The Glenfield Waste Facility proposal requires clearing of 9.5 hectares of the PCT Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion, which forms part of the Critically Endangered Ecological Community (CEEC) Cumberland Plain Woodland, listed under the *Environmental Protection and Biological Conservation Act* 1999 (EPBC Act) and TSC Act. As the Proposal does not impact on Cumberland Plain Woodland, cumulative impacts on this TEC as a result of the Proposal are not predicted.

No threatened flora species were identified on the Proposal site during the targeted surveys, therefore no cumulative impacts to threatened flora species are anticipated.

Two threatened fauna species have a high likelihood of occurrence and 11 have a moderate likelihood of occurrence on the proposal Site. Given the modified and fragmented nature of fauna habitat in the Proposal site, potential impacts on these species are considered likely to be minimal, and mainly comprise removal of marginal foraging, sheltering and roosting habitat. As a result, cumulative impacts to threatened fauna species are considered to be unlikely.

19.4.6 Hazard and Risk

Potential impacts relevant for the Proposal relating to Hazards and Risks include:

- the potential for asbestos fibres to become airborne during demolition and excavation activities
- accidental release or improper transport, handling and storage of dangerous goods and/or hazardous substances
- spills and loss of containment of flammable/combustible or corrosive liquids
- fire and explosion
- personnel injury as a result of vehicle accidents and machinery use
- gas leaks (natural gas and LNG)
- flooding as a result of extreme weather; and
- inappropriate waste disposal.

All dangerous goods present on the Proposal site would be stored in locations and quantities below the risk levels under SEPP 33. It is therefore considered that the Proposal would not pose an unacceptable level of risk to the surrounding community, negating the need for a Preliminary Hazard Analysis (PHA) for the Proposal. As no major effects would be felt outside of the Proposal site, it is considered unlikely that any cumulative impacts would arise as a result of the construction or operation of the Proposal. Key impacts for the Proposal and the MPE Stage 1 and MPW Stage 2 Projects would be managed and controlled locally in accordance with appropriate management plans.

19.4.7 Visual Amenity

Both the MPE and MPW sites are effectively screened from surrounding sensitive receivers by existing vegetation to the west, south and east, and existing Defence and industrial areas to the north. Landscaping proposed on the Proposal site would also assist in reducing any visual impacts. In addition, the Proposal and the MPE Stage 1 and MPW Stage 2 Projects are all in keeping with the existing industrial nature of both sites. Therefore, it is not anticipated for the cumulative scenario to result in any visual impacts above what was assessed for the Proposal in isolation.

19.5 Mitigation Measures

Across the issues assessed for cumulative impacts, most did not identify significant additional impacts or exceedances of criteria and no additional mitigation measures were identified. As such, the mitigation measures identified for the Proposal would also effectively mitigate the cumulative impacts identified within this section. The mitigation measures for each of the key issues assessed are presented in following sections of this report:

- Traffic and Transport: Section 7 of this EIS
- Noise and Vibration: Section 8 of this EIS
- Air Quality: Section 9 of this EIS
- Human Health: Section 10 of this EIS
- Biodiversity: Section 11 of this EIS
- Hazard and Risk: Section 14 of this EIS.

This page has been left blank intentionally

20 OTHER ISSUES

20.1 Waste

Arcadis have undertaken an assessment of the waste impacts associated with the Proposal to address the SEARs.

Table 20-1 provides a summary of the relevant SEARs which relate to waste, and where these have been addressed in this EIS.

Table 20-1 SEARs (waste)

SEARs	Where addressed
14. Waste	
An assessment of liquid and/or non-liquid waste generated on the site, how it will be identified, quantified, classified, documented and disposed of. The assessment shall also include a description of measures to be implemented to manage waste in accordance with the waste hierarchy. This assessment shall include waste management measures to ensure that the proposal considers the aims, objectives and guidelines in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021	Section 20.1.3 and 19.1.4

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to waste (refer to Table 20-1) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 20.1.1) and, more recently, for the Proposal. This section of the EIS also describes the existing environment as it relates to waste (section 20.1.2) and provides an assessment of waste impacts associated with construction and operation of the Proposal (section 20.1.3). Measures to mitigate potential waste impacts where they are required have been identified in Section 20.1.4.

20.1.1 Concept Plan Assessment

A Waste Management Strategy (WMS) was prepared by Hyder Consulting (2013c) for, and appended to, the EA for the MPE Concept Plan Approval. The WMS identified a number of re-use opportunities for waste generated by the Proposal within its key stages, including demolition, construction and operation. The purpose of the WMS was to promote re-use to minimise the amount of waste taken to landfills and thereby reduce environmental impacts associated with the MPE Project.

The WMS identified the type of waste and materials that would be produced at each phase of the SIMTA Project and included a number of strategies for waste management and minimisation. The Revised Statement of Commitments, included in the Response to Submissions for the Concept Plan (2014), committed to a number of strategies and opportunities, which are consistent with the waste management and minimisation strategies included in the WMS. These are summarised in Table 20-2.

Table 20-2 Summary of waste management and minimisation strategies

Demolition Waste	Construction Waste	Operation Waste
<ul style="list-style-type: none"> Re-use of material will have priority over recycling Recycling will have priority over disposal Selection of reputable waste removal contractors who will guarantee that recyclable material will be recycled and will provide relevant certificates Vegetation removed shall be either preserved for use in the new development, or mulched for inclusion in landscaping activities. The remainder will be sent to a composting facility Excavated earth will be used for infill and landscaping where feasible, the remainder will be sent to a recycling facility Asphalt will be re-used by transferring it to a batching plant or using it as a base later for access roads Concrete components will, where possible, be crushed and reused on site, the remainder will be sent to a recycling facility Fuel of oil storage from demolition machinery will be secured and managed responsibly within compound sites during works, and removed upon completion of works Sewage waste shall be disposed of by a licenced contractor in accordance with Sydney Water and OEH requirements 	<ul style="list-style-type: none"> Reduce potential waste by ordering the correct quantities of materials Coordinate and sequence trades people to minimise waste Prefabricate material where possible Use modular construction and basic designs to reduce the need for off-cuts Reuse formwork Reuse or recycle materials from the demolition phase Separate off-cuts to facilitate reuse, resale or efficient recycling Minimise site disturbance and limit unnecessary excavation Select landscaping which reduces green waste Select waste removal contractors to guarantee that recyclable waste are recycled Engage with the supply chain to supply products and materials that use minimal packaging Set up schemes with suppliers to take back packaging materials Sewage waste shall be disposed of by a licenced waste contractor in accordance with Sydney Water and OEH requirements 	<ul style="list-style-type: none"> Appropriate areas shall be provided for the storage of waste and recyclable material Standard signage on how to use the waste management system and what materials are acceptable in the recycling will be posted in all waste collection and storage areas All domestic waste shall be collected regularly and disposed of at licenced facilities An education programme and on-going monitor will be implemented for training personnel to properly sort and transport waste into the right components and destinations Sewage waste will be disposed of by a licenced waste contractor in accordance with Sydney Water and OEH requirements Trade waste will be discharged to the sewer through a trade waste agreement with Sydney Water

In addition to the Statement of Commitments, the MPE Concept Plan Approval included a number of requirements to be undertaken relating to waste management for future approvals. The Conditions of Approval are generally consistent with the SEARs provided for the Proposal and have been addressed in this Section. A complete compliance table of this EIS with the SEARs, Statement of Commitments and Conditions of Approval is provided in Appendix A of this EIS.

20.1.2 Existing Environment

Existing environmental conditions are those described in Section 2.4 of this EIS and was historically associated with the Department of Defence. The Proposal site is now privately owned by SIMTA, however the following infrastructure and features are still present:

- A number of existing buildings previously utilised by the Department of Defence, comprising a mixture of warehouses, offices and administrative facilities
- An internal road network and areas of large hardstand, typically comprising asphalt and concrete
- Planted vegetation along site boundaries, walkways, internal roads and areas of open space.

20.1.3 Potential Impacts

Construction

Waste generating activities, and their corresponding waste types, associated with the construction phase are listed in Table 19-3.

Table 20-3 Waste generating activities during construction

Phase	Waste Generating Activity	Waste/Resource Types
Works period A – Pre-construction activities	Earthworks associated with the installation of site access points	<ul style="list-style-type: none"> • Virgin Excavated Natural Material and Excavated Natural Material (VENM and ENM) • Vegetation
	Installation of site fencing	<ul style="list-style-type: none"> • Surplus building materials • Vegetation
	Remediation (where required)	<ul style="list-style-type: none"> • General Solid Waste • Contaminated Soil • Vegetation
Works period B – site preparation activities	Establishment of construction compound fencing and hoardings	<ul style="list-style-type: none"> • Surplus building materials
	Earthworks associated with the installation of temporary sediment and erosion controls measures	<ul style="list-style-type: none"> • VENM/ENM • Depending on the controls used, may include sediment fences and hay bales

Phase	Waste Generating Activity	Waste/Resource Types
	Vegetation clearing	<ul style="list-style-type: none"> Vegetation
	Demolition of existing structures	<ul style="list-style-type: none"> Construction and demolition waste
	Installation of temporary site offices and amenities	<ul style="list-style-type: none"> Surplus building materials Packaging
	Construction of hardstands for staff parking and laydown areas	<ul style="list-style-type: none"> VENM/ENM Surplus building material
	Establishment of a concrete batching plant	<ul style="list-style-type: none"> Surplus concrete Surplus building material
	Establishment of site haul roads	<ul style="list-style-type: none"> VENM/ENM Surplus building material
	Relocation of utilities	<ul style="list-style-type: none"> VENM/ENM
	Establishment of construction compounds	<ul style="list-style-type: none"> Surplus building materials Packaging
	Office administration, lunch room and other activities	<ul style="list-style-type: none"> Residual waste (putrescible and non-putrescible) Recyclable waste (containers and paper/cardboard)
Works period C – construction of the Moorebank Avenue diversion road	Striping and stockpiling of topsoil	<ul style="list-style-type: none"> VENM/ENM Contaminated soil
	Earthworks associated with the installation of temporary sediment and erosion controls measures	<ul style="list-style-type: none"> VENM/ENM Depending on the controls used, may include sediment fences and hay bales
	Installation of temporary drainage	<ul style="list-style-type: none"> VENM/ENM Surplus building materials
	Placement of temporary road pavement	<ul style="list-style-type: none"> Surplus building materials
	Installation of temporary road signage, street lighting and signalling	<ul style="list-style-type: none"> Surplus building materials
Works period D- bulk earthworks, drainage and utilities	Removal of existing road pavements, as required	<ul style="list-style-type: none"> Concrete Asphalt
	Installation of onsite detention basins (OSD)	<ul style="list-style-type: none"> VENM/ENM

Phase	Waste Generating Activity	Waste/Resource Types
		<ul style="list-style-type: none"> • Surplus building materials • Surplus concrete waste
	Bulk earthworks and adjustment of the building formation level	<ul style="list-style-type: none"> • VENM/ENM
	Construction of retaining walls	<ul style="list-style-type: none"> • Surplus concrete waste • Surplus building materials
	Drainage and utilities installation	<ul style="list-style-type: none"> • Surplus building materials from drainage installation • Surplus material from installation of utilities • VENM/ENM
	Establishment of a concrete batching plant	<ul style="list-style-type: none"> • Concrete • Surplus building material
	Establishment of hardstand area	<ul style="list-style-type: none"> • VENM/ENM • Surplus building materials
	Office administration, lunch room and other activities	<ul style="list-style-type: none"> • Residual waste (putrescible and non-putrescible) • Recyclable waste (containers and paper/cardboard)
Works period E – Pavement works along Moorebank Avenue	Earthworks associated with sub-base and base of the road formation	<ul style="list-style-type: none"> • VENM/ENM • Surplus building material
	Installation of road pavement	<ul style="list-style-type: none"> • Concrete • Asphalt • Bitumen
Works period F – construction and internal fit out of warehousing	Excavation, foundation and floor slab installation	<ul style="list-style-type: none"> • VENM/ENM • Surplus building materials
	Erection of framework and structural walls	<ul style="list-style-type: none"> • Surplus building materials • Surplus concrete waste
	Installation of roof	<ul style="list-style-type: none"> • Surplus building materials
	Internal fit out	<ul style="list-style-type: none"> • Surplus building materials
	Landscaping and surrounds	<ul style="list-style-type: none"> • Vegetation
	Preparation of warehouse access road sub-grade	<ul style="list-style-type: none"> • Surplus building materials

Phase	Waste Generating Activity	Waste/Resource Types
	Forming of new kerbs, gutters, medians and other structures	<ul style="list-style-type: none"> Surplus building materials - concrete
	Construction of asphalt and concrete pavement	<ul style="list-style-type: none"> Surplus building materials – concrete and asphalt
	Office administration, lunch room and other activities	<ul style="list-style-type: none"> Residual waste Recyclable waste (containers and paper/cardboard)
Works period G – miscellaneous construction and finishing works	Landscaping	<ul style="list-style-type: none"> Vegetation
	Establishment of line marking, street furniture, traffic signals and pavement markers	<ul style="list-style-type: none"> Surplus building materials
	Demobilisation of construction compounds and construction environmental controls	<ul style="list-style-type: none"> Construction and demolition waste
	Office administration, lunch room and other activities	<ul style="list-style-type: none"> Residual waste (putrescible and non-putrescible) Recyclable waste (containers and paper/cardboard)

The estimated quantities of key waste types generated during construction and estimated quantities being suitable for reuse are listed in Table 19-4.

Table 20-4 Estimated quantities of waste generated during demolition and construction

Waste Type	Estimated Quantity of Waste Generated	Estimated Quantity Suitable For		
		Onsite Reuse	Offsite Recycling or Reprocessing	Offsite Disposal
Demolition				
Vegetation ¹	1,913 tonnes	1,913 tonnes (mulch for landscaping)	N/A	N/A
Concrete/asphalt roads and pavement	Dependent upon construction planning and methodology			

¹ Sourced from MPE Project Stage 2 Greenhouse Gas and Climate Change Impact Assessment (Arcadis, 2016)

Waste Type	Estimated Quantity of Waste Generated	Estimated Quantity Suitable For		
		Onsite Reuse	Offsite Recycling or Reprocessing	Offsite Disposal
Construction and demolition waste from Phase A and Phase G activities	Dependent upon construction planning and methodology			
Residual waste from lunch rooms and offices ²	75 L/day	N/A	N/A	75 L/day
Recyclable waste from lunch rooms and offices ³	75 L/day	N/A	75 L/day	N/A
Sewerage ⁴	0.75 kL/day	N/A	N/A	0.75 kL/day
Construction				
Excavated material	246,700m ³⁵	<p>There is demand for onsite re-use of excavated material as 942,220m³ of fill is required. Given the prevalence of noxious weeds onsite, a significant portion of the topsoil would be contaminated with noxious weeds and require appropriate treatment and/ or disposal.</p> <p>At the time of writing this EIS it was considered likely that a portion of topsoil contaminated with noxious weeds may be able to be re-used on-site; however, this will not be able to be fully determined until construction</p>		
Temporary sediment and erosion control	Sediment fences, hay bales, mesh and gravel inlet filters, construction exit/wash down, sand bags, geotextile inlet	Where feasible, temporary sediment and erosion controls may be reused, or re-processed off-site when no longer required.		

² This will be determined by the construction contractor. For the purpose of this EIS, it has been assumed that the waste generation rate for the demountable offices and lunch rooms is equivalent to the waste generation rate for standard offices. To estimate waste generation, the City of Melbourne's Guidelines for Preparing a Waste Management Plan – 2015 has been utilised. According to this report, 10L of residual waste and 10L of recycling waste is generated per 100m² of office floor area (for standard daily operating hours). These generation rates were applied to the Building Code of Australia floor area/personnel design ratio of 10m²/person floor area, 50 people and a 60 hour working week.

³ As above.

⁴ Typical wastewater flow rate for portable toilet assumed to be 15L per person per day (Metcalf and Eddy (2003) Wastewater Engineering, Treatment and Reuse. Proposal consists of 50 construction personnel during demolition

⁵ Stripped topsoil – 60,450 m³. Sourced from Drawing SSS2-ARC-CV-DWG-0111-03

Waste Type	Estimated Quantity of Waste Generated	Estimated Quantity Suitable For		
		Onsite Reuse	Offsite Recycling or Reprocessing	Offsite Disposal
	filters, pipes and site fences.			
Spill kit consumables	As needs basis	N/A	N/A	As needs basis
Surplus building materials from construction, internal fit-out, utilities extension, drainage installation, pavements, new kerbs, gutters, medians and other structures	Dependent upon construction planning and methodology. Indicative waste margins are as follows: <ul style="list-style-type: none"> • Timber 5-7% • Plasterboard 5-20% • Concrete 3-5% • Bricks 5-10% • Tiles 2-5%⁶ 			
Construction packaging	Dependent upon construction planning methodology and purchasing policies. Paper and cardboard packaging typically represents 1.1% and plastic typically represents 1% by weight of the total construction and demolition waste stream.			
Residual waste from lunch rooms ⁷	300 L/day	N/A	N/A	300 L/day
Recyclable waste from lunch rooms and offices ⁸	300 L/day	N/A	300 L/day	N/A
Sewerage ⁹	3 kL/day	N/A	N/A	3 kL/day

Operation

Waste generating activities during the operational phase are listed in Table 19-5, with the types and estimated quantities of waste these activities are likely to generate being listed in Table 19-6.

⁶ Construction Waste Management Plan Guidelines, WALGA and the Waste Authority, 2014

⁷ This will be determined by the construction contractor. For the purpose of this EIS, it has been assumed that the waste generation rate for the demountable offices and lunch rooms is equivalent to the waste generation rate for standard offices. To estimate waste generation, the City of Melbourne's Guidelines for Preparing a Waste Management Plan – 2015 has been utilised. According to this report, 10L of residual waste and 10L of recycling waste is generated per 100m² of office floor area (for standard daily operating hours). These generation rates were applied to the Building Code of Australia floor area/personnel design ratio of 10m²/person floor area, 200 people and a 60 hour working week

⁸ As above

⁹ Typical wastewater flow rate for portable toilet assumed to be 15L per person per day (Metcalf and Eddy (2003) Wastewater Engineering, Treatment and Reuse. Proposal consists of 200 construction personnel during peak construction

Table 20-5 Waste generating activities during operation

Waste Generating Activity	Waste/Resource Type
Administration, amenities and lunchrooms	<ul style="list-style-type: none"> Residual waste Recyclable waste (containers and paper/cardboard) Used spill kit consumables Sewerage Trade waste
De-stuffing and packing containers	<ul style="list-style-type: none"> Waste generated from de-stuffing <ul style="list-style-type: none"> Cardboard Flexible plastic Pallets

Table 20-6 Estimated quantities of waste generated during operations

Waste Type	Estimated Quantity of Waste Generated	Estimated Quantity Suitable For		
		Onsite Reuse	Offsite Recycling or Reprocessing	Offsite Disposal
Residual waste ¹⁰ (Offices)	3,360 L/day	N/A	N/A	3,360 L/day
Recyclables ¹¹ (Offices)	3,360 L/day	N/A	3,360 L/day	N/A
Residual waste ¹² (Precinct Amenities)	1,830 L/day	N/A	N/A	1,830 L/day
Recyclable waste ¹³ (Precinct Amenities)	1,830 L/day	N/A	1,830 L/day	N/A

¹⁰ The estimated volume of waste generated was based on the commercial waste generation rate for an Office, published in City of Melbourne's Guidelines for Preparing a Waste Management Plan – 2015. According to this EIS, 10L of residual waste and 10L of recycling is generated per 100m² of office floor area (for standard daily operating hours). These generation rates were applied to a floor area of 8,000 m² a 168 (24/7) hour work week

¹¹ As above

¹² The precinct amenities include a takeaway/café area. The estimated volume of waste generated was based on the commercial waste generation rate for a takeaway/café, published in City of Melbourne's Guidelines for Preparing a Waste Management Plan – 2015. According to this report, 150L of residual waste and 150L of recycling waste is generated per 100m² of floor area (for standard daily operating hours). These generation rates were applied to a floor area of 1,220 m² and a 40 hour work week

¹³ As above

Waste Type	Estimated Quantity of Waste Generated	Estimated Quantity Suitable For		
		Onsite Reuse	Offsite Recycling or Reprocessing	Offsite Disposal
Sewerage ¹⁴	105.6 kL/day	N/A	N/A	105.6 kL/day
Trade Waste ¹⁵ (Precinct Amenities)	35 L/customer/day	N/A	N/A	35 L/customer/day
Spill kit consumables	As needs basis	N/A	N/A	As needs basis
De-stuffing waste	<p>Approximately 95% of expected containers will be Full Container Loads (FCL) and contents will be transferred directly to the consumer (generating the de-stuffing waste outside the boundary of the project).</p> <p>The remaining 5% will be classified as Freight All Kind (FAK) and Less Than A Container Load (LCL) - these containers will be de-stuffed in the warehouse. Goods will come in the form of loose cartons or disposable pallets, with a proportion of these wrapping materials transported to the consumer.</p> <p>Assuming 50% of the waste to be de-stuffed in the warehouses are disposable pallets, it is estimated 500,000 disposable pallets will be generated per annum¹⁶.</p> <p>Other waste likely to be generated include flexible plastics and cardboard. However, the quantity of these streams is variable subject to the contents of the containers.</p>			

Trade waste may be generated within the warehouses, subject to the tenant and requirements of their operation. As the tenants are not known indicative volumes cannot be quantified at this stage.

20.1.4 Mitigation Measures

This Section outlines mitigation measures to address the impacts of waste during the construction and operation phases as described in Section 19.1.3 of this EIS.

Construction

- Measures to mitigate the effect of the construction waste streams would be incorporated into the Proposal's CEMP, including the following information:
 - Avoidance and reuse of material will have priority over recycling
 - Recycling will have priority over disposal

¹⁴ Typical wastewater flow rate for an industrial building assumed to be 75L per person per day (Metcalf and Eddy (2003) Wastewater Engineering, Treatment and Reuse. Proposal consists of 1,408 FTE during operation.

¹⁵ Typical wastewater flow rate for retail premises preparing and serving food is assumed to be 35L per customer per day (Metcalf and Eddy (2003) Wastewater Engineering, Treatment and Reuse.

¹⁶ Assuming 2 rows of 10 standard sized disposable pallets per container

- Earth excavated from the site will be used for fill material and landscaping where feasible
- If possible concrete components will be crushed and reused onsite, with the remainder sent to a recycling facility
- Waste generation will be minimised by ordering the correct quantity of materials
- Selection of materials which maximise recycled content, while having low embodied water and energy use
- Selection of materials which maximise durability and lifespan.
- The following procedures and protocols will be considered within the CEMP regarding waste management:
 - Characterisation of construction waste streams
 - Management of any identified hazardous waste streams
 - Procedures to manage construction waste streams, including handling, storage, classification, quantification, identification and tracking
 - Mitigation measures for avoidance and minimisation of waste materials
 - Procedures and targets for reuse and recycling of waste materials.
 - Inclusion of the waste management strategies included in the Concept Plan Statement of Commitments for construction waste management.

Operation

- Measures to mitigate the effect of the operational waste streams would be incorporated into the Proposal's OEMP, including the following information:
 - Addressing waste management requirements and goals in staff inductions
 - Providing staff access to documentation outlining the facility's waste management requirements
 - Appropriate areas shall be provided for the storage of waste and recyclable material including:
 - Locating recycling bins in kitchen areas beside general waste bins to prevent contamination of recycling
 - Positioning paper recycling bins close to printer / photocopying equipment
 - Establishing bays or containers for recyclable waste generated through de-stuffing
 - Minimising general waste bins at desks but providing adequate container and paper recycling to encourage sorting of recyclables
 - Ensuring warehouse tenants are providing adequate bin storage for the expected quantity of waste
 - Standard signage on how to use the waste management system and what materials are acceptable in the recycling will be posted in all waste collection and storage areas
 - Waste management planning incorporating principles of the waste hierarchy
 - All domestic waste shall be collected regularly and disposed of at licensed facilities

- By ensuring bins are placed in the correct location and access ways are clear waste collection vehicles will be able to service the development efficiently and effectively
- An education programme and on-going monitoring will to be implemented for training personnel to properly sort and transport waste into the right components and destinations
- Sewage waste will be discharged to Sydney Water sewerage infrastructure in accordance with Sydney Water requirements
- Trade waste will be discharged to the sewer through a trade waste agreement with Sydney Water
- Inclusion of the waste management strategies included in the Concept Plan Statement of Commitments for operational waste management.

20.2 Bushfire

Australian Bushfire Protection Planners (ABPP) have undertaken an assessment of the bushfire impacts associated with the Proposal to address the SEARs. The *Bushfire Protection Assessment* (ABPP, 2016) is included in Appendix U of this EIS.

Table 20-7 provides a summary of the relevant SEARs, which relate to bushfire, and where these have been addressed in this EIS.

Table 20-7 SEARs (Bushfire)

SEARs	Where addressed
15. Bushfire Management	
An assessment against the Planning for Bushfire 2006 (NSW Rural Fire Service)	Section 0 and Appendix U of this EIS

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to bushfire (refer to Table 20-7) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 20.2.1) and, more recently, for the Proposal. This section of the EIS also describes the existing environment as it relates to bushfire (section 20.2.2) and provides an assessment of bushfire impacts associated with construction and operation of the Proposal (section 20.2.3). Measures to mitigate potential bushfire impacts where they are required have been identified in Section 20.2.4.

20.2.1 Concept Plan Assessment

The Hazard and Risks Assessment prepared for the MPE Concept Plan Approval assessed the potential hazards and risks associated with development of the MPE Project, including the spread and management of bushfire.

The MPE Concept Plan EA included consideration of bushfire management as part of the Hazard and Risk Assessment. This assessment identified that the broader MPE site adjoins Vegetation Category 1 bushfire prone land to the east, south and west; and confirmed that SIMTA has committed to addressing the key objectives identified by the Rural Fire Service during the future design stages. Overall the MPE Project was assessed as having a low bushfire risk.

Based on the recommendation of the *Hazards and Risks Assessment* (Hyder Consulting, 2013), the Revised Statement of Commitments committed to the following actions:

- *The Proponent commits to incorporating the key objectives identified by the Rural Fire Service (RFS) into relevant future design stages, in accordance with the following principles:*
 - *Afford occupants of any building adequate protection from exposure to a bush fire*
 - *Ensure safe operational access and egress for emergency service personnel and residents*

- *Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in asset protection zones (APZs)*
- *The Proponent commits to the development of a Bushfire Management Plan for both the construction and operational phases of the MPE Proposal that aligns with the requirements of the local RFS Bushfire Management Committee operational plans of management.*

The Revised Statement of Commitments and SEARs are consistent with the Condition of Approval (CoA) in relation to bushfire management being, *any future Development Application shall be accompanied by an assessment against the Planning for Bushfire 2006 (NSW Rural Fire Service)*. The Revised Statement of Commitments, SEARs and CoA have been addressed in this Section. A complete compliance table of this EIS is provided in Appendix A.

20.2.2 Existing Environment

The existing environment relevant to the Bushfire Protection Assessment comprises the following, and are detailed in Table 20-8.

- Topography, including an assessment to determine the effective slope of the land on and surrounding the Proposal site as the slope of the land will influence fire behaviour
- Vegetation on and surrounding the Proposal site in accordance with the vegetation classification system contained in Planning for Bushfire Protection 2006.
 - The definition of bushfire vegetation categories is as follows:
 - Bushfire Vegetation Category 1 refers to forest, woodlands, heath, wetlands
 - Bushfire Vegetation Category 2 refers to moist rainforests, shrublands, open woodlands, mallee and grasslands
 - Buffer was created based on the bushfire vegetation, with the buffering distance being 100 metres for vegetation category 1, and 30 metres for category 2.
- Surrounding land uses, which provides the context for the Proposal site and enable an accurate assessment of bushfire risk.

Figure 20-1 shows an extract of the Certified Liverpool Bushfire Prone Land Map showing the Proposal site and the surrounding vegetation mapping.

Table 20-8 Existing environment - bushfire

Parameter	Existing Environment
Land use adjoining the Proposal site	<ul style="list-style-type: none"> • The MPW site, on the western side of Moorebank Avenue directly adjacent to the MPE site • The Holsworthy Military Reserve, to the south of the MPE site • Residual Commonwealth Land to the east of the MPE site
Topography	<p>The land within the MPE site is level except for a gradual fall towards the Anzac Creek corridor, which is located to the south of the Proposal site.</p> <p>The surrounding land is also generally level.</p>
Vegetation	<p>There are currently mature trees lining the roads and paved areas of the Proposal site. Tree species are those that are commonly found as mature street trees in suburban Sydney, including Sydney Blue Gum and Lemon-scented Gum. The ground layer in the non-paved areas consists of mown grass lawns, dominated by Couch, Kikuyu and other exotic grass species.</p> <p>The vegetation on the land to the east and south of the MPE Stage 2 Site consists of unmanaged EECs including the Castlereagh Scribbly Gum Woodland and Castlereagh Swamp Woodland extending to the east and south, beyond the fire/access track. These EECs contain threatened species <i>Persoonia nutans</i> and <i>Grevilla parviflora subsp. parviflora</i>.</p> <p>For the purpose of determining bushfire protection measures this vegetation is classified as forest due to the density of the shrubs and interlocking canopies.</p> <p>Moorebank Avenue to the west contains a managed road verge. Beyond the road corridor the land managed vegetation, including playing fields, ovals and the Royal Australian Engineers Golf Course. The current landuse will be replaced with the MPW development.</p> <p>A narrow corridor of remnant forest vegetation varying in width forms a privacy screen to the existing managed vegetation. This remnant forest vegetation will also be removed as part of the proposed MPW development.</p>

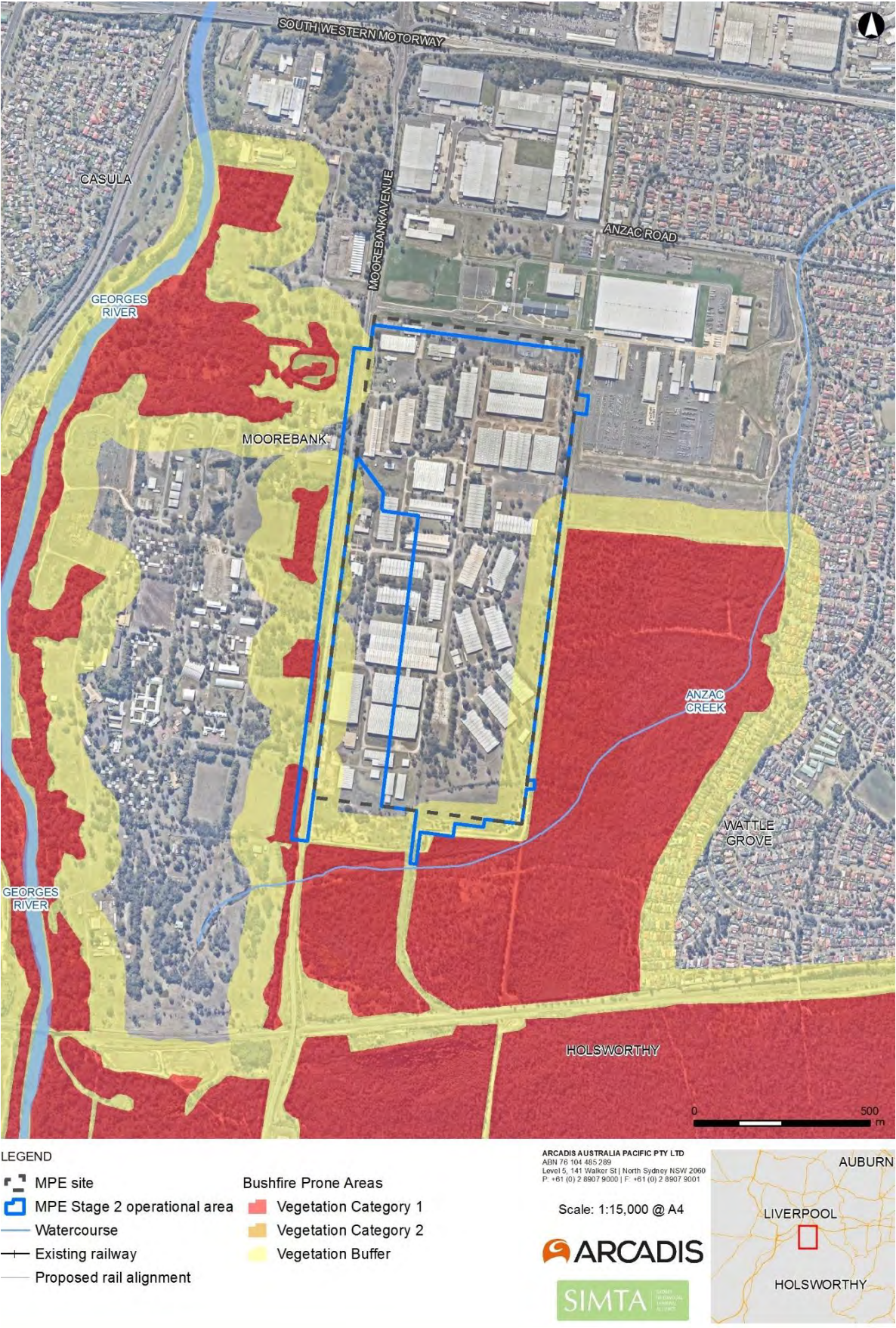


Figure 20-1 Bushfire prone land map - Proposal site

The above existing environment information was then used to undertake a precinct level assessment to determine those aspects of the Proposal deemed to be prone to bushfire threat and therefore subject to the provision of Asset Protection Zones/Defendable Spaces.

The bushfire hazard assessment produced a 'Bushfire Hazard Score' and 'Bushfire Hazard Rating' which considers the predominant vegetation within 140m of the Proposal site and the effective slope of the land, in accordance with Planning for Bushfire Protection 2006 (NSW Rural Fire Service). The land to the north of the Proposal site is not mapped as bushfire prone vegetation, this has not been considered further.

The vegetation that presents the potential bushfire threat to the Proposal is Dry Sclerophyll Low Open Forest on the vacant land to the east and south of the Proposal site and the vegetation beyond the Moorebank Avenue road corridor, to the west. The Bushfire Hazard Score and Bushfire Hazard Rating for the land to the south, east and west is described in Table 20-9.

Table 20-9 Bushfire Hazard Rating

Aspect	Vegetation Type	Vegetation Index Score	Slope Index Score	Bushfire Hazard Score	Bushfire Hazard Rating
East	Dry Sclerophyll Low Open Forest	2.8	2.0	5.6	High
South	Dry Sclerophyll Low Open Forest	2.8	2.0	5.6	High
West	Managed curtilage & isolated pockets of Dry Sclerophyll Low Open Forest	The remnant vegetation on the land to the west of Moorebank Avenue is not contiguous with a large area of bushfire prone vegetation which could be involved in a fire spread from the northwest, west or southwest – the primary direction for severe/catastrophic bushfires			Low

20.2.3 Potential impacts

Construction

Site offices would be located in two construction compounds during the construction phase of the Proposal:

- The Warehousing Compound within the Proposal site
- The Moorebank Avenue compound, within the Proposal site (also part of the MPW site) and immediately west of Moorebank Avenue.

The Warehousing Compound would be located within land proposed to be used as the Stage 1 Proposal's main IMT compound. It is expected that some additional satellite compounds would be required during the construction of each individual warehouse on the Proposal site; however, the Warehousing Compound would be used for the majority of construction works.

The Moorebank Avenue Compound would be located on the western side of Moorebank Avenue, in an existing area of hardstand within the Proposal site (also part of the MPW site). This area was previously used as a staff car park and as such, is characterised by large areas of level paved / hardstand surfaces and narrow garden beds that support a small number of trees.

All site office structures are classified as non-habitable i.e. do not meet the requirements of Class 1, 2 or 3 structures under the *Australian Standard: 3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)*.

The Warehousing compound includes a site office is well outside bushfire prone land and would achieve a minimum setback distance of 10m. The Moorebank Avenue compound is located directly adjacent to bushfire prone land. Notwithstanding this, this vegetation is not contiguous with a large area of bushfire prone vegetation which could be involved in a fire spread from the northwest, west or southwest – the primary direction for severe/catastrophic bushfires. The Bushfire Hazard Rating for this vegetation is low. Consequently, the bushfire threat to the fixed assets (construction compounds) during construction is considered to be low.

Operation

The bushfire threat to the Proposal site, from vegetation on the land to the south is deemed to be moderate with the continued management of the adjoining land. Should this activity cease, the hazard will increase to high. The bushfire threat to the Proposal site from the land to the east is deemed to be high. The bushfire threat from the west is low and there is no bushfire threat from the north due to area being fully developed as part of the DJLU site.

The bushfire protection assessment involves consideration of the objectives of the *Planning for Bushfire Protection 2006*. This is summarised in Table 20-10.

Table 20-10 Compliance with the objectives of *Planning for Bushfire Protection 2006*

Objective	Compliance with deemed-to-satisfy provisions
Afford occupants of any building adequate protection from exposure to the impacts of bushfire	The flame length associated with the vegetation to the south and east of the Proposal site is in the order of 25m. Therefore the separation between the fixed assets and the bushfire prone vegetation (at least 50m) exceeds the defendable space widths required by <i>Planning for Bushfire</i>

Objective	Compliance with deemed-to-satisfy provisions
	<i>Protection 2006</i> and reduces the risk of flame contact, high levels of radiant heat and ember attack.
Provide a defendable space to be located around buildings	A defendable space of at least 50 metres is provided to the east and 100 metres to the south of the warehouse buildings. The continued maintenance of the existing vegetation on the land to the east and south of the Warehouses, within the Proposal site, provides a satisfactory reduction of fuel loads within these defendable spaces
Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent direct flame contact and material ignition	The width of the defendable space provided between the fixed assets and the bushfire prone vegetation (at least 50m reduces the possibility of flame contact and high levels of radiant heat impact on the building. The continued maintenance of the existing vegetation on the land to the east and south of the Warehouses, within the Proposal site, provides a satisfactory reduction of fuel loads within these defendable spaces
Ensure that safe operational access and egress for emergency service personnel and residents is available	Safe egress from the Proposal site is provided onto Moorebank Avenue.
Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in Asset Protection Zones	In non-residential applications, such as the Proposal, the defendable space is considered the same as an Asset Protection Zone. The Management of the landscaped areas within the Proposal site would be undertaken by the operators to maintain minimum dry fuels loads.
Ensure that utility services are adequate to meet the needs of fire-fighters and other assisting in bushfire fighting	Utility services meet the needs of fire-fighting requirements.

20.2.4 Mitigation Measures

Construction

- A bushfire management strategy, or equivalent, will be prepared as part of the CEMP for the Proposal. The strategy will include:
 - Emergency response plans and procedures
 - Restrictions on activities (namely hot works) that cannot be undertaken on total fire ban days within areas of high Bushfire Hazard Rating, unless otherwise advised by the NSW Rural Fire Service.
 - All construction site offices and temporary buildings will be located outside buffer areas to ensure minimum setbacks of 10 m.
 - All construction site offices will be accessible via access roads suitable for firefighting appliances similar to NSW Rural Fire Service category 1 tankers.

Operation

- A bushfire management strategy, or equivalent, would be prepared as part of the OEMP for the Proposal. In particular, the strategy would ensure management of landscaped areas within the Stage 2 site would be undertaken to maintain minimum dry fuel loads.

20.3 Property and infrastructure

Arcadis have undertaken an assessment of the property and infrastructure impacts associated with the Proposal to address the SEARs. The majority of reports prepared for this EIS address impacts of the Proposal on property and infrastructure; however, of particular relevance is the Utilities Strategy Report provided in Appendix F of this EIS).

Table 20-11 provides a summary of the relevant SEARs, which relate to property and infrastructure, and where these have been addressed in this EIS.

Table 20-11 SEARs (Property and Infrastructure)

SEARs	Where addressed
6. Infrastructure Upgrades/Contributions – including but not limited to the following:	
a) an assessment of the impacts of the project on local infrastructure, demonstrating that satisfactory arrangements are in place to support and mitigate any impacts of Stage 2 of the Concept Proposal including applicable costs, timing, TEU thresholds and approval pathways for such measures;	Section 20.3 of this EIS
b) Consideration of any relevant Council's Developer Contributions Plan (or equivalent document requiring developer contributions), including the contributions plan for Prestons Industrial Area; and	Section 20.3.4 of this EIS
16. Property and Infrastructure – including but not limited to:	
c) Assessing the impacts on affected properties and land uses, including impacts relating to access, land use, business activities, future development potential, and property acquisition	Section 20.3 of this EIS
d) Assessing the service demand, capacity and augmentation of existing and proposed utilities and infrastructure, including any relocation as a result of the development	Section 20.3.4 of this EIS

The Concept Plan Conditions of Approval are generally consistent with the SEARs provided for the Proposal as they relate to property and infrastructure (refer to Table 20-7) and have been addressed in this Section of the EIS. The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 20.3.1) and, more recently, for the Proposal. This section of the EIS also summarises the methodology used to assess property and infrastructure related impacts of the Proposal (section 20.3.2) describes the existing environment as it relates to property and infrastructure (section 20.3.3) and provides an assessment of property and infrastructure impacts associated with construction and operation of the Proposal (section 20.3.4). Measures to mitigate potential property and infrastructure impacts where they are required have been identified in Section 20.3.5.

20.3.1 MPE Concept Plan Assessment

The MPE Concept Plan included a number of technical specialist studies and information within the EA to provide an assessment of potential impacts of the MPE Proposal on properties, utilities and infrastructure.

An *Economic Assessment* (Urbis 2013) and *Social Impact Assessment* (Urbis 2013) was prepared as part of the EA for the Concept Plan. In particular, the *Economic Assessment* identified that the MPE Proposal would generally have a positive impact on the surrounding area through increased employment and a reduction in the volumes of truck movements along the M5 Motorway.

A *Utility Strategy Report* (Hyder Consulting 2013d) was prepared for the MPE Concept Plan Approval to provide details on the existing utility services for the MPE site and the potential for augmentation and/or adjustments to deliver the necessary utility servicing to support the MPE Proposal. The report identified that the MPE Proposal would require connection to a number of key utilities. Table 20-12 provides a summary of the utility connections required and the potential impacts associated with the connections for the MPE Project. Consultation was also undertaken with each of the service providers during the preparation of the EA for the MPE Concept Plan Approval.

Table 20-12 Utility requirements for the MPE Proposal

Utility	Capacity potential
Potable water	Sydney Water advised that there was capacity for the MPE Proposal from the 500mm water main at the corner of Anzac Road and Heathcote Road
Sewer	Sydney Water advised that a private sewer line would need to be constructed for the MPE Proposal. This connection may involve an extension of an existing gravity main or construction of a new pumping station and associated rising main
Electrical supply	Endeavour Energy advised that supply is able to be provided for the MPE Proposal from the Anzac Village Substation
Gas	Jemena advised that there are two options for providing gas servicing to the MPE site including possible use of the following: <ul style="list-style-type: none"> 75mm main in Moorebank Avenue, suitable for light commercial applications High pressure main at Moorebank Avenue and Bapaume Road, capable of supplying an alternative energy source such as tri-generation
Telecommunications	Telstra advised that the site can receive connection to telecommunications
AGL Upstream	AGL Upstream Investments advised that although they held an exploration licence for Coal Seam Gas over the MPE site there was no immediate plans for the MPE site

Based on the recommendation for the Utilities Strategy Report, the Revised Statement of Commitments committed to the implementation of the following during development of the Proposal:

- *The Proponent will protect and relocate (where required) the existing services passing through the site, including stormwater, sewer, water, telecommunications and electricity*
- *The Proponent will undertake further investigations, as required, and provide details that adequate services are available to the site and/or provide details regarding the proposed servicing upgrades. Details are to be provided with the applications for each of the future stages of the development*
- *The Proponent will undertake to source all water supplies for the project from an authorised and reliable source*
- *The Proponent will obtain authorisation for the taking of water for purposes other than water supply, including for dewatering during construction*

In addition to the Statement of Commitments, the MPE Concept Plan Approval included a number of requirements to be undertaken relating to property and infrastructure for future approvals. The Conditions of Approval are generally consistent with the SEARs provided for the Proposal and have been addressed in this Section. A complete compliance table of this EIS with the SEARs, Statement of Commitments and Conditions of Approval is provided in Appendix A of this EIS.

20.3.2 Methodology

The assessment of property and infrastructure impacts from the Proposal involved a review of the following technical assessments:

- Traffic and Transport (Section 7 and Appendix K of this EIS)
- Noise and Vibration (Section 8 and Appendix L of this EIS)
- Air Quality (Section 9 and Appendix M of this EIS)
- Health (Section 10 and Appendix N of this EIS)
- Socio-economic (Section 20.5 of this EIS)
- Utilities Strategy Report (Appendix F of this EIS).

The results of these above assessments were then considered in terms of the resultant property and infrastructure impacts, which are detailed below. The impact assessment provided discusses potential impacts on both affected properties (those which are included within the Proposal site) and also surrounding properties (those which are located around, however outside of the Proposal site).

20.3.3 Existing Environment

Property ownership and land use

Affected properties (within the Proposal site), surrounding properties and land uses are shown in Figure 20-2.

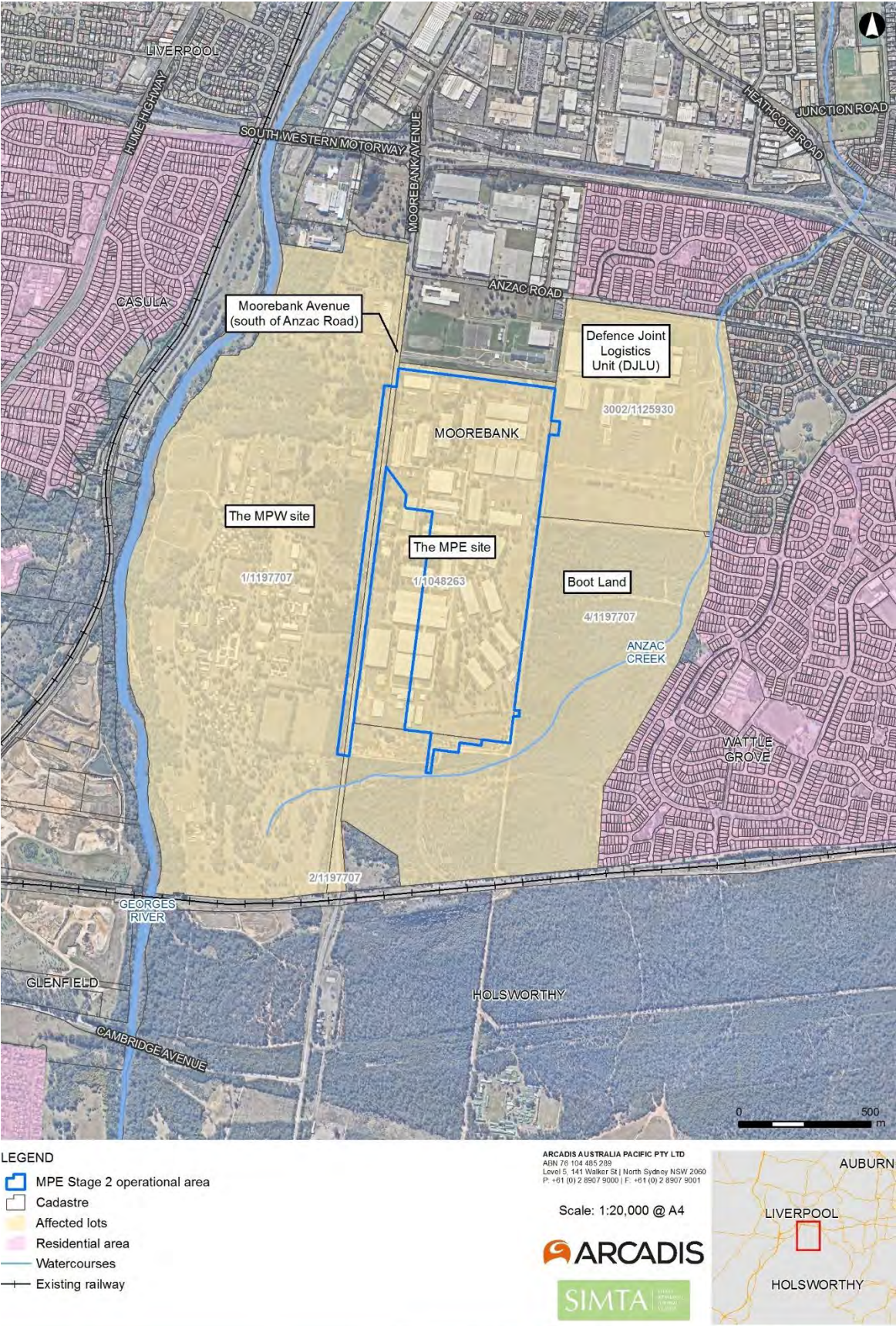


Figure 20-2 Affected properties within the Proposal site, and surrounding properties and land uses

Affected properties (the Proposal site)

A summary of the current and future ownership and land uses for the Proposal site is included in Table 20-13.

These properties are subject to the MPE Concept Plan Approval (MP 10_0193) (and/or a modification to this approval) which facilitates their use for the purposes of the MPE Project.

Table 20-13 Current property ownership and land use for the Proposal site

Site	Legal description	Ownership	Land use description
The MPE site	Lot 1, DP 1048263	SIMTA (Qube Holdings and Aurizon Holdings).	<p>The site has previously been occupied by the Department of Defence and was used for industrial storage and logistic purposes for the DNSDC. The MPE site has been vacated with Department of Defence having relocated from the site to the Defence Joint Logistic Unit (DJLU) to the north of the SIMTA site.</p> <p>MPE Concept Plan Approval (MP 10_0193) was granted on 29 September 2015 and EPBC Approval (2011/6229) was granted in March 2014 for the development of an IMT, including rail and associated warehousing. This EIS seeks approval for the second stage (Stage 2) of development on the MPE Proposal, including the construction and operation of warehousing freight village and infrastructure associated with an IMT.</p> <p>A number of the former Defence warehouses have been temporarily leased by SIMTA whilst approval is being sought for the Proposal. Leased premises will be progressively vacated during the Proposal construction period as required.</p>

Site	Legal description	Ownership	Land use description
Moorebank Avenue	Lot 2, DP 1197707 ¹⁷	Commonwealth of Australia	Moorebank Avenue is currently a two lane undivided road (one lane on each direction) between Cambridge Avenue and the M5 Motorway (adjacent to and traversing the MPE Proposal) and four lane undivided road (two lanes in each direction) north of the M5 Motorway. This road provides a north-south link between Liverpool and Glenfield. Moorebank Avenue between M5 Motorway and Anzac Road is owned and maintained by Liverpool City Council. Moorebank Avenue between Anzac Road and Cambridge Avenue (the area which will be directly affected) is a private road on Commonwealth land.
Defence Joint Logistics Unit (DJLU)	Lot 3002, DP 1125930	Commonwealth of Australia	<p>This land is owned and occupied by the DJLU and is utilised for the purposes of storage, maintenance, distribution and management of defence resources.</p> <p>The site includes a drainage channel running parallel to the Proposal site's northern and eastern boundary that drains to Anzac Creek.</p>
Boot Land	Lot 4, DP 1197707 ¹⁸	Commonwealth of Australia	Undeveloped land, containing native vegetation including Castlereagh Scribbly Gum Woodland, Castlereagh Swamp Woodland, and Freshwater Wetlands on Coastal Floodplains. Small pockets of land have been cleared for past rail-related activities. This land is traversed by Anzac Creek, which flows to the north, discharging to the Georges River approximately three kilometres to the north-east of the Proposal site. The land includes a disused railway spur which connects to the East Hills Rail Line.

¹⁷ Previously legally described as "Lot 3001, DP 1125930" in the MPE Concept Plan Approval (MP 10_0193), however has since been subdivided.

¹⁸ Previously legally described as "Lot 3001, DP 1125930" in the MPE Concept Plan Approval (MP 10_0193), however has since been subdivided.

Site	Legal description	Ownership	Land use description
MPW site	Lot 1, DP 1197707 ¹⁹	Commonwealth of Australia	<p>The MPW site was previously occupied by the Department of Defence for the purpose of training and housing and was known as the School of Military Engineering (SME). This site has recently been vacated by Defence. The site also includes the former RAE Golf Course, located to the south.</p> <p>The MPW site includes a riparian vegetation corridor along the eastern bank of the Georges River which mainly comprises River Flat Eucalypt Forest.</p> <p>The MPW site is the subject of the MPW Concept Approval for the development of an IMT, warehousing and associated infrastructure (refer to Section 1 of this EIS). The MPW site is also the subject of the MPW Stage 2 Proposal, which seeks approval for the development of the IMT, warehousing, and rail link connection under the MPW Concept Approval.</p>

Surrounding properties

The Proposal site is surrounded by a number of residential suburbs. Distances to the nearest sensitive receivers in each suburb, relative to the MPE Stage 2 site and the Moorebank Avenue site are provided in Table 20-14.

Table 20-14 Distance of the Proposal to nearby suburbs

Suburb	Distance to MPE Stage 2 site	Distance to Moorebank Avenue site
Wattle Grove	360 m to the north-east	865 m to the north-east
Moorebank	1300 m to the north	1430 m to the north
Casula	820 m to the west	760 m to the west
Glenfield	1830 m to the south-west	1540 m to the south-west

¹⁹ Previously legally described as "Lot 3001, DP 1125930" in the MPE Concept Plan Approval (MP 10_0193), however has since been subdivided.

A number of other sensitive properties and land uses which have been identified in the surrounding area include, but are not limited to:

- All Saints Senior College located approximately 1,500 m from the Stage 2 site (operational area) to the west.
- Casula Powerhouse located approximately 950 m from the Stage 2 site (operational area) to the west.
- Glenfield Farm (listed on the State Heritage Register) located approximately 1,550 m from the Stage 1 site (operational area) to the west.
- Holsworthy Military Area located approximately 670 m from the Stage 2 site (operational area) to the south.

Key commercial and industrial sites which surround the Proposal site include:

- DJLU (recently constructed site) located directly adjacent to the Stage 2 site (operational area) to the north-east.
- The ABB site located to the north of the MPW site on the eastern side of Georges River, located approximately 280 m from the Stage 2 site (operational area) to the north-west.
- The Moorebank Business Park (currently including companies such as Toyota, Electrolux and BMW warehousing and showroom facilities) located to the north of the DJLU site, approximately 350 m from the Stage 2 site (operational area) north.

Additional sensitive receivers to those listed above relating to noise and vibration, air quality and human health aspects of the Proposal are identified in Section 8 and Appendix L, Section 9 and Appendix M and Section 10 and Appendix N of this EIS.

Utilities (including enabling works)

The Proposal site is currently serviced from public utility networks through connections that are Commonwealth owned assets. A number of existing public utilities are available in close proximity to the Proposal site including:

- Potable water – Water main north of Anzac Road on Moorebank Avenue
- Sewer - Moorebank Avenue gravity sewer near Bapaume Road
- Electricity - Anzac Village Substation on Anzac Road
- Communications - existing assets along Moorebank Avenue and Anzac Road
- Gas – existing assets along Moorebank Avenue.

These connections would be disconnected and redundant infrastructure would be decommissioned as part of the Proposal. All external utilities required for the Proposal would be provided through the MPE Stage 1 site. Utility connections to the MPE Stage 1 site would be undertaken via applications made directly to the relevant utility providers and approved through their authority and delegation under Part 5 of the EP&A Act. No direct connections from the Proposal to any authority mains would be required.

20.3.4 Potential impacts

A detailed description of the works for the Proposal, including necessary property rights alterations, are provided in Section 4 of this EIS.

A detailed assessment of the impacts of the Proposal (for both construction and operation) on both affected and surrounding properties (as identified above) has been provided in Sections 7 to 22 of this EIS. This has considered the following potential environmental impacts associated with the use of certain properties (included within the Proposal site) and an assessment of the impacts on surrounding properties. These assessments relate to the following:

- Traffic and transport
- Air quality
- Noise and vibration
- Human health
- Surface water
- Visual amenity, urban design and landscape
- Indigenous heritage
- Non-indigenous heritage
- Greenhouse gas and climate change
- Bushfire
- Flora and fauna
- Contamination.

This assessment section summarises, and provides reference to the assessment sections provided for each technical speciality, as relevant.

These properties are subject to the MPE Concept Plan Approval (MP 10_0193) (and/or a modification to this approval) which facilitates their use for the purposes of warehousing and freight village associated with an IMT.

Construction

Property ownership and land use

Affected properties (the Proposal site)

The potential impacts to property ownership and land use (within the Proposal footprint) from construction of the Proposal on are provided in Table 20-15.

Table 20-15 Construction impacts on property ownership and land use (affected properties)

Site	Potential impact
The MPE stage 2 site	<p>The Proposal would not change the ownership of the MPE stage 2 site. The site was formerly occupied by the Department of Defence DNSDC however has recently been vacated.</p> <p>Construction of the Proposal would generally involve clearance of buildings and vegetation, earthworks and construction of operational infrastructure.</p> <p>This would facilitate a change in land use from the former Defence uses (including for warehousing and distribution purposes) to warehousing and associated infrastructure as part of an IMT facility</p>

Site	Potential impact
Moorebank Avenue	<p>The Proposal would not change the ownership of Moorebank Avenue.</p> <p>Construction of the Proposal would involve an upgrade to Moorebank Avenue, within the Moorebank Avenue site, including:</p> <ul style="list-style-type: none"> • Modifications to the existing lane configuration, including some widening • Earthworks, including construction of embankments and tie-ins to existing Moorebank Avenue road level at the Proposal's southern and northern extents • Establishment of temporary drainage infrastructure, including temporary basins and / or swales • Raising the vertical alignment by about two metres from the existing levels, including kerbs, gutters and a sealed shoulder • Establishment of permanent stormwater and flooding infrastructure • Signalling and intersection works <p>These works would involve temporary closures (in part and full) of Moorebank Avenue during certain works periods as part of the construction of the Proposal. A diversion road would be constructed on to divert traffic, in particular background traffic, from Moorebank Avenue to minimise disruption. In addition to background traffic, Moorebank Avenue would be utilised by heavy and light vehicles travelling to and from the Proposal site.</p> <p>The impact of these works and construction traffic movement on Moorebank Avenue has been considered in Section 7 and Appendix K of this EIS and measures to mitigation the impacts have been proposed.</p> <p>The Proposal may result in temporary disturbances during construction, however, would not result in changes to the on-going land use of the Moorebank Avenue as a publicly accessible private road.</p>
Defence Joint Logistics Unit (DJLU)	<p>The Proposal would not change the current land ownership of the adjacent DJLU properties. Works would be undertaken within a discrete area on the western boundary of the DJLU site (Lot 3002, DP 1125930). Works would include connection of construction and operational surface water drainage systems for the Proposal to an existing drainage channel that flows to Anzac Creek. A number of temporary surface water management measures would be installed during construction to minimise the impact of the Proposal on this site as identified in Section 12 and Appendix P of this EIS.</p> <p>Construction of the Proposal would not require alterations to Moorebank Avenue adjacent to the DJLU or the DJLU entrance. However, the DJLU may experience minor Traffic impacts at the Moorebank Avenue / DJLU intersection from construction of the Proposal. A number of temporary traffic management measures would be implemented during construction to minimise impacts of the Proposal on this site as identified in Section 7 and Appendix K of this EIS. The Proposal would result in temporary disturbance to a discrete area of the DJLU site but would not result in changes to the on-going land use.</p>

Site	Potential impact
Boot Land	<p>The Proposal would not change the current landownership of the Boot Land.</p> <p>Works would be undertaken within a discrete area on the western boundary of the Boot Land to facilitate connection of construction and operational surface water drainage systems for the Proposal to an existing drainage channel that flows to Anzac Creek. A number of temporary surface water management measures would be installed during construction to minimise the impact of the Proposal on this site as identified in Section 12 and Appendix P of this EIS.</p> <p>The works to be undertaken would be outside of the Biodiversity Offset areas which are to be established as part of the MPE Stage 1 Proposal. With the implementation of stormwater measures the construction of the Proposal is not considered to have an impact on these offset areas.</p> <p>The Proposal would result in temporary disturbance to a discrete area of the Boot Lands to facilitate construction however would not result in changes to the on-going land use.</p>
MPW site	<p>The Proposal would not change the current landownership of the MPW site.</p> <p>Works would be undertaken within a strip of land adjacent to the western side of Moorebank Avenue. Works within the MPW site would require the construction of the Moorebank Avenue diversion road to maintain traffic movements along Moorebank Avenue during construction. The MPW site is proposed to be cleared of vegetation as part of the MPW Stage 2 Proposal and therefore these works would not involve any further impacts on the biodiversity of this site.</p> <p>The Proposal would result in a temporary change in land use while Moorebank Avenue is being constructed to allow for the temporary Moorebank Avenue diversion road. Following construction of the upgraded Moorebank Avenue, the Moorebank Avenue diversion road would be removed and the area would be utilised to construct an on-site detention basin (OSD), running parallel to the upgraded Moorebank Avenue. The OSD would result in a permanent change in land use on the MPW site. However, this change in land use would be consistent with the surrounding land uses in that it would represent ancillary infrastructure to manage site run-off for the Moorebank Precinct.</p> <p>The Proposal, is considered to have minimal impact on the construction traffic accessing the MPW site for the MPW Stage 2 Proposal. Access to key intersections would be retained from the diversion road. The impact of these works and construction traffic movement on Moorebank Avenue has been considered in Section 7) and Appendix K of this EIS and measures to mitigation the impacts have been proposed.</p>

Surrounding land uses

Detailed environmental impact assessment has been undertaken to minimise the impacts of the construction of the Proposal on surrounding land uses. Particular consideration has been given to sensitive surrounding land uses including residential (Wattle Grove, Moorebank, Casula and Glenfield) and educational, commercial and industrial uses.

Of particular importance to the land uses in the surrounding area are impacts related to traffic and transport, air quality, noise and vibration, visual and socio-economic. A summary of how these impacts are to be mitigated during the construction of the Proposal is provided in Table 20-16.

Table 20-16 Potential construction impacts and mitigation on surrounding properties

Aspect	Mitigation	Where addressed
Traffic	<p>The key potential impacts would be associated with the use of construction vehicles (cars and trucks) accessing the site via Moorebank Avenue from the M5 Motorway. During construction of the proposal a small proportion of light (eight per cent) and heavy (0.2 per cent) vehicles would use Anzac Road; however, traffic modelling as part of the operational traffic assessment has indicated that construction traffic would not significantly impact on the performance of Anzac Road (refer to Section 7 and Appendix K).</p> <p>During construction, the Moorebank Avenue diversion road would be established within the MPW site. This would allow traffic movements to continue along Moorebank Avenue, minimising traffic impacts to the local road network during construction.</p> <p>The following would be prepared and implemented during construction to minimise impacts on surrounding properties:</p> <ul style="list-style-type: none"> • A community information and awareness strategy would be included in the CEMP • Road Safety Audit would be undertaken of Moorebank Avenue to identify the traffic safety risk and its findings and recommendations included in the CTMP • CTMP would be prepared in accordance with the PCTMP included in Appendix K and included in the CEMP. 	Section 7 and Appendix K of this EIS
Air Quality	<p>The principle air emissions during the construction phase of the Proposal would be dust generated from construction activities. Overall, the modelling results indicate that the construction phase of the Proposal complies with all relevant impact assessment criteria.</p> <p>The Air Quality Management Plan (provided in Appendix M of this EIS), would be further progressed and incorporated into the CEMP for the Proposal.</p>	Section 9 and Appendix M of this EIS.
Noise and Vibration	<p>Noise emissions generated during construction of the Proposal have the potential to impact on surrounding sensitive receivers. Construction noise emissions are expected to comply with the relevant guidelines during all works periods at all sensitive receivers with the exception of OOH Period 2. Construction works within OOH Period 2 are predicted to exceed the noise management levels by up to 1dBA; however, this exceedance is considered to be, short term and negligible and would not warrant additional mitigation.</p> <p>Given the setback distances to nearby sensitive receivers, any ground vibrations arising from the construction activities would be significantly below the relevant guideline criteria for human comfort and structural damage.</p>	Section 8 and Appendix L of this EIS.

Aspect	Mitigation	Where addressed
	A Construction Noise and Vibration Management Plan (CNVMP), or equivalent, would be developed in accordance with the ICNG, and implemented as part of the CEMP for the Proposal.	
Visual	<p>The construction footprint of the Proposal, and the construction activities and equipment within this footprint would be visible from Moorebank Avenue in the vicinity of the Proposal, and areas at a higher elevation where views aren't obstructed from existing infrastructure and adjacent vegetation.</p> <p>The visual impact assessment found that construction of the Proposal would generally incur a low to moderate visual impact to surrounding receivers, with the exception of one receiver at Carroll Park, Casula, to the west of the Proposal site, which would experience a moderate to high visual impact. Visual impacts during construction would generally be localised and temporary in nature.</p> <p>A Visual Impact Assessment has been prepared as part of this EIS. A number of mitigation measures would be considered for implementation to further reduce visual impacts on surrounding land uses during construction.</p>	Section 15 and Appendix R of this EIS.
Socio-economic	<p>Construction impacts that would affect the socio-economic environment would be temporary and include the employment of a construction workforce, generation of additional customers for local businesses. There may be potential disruptions to businesses as a result of the impacts listed above. The majority of the impacts are positive, however there may also be some short term negative impacts as a result of the construction works.</p> <p>A community information and awareness strategy would be included in the CEMP and would outline measures to maintain communication with the community (including surrounding businesses) and all relevant stakeholders throughout the construction process of the Proposal.</p>	Section 20.5 of this EIS.

Overall, the Proposal includes a number of measures which would reduce the impact of the construction works on the surrounding area. Impacts would be temporary and are not considered to significantly impact on surrounding land uses.

Utilities

The construction works for the Proposal would include connection to existing utilities. The Utilities Strategy Report (Appendix F of this EIS) and Section 4 of this EIS, provide further detail on the utilities works to be undertaken.

A summary of the demand requirements, for each utilities connection, for the Proposal site includes:

- Water – 30.821 L/s (peak) and 123.282 kL (daily)
- Sewer – 24.656 L/s (peak) and 98.626 kL (daily) – *Drafting note: Further information is being sought.*
- Electricity – 8.1 MVA

- No additional gas demand is expected from the Proposal
- The Proposal would require connections to telecommunications.

The Proposal site has historically been connected to nearby public utility networks through Commonwealth owned assets. These connections would be disconnected and redundant infrastructure would be decommissioned as part of the Proposal. Utilities relocation and installation across the Proposal site would be completed in a staged manner.

The existing utility supply to the Proposal site would be maintained until the proposed permanent utilities can be provided. Refer to Section 4 and Appendix F of this EIS for details.

All external utilities for the Proposal would be provided through those established under the MPE Stage 1 Proposal. No direct connections from the Proposal to any authority mains would be required for the Proposal.

There is likely to be some temporary impacts on surrounding utilities during construction, however these would be short term and avoided where possible. All works would be undertaken in consultation with relevant land owners and infrastructure and service providers to further minimise impacts.

Operation

Property ownership and land use

Affected properties (the Proposal site)

The potential impacts of the operation of the Proposal, in relation to property ownership and land use for affected properties within the Proposal footprint, is provided in Table 20-17.

Table 20-17 Operational impacts on property ownership and land use (affected properties)

Site	Potential impact
The MPE stage 2 site	<p>The Proposal would not change the land ownership of the MPE Stage 2 site. Subdivision of the Proposal site is needed to facilitate the long-term leases on land associated with warehousing, freight village and general infrastructure. Subdivision of the site would not impact on allocation of utilities or access to individual lots. The overall operation of the Proposal site from an environmental perspective would be guided by the implementation of an OEMP.</p> <p>The Proposal would result in a change of land use to the Stage 2 site. However, this change would be consistent with the approved Concept Plan for the site.</p>
Moorebank Avenue	<p>The Proposal would not change the land ownership of Moorebank Avenue.</p> <p>Moorebank Avenue would include an upgraded road alignment, road configuration, traffic signalling and intersections as a result of the Proposal.</p> <p>Drainage and utilities infrastructure would be installed within the verge of Moorebank Avenue. This proposed infrastructure would replace existing infrastructure.</p> <p>Once operational, the Proposal is considered, to result in a positive impact on traffic movement on Moorebank Avenue. The use of Moorebank Avenue (to the south of the M5 Motorway) for access to the Proposal would be managed through the implementation of a number of mitigation measures during operation of the Proposal (refer to Section 7 and Appendix K of this EIS).</p>

Site	Potential impact
	<p>The Proposal would result in a visual change to the streetscape of Moorebank Avenue, however, the Proposal would continue the industrial character of this streetscape and includes landscaping and visual treatment to minimise impacts on the visual amenity of Moorebank Avenue (refer to Section 15 (and Appendix R of this EIS).</p> <p>The Proposal would not result in a change to the on-going land use of Moorebank Avenue as a publicly accessible road.</p>
DJLU	<p>The Proposal would not change the land ownership of the DJLU.</p> <p>The Proposal would involve operation of a stormwater drainage outlet feeding into an existing drainage channel on the DJLU site. The operation of this outlet would not change the existing land use of the DJLU site and would not impact on Defence's ability to continue operations on the site.</p> <p>Impacts from operation of the Proposal on surface water flows including those on adjacent properties are assessed in Section 12 and Appendix P.</p> <p>The Proposal would not require alterations to Moorebank Avenue adjacent to the DJLU or the DJLU entrance and once operational is anticipated to result in a positive impact on traffic movement on Moorebank Avenue. Traffic impacts of the Proposal on this site are identified in Section 7 (Traffic and transport) and Appendix K of this EIS.</p>
Boot Land	<p>The Proposal would not change the land ownership of the Bootland.</p> <p>The Proposal would involve operation of a stormwater drainage outlet feeding into an existing drainage channel on the Boot lands. The operation of this outlet would not change the existing land use of the Boot land site.</p> <p>Impacts from operation of the Proposal on surface water flows including those on adjacent properties are assessed in Section 12 and Appendix P.</p>
MPW site	<p>The Proposal would not change the land ownership of the MPW site.</p> <p>The Proposal would involve operation of an OSD running parallel to the upgraded Moorebank Avenue. This change in land use would be consistent with the surrounding land uses in that it would represent ancillary infrastructure for the Moorebank Precinct. Further, the OSD would provide a buffer, both visual and separation, to the IMT operational activities on this site and the traffic travelling along Moorebank Avenue.</p>

Surrounding land uses

As has been discussed above, detailed environmental impact assessment has been undertaken to minimise the impacts of the operation of the Proposal on surrounding land uses. Particular consideration has been given to sensitive surrounding land uses including residential (Wattle Grove, Moorebank, Casula and Glenfield) and educational, commercial and industrial uses.

Of particular importance to the land uses in the surrounding area are impacts related to traffic and transport, air quality, noise and vibration, human health, visual and socio-economic. A summary of how these impacts are to be mitigated during the operation of the Proposal is provided in Table 20-18.

Table 20-18 Potential operational impacts and mitigation on surrounding properties

Aspect	Mitigation	Where addressed
Traffic	<p>Operation of the Proposal would generate additional traffic movements for access to the MPE Stage 2 site. These additional movements have the potential to impact on the local road network, including nearby intersections. Traffic modelling undertaken as part of the Traffic and Transport Impact Assessment (Arcadis, 2016) found that the Proposal would result in a slight increase to traffic numbers along Moorebank Avenue near the Proposal; however, key intersections would continue to operate at a comparable / better level of service with the implementation of proposed upgrades along Moorebank Avenue. A Preliminary Operational Traffic Management Plan (or equivalent) including a driver code of conduct would be prepared and implemented during operation to minimise and manage traffic impacts to the surrounding properties, businesses and the local road network.</p> <p>The proposed MPE Stage 2 site access would also be improved to facilitate safe access for vehicles, pedestrians and cyclists during the operation of the Proposal.</p>	Section 7 and Appendix K of this EIS
Air quality	<p>Overall, the modelling predictions indicate that the risk of adverse air quality impacts from the Proposal are low. The incremental increase in key pollutants (PM₁₀ and PM_{2.5}) at the surrounding residential areas would be minor compared to existing background conditions. The implementation of Best Practice, identified in the Air Quality Best Practice Review would further reduce the operational impacts of the Proposal (refer to Section 9 and Appendix M of this EIS).</p> <p>The Air Quality Management Plan (provided in this EIS), would be further progressed and incorporated into the OEMP for the operation of the Proposal.</p>	Section 9 and Appendix M of this EIS.
Noise and Vibration	<p>The noise modelling has predicted that operation of the warehousing and freight village and road traffic associated with the Proposal would not exceed the relevant noise assessment criteria, hence additional measures to mitigate noise impacts associated with these components of the Proposal are not proposed.</p>	Section 8 and Appendix L of this EIS.
Human health	<p>With regards to air quality, the increase in risk due to air pollution from the operations at the Proposal site are low and in most cases are negligible. The cancer risk from the air toxics are well below acceptable risk levels set by international agencies. The implementation of best practice measures, as outlined in Section 10 of this EIS, would lead to further reductions in air pollution levels and the associated health risks.</p> <p>The assessment undertaken for noise indicated that the Proposal operation meets the WHO community noise guidelines at all sensitive receivers.</p>	Section 10 and Appendix N of this EIS.

Aspect	Mitigation	Where addressed
Visual	<p>The pattern of existing development surrounding the site would assist with screening the development from much of the surrounding area. Potential views to the site would be possible from Moorebank Avenue and at discrete locations within Casula (resulting from elevated view points).</p> <p>Overall, the visual impacts of the proposal are considered low to moderate</p> <p>A number of visual impact mitigation measures have been proposed including significant and intensive landscaping, planting, built-form screening, that would reduce the visibility of the development and improve the overall visual amenity of the site and area generally.</p> <p>The lighting to be used for the operation of the IMT facility and warehousing area would have minimal effect on adjacent properties and on the environment as a result of the appropriate selection of light source, luminaire, luminaire mounting height and luminaire aiming.</p>	Section 15 and Appendix R of this EIS.
Socio-economic	<p>There is potential for positive and negative socio-economic impacts associated with the operation of the Proposal. Positive impacts are likely to be more pronounced at a regional level while the direct impact (positive and negative) of the development would possibly be experienced at the local level. The Proposal would have a positive long term impact on economy through employment and investment in the local and regional area.</p> <p>The OEMP would include measures to engage with stakeholders and to manage and respond to feedback received during operation of the Proposal. A number of mitigation measures are proposed (in the sections above) to reduce the operational impacts of the Proposal on the surrounding social and economic community.</p>	Section 20.5 of this EIS.

Overall, the Proposal includes a number of measures which would reduce its operational impact on the surrounding area.

Utilities

The Utilities Strategy Report (Appendix H of this EIS) and Section 4 of this EIS, provide further detail on the utilities works to be undertaken.

These utility connections provided for the operation of the Proposal have been determined through an assessment of the service demand requirements for the Proposal available in the surrounding area. The assessment provided within the Utilities Strategy Report (Appendix H of this EIS) concludes that the existing infrastructure is suitable to service the estimated demands of the Proposal either with augmentation or in its current condition. The report also indicates that consultation and applications have been made during the development of the MPE Stage 1 Proposal, to service and infrastructure providers including Sydney Water, Telstra, and Endeavour Energy to facilitate for the necessary utilities connections (refer also to Sections 4 and 6 of this EIS).

Further consultation with infrastructure and service providers would continue during the progression of the design for the Proposal, prior to and during construction. A summary of consultation undertaken to date with utility and service providers is included in Section 6 of this EIS.

Developer contributions

Section 7.6 of this EIS provides a summary of the potential traffic impacts of the operation of the Proposal and concludes that developer contribution discussions to address these impacts would be undertaken with Roads and Maritime subsequent to the finalisation of the Precinct Model²⁰. The apportionment of developer contributions would be subject to the outcomes of the Precinct Model and would be discussed further, and as necessary an agreement determined, between MIC, SIMTA and the relevant government agencies (Roads and Maritime and Liverpool City Council, as relevant).

Liverpool City Council does not currently have a Section 94 Contributions Plan which relates to industrial development on the Proposal site. In the absence of a relevant contributions plan for the Proposal site and the Proposal, SIMTA has considered the principles of the Liverpool Contributions Plan 2009, in particular in relation to the Preston's Industrial Release Area (Section 1.1 of the plan). It is noted that there are considerable differences between the Preston's Industrial Release Area and its location to surrounding development, drainage infrastructure, need for transport infrastructure and ownership arrangements, which form, amongst other aspects, the basis for developer contributions. Notwithstanding this, Table 20-19 provides a summary of the general considerations of the Preston's Industrial Release Area contributions and the benefits proposed by the Proposal.

Table 20-19 Considerations of the Preston's Industrial Release Area contributions

Principle	Proposal comments
Transport	Section 7 and Appendix M of this EIS provides a summary of the potential traffic impacts of the Proposal. The analysis has identified a number of intersections, which are in part impacted by the Proposal, and require upgrade. Further the Proposal includes the upgrade of Moorebank Avenue. It is considered acceptable that developer contributions, from SIMTA, would be provided to assist with the development of these intersections, however this would need to be confirmed through discussions with Roads and Maritime.
Drainage	Sections 4, 12 and Appendix R of this EIS identify the stormwater strategy and potential impacts of the Proposal. In particular, the Proposal includes an integrated stormwater strategy comprising pits and pipes draining to OSD, which filter run-off and then periodically discharge. The Proposal's drainage strategy considers other surrounding site's and historic drainage flows.
Landscaped Buffer Areas	Sections 4, 11 and Appendix E and Q of this EIS provide further detail on the landscaped (or otherwise) buffers proposed to be established for the Proposal site. In particular, buffers are to be provided along Moorebank Avenue and also as part of a biodiversity offset on to the immediate east of the Proposal site.

²⁰ Currently under preparation by MIC to highlight all potential traffic impacts of the Proposal (as a part of the Moorebank Precinct), the need for upgrades to the road network, and the timing and triggers for those upgrades. This Precinct Model is envisaged to be available towards the end of 2016.

The above aspects are considered to provide benefits to the Proposal, the Moorebank Precinct, and the surrounding area, and therefore may form part of the developer contributions discussions.

20.3.5 Mitigation Measures

A number of mitigation measures would be implemented during both the construction and operation of the Proposal to minimise impacts on affected and surrounding land uses, as provided in Section 22 of this EIS.

As relevant, further assessment of services demand, infrastructure requirements and augmentation works, in consultation with relevant infrastructure and service providers would be undertaken.

This page has been left blank intentionally

20.4 Ecologically sustainable development

Arcadis have undertaken an assessment of the Proposal's consistency with the principles of ESD, and how these principles have been considered and incorporated into the design, construction and operation of the Proposal, to address the SEARs.

Table 20-20 provides a summary of the relevant SEARs as which relate to ESD and where these have been addressed in this EIS.

Table 20-20 SEARs (Ecologically Sustainable Development)

SEARs	Where addressed
General requirements	
Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) will be incorporated in each stage of the development	Section 19.4
18. Ecologically Sustainable Design	
<i>The EIS shall detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development</i>	Section 19.4

The compliance of the Proposal with the SEARs, Concept Plan Conditions of Approval and Statement of Commitments is provided at Appendix A of this EIS.

This Section summarises the studies undertaken for the MPE Concept Plan Approval (section 20.4.2) and, more recently, for the Proposal. This section of the EIS also describes the impacts associated with construction and operation of the Proposal on ESD (section 20.4.3). Measures to mitigate potential impacts to ESD where they are required have been identified in Section 20.4.4.

20.4.1 Ecologically sustainable development

The Commonwealth Government refers to ESD as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future can be increased' (Commonwealth Department of the Environment, 1992).

In NSW, the commitment to the concept of environmental sustainability is expressed in current legislation. It is an object of the EP&A Act (section 5((a) vii) to encourage ESD through the implementation of the four principles of ESD. The four principles of ESD are defined in clause 7(4) of Schedule 2 of the EP&A Regulation as being:

- **Precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
 - An assessment of the risk-weighted consequences of various options
- **Inter-generational equality**, namely, that 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 and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration
- **Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;
 - The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and
 - Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

20.4.2 Concept Plan Assessment

The principles of ESD, as defined in Section 0 were considered in the concept plan EIS for the MPE Project. The Concept Plan EIS identified a number of ESD opportunities that exist across the life of the MPE Project, relating to the conservation of water and energy and waste minimisation.

To realise these ESD opportunities, three core groups of ESD initiatives were identified that would be implemented across the construction, operation and decommissioning stages of the Proposal. These are categorised as:

- Site management policies and strategies
- Materials selection and energy and water demand management
- On-site renewable energy generation.

These initiatives would aid in the sustainable management of the Proposal and would contribute to minimising the ecological footprint. In addition, by including warehousing and distribution facilities at the same location as the IMT, road traffic between Port Botany (and surrounding precincts) and the broader MPE is ultimately reduced and local employment opportunities would be created.

As stated in the Statement of Commitments for the MPE Concept Plan Approval, the Proposal would give consideration to the principles of ESD. The MPE Concept Plan Approval for the MPE Project (as modified) defined the extent of the project and included a number of environmental investigations which identified the potential impacts of the project. It was the intention of the Proposal design to further progress the design provided in the Concept Plan and minimise environmental damage to the Proposal site and surrounds.

The four main principles of ESD, including how they have been recognised and incorporated throughout the design, construction and operation of the Proposal are discussed in Section 20.4.3 below.

20.4.3 Potential Impacts

Precautionary principle

The precautionary principle deals with certainty in decision making. It provides that if there are risks of serious or irreversible environmental damage associated with a proposed development, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

The precautionary principle approach has been applied throughout the design and development of the Proposal and all technical studies associated with the Proposal, with the intent to minimise any potential environmental impacts. This included identifying opportunities to avoid and minimise potential impacts to nearby ecologically sensitive areas and sensitive residential receivers (refer to Section 3 (Proposal justification, need and alternatives) for more information).

This EIS details the evaluation of environmental impacts associated with the Proposal. The EIS was prepared adopting a conservative approach, which included assessing the worst case impacts and scenarios. It has been undertaken using the best available technical information and has adopted best practice environmental standards, goals and measures to minimise environmental risks. The environmental assessment has been undertaken in collaboration with key stakeholders and relevant statutory and agency requirements.

The threat of serious or irreversible environmental damage is the fundamental requirement for implementing the precautionary principle. Potential environmental risks associated with the Proposal were identified during the design development stage of the Proposal, to ensure that an appropriate amount of attention was afforded to minimising potential environmental risk and to ensure sufficient time was available for the preparation of detailed technical specialist reports to support this EIS (refer to Section 21 (Environmental risk analysis) for more information). Technical specialist studies that were undertaken to provide accurate information to assist with the evaluation and development of the Proposal, included:

- A traffic and transport assessment (Section 7 and Appendix K)
- Noise and vibration (Section 8 and Appendix L)
- Air quality (Section 9 and Appendix M)
- Human health (Section 10 and Appendix N)
- Biodiversity (Section 11 and Appendix O)
- Stormwater and Flooding (Section 12 and Appendix P)
- Geology, Soils and Contamination (Section 13 and Appendix Q)
- Visual amenity, Urban design and Landscape (Section 15 and Appendix R)
- Indigenous heritage (Section 16 and Appendix S)
- Non-indigenous heritage (Section 17 and Appendix T)
- Greenhouse gas and Climate Change (Section 18 and Appendix V).
- Bushfire (Section 20.2 and Appendix U)

Mitigation measures which have been developed to manage the potential environmental impacts during construction and operation of the Proposal, as identified in these assessments are provided in Section 22 (Compilation of mitigation measures). Subject to the implementation of these mitigation measures, these specialist studies did not identify any issues that may cause serious and irreversible environmental damage as a result of the Proposal.

Inter-generational equity

Inter-generational equity refers to the premise that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The Proposal has been considered in terms of intergenerational equity through its design and the management of potential environmental impacts discussed throughout this EIS.

The Proposal has been designed to benefit both existing and future generations through the provision of high standard warehousing and distribution facilities, which, when supported by an IMT, will remove significant numbers of freight vehicles from main roads between the Moorebank Precinct and other rail connected freight facilities. This is a high growth area for a number of activities and in the absence of any alleviating measures the cumulative effects of congestions would significantly reduce amenity and regional accessibility for local communities.

Reducing the freight traffic volume would have direct flow-on economic, social and wider environmental benefits, including but not limited to improved inter-regional access, reduced freight and transport costs for industry and businesses and job creation during construction and operation. While the Proposal would have some adverse impacts during construction and operation, as outlined throughout this EIS, these impacts are expected to be of a nature or extent that would not inequitably disadvantage any sector of the community or future generations. Mitigation measures have also been identified for the Proposal that would be implemented throughout construction and operation (refer to Section 21 (Compilation of mitigation measures)), which will result in there being no significant adverse environmental impacts associated with the Proposal.

Further, the development of warehousing and distribution facilities at Moorebank and the associated IMT facility was identified in a number of NSW strategic planning and policy documents (refer to Section 3 of this EIS), as a key facility which would provide for localised employment opportunities, and provide opportunities to meet the long term projected increases in freight demand across the Sydney Greater Metropolitan Area. The Proposal, being the provision of warehouse and distribution facilities to support an IMT, forms an integral part of the overall IMT strategy for Sydney.

Overall, the design of the Proposal has incorporated the ESD principle of intergenerational equity through ensuring that the warehousing and distribution facilities can be constructed and operated sustainably to ensure there is no significant on-going impacts on the surrounding community and future generations. The mitigations measures provided in Section 22 of this EIS, in particular those relating to traffic and transport, noise and vibration, air quality and human health are reflective of the commitment of SIMTA (as the Proponent) to minimising environmental impacts of the Proposal on the surrounding environment during construction and operation.

Conservation of biological diversity and ecological integrity

This ESD principle stipulates that biological diversity and ecological integrity should be fundamentally considered when assessing the impacts of a Proposal. The design and assessment of the Proposal has been undertaken with the aim of identifying, avoiding, minimising and mitigating impacts on biodiversity.

Habitat values on the Proposal site are limited to scattered patches of planted vegetation, including some mature eucalypts and scattered native and exotic shrubs and trees associated with the formalised drainage channels throughout the MPE Stage 2 site. The Proposal would result in clearing of planted vegetation throughout the MPE Stage 2 site. Given the location and nature of the Proposal and its context with regard to existing road infrastructure, there is limited scope for using alternative locations to entirely avoid impacts on biodiversity. The Proposal has generally

minimised impacts to sensitive areas adjacent to the Proposal site, including the Boot Land to the south and the east of the MPE site, where reasonable and feasible.

All areas mapped as Plant Community Types (PCTs) to be impacted by the Proposal would be offset in accordance with the FBA from the *NSW Biodiversity Offsets Policy for Major Projects*. Endangered Ecological Communities (EECs)/ Threatened Species occurring within the Proposal site include:

- Castlereagh Scribbly Gum Woodland of the Sydney Basin bioregion, listed as Endangered under the EPBC Act and Vulnerable under the TSC Act
- Cooks River – Castlereagh Ironbark Forest in the Sydney Basin Bioregion, listed as Critically Endangered under the EPBC Act and Endangered under the TSC Act.

This EIS includes a Biodiversity Assessment Report (BAR) (refer to Appendix O), which identifies impacts to biodiversity, and provides a range of mitigation measures which would be implemented in order to further avoid and minimise potential impacts to biodiversity. A summary of the potential impacts to biodiversity during construction and operation of the Proposal is provided in Section 11 of this EIS.

Improved valuation, pricing and incentive mechanisms

This principle requires that costs to the environment are incorporated or internalised in terms of overall project costs, ensuring that decision making takes into account the environmental impacts.

Environmental factors have been considered throughout the design development of the Proposal in relation to its construction methodology and operation. As a result, environmental impacts have been avoided or minimised, where possible and mitigation measures as provided in Section 22 of this EIS would be implemented during construction and operation of the Proposal to avoid, minimise and mitigate impacts.

While acknowledging that it is often difficult to place a reliable monetary value on the residual, environmental and social effects of the Proposal, the value placed on avoiding and minimising the environmental impacts of the Proposal is demonstrated in the design features incorporated into the Proposal, and the extent of environmental investigations that have been undertaken to inform this EIS.

SIMTA has undertaken an analysis of the marginal cost of abatement for reducing greenhouse gas emissions generated by the Proposal. Details of the GHG emissions and potential opportunities to minimise emissions are presented in Section 18 and Appendix V of this EIS. The measures identified to reduce greenhouse gas emissions would be considered by SIMTA and, if implemented, become a cost to the project that is directly attributed to minimising environmental impacts. A Biodiversity Offset Strategy to offset the impacts of the Moorebank Precinct on listed threatened species and ecological communities under the EPBC Act and / or TSC Act is currently being developed, which would include the consideration of the biodiversity impacts of the Proposal. . A key part of the biodiversity offset process, under the FBA involves the identification of an 'ecological value' for the flora and fauna to be impacted by the Proposal. The offsetting to be undertaken for the Moorebank Precinct, inclusive of the Proposal would result in a cost to SIMTA, thereby ensuring that this environmental impact has been considered as an overall cost to the Proposal, which is consistent with the ESD principle of improved valuation, pricing and incentive mechanisms.

This EIS has examined the environmental consequences of the Proposal and identifies mitigation measures for areas where adverse environmental impacts may occur. The implementation of mitigation measures represents a capital and/ or operational cost for the Proposal, acting as a valuation in economic terms of environmental resources.

20.4.4 Mitigation Measures

The Proposal would include the implementation of a number of environmental controls and initiatives as described in the Statement of Commitments provided in the MPE Concept Plan Approval (refer to Appendix A).

Mitigation measures identified in this EIS specific to the Proposal would also be implemented (refer to Section 21), which are considered suitable to ensure that ESD principles are integrated into the Proposal.

20.5 Socio-economic

This section provides an assessment of the socio-economic impacts associated with the Proposal. The SEARs for the Proposal, Concept Plan Conditions of Approval and the Statement of Commitments do not include specific requirements for the assessment of socio-economic impacts; however, in order to provide a thorough and robust assessment of the Proposal, a desktop assessment to identify the potential socio-economic impacts and benefits of the Proposal has been undertaken.

20.5.1 Concept Plan Assessment

An *Economic Assessment* (Urbis 2013) and *Social Impact Commentary* (Urbis 2013) were prepared as part of the MPE Concept Plan Approval EIS, including an assessment of the potential impacts associated with the development of an IMT facility, warehouse and distribution facilities and ancillary services.

The *Economic Assessment* identified that the MPE project would have a number of positive economic-related impacts; particularly for the Liverpool LGA, the South West subregion, and the Sydney Metropolitan Area, including:

- Creation of employment opportunities in occupational categories that align with the employment profile of the local population.
- Reduced volumes of heavy vehicle movements along the M5 corridor
- Reduced truck vehicle kilometres across the Sydney Metropolitan Network, compared to a relatively small increase in train kilometres travelled (once the MPE Project is operating at an annual throughput capacity of one million TEU).

The population profile and demographics for the surrounding area identified in the *Social Impact Commentary* included:

- The local environment is characterised by a high level of labour market regionalisation with a low job to resident ratio, exacerbated by rapid growth of the local labour market, which has grown faster than the overall population
- There is significant population and employment growth anticipated across a number of areas and industries in the Liverpool LGA, which is assigned the highest employment growth target for Sydney's south-west subregion. Residential growth is expected to occur in Moorebank through infill development
- The local employment base has been declining, with a fall in the ratio of local employment opportunities to local employees. This is forecast to change through the implementation of the North West and Central-West Sydney Employment Strategies
- There is a strong existing employment base in logistics, with Western Sydney well represented in the manufacturing, construction, retail, and transport and warehousing. Many employment opportunities at the fringe of Western Sydney have tended to occur in low-skilled areas, such as manufacturing, wholesaling, transport and construction, with fewer opportunities in more skilled employment sectors.

In addition, the *Social Impact Commentary* included a review of local planning documents to identify a number of socio-economic priorities, as relevant to the Proposal, for the Liverpool LGA, including:

- Reduce unemployment, particularly young people and those experiencing long term unemployment
- Support initiatives that improve employment outcomes for Aboriginal people
- Support economic development and access to local employment opportunities
- Support development of Liverpool City Centre into a regional City with accessible services and employment opportunities
- Support affordable goods and services.

20.5.2 Methodology

The social and economic assessment for the Proposal has included a desktop review and collection of background information to identify potential social and economic impacts associated with the Proposal in the context of the broader MPE Project and surrounding environment.

The desktop review and collection of background information relevant to the Proposal included an examination of existing reports including:

- *Transitional Part 3A Concept Plan Application: Economic Assessment* (Urbis 2013)
- *Transitional Part 3A Concept Plan Application: Social Impact Commentary* (Urbis 2013b).
- *NSW DP&E 2016 population and household projections*
(<http://www.planning.nsw.gov.au/Research-and-Demography/Demography/Population-Projections>)
- *Australian Bureau of Statistics Census Data*
(<http://www.abs.gov.au/websitedbs/censushome.nsf/home/Data>).

20.5.3 Existing environment

The demographic profile provided in the *Social Impact Commentary* was prepared based on the 2011 Australian Bureau of Statistics (ABS) Census data. A subsequent census has taken place in 2016; however, the data has not been released by ABS and as such, the information provided in the *Social Impact Commentary* is considered to provide the most recent information regarding the demographic profile of the Liverpool LGA.

Population

The Proposal is situated within the Liverpool LGA, in Sydney's South West Sub-Region, and is surrounded by the suburbs of Moorebank, Wattle Grove, Glenfield and Casula.

The population in the surrounding suburbs have been derived from the latest Census data (ABS 2011) and are shown in Table 20-21.

Table 20-21 Population statistics within the vicinity of the MPE site (ABS 2011)

Age	Casula		Wattle Grove		Moorebank		Glenfield	
	No. people	% population	No. people	% population	No. people	% population	No. people	% population
< 5 years	1168	7.9	714	8.7	641	8.4	500	6.6
< 15 years	3341	22.7	2154	26.3	1641	21.6	1424	18.8
15 to 64 years	9835	66.9	5610	68.5	4982	65.6	6008	79.5
65 +	1520	10.3	426	5.2	972	12.8	1049	13.8

The 2011 Census data shows that the population of the Liverpool LGA is expected to grow from 188,088 people in 2011 to 289,959 people in 2031. Since the release of the 2011 Census, NSW DP&E has released updated population projections for the Liverpool LGA from 2011 to 2036. A summary of the total population growth projections at 5 year intervals from 2011 to 2036 are summarised in Table 20-22 and the changes to the Liverpool LGA population are provided in Table 20-23.

Table 20-22 Liverpool population projections, 2011-2036 (NSW DP&E, 2016)

Year	2011	2016	2021	2026	2031	2036
Total projected population	188,100	214,100	241,900	274,800	301,100	331,000

Table 20-23 Projected population growth in the Liverpool LGA, 2011 – 2036 (NSW DP&E, 2016)

Year	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036
Total population change	26,000	27,800	32,900	26,300	29,900
Average Annual Population Growth Rate (%)	2.6%	2.5%	2.6%	1.8%	1.9%

Socio-Economic Index

There are several indices used to assess socio-economic status; one commonly used is the Socio-Economic Indexes for Areas (SEIFA) index. SEIFA is a tool developed by the ABS that ranks areas in Australia based on relative socio-economic advantage and disadvantage by taking into account 20 variables.

A review of the SEIFA for each of the suburbs revealed that both Moorebank and Wattle Grove have a higher level of socio-economic advantage than the NSW and Australian average, while Casula has a slightly high level of disadvantage compared to the NSW average. Glenfield's SEIFA index is consistent with the NSW average.

Employment

Moorebank, Wattle Grove, Glenfield and Casula all have high levels of employment with 93 percent, 95.7 percent, 93.2 percent and 96.9 percent of the population in full or part time employment, respectively. This is comparable to the Sydney average of 94.3 per cent. The three top professions within the area are:

1. Clerical and administration
2. Professional
3. Technical and trade services

20.5.4 Potential impacts

Construction

Socio-economic impacts related to the construction of the Proposal would be temporary (between 24 to 36 months) and mainly localised to the construction area and nearby suburbs of Moorebank, Wattle Grove, Glenfield and Casula. The Proposal would have a number of beneficial and adverse impacts which are summarised in Table 20-24 below.

Detailed environmental assessments of traffic, noise and vibration, air, human health and visual amenity associated with the construction of the Proposal are presented in sections 7, 8, 9, 10 and 14, respectively.

Table 20-24 Summary of social and economic impacts – construction

Impact	Description	Unmitigated impact
Economic		
Employment	<p>It is anticipated that construction of the Proposal would require approximately 600 construction personnel across the duration of the construction program. During peak construction, the Proposal would require around 200 construction personnel on-site per day</p> <p>Employment opportunities would be provided for the local workforce throughout the duration of construction (between 24 to 36 months). This is of particular benefit as technical and trade services are within the top three professions within Moorebank, Wattle Grove, Glenfield and Casula.</p>	Positive
Traffic and access	<p>Access to and from the MPE Stage 2 site during construction would be via the existing intersection on Moorebank Avenue, formerly utilised as the northern DSND site access (at Ch.900 along Moorebank Avenue). This intersection is situated north of the MPE Stage 1 Proposal (refer to Figure 4-1).</p> <p>Construction vehicles (including general light and heavy construction vehicles, and heavy vehicles importing general fill for bulk earthworks) would typically access the Moorebank Avenue site from the north, via a gated access point off Moorebank Avenue.</p> <p>During construction, Moorebank Avenue would have a 40 kilometres per hour construction speed limit from Anzac Road to approximately 200 metres south of the MPE Site.</p>	Slight short-term negative

Impact	Description	Unmitigated impact
	Some minor disruptions to traffic along Moorebank Avenue are anticipated during construction of intersections facilitating site usage, however these are expected to be temporary in nature and managed through mitigation measures presented in Section 7 (Traffic and transport).	
Economic development	There is potential that some nearby businesses may experience increased trade due to the presence of additional construction workers or to meet the demand for construction related goods arising from construction of the Proposal.	Positive
Social		
Community perception	Local residents and businesses are likely to have perceived concerns regarding disruptions to traffic, and amenity impacts associated with construction of the Proposal.	Short-term negative
Traffic and transport	<p>Access to the Proposal site would be via the existing DSND intersection on Moorebank Avenue. Construction activities would involve up to 1,022 truck movements (round trip) per day during the peak construction period. As demonstrated in Section 7 of this EIS, the level of service at key intersections near the Proposal would be reduced during the peak construction period; however, these impacts would be short term and managed through the implementation of a CTMP developed for the Proposal and implemented as part of the CEMP.</p> <p>Construction traffic from the Proposal is not expected to adversely impact through traffic on Moorebank Avenue, including along the Moorebank Avenue diversion road. Additional information relating to construction traffic impacts and the mitigation of these impacts is provided in Section 7 and Appendix K of this EIS.</p>	Short-term negative
Noise and vibration	<p>Construction activities have the potential to generate increased levels of noise and vibration at nearby sensitive receivers.. Noise emissions during construction of the Proposal are expected to comply with the relevant construction noise guidelines during all works periods at all receivers with the exception of OOH Period 2. Construction works within OOH Period 2 are predicted to exceed the noise management levels by up to 1dBA; however, this exceedance is considered to be, short term and negligible and would not warrant additional mitigation.</p> <p>Given the setback distances to nearby sensitive receivers, any ground vibrations arising from the construction of the Proposal would be significantly below the relevant guideline criteria for human comfort and structural damage.</p> <p>Additional information regarding the potential noise and vibration impacts associated with the Proposal is provided in Section 8 and Appendix L of this EIS.</p>	Short-term, negligible

Impact	Description	Unmitigated impact
Air quality	<p>Vegetation clearance, the importation of general fill for bulk earthworks and general construction activities associated with the Proposal have the potential to generate dust.</p> <p>In addition, the operation of diesel-powered construction plant and equipment would potentially result in an increase in NO_x emissions.</p> <p>Modelling results for construction of the Proposal indicate that all activities would comply with relevant impact assessment criteria. Additional information regarding the potential noise and vibration impacts associated with the Proposal is provided in Section 9 and Appendix M of this EIS.</p>	Short-term negative
Visual amenity	<p>During construction, plant and equipment including piling rigs and cranes are likely to be visible from residential dwellings and recreational areas in nearby suburbs, such as Wattle Grove and Casula. Visual impacts related to construction equipment will be localised and temporary in nature.</p>	Short-term negative
Cumulative impact	<p>The construction of the Proposal concurrently with the MPE Stage 1 Proposal, MPW Stage 2 Project, and other planned proposals in the local area may have a cumulative impact on the surrounding community. The majority of cumulative impacts assessed would not result in significant additional impacts or exceedance of relevant criteria. There would be some cumulative impacts to visual amenity and to traffic along the local road network; however, these would be temporary and managed in accordance with the CTMP to be prepared for the Proposal and implemented as part of the CEMP.</p> <p>An assessment of cumulative construction impacts associated with the Proposal is provided in Section 19 of this EIS. Cumulative construction traffic impacts have been detailed in Section 7 and Appendix K of this EIS. An assessment of the visual impacts associated with construction of the Proposal is provided in Section 15 and Appendix</p>	Slight short term negative

In general, construction related socio-economic impacts generated by the Proposal would be temporary in nature, localised and would be able to be appropriately managed through the implementation of the mitigation measures provided in Section 21 (Compilation of mitigation measures).

Operation

The operation of the Proposal has the potential to generate both beneficial and adverse socio-economic impacts. The long-term positive impacts are generally more likely to be experienced at a regional level, while the short-term direct impacts (both positive and negative) are likely to be more localised to nearby suburbs, including Moorebank, Wattle Grove, Glenfield and Casula.

The potential socio-economic impacts related to the operation of the Proposal are summarised in Table 20-25.

Table 20-25 Summary of social and economic impacts - operation

Impact	Description	Unmitigated impact
Economic		
Employment	<p>The Proposal would provide employment opportunities associated with the operation and maintenance of the warehouse and distribution facilities, of both skilled and unskilled in nature. It is estimated the Proposal will result in the generation of approximately 1,408 employment positions.</p> <p>As technical and trades profession are in the top three professions for the local and regional area (based on ABS data), it is anticipated that the majority of employees and contractors to be employed for the operation of the Proposal would live in the local and regional area</p>	Significant, long term, direct and indirect positive impacts
Local and regional economic development	<p>A range of direct and indirect business impacts associated with the Proposal are expected.</p> <p>The development of the Proposal would involve a capital investment of \$454,020,000 (excl. GST). It is expected that a proportion of the Proposal's expenditure would occur in the local area; increasing demand for local goods and services, having an indirect increase in employment and injecting funds into the local economy.</p> <p>Direct impacts would include the provision of goods and services of nearby businesses to support the operation of the Proposal. Indirect impacts would be associated with increased trade due to the presence of additional operational employees particularly for nearby commercial and retail businesses.</p> <p>There is the potential for the freight village to result in additional competition for local, established businesses near the Proposal, which may result in a reduction in trade. However, as the potential tenants to be established within the freight village are currently unknown, the potential impacts associated with the freight village cannot be quantified. Further, given the scale of the Proposal, significant, adverse business impacts are not anticipated.</p>	Long term, direct and indirect positive impacts
Social		
Community perception	The public perception of the Proposal may include uncertainty and concerns regarding the nature of the Proposal and its potential impact. This may result in stress and anxiety towards the Proposal. A community information and awareness strategy would be prepared for the Proposal to aid in minimising uncertainty regarding the operation of the Proposal.	Negative impact
Traffic and transport	The Proposal would provide warehouse and distribution facilities in south-western Sydney which, when combined with the operation of the MPE Stage 1 IMT, would result in a reduction in freight related road traffic around Port Botany and along the M5 Motorway.	Positive long term impact

Impact	Description	Unmitigated impact
	An assessment of traffic impacts from the operation of the Proposal found that the Proposal would result in a slight increase to traffic numbers along Moorebank Avenue near the Proposal; however, key intersections would continue to operate at a comparable / better level of service with the implementation of proposed upgrades along Moorebank Avenue (refer to Section 7 and Appendix K for more information).	Negligible
Noise and vibration	Noise impacts from the operation of the Proposal are expected to be relatively low, and within acceptable industrial noise criteria throughout the operation of the Proposal. Predicted noise levels at all sensitive receivers have been modelled as part of a noise and vibration assessment for the Proposal. Modelling results have demonstrated that the relevant sleep disturbance screening levels at sensitive receivers would not be exceeded during operation of the Proposal (refer to Section 8 and Appendix L of this EIS).	Negligible
Air quality	Air quality impacts during operation of the Proposal would mainly be generated by warehouse heating and cooling and the operation of warehouse forklifts around the Proposal site. Dispersion modelling predictions indicate that the incremental increase in key pollutants (PM ₁₀ and PM _{2.5}) at the surrounding residential areas would be largely indistinguishable from the existing background ambient air quality levels (refer Section 9 and Appendix M of this EIS).	Negligible
Human health	<p>There are no significant adverse health effects expected at nearby sensitive receivers as a result of short-term and long-term exposure to key air pollutants associated with the operation of the Proposal, and cumulatively with the operation of the MPE Stage 1 Proposal and MPW Stage 2 Project.</p> <p>Predicted noise emissions from the operation of the Proposal and when considered cumulatively with the operation of the MPE Stage 1 Proposal and MPW Stage 2 Project would comply with the WHO community noise guidelines at all residential receivers. Additional information regarding potential health impacts associated with the Proposal is provided in Section 10 and Appendix N of this EIS.</p> <p>The generation of employment within the region would provide health benefits through the improvement of the socio-economic status of the area.</p>	Negligible
Visual amenity and light spill	<p>The visual impacts of the built form of the Proposal are considered to be low, with limited and highly localised impacts (refer to Section 15 and Appendix R of this EIS). The lighting design for the Proposal has been selected to result in minimal light spill on the surrounding area.</p> <p>The Proposal is considered to be consistent with the existing character of the area</p>	Slight long term negative impact
Locational of the Proposal	Moorebank has been identified in State and National strategic policy and planning documents as the preferred location for IMTs and warehouse and distribution facilities. The Proposal site is in close proximity to the freight rail network and M5, M7 and Hume Highway connections. In	Positive long term impact

Impact	Description	Unmitigated impact
	terms of employment, the Proposal would benefit Sydney's South Western subregion.	
Crime	The Proposal would be self-contained, enclosed and secure and the principles of Crime Prevention Through Environmental Design initiatives would be implemented across the Proposal site, where reasonable and feasible. Natural and electronic surveillance would be installed throughout the Proposal site, and a security fence would restrict access to the Proposal. Crime within the Proposal site would therefore be prevented to the greatest extent possible.	Negligible
Cumulative impacts	The operation of the Proposal concurrently with the MPE Stage 1 Proposal, MPW Stage 2 Project, and other planned proposals in the local area may have a cumulative impact on the surrounding community. Most cumulative impacts assessed would not result in significant additional impacts or exceedance of criteria and no additional mitigation measures were identified (Section 22).	Negligible

20.5.5 Mitigation measures

Mitigation measures have been identified throughout this EIS to avoid, minimise and mitigate potential environmental impacts that may result from the construction and operation of the Proposal, and inherently, the associated socio-economic impacts that may result. A compilation of mitigation measures for the Proposal is provided in Section 21. Mitigation measures,

Construction

- Key stakeholders and the community would be consulted with regularly throughout construction of the proposal in accordance with the consultation strategy prescribed in Section 6 of this EIS.
- A range of measures to mitigate the construction impacts associated with air quality impacts, noise and vibration, visual amenity and health impacts are proposed and included in this EIS. A summary of mitigation measures to be implemented is provided in Section 22 of this EIS.
- A community information and awareness strategy would be included in the CEMP and would outline measures to maintain communication with the community and all relevant stakeholders throughout the construction process of the Proposal.

Operation

- The Operational Environmental Management Plan (OEMP) would include measures to engage with stakeholders and to manage and respond to feedback received during the operation of the Proposal.
- A range of measures would be implemented throughout the operation of the Proposal to minimise and mitigate operational impacts, including measures specific to the management of traffic and transport, noise and vibration, air quality human health and visual amenity-related impacts. A summary of mitigation measures to be implemented is provided in Section 21 of this EIS.

This page has been left blank intentionally

21 ENVIRONMENTAL RISK ANALYSIS

An environmental risk analysis (ERA) has been undertaken to identify the key environmental impacts associated with construction and operation of the Proposal, as identified in Sections 7 to 20 above, and assign a risk ranking to each issue, before and after the application of the mitigation measures identified. The ERA has been undertaken to address the SEAR in relation to environmental risk, which is shown in Table 21-1.

Table 21-1 SEARs (Environmental Risk Assessment)

SEARs	Where addressed
General Requirements	
The EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional environmental impacts are identified through this risk analysis, an appropriately detailed impact assessment of the additional environmental impacts shall be included as part of the Development Application.	Section 20.3

This Section outlines the ERA undertaken for the MPE Concept Plan Approval and contains the ERA undertaken for the Proposal.

21.1 Concept Plan Assessment

An ERA was undertaken for the MPE Concept Plan Approval, which identified:

- Potential environmental impacts associated with the Proposal, environmental performance criteria and development standards
- Control measures and significant residual impacts
- The nature and extent of environmental impacts likely to remain after the implementation of control measures.

The ERA identified and assessed the potential environmental impacts associated with the MPE Project and assigned a risk ranking to each of the impacts identified. Each of the potential environmental impacts were initially ranked between low and very high based on the environmental impacts that could potentially result if the issue was unmitigated.

Mitigation measures to reduce the risks, as identified in the specialist studies undertaken for the MPE Concept Plan Approval, were applied to each impact and a residual risk ranking was assigned. The ERA found that, with the application of the proposed mitigation measures, no environmental impact was ranked as 'very high' and accordingly, no unacceptable risks associated with the MPE Project were identified once the mitigation measures had been applied. As such, no additional assessments were deemed necessary.

21.2 Methodology

An assessment of environmental risk associated with the Proposal has been undertaken to identify the residual environmental risk, once the mitigation measures identified for each environmental aspect have been applied. The ERA aims to assign a qualitative environmental risk category to each issue. For consistency, the methodology used in the MPE Concept Plan Approval has been adopted.

Table 21-2 provides the risk categories used to guide the identification of an appropriate risk rating.

Table 21-2 Risk analysis categories and criteria for risk rating

Likelihood	Consequence				
	1 – Not significant	2 – Minor	3 – Moderate	4 – Major	5 – Severe
A – Almost certain	Moderate	Moderate	High	Very High	Very High
B – Likely	Low	Moderate	High	Very High	Very High
C – Possible	Low	Low	Moderate	High	High
D – Improbable	Low	Low	Low	Moderate	Moderate
E – Rare	Low	Low	Low	Low	Moderate

Risk category is determined on the basis of consideration of the likelihood of an impact occurring and the consequences of the impact occurring. The criteria for evaluating likelihood and consequence are identified in Table 21-3 and Table 21-4 respectively.

Table 21-3 Criteria for evaluating likelihood

Level	Descriptor	Description	Frequency of Occurrence
A	Almost Certain	Is expected to occur in most circumstances	Once per month
B	Likely	Will probably occur in most circumstances	Between once a month and once a year
C	Possible	Might occur at some time	Between once a year and once in five years
D	Improbable	Could occur at some time	Between once in five years and once in 20 years
E	Rare	May occur in exceptional circumstances	Once in more than 20 years

Table 21-4 Criteria for evaluating consequence

Level	Category	Safety	Financial	Operational	Environmental	Community
1	Not Significant	No medical control	<\$250,000	<6 hrs track closure or disruption to facility operations	Release to the environment immediately contained. No impact on native vegetation/fauna species	No community or stakeholder complaints
2	Minor	Lost time injury occurs or medical control required	≥\$250,000 but less than \$2M	≥6 hrs but less than 24 hrs track closure or disruption to facility operations	Release to environment contained with internal assistance. Short term impact on PCT vegetation/fauna habitat – no threatened species or community impacted	Several community or stakeholder complaints. Complaints rectified within adequate timeframes
3	Moderate	Serious injury occurs	≥\$2M but less than \$10M	≥24 hrs but less than 48 hrs track closure or disruption to facility operations	Release to the environment and contained with external assistance. Impact to PCT vegetation/fauna habitat requiring action to correct OR minor impact to threatened species or communities	Multiple and sustained community or stakeholder complaints. Complaints addressed after an interval. Limited media coverage of issues raised
4	Major	Single fatality occurs	≥\$10M but less than \$50M	≥2 days but less than 5 days track closure or disruption to facility operations	Pollution event with short-term detrimental effect. Short term impact on threatened species or communities requiring action to correct	Widespread community and stakeholder concern. Sustained failure to address complaints. Extensive media coverage
5	Severe	Multiple but	≥ \$50M	≥5 days track	Pollution event with long-term	Ongoing and

Level	Category	Safety	Financial	Operational	Environmental	Community
		localised fatalities occur		closure or disruption to facility operations	<p>detrimental effect.</p> <p>Long term impact on threatened species or communities requiring action to correct; possibly requiring the provision of offsets</p>	<p>widespread community and stakeholder concern, culminating in litigation.</p> <p>Inability to address complaints.</p> <p>Extensive and sustained negative media coverage.</p>

Each potential environmental impact was initially ranked between low and very high based on the environmental impacts that could potentially result if the issue was unmitigated.

Subsequent to this initial risk categorisation, the environmental issues identified were assigned a second risk rating to indicate the residual risk following implementation of the control measure/s that have been identified within this EIS.

21.3 Risk Assessment

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
Air Quality	Yes	Increased air pollution (PM, NO ₂ and CO) from the construction of the Proposal resulting in impacts on the environment and community.	M	The measures outlined in the Air Quality Management Plan, included in Appendix M of this EIS, would be implemented during the construction of the Proposal to control dust and other air emissions.	L	Section 9 Appendix M – Air Quality Impact Assessment
		Increased air pollution (PM, NO _x , SO ₂ , CO and VOCs) from the operation of the Proposal resulting in impacts on the environment and community.	L	The measures outlined in the Air Quality Management Plan, included in Appendix M of this EIS, would be implemented during the operation of the Proposal to minimise the generation of air emissions.	L	
Traffic and Transport	Yes	Increased traffic on local and regional roads resulting in decreased level of service at key intersections and increased risk of traffic incidents during construction.	M	A Construction Traffic Management Plan (CTMP) would be developed for the Proposal, in accordance with the measures outlined in the Preliminary Construction Traffic Management Plan (PCTMP), included in Appendix K of this EIS.	L	Section 7 Appendix K - Operational Traffic and Transport Impact Assessment Construction Traffic Impact Assessment PCTMP

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Increased traffic on local and regional roads resulting in decreased level of service at key intersections and increased risk of traffic incidents during operation.	M	<p>An Operational Traffic Management Plan (OTMP) would be developed for the Proposal in accordance with the measures outlined in the Preliminary Operational Traffic Management Plan (POTMP), included in Appendix K of this EIS.</p> <p>The recommended road infrastructure upgrades (to mitigate the traffic impacts of the Proposal) would result in network performance within an acceptable LoS with no-worsening of the performance compared to without the Proposal.</p>	L	POTMP
Noise and Vibration	Yes	Increased noise and vibration levels at adjoining receivers during construction (including nearby residential areas of Moorebank, Wattle Grove, Glenfield and Casula and sensitive land uses).	M	A Construction Noise and Vibration Management Plan would be prepared and implemented to include the appropriate control measures to avoid, reduce and manage noise emissions and vibration.	L	Section 8 Appendix L - Noise and Vibration Impact Assessment
		Increased noise and vibration caused by operation of container handling equipment and truck movements during operation of the Proposal.	M	An Operational Noise and Vibration Management Plan, or equivalent, would be prepared and implemented and would include appropriate control measures to avoid, reduce and manage noise emissions and vibration.	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
Soil and Water	Yes	Regional and local hydrological impacts including: <ul style="list-style-type: none"> ▪ Effects on flood characteristics on and off the Proposal site ▪ Loss of operations of the Proposal due to flooding 	H	On site detention basins (OSDs) have been sized to limit peak discharges from the Proposal site to no greater than under existing conditions.	L	Section 11 Appendix P – Stormwater and flooding environmental impact assessment
		Reduced surface water and stormwater quality resulting in impacts to the environment.	M	Water Sensitive Urban Design (WSUD) measures have been identified to ensure that the Proposal would have a neutral or beneficial effect on the quality of stormwater leaving the site.	L	
		Increased erosion during construction (on and off the Proposal site) resulting in impacts to the environment	H	A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP) would be developed and implemented. Including appropriate control measures to minimise impacts upon water quality.	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
Aboriginal Heritage	Yes	Unexpected damage and/or destruction of Aboriginal heritage items of significance	L	<p>Aboriginal heritage would be managed through the CEMP for the Proposal. The CEMP would include:</p> <ul style="list-style-type: none"> ▪ A summary of the findings of the Aboriginal Heritage Impact Assessment Report ▪ guidance on unexpected archaeological and cultural finds (including human remains). 	L	<p>Section 16</p> <p>Appendix S –</p> <p>Aboriginal heritage impact assessment report</p>

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
Historic Heritage (non-indigenous heritage)	Yes	Damage and/or destruction of non-Indigenous heritage items of significance	H	<p>Impacts to historic heritage items on the Proposal site would be managed in accordance with the Non-indigenous heritage impacts assessment.</p> <p>A Heritage Interpretation Strategy should be prepared prior to the commencement of construction outlining appropriate interpretive measure for the Stage 2 site in the context of the MPE site as a whole.</p> <p>A Heritage Management Plan in adherence to NSW Heritage Council guidelines would be prepared as part of the Construction Environment Management Plan (CEMP) for the Proposal.</p> <p>Unexpected finds would be managed in accordance with the Non-indigenous heritage impacts assessment.</p>	H	Section 17 Appendix T – Non-Indigenous heritage impact assessment
Visual Amenity, Urban Design and Landscape	Yes	Negative change in visual character of the Proposal site, impacting the community.	M	The Proposal would be developed in accordance with a landscape management plan that reinforces the surrounding natural context and integrates the site with its broader environment.	L	Section 15 Appendix E - Landscape design statement and plans Appendix R – Visual impact assessment and light spill study report

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
Biodiversity	Yes	Environmental impacts resulting from the loss of riparian vegetation due to installation of the southern drainage swale at Anzac Creek	L	A Flora and Fauna Management Plan would be prepared as part of the CEMP for the Proposal. This would comprise measures for construction works within riparian areas and would be consistent with the measures outlined in the Biodiversity assessment report (Appendix O, of this EIS)	L	Section 11 Appendix O – Biodiversity assessment report (BAR)
		Environmental impacts resulting from the permanent loss of threatened flora and fauna species habitat and threatened communities due to vegetation clearance and the installation of infrastructure on the Proposal site.	L	The Proposal would comprise limited clearing of native vegetation within the development site, including fragmented and isolated patches of threatened ecological communities. Construction and operational activities would be undertaken in accordance with the measures identified in the BAR (Appendix O of this EIS) that would form part of the CEMP and OEMP for the Proposal. Offsets would also be provided for vegetation removal required for the Proposal (refer Appendix O of this EIS).	L	
		Environmental impacts resulting from the inadvertent removal and/or modification of areas containing populations, endangered ecological communities and/or habitat for threatened species	M	A Flora and Fauna Management Plan would be prepared as part of the CEMP for the Proposal. Native vegetation clearing would not occur until the Flora and Fauna Management Plan is approved. The threatened plant populations identified to the south of the Proposal site	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
				<p>would be protected by a minimum 10 metre buffer between the edge of the area of occupied habitat and the proposed works.</p> <p>Fencing would be installed where relevant to clearly define the limits of the construction area so as to not encroach on vegetated areas outside of the Proposal site.</p> <p>Works would be undertaken in accordance with the measures identified in the BAR (Appendix O of this EIS).</p>		
		<p>Environmental impacts resulting from the collective loss of vegetation and fauna habitat across the landscape, as a result of removal and/or modification of native vegetation and fauna habitat.</p> <p>Vegetation clearing (including riparian areas) and loss and fragmentation of foraging, nesting and roosting areas.</p>	M	All vegetation removal works and works within riparian areas would be undertaken in accordance with the methods prescribed in the BAR (Appendix O of this EIS), including provision of offsets.	L	
		Environmental impacts resulting from the loss of hollow bearing trees and fauna habitat.	M	Clearing of hollow bearing trees would be undertaken in accordance with the BAR.	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Environmental impacts resulting from the permanent loss of biodiversity due to changes in hydrological function of the Proposal site and lowering of water quality, including potential impacts to groundwater dependent ecosystems.	M	<p>Design of on-site water retention to facilitate discharges to receiving waterways would have a neutral or beneficial impact on water quality.</p> <p>Installation of appropriate onsite detention (OSDs) drainage infrastructure, sediment and erosion controls would occur, to manage surface waters.</p> <p>Gross Pollutant Traps and Rain gardens (bio-retention systems) would be installed in the base of the OSDs proposed to capture and store stormwater. This would consist of bio-filtration layers, planting and subsoil collection and drainage.</p>	L	
		Environmental impacts resulting from the impacts on aquatic biodiversity due to changes in hydrological function of the Proposal site and lowering of water quality during construction.	M	<p>Installation of sediment basins and sediment fences as per the Stormwater and Flooding Environmental Assessment (Appendix P of this EIS).</p> <p>Development of an Erosion and Sediment Control Plan (ESCP) and Soil and Water Management Plan (SWMP) for management of construction activities.</p> <p>Development of spill management and incident response measures.</p>	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Environmental impacts resulting from the loss of biodiversity due to weed infestation.	M	The FFMP and Operational Environmental Management Plan (OEMP) would contain a section relating to the monitoring, management and where necessary eradication of weeds, disposal of green waste, and vehicle/plant weed wash down protocols if required and outline the measures that will be adopted to undertake these works in accordance with the <i>Noxious Weeds Act</i> 1993. Management of weeds in and adjacent to cleared areas will occur in accordance with the FFMP and OEMP.	L	
Contamination (soils, geology and contamination)	Yes	<p>Migration of contamination offsite as a result of the Proposal, resulting in impacts on the environment and community.</p> <p>Exposure of site workers to contamination resulting in safety incidents.</p>	M	Excavation works on the Proposal site would be minimal and the likelihood of intercepting groundwater is considered low. A Construction Environmental Management Plan (CEMP) would be prepared prior to commencement of construction that would as a minimum identify processes to be followed in the event of an unexpected find of contamination.	L	Section 13 Appendix Q - Geotechnical interpretive report and contamination summary report

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Contamination of soils and groundwater due to spills during operation of the Proposal, resulting in impacts to the environment.	L	<p>A Contamination Management Plan would be developed for construction of the Proposal in accordance with the measures outlined in the SAS, Site Audit Report (SAR) and EMP (GHD, 2016) and incorporated into the CEMP</p> <p>The Operational Environmental Management Plan (OEMP) would include an Emergency Response Plan (ERP), including a Pollution Incident Response Management Plan (PIRMP), and a refuelling procedure that would specify procedures to follow in the event of a spill and refuelling, to prevent contamination.</p>	L	
		Discovery of UXO or explosive ordnance waste (EOW) during construction	L	A site-wide UXO, EO, and EOW management plan (or equivalent) would be developed for the Proposal site.	L	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Inappropriate disposal of waste materials excavated from the Proposal site and handling of material to be reused on the site, resulting in impacts on the environment and safety for site workers.	M	<p>The Bulk Earthworks Strategy would be progressed by the construction contractor and would outline material handling processes and stockpiling areas.</p> <p>Material requiring disposal to be subject to waste classification under the <i>Waste Classification Guidelines 2014</i> (NSW EPA, 2014) and would be disposed of at an appropriate licensed facility.</p> <p>A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plans (ESCP) will be implemented for the construction of the Proposal in accordance with the principles and requirements of the Blue Book and generally align with the concepts presented in the Preliminary Erosion and Sediment Control Plans.</p>	L	
Hazards and Risks	Yes	Environmental and community impacts from the release of hazardous materials and dangerous goods	M	All goods at the Proposal site would be managed in accordance with the Code of Practice for storage and handling of dangerous goods (WorkCover NSW, 2005) and Model Code of Practice - Labelling of Workplace Hazardous Chemicals (Safe Work Australia 2011), as a minimum.	L	Section 14

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Safety impacts, resulting from the exposure of workers to asbestos during demolition works	H	Prior to the commencement of construction, an Asbestos Management Plan would be developed for the Proposal in accordance with the Code of Practice: How to Manage and Control Asbestos in the Workplace (WorkCover NSW, 2011)	M	
Waste	No	Management of demolition waste, including asbestos containing material	M	Measures to minimise waste would be included within the CEMP and OEMP for the Proposal, in accordance with the recommendations in this EIS.	L	Section 20.1
		Use of resources and generation of construction waste	M		L	
		Use of resources and generation of operational waste	L		L	
Bushfire Management	No	Risk of bushfire impacting the Proposal site and construction compounds, posing safety risk to workers.	M	Design of the Proposal conforms to the management principles identified in <i>Planning for Bushfire Protection</i> (NSW RFS, 2006).	L	Section 19 Appendix U –

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Increased risk of bushfire ignition from construction activities and operation of the Proposal.	M	A Bushfire Management Strategy would be developed for both the construction and operational phases of the Proposal as part of the CEMP and OEMP. Appropriate buffer zones would be established and maintained.	L	Bushfire protection assessment
Property and Infrastructure	No	Increase on service demand, capacity and augmentation of existing and proposed utilities and infrastructure as a result of the Proposal.	M	The existing infrastructure would have sufficient capacity to service the estimated increase in utility demands for the Proposal, either with augmentation or in its current condition	L	Section 20.3 Appendix F – Utilities and servicing strategy
Socio-economic	No	Disruption to the community during construction.	M	A community information and awareness strategy would be included in the CEMP, which would provide for maintaining communication with the community and all relevant stakeholders throughout the construction process.	L	Section 20.5
		Community concern over impacts on environmental and health impacts associated with operation of the Proposal.	H	A community information and awareness strategy would be included in the OEMP, which would enable community members to access information and provide feedback regarding the operation of the Proposal. Measures identified in the Compilation of Mitigation Measures (Section 22 of this EIS)	M	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Employment generation and injection of significant capital into local and regional economy.	L	Employment of local people and use of goods and services from local and regional suppliers would be prioritised.	L	
Human Health	No	Increase in morbidity and mortality.	L	Mitigation measures prescribed within Section 8 (for Noise) and 9 (for Air Quality) of this EIS respectively are to be implemented to further reduce the air and noise impacts generated as a result of the operation of the Proposal.	L	Section 10 Appendix N – Health risk assessment
Greenhouse Gas and Climate Change	No	Increase in greenhouse gas emissions as a result of construction and embodied emissions in materials used	L	Greenhouse gas emissions associated with the Proposal are considered to be negligible. A Greenhouse Gas (GHG) Management Plan would be developed and implemented to include appropriate control measures during the construction and operation of the Proposal. This would include consideration of materials selection to minimise embodied greenhouse gases. Mitigation measures identified for the management of Greenhouse Gas (GHG) emissions during construction would be incorporated into the CEMP.	L	Section 18 Appendix V – Greenhouse gas and climate risk
		Potential net increase in direct and indirect greenhouse gas emissions as a result of operation.	H	Mitigation measures identified for the management of GHG emissions during operations would be incorporated into the OEMP.	M	

Issue	SEARs /Key Issue?	Potential impacts	Risk ranking – Pre-mitigation	Mitigation	Risk ranking – Post-mitigation	Reference
		Increased extreme weather events, including heat waves and flooding impacting the proposal	M	Incorporation of adaptation responses into the final design and operational procedures.	L	
Cumulative Impacts	No	Cumulative impacts on the environment and community as a result of works associated with the construction and operation of the MPE Stage 1 Proposal and the Proposal and the MPW Project.	L	Assessments on the cumulative impacts of traffic, air quality, noise and health for the scenario whereby the construction/operation of the MPW and MPE Stage 1 Proposal occurs concurrently with the construction/operation of the Proposal identified minor cumulative impacts. Impacts would be managed through the implementation of mitigation measures and plans outlined with this EIS.	L	Section 19 Appendix M - Air Quality Impact Assessment Appendix L - Noise and Vibration Impact Assessment Appendix N - Health Impact Assessment Appendix L - Transport and Traffic Impact
		Environmental impacts resulting from the loss of biodiversity on both the Proposal site and the MPW site.	L	A Biodiversity Offset Strategy would be prepared for the Proposal as detailed in the BAR (Appendix O).	L	Section 19 Appendix O - Biodiversity Assessment Report Biodiversity Offset Strategy

This page has been left blank intentionally

22 COMPILATION OF MITIGATION MEASURES

The EIS for the Proposal has identified a range of environmental impacts and recommended management and mitigation measures to avoid, remedy or mitigate these impacts (refer to Sections 7 – 20 of this EIS). This compilation of mitigation measures has been provided to satisfy Schedule 2, Part 3, clause 7(1)(e) of the EP&A Regs 2000.

The mitigation measures provided below recognise that the Proposal would also need to comply with the MPE Concept Plan Approval (CoA and SoCs) as relevant, and therefore avoid repetition where possible.

This Section presents a summary of the measures which would be implemented, either prior to construction, during construction or during operation. These draft mitigation measures may be revised in response to public submissions to the EIS and/or design changes following the public exhibition of this EIS. The final Compilation of Mitigation Measures would form part of a post submissions response for the Proposal.

The draft Compilation of Mitigations Measures for the Proposal is provided in Table 22-1.

The 'implementation stage' column of Table 22-1 details the timing as to when the specific mitigation measures would be implemented. For example, a CEMP may be prepared prior to construction, but would not be 'implemented' until the construction phase. The 'applicability column' details the relevance of mitigation measures to relevant components of the Proposal, including warehousing, freight village and Moorebank Avenue upgrade.

For the purpose of this Compilation of Mitigations Measures, the following definitions apply to the terms used in the implementation phase column:

- Detailed design - works and design progression prior to construction of the associated permanent physical works for the Proposal
- Pre-construction – initial stage of physical works for the Proposal, which are not included within the definition of construction and within Works period A
- Construction – during construction of all permanent physical works for the Proposal (Works periods B - G)
- Operation - either prior to, or during, operation of the Proposal

Table 22-1 Consolidated list of mitigation measures

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
0.	General environmental management				
0A	<p>Pre-construction works would be undertaken subject to the preparation of an Environmental Work Method Statement (EWMS) or equivalent. Pre-construction works include the following:</p> <ul style="list-style-type: none"> works within Works period A (preconstruction activities), including: <ul style="list-style-type: none"> Establishment of site access points Importation of fill for site preparation activities Installation of site fencing Remediation, where required. survey; acquisitions; or building/ road dilapidation surveys; fencing; investigative drilling, excavation or salvage clearing any native vegetation within the Proposal site, with the exception of the southern and eastern swales located outside of the SIMTA site establishment of site compounds and construction facilities installation of environmental mitigation measures utilities adjustment and relocation that do not present a significant risk to the environment, as determined by the Environmental Representative other activities determined by the Environmental Representative to have minimal environmental impact all works as described in Works period A in Section 4 of this EIS 	Pre-Construction	Y	Y	Y
0B	The Construction Environmental Management Plan (CEMP), or equivalent, for the Proposal would be based on the PCEMP (Appendix G of this EIS), and include the following preliminary management plans:	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Preliminary Construction Traffic Management Plan (PCTMP) (Appendix K of this EIS) Air Quality Management Plan (AQMP) (Appendix M of this EIS) Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans (Appendix P of this EIS). <p>As a minimum, the CEMP would include the following sub-plans:</p> <ul style="list-style-type: none"> Construction Traffic Management Plan (CTMP) Construction Noise and Vibration Management Plan (CNVMP), prepared in accordance with the <i>Interim Construction Noise Guideline</i> Construction Air Quality Management Plan Flora and Fauna Management Plan A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan Contamination Management Plan Flood Emergency Response and Evacuation Plan UXO, EO, and EOW Management Plan Asbestos Management Plan Heritage (Indigenous and Non-Indigenous) Management Plan/s Bushfire Management Strategy Community Information and Awareness Strategy. 				
0C	<p>The Operational Environmental Management Plan (OEMP), or equivalent, for the Proposal would be based on the following preliminary management plans:</p> <ul style="list-style-type: none"> Preliminary Operational Traffic Management Plan (POTMP) (Appendix K of this EIS) Air Quality Management Plan (Appendix M of this EIS) 	Operation	Y	Y	N

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Stormwater Drainage Design Drawings (Appendix P of this EIS) <p>As a minimum the OEMP would include the following sub-plans:</p> <ul style="list-style-type: none"> Operational Traffic Management Plan (OTMP) Operational Noise and Vibration Management plan (ONVMP) Air Quality Management Plan Flora and Fauna Management Plan Flooding and Emergency Response Plan Emergency Response Plan in accordance with the requirements of Clause 153C of the POEO Act and the POEO (General) Regulation (Cl. 98B) Operational Hazard and Risk Management Plan Bushfire Management Strategy Community Information and Awareness Strategy. 				
0D	The construction and/or operation of the Proposal may be delivered in a number of stages. If construction and/or operation is to be delivered in stages a Staging Report would be provided to the Secretary prior to commencement of the initial stage of construction and updated prior to the commencement of each stage as that stage is identified.	Construction and Operation	Y	Y	Y
1.	Traffic and Transport				
1A	A Construction Traffic Management Plan (CTMP) would be prepared, based on the PCTMP prepared as part of this EIS (refer to Appendix K of this EIS). It is intended that the PCTMP would be further progressed and integrated into the CEMP for the Proposal for implementation by the construction contractor for the duration of construction. The CTMP would detail the management controls to be implemented to avoid, minimise and mitigate impacts of construction of the Proposal to traffic performance on the surrounding road network, pedestrian and cyclist access, and the amenity of the surrounding environment and would include the following key initiatives:	Construction	Y	Y	Y

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Review of speed restrictions along Moorebank Avenue and additional signposting of speed limitations to reinforce reduced speed limits during construction of the Proposal Restriction of haulage routes through signage and education to ensure, where possible, that construction vehicles do not travel through nearby residential areas to access the Proposal site, in particular Moorebank (Anzac Road) or the Wattle Grove residential areas Inform local residents (in conjunction with the Community Information and Awareness Strategy) of the proposed construction activities and road access restrictions that the construction traffic must adhere to and establish communication protocols for community feedback on issues relating to construction vehicle driver behaviour and construction related matters Installation of specific warning signs on approach to, and at entrances to, the construction site to warn existing road users of entering and exiting construction traffic Establishing pedestrian exclusion zones and walking routes/crossing points which integrate within the existing pedestrian network Distribution of day warning notices to advise local road users of scheduled construction activities and associated traffic movements. Installation of appropriate traffic controls and warning signs for areas identified where potential safety risk issues exist The promotion of car-pooling for construction staff and other shared transport initiatives during the construction phase Management and coordination of the transportation of materials to maximise vehicle loads and therefore minimise vehicle movements Monitoring of traffic on Moorebank Avenue during peak periods to ensure that queuing at intersections does not impact on other road users Reducing, where reasonable and feasible, the volumes of construction vehicles travelling during peak periods, especially if the increase in traffic generated by construction activities impedes on the operation of Moorebank Avenue 				

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
1B	A road Safety Audit on Cambridge Avenue to be undertaken prior to the commencement of the construction of the Proposal to identify the traffic safety risks and determine appropriate mitigations.	Construction	Y	Y	Y
1C	<p>Moorebank Avenue would be upgraded for approximately 1.4 kilometres from approximately 95 metres south of the northern boundary of the MPE site to approximately 120 metres south of the southern MPE site boundary. The following intersections would also be upgraded as part of the Proposal:</p> <ul style="list-style-type: none"> Moorebank Avenue / MPE Stage 2 Moorebank Avenue / MPE Stage 1 northern access Moorebank Avenue / MPE Stage 1 central access Moorebank Avenue / MPE Stage 1 southern emergency access. <p>The funding of these upgrades would be clarified through discussions with SIMTA, Roads and Maritime and Transport for NSW.</p>	Construction and Operation	Y	Y	Y
1D	<p>A Preliminary Operational Traffic Management Plan (POTMP) has been prepared as part of this EIS (refer to Appendix K of this EIS). It is intended that the POTMP would be further progressed and integrated into the OEMP for the Proposal. Specifically, the following key aspects would be addressed in the OTMP:</p> <ul style="list-style-type: none"> Heavy vehicle route management Safety and amenity of road users and public Congestion management on Moorebank Avenue Road user delay management Information signage, distance information and advance warning Driver code of conduct Incident management Traffic monitoring. 	Operation	Y	Y	N

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
1E	Bicycle and end of trip facilities would be provided in accordance with the <i>City of Sydney Section 3 – General Provisions</i> .	Operation	Y	Y	Y
1F	Consultation would be undertaken with relevant bus provider(s) regarding the potential to extend the 901 bus service (or equivalent) and additional regular service bus stops with the aim of maximising public transport accessibility to, from and within the Proposal site.	Operation	Y	Y	Y
2.	Noise and Vibration				
2A	<p>A Construction Noise and Vibration Management Plan (CNVMP), or equivalent, would be prepared for the Proposal in accordance with the <i>Interim Construction Noise Guideline</i> (DECC, 2009) (or equivalent), and will include the following:</p> <ul style="list-style-type: none"> • Identification of nearby residences and other sensitive land uses • Description of approved hours of work • Description and identification of construction activities, including work areas, equipment and duration • Description of what work practices (generic and specific) will be applied to minimise noise and vibration • Consider the selection of plant and processes with reduced noise emissions • A complaints handling process • Noise and vibration monitoring procedures • Overview of community consultation required for identified high impact works • Induction and training will be provided to relevant staff and sub- contractors outlining their responsibilities with regard to noise • Procedure for approval of any works undertaken outside of the following hours: <ul style="list-style-type: none"> - Standard hours of 07:00 am to 18:00 pm Monday to Friday, and 08:00am to 13:00 pm Saturday, 	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> - Out of hours (OOH) work periods of OOH Period 1 is 6:00am – 7:00am weekdays; OOH Period 2 is 6:00pm – 10:00pm weekdays; OOH Period 3 is 7:00am – 8:00am Saturday; and OOH Period 4 is 1:00pm – 6:00pm Saturday. 				
2B	<p>Any works undertaken outside of the hours prescribed in mitigation measure 2A would be undertaken in consultation with relevant authorities. Works outside these hours that may be permitted would include:</p> <ul style="list-style-type: none"> • Any works which would not result in audible noise emissions at any nearby sensitive receptors. • The delivery of oversized plant and/or structures that police or other authorities determine require special arrangements to transport along public roads • Emergency work to avoid the loss of lives, property and/or to prevent environmental harm • Maintenance and repair of public infrastructure where disruption to essential services and/or consideration of worker safety do not allow work within standard construction hours. • Public infrastructure works that shorten the length of the project and are supported by noise-sensitive receivers. • Construction works where it can be demonstrated and justified that these works are required to be undertaken outside of standard construction hours. • Any other work as approved through the CNVMP. 	Construction	Y	Y	Y
2D	In the event of any noise or vibration related complaint or adverse comment from the community, noise and ground vibration levels (as relevant) would be investigated. Remedial action would be implemented where feasible and reasonable. The procedures for managing complaints would be provided within the Community Information and Awareness Strategy.	Construction and operation	Y	Y	Y
2E	An Operational Noise Management Plan (ONMP) would be prepared which includes a framework for regular monitoring of operational noise. Monitoring would begin at the commencement of the operation of the Proposal and would	Operation	Y	Y	N

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	be conducted on an annual basis for up to 2 years (after commencement of operations of the Proposal).				
3.	Air Quality				
3A	<p>The Air Quality Management Plan (Ramboll, 2016), included within Appendix M of this EIS, would be further progressed and incorporated into the CEMP for the Proposal. Specifically, the following key aspects would be addressed in the CEMP:</p> <ul style="list-style-type: none"> Procedures for controlling/managing dust Roles, responsibilities and reporting requirements Contingency measures for dust control where standard measures are deemed ineffective. 	Construction	Y	Y	Y
3B	<p>The Air Quality Management Plan (Ramboll, 2016), included within Appendix M of this EIS would be further progressed and integrated into the OEMP for the Proposal. In accordance with the Air Quality Management Plan the following key aspects would be addressed in the OEMP:</p> <ul style="list-style-type: none"> Implementation and communication of anti-idling policy for trucks Complaints line for the community to report on excessive idling and smoky vehicles Procedures to reject excessively smoky trucks visiting the site based on visual inspection. 	Operation	Y	Y	N
4.	Biodiversity				
4A	A Construction Flora and Fauna Management Plan (CFFMP) would be prepared as part of the CEMP for the Proposal. Native vegetation clearing for southern and eastern swales located outside of the MPE site would not occur until the Flora and Fauna Management Plan is approved. This would include the following:	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> • Clear identification of vegetation exclusion zones • Site induction procedure, including briefings regarding the local threatened flora and local fauna of the site and protocols to be undertaken if they are encountered • A pre-start up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials • Application of speed limits in areas adjacent to native vegetation 				
4B	The threatened plant populations identified to the south of the Proposal site would be protected by a minimum 10 metre buffer between the edge of the area of occupied habitat and the Proposal site.	Construction	Y	Y	Y
4C	Potential bat roosting locations in buildings to be demolished would be checked, as far as is practicable, by a qualified ecologist or wildlife carer for presence of bats prior to demolition. Any bats found would be relocated.	Construction	Y	Y	N
4D	<p>A two-stage approach would be undertaken to clearing:</p> <ul style="list-style-type: none"> • Remove non-hollow bearing trees at least 48 hours before habitat trees are removed. • Hollow bearing trees are to be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling. • Felled trees must be left for a short period of time on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees. • Felled hollow bearing trees must be inspected by an ecologist as soon as possible (not longer than 2 hours after felling). 	Construction	Y	Y	Y
4E	Directional lighting will be used where lighting is required in construction areas to avoid impact on fauna.	Construction	Y	Y	Y

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
4F	<p>Should any animal be injured, the relevant local wildlife rescue agency (e.g. WIRES) and/or veterinary surgery would be contacted as soon as practical.</p> <p>Until the animal can be cared for by a suitably qualified animal handler, if possible minimise stress to the animal and reduce the risk of further injury by:</p> <ul style="list-style-type: none"> • Handling fauna with care and as little as possible. • Covering larger animals with a towel or blanket and placing in a large cardboard box. • Placing small animals in a cotton bag, tied at the top. • Keeping the animal in a quiet, warm, ventilated and dark location. 	Pre-construction, construction and operation	Y	Y	Y
4G	A Flora and Fauna Management Plan would be prepared as part of the OEMP for the Proposal. This FFMP would focus on minimising impacts on biodiversity values on the adjacent Boot Land.	Operation	Y	Y	N
5.	Stormwater and Flooding				
5A	<p>A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, would be incorporated into the CEMP for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book') (Landcom, 2004) and Volume 2 (DECC 2008). and consider the Preliminary ESCPs (Appendix P of this EIS). The following aspects would be addressed within the SWMP and ESCPs:</p> <ul style="list-style-type: none"> • Construction traffic restricted to delineated access tracks, and maintained until construction complete • Appropriate sediment and erosion controls to be implemented prior to soil disturbance • Stormwater management to avoid flow over exposed soils which may result in erosion and impacts to water quality • Location of stockpiles outside of flow paths on appropriate impermeable surfaces as well as outside of riparian corridors 	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> • Inspection of all permanent and temporary erosion and sedimentation control works prior to and post rainfall events and prior to closure of the construction area • Wheel wash or rumble grid systems installed at exit points to minimise dirt on roads. 				
5B	<p>To minimise potential flood impacts as a result of construction of the Proposal, the following measures would be implemented and documented in the SWMP:</p> <ul style="list-style-type: none"> • The existing site catchment and sub-catchment boundaries would be maintained as far as practicable • To the extent practicable, site imperviousness and grades should be limited to the extent of existing imperviousness and grades under existing development conditions. 	Construction	Y	Y	Y
5C	<p>A Flood Emergency Response and Evacuation Plan, or equivalent, would be prepared and implemented for the construction phase of the Proposal to allow work sites to be safely evacuated and secured in advance of flooding occurring at the Proposal site.</p>	Construction	Y	Y	Y
5D	<p>Stormwater quality improvement devices management measures would be designed and installed on site as presented in the Stormwater and Flooding Environmental Assessment (Appendix P of this EIS), including:</p> <ul style="list-style-type: none"> • Gross Pollutant Traps (GPTs) at Section 6.2.1 • Rain gardens in the base of the OSD channels, as shown in Figure 6-1 of Appendix P of this EIS. Stormwater quality improvement devices would be designed to meet the performance targets identified in Georges River Estuary CZMP. 	Detailed design and Construction	Y	Y	Y
5E	<p>A water quality monitoring program for the operational phase of the Proposal would be prepared as part of the OEMP for the Proposal and would detail:</p> <ul style="list-style-type: none"> • The frequency and duration of sampling • Background water quality conditions 	Operation	Y	Y	N

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> • Sampling methodology • Reporting requirements <p>Water quality monitoring would be undertaken for both Anzac Creek and the Georges River and would include the following parameters:</p> <ul style="list-style-type: none"> • Total suspended solids • Total phosphorous • Total nitrogen • Oils and grease. 				
5F	A Flood Emergency Response Plan (FERP) would be developed for operational phase of the Proposal. The FERP would take into consideration, site flooding and broader flood emergency response plans for the Georges River and Anzac Creek floodplains and Moorebank area. The FERP would also include the identification of an area of safe refuge within the Proposal site that would allow people to wait until hazardous flows have receded and safe evacuation is possible.	Operation	Y	Y	N
6.	Geology, Soils and Land Contamination				
6A	Excavated material would be reused on site where possible. Any excavated material that requires disposal would be subject to waste classification under the <i>Waste Classification Guidelines 2014</i> (NSW EPA, 2014) and would be disposed of at an appropriate licensed facility.	Construction	Y	Y	Y
6B	The construction contractor would progress the Bulk Earthworks strategy (to be included within the CEMP) which would outline the volumes of imported and exported material, any buffer areas, temporary soil stockpiling areas and fencing of excavations, as required.	Construction	Y	Y	Y
6C	A Contamination Management Plan (CMP) (or equivalent) would be prepared and included within the CEMP for the Proposal. The CMP would be prepared in consideration of the outcomes of the Environmental Management Plan (GHD, 2016) and Site Audit Statement and Site Audit Report (JBS&G, 2016) and would contain procedures on the following:	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Handling, stockpiling and assessing potentially contaminated materials encountered during the development works. A management tracking system for excavated potentially contaminated materials to ensure the proper management material movements at the Proposal site, particularly during excavation Assessment, classification and disposal of waste in accordance with relevant legislation A contingency plan for unexpected contaminated materials (unexpected finds protocol), such as materials that are odorous, stained or containing anthropogenic materials, that may be encountered during construction. 				
6D	A site-wide UXO, EO, and EOW Management Plan (or equivalent) would be developed for the Proposal site. This plan would be included within the CEMP and address the unexpected discovery of UXO, EO or EOW during construction.	Construction	Y	Y	Y
6E	An Emergency Response Plan would be prepared and implemented. The plan would meet the requirements of Clause 153C of the POEO Act and the POEO (General) Regulation (Cl. 98B) and specify the procedure to be followed in the event of a spill, including the notification requirements and use of absorbent material to contain the spill. A spill kit would be provided on the Proposal site at all times.	Operation	Y	Y	N
7.	Hazard and risk				
7A	Hazards associated with operation of the Proposal would be identified through a Hazard and Operability Study (HAZOP), which would be undertaken as part of the detailed design.	Detail design	Y	Y	N
7B	<p>The following measures would be included in the CEMP (or equivalent) to minimise hazards and risks:</p> <ul style="list-style-type: none"> Construction works, including the storage, handling and use of hazardous construction materials would be undertaken in accordance with the 	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<p>provisions of the <i>Work Health and Safety Act 2011</i> and <i>Work Health and Safety Regulation 2011</i>.</p> <ul style="list-style-type: none"> All demolition activities would be undertaken in accordance with <i>Australian Standard AS2601-1991 – Demolition of Structures</i> Safe operational access and egress for emergency service personnel and workers will be provided at all times, and specified in the CEMP. Regular maintenance and inspection of all environmental and safety protection controls would be undertaken. 				
7C	<p>An Asbestos Management Plan would be prepared for the Proposal in accordance with the <i>Code of Practice: How to Manage and Control of Asbestos in the Workplace</i> (WorkCover NSW, 2011). The plan would include, but not be limited to:</p> <ul style="list-style-type: none"> Identification of potential (suspected or confirmed) asbestos areas an outline of how asbestos risks would be controlled the identification of each person with responsibilities and details of their responsibilities under this plan Reference the asbestos register and risk assessment, which would also be prepared prior to construction being undertaken. 	Construction	Y	Y	N
7D	<p>All asbestos removal works, including the demolition of the eight structures identified as containing asbestos (refer to Error! Reference source not found.) will be undertaken in accordance with the Environmental Management Plan (GHD, 2016) and the following:</p> <ul style="list-style-type: none"> The <i>Code of Practice for the Safe Removal of Asbestos</i> (NOHSC, 2005) 	Construction	Y	Y	N

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Code of Practice: How to Safely Remove Asbestos (WorkCover NSW, 2011)¹ <p>Asbestos removal would be carried out by an appropriately licensed asbestos removalist. The licencing requirements for asbestos removal as specified in the <i>Code of Practice How to Safely Remove Asbestos</i> (WorkCover NSW, 2011) are provided in Error! Reference source not found..</p>				
7E	Dangerous goods entering or leaving the Stage 2 site must be notified in advance in accordance with the International Maritime Organisation (IMO) and regulations pertaining to the International Convention for the Safety of Life at Sea (SOLAS).	Operation	Y	Y	N
7F	Handling of dangerous goods including unpacking from containers and storage within warehouses on the Stage 2 site would be undertaken in accordance with the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005).	Operation	Y	Y	N
7G	Staff involved in the transport and handling of dangerous goods within the Proposal site would receive training regarding the contents of the dangerous goods provisions and their roles and responsibilities. All training would be recorded and maintained in accordance with the appropriate competent authority (SafeWork NSW).	Operation	Y	Y	N
7H	Design, installation and maintenance of gas reticulation infrastructure would be undertaken in accordance with <i>Australian Standard AS 2944-1 (2007): Plastic pipes and fittings for gas reticulation – Polyamide pipes</i> and <i>Australian Standard AS 2944-2 (2007): plastic pipes and fittings for gas reticulation – Polyamide fittings</i> .	Operation	Y	Y	Y
7I	Storage of flammable/combustible liquids within the Proposal site would be carried out in accordance with <i>Australian Standard AS 1940: The Storage and Handling of Flammable and Combustible Liquids</i> . Secondary containment	Operation	Y	Y	N

¹ Excavation or disturbance of those areas of the Proposal site where potential for asbestos to be present within the soil is discussed and mitigated in Chapter 13 (Soils, Geology and Contamination).

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	measures would be implemented in a location away from waterways and drainage paths/infrastructure.				
7J	An Operational Hazard and Risk Management Plan would be developed for the Proposal site and be implemented as part of the OEMP for the Proposal. This plan would be reviewed regularly and updated should goods entering the site change. As a minimum, the plan would adopt the requirements of the Code of Practice for Storage and Handling of Dangerous Goods (WorkCover NSW, 2005).	Operation	Y	Y	N
7K	Appropriate testing, alarm systems and work, health and safety (WHS) precautions would be implemented for the safety of personnel and infrastructure.	Operation	Y	Y	N
7L	No hazardous or regulated wastes would be disposed of on site.	Operation	Y	Y	N
8.	Visual Amenity, urban design and landscape				
8A	<p>The following mitigation measures would be implemented, where reasonable and feasible, to minimise the visual impacts of the Proposal:</p> <ul style="list-style-type: none"> Existing vegetation around the perimeter of construction sites would be retained The early implementation of landscape planting would be considered in order to provide visual screening during the construction of the Proposal Elements within construction sites would be located to minimise visual impacts, e.g. setting back large equipment from site boundaries Construction lighting, on both ancillary facilities and plant and equipment, would be designed and located to minimise the effects of light spill on surrounding sensitive receivers, including residential areas and the proposed conservation area Design of site hoardings would consider the use of artwork or project information Regular maintenance would be undertaken of site hoardings and perimeter areas including the prompt removal of graffiti 	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Re-vegetation/landscaping would be undertaken progressively Where required for construction works, cut-off and directed lighting would be used and lighting location considered to ensure glare and light spill are minimised. 				
8B	<p>The following mitigation measures would be implemented, where reasonable and feasible, for the landscaping of the Proposal:</p> <ul style="list-style-type: none"> Use of native shrubs and ground covers to form a screening barrier when mature. A landscaping corridor of screening vegetation to provide informal street character along Moorebank Avenue. Use of local species as understory planting to support and enhance local habitat values Use of seeds collected within the local area for planting to reinforce the genetic integrity of the region, where possible. 	Operation	Y	Y	Y
8C	<p>Light for the Proposal would be designed to minimise any direct light spill and would comply with the requirements of <i>Australian Standard AS4282-1997- Control of the Obtrusive Effects of Outdoor Lighting</i>.</p>	Detailed design and operation	Y	Y	Y
9.	Indigenous Heritage				
9A	<p>An exclusion zone would be provided around previously identified MPE Isolated Artefacts 2, 3 and 4 (refer to Figure 16-2) to avoid potential disturbance of these artefacts during construction of the Proposal.</p>	Construction	Y	N	N
9B	<p>Management of Aboriginal heritage would be included in the CEMP for the Proposal. Information within the CEMP would include:</p> <ul style="list-style-type: none"> A summary of the findings of the Aboriginal Heritage Impact Assessment Report (provided at Appendix S of this EIS) Guidance on unexpected archaeological and cultural finds (including human remains). 	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
9C	All relevant personnel and contractors involved in the design and construction of the Proposal would be advised of the relevant heritage considerations, legislative requirements and recommendations in the Aboriginal Heritage Impact Assessment Report (provided at Appendix S of this EIS).	Detailed design and Construction	Y	Y	Y
10.	Non-Indigenous Heritage				
10A	A Heritage Management Plan in adherence to NSW Heritage Council guidelines would be prepared as part of the CEMP for the Proposal.	Construction	Y	Y	N
10B	Archaeological monitoring and recording would be conducted at PADs V and W, which have the potential to contain archaeological remains of local significance. Monitoring and recording would be undertaken by a suitably qualified archaeologist, who would assess the likely significance of any archaeological deposits encountered, and provide advice regarding appropriate further action. If highly significant remains were identified during monitoring, it would be appropriate to conduct further monitoring for additional sites of former structures or test excavations.	Construction	Y	N	Y
10C	A Heritage Interpretation Strategy should be prepared prior to the commencement of construction, outlining appropriate interpretive measure for the Proposal site in the context of the MPE site as a whole.	Construction	Y	Y	N
10D	If unexpected finds are located during works an archaeological consultant would be engaged to assess the significance of the finds and the NSW Heritage Council notified.	Construction	Y	Y	Y
11.	Greenhouse Gas				
11A	Energy efficiency design aspects would be investigated, where practicable as part of the detailed design process in order to reduce energy and fuel consumption.	Detailed design	Y	Y	N

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
11B	Project planning would be undertaken to ensure that the site vehicle movements and construction activities are efficient, to avoid double handling of materials and unnecessary fuel use where possible.	Construction	Y	Y	Y
11C	Fuel efficiency of the construction plant/equipment will be assessed prior to selection, and where practical, equipment with the highest fuel efficiency and which uses lower GHG intensive fuel (e.g. biodiesel) will be used.	Construction	Y	Y	Y
11D	Consideration will be given to material substitution where reasonable and feasible to reduce embodied energy of construction materials.	Detailed design and Construction	Y	Y	Y
11E	Where possible locally sourced materials will be used to reduce GHG emissions associated with transport during construction.	Construction	Y	Y	Y
11F	Waste would be diverted from landfill, including diversion of spoil, construction and demolition waste, and commercial and industrial waste, where reasonable and feasible. The management of waste would be considered as part of the preparation of the CEMP for the Proposal, detailing the appropriate procedures for waste management.	Construction	Y	Y	Y
11G	Fuel efficiency of the operation plant/equipment will be assessed prior to selection, and where practical, equipment with the highest fuel efficiency and which uses lower GHG intensive fuel (e.g. biodiesel) will be used during operation.	Operation	Y	Y	N
11H	Implement adaptation measures to address medium and high rated risks detailed in the climate change risk assessment presented in the Greenhouse Gas (GHG) and Climate Change Risk Assessment (Appendix V of this EIS).	Detailed design Operation	Y	Y	N
12.	Waste				
12A	Measures to mitigate the effect of the construction waste streams would be incorporated into the Proposal's CEMP, including the following information:	Construction	Y	Y	Y

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Avoidance and reuse of material will have priority over recycling Recycling will have priority over disposal Earth excavated from the site will be used for fill material and landscaping where feasible If possible concrete components will be crushed and reused onsite, with the remainder sent to a recycling facility Waste generation will be minimised by ordering the correct quantity of materials Selection of materials which maximise recycled content, while having low embodied water and energy use Selection of materials which maximise durability and lifespan. <p>The following procedures and protocols will be considered within the CEMP regarding waste management:</p> <ul style="list-style-type: none"> Characterisation of construction waste streams Management of any identified hazardous waste streams Procedures to manage construction waste streams, including handling, storage, classification, quantification, identification and tracking Mitigation measures for avoidance and minimisation of waste materials Procedures and targets for reuse and recycling of waste materials. Inclusion of the waste management strategies included in the Concept Plan Statement of Commitments for construction waste management. 				
12B	<p>Measures to mitigate the effect of the operational waste streams would be incorporated into the Proposal's OEMP, including the following information:</p> <ul style="list-style-type: none"> Addressing waste management requirements and goals in staff inductions Providing staff access to documentation outlining the facility's waste management requirements 	Operation	Y	Y	N

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> • Appropriate areas shall be provided for the storage of waste and recyclable material including: <ul style="list-style-type: none"> – Locating recycling bins in kitchen areas beside general waste bins to prevent contamination of recycling – Positioning paper recycling bins close to printer / photocopying equipment – Establishing bays or containers for recyclable waste generated through de-stuffing – Minimising general waste bins at desks but providing adequate container and paper recycling to encourage sorting of recyclables – Ensuring warehouse tenants are providing adequate bin storage for the expected quantity of waste • Standard signage on how to use the waste management system and what materials are acceptable in the recycling will be posted in all waste collection and storage areas • Waste management planning incorporating principles of the waste hierarchy • All domestic waste shall be collected regularly and disposed of at licensed facilities • By ensuring bins are placed in the correct location and access ways are clear waste collection vehicles will be able to service the development efficiently and effectively • An education programme and on-going monitoring will to be implemented for training personnel to properly sort and transport waste into the right components and destinations • Sewage waste will be discharged to Sydney Water sewerage infrastructure in accordance with Sydney Water requirements • Trade waste will be discharged to the sewer through a trade waste agreement with Sydney Water 				

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
	<ul style="list-style-type: none"> Inclusion of the waste management strategies included in the Concept Plan Statement of Commitments for operational waste management. 				
13.	Bushfire				
13A	<p>A bushfire management strategy, or equivalent, will be prepared as part of the CEMP for the Proposal. The strategy will include:</p> <ul style="list-style-type: none"> Emergency response plans and procedures Restrictions on activities (namely hot works) that cannot be undertaken on total fire ban days within areas of high Bushfire Hazard Rating, unless otherwise advised by the NSW Rural Fire Service. All construction site offices and temporary buildings will be located outside buffer areas to ensure minimum setbacks of 10 m. All construction site offices will be accessible via access roads suitable for firefighting appliances similar to NSW Rural Fire Service category 1 tankers. 	Construction	Y	Y	Y
13B	<p>A bushfire management strategy, or equivalent, would be prepared as part of the OEMP for the Proposal. In particular, the strategy would ensure management of landscaped areas within the Stage 2 site would be undertaken to maintain minimum dry fuel loads.</p>	Operation	Y	Y	N
14.	Property and infrastructure				
14A	<p>As relevant, further assessment of services demand, infrastructure requirements and augmentation works, in consultation with relevant infrastructure and service providers would be undertaken.</p>	Detailed design	Y	Y	Y
15.	Socio-economic				
15A	<p>A community information and awareness strategy would be included in the CEMP and would outline measures to maintain communication with the community and all relevant stakeholders throughout the construction process of the Proposal.</p>	Construction	Y	Y	Y

MPE Stage 2 Proposal - Environmental Impact Statement

No.	Mitigation measures	Implementation stage	Applicability		
			Warehousing	Freight village	Moorebank Avenue
15B	The Operational Environmental Management Plan (OEMP) would include measures to engage with stakeholders and to manage and respond to feedback received during the operation of the Proposal.	Operation	Y	Y	N

23 JUSTIFICATION AND CONCLUSION

This section of the EIS provides a justification for the Proposal and a conclusion to the EIS. The justification is based on the strategic need for the Proposal, and in particular, how the Proposal would fulfil the objectives outlined in Section 3. The justification also takes into consideration the objects of the EP&A Act.

The Proposal seeks approval, on behalf of the Applicant, SIMTA, for construction and operation of the Proposal as part of the second stage of the development under the MPE Concept Plan Approval (MP 10_0193).

The approval provided for the MPE Project, within the MPE Concept Approval and EPBC Approval, is considered recognition from State government and authorities that the MPE Project inclusive of all stages, the Proposal being one such stage, is justified and, subject to further assessment, is considered suitable for its location.

This EIS has provided considerable justification for the Proposal (refer to Section 3 for more information), in consideration of its consistency with the relevant national and State strategic planning and policy framework, its importance to the ongoing distribution of freight within Sydney and the number of options which have been considered to improve its operational efficiency and reduce its environmental impact.

A summary of the key outcomes for the environmental issues associated with the Proposal has also been provided within this EIS (refer to Sections 7-20 of this EIS). These sections conclude that, subject to the implementation of the mitigation measures included in Section 22 of this EIS, no significant environmental impacts would result from the construction and / or operation of the Proposal.

23.1 Proposal justification

23.1.1 Proposal objectives

The key objectives of the MPE Project are identified in the Concept Plan Environmental Assessment (EA). The key objectives of the Proposal as part of the MPE Project, are to deliver warehousing facilities in support of an IMT facility which will:

- Be strategically located to utilise existing and future metropolitan, State and National rail freight and road networks, including the SSFL and the M5 and M7 Motorways
- Provide freight distribution opportunities in a strategically appropriate location, and in turn, provide employment opportunities and associated economic and social benefits in Western and South-Western Sydney
- Be appropriately designed and managed to provide operational efficiencies and to appropriately mitigate impacts on the surrounding environment and local community
- Provide capacity for an annual throughput of up to 500,000 TEUs, as an initial step to meeting the forecast demand of approximately 1,000,000 TEU for Western and South-Western Sydney
- Make a significant contribution to achieving Federal and State land use, freight and logistics policies, including the State Plan target of increasing the proportion of container freight being transported by rail
- Assist with alleviating freight-related road congestion between Port Botany and Moorebank, particularly along the M5 Motorway.

The Proposal would assist in the delivery of the above overall MPE Project objectives, in particular:

- Through freight distribution opportunities in a strategically appropriate location, which will provide employment opportunities and associated economic and social benefits in Western and South-Western Sydney.
- By providing operational efficiencies and mitigating impacts on the environment and community through appropriate design and management
- Be strategically located to utilise existing and future metropolitan, State and National rail freight and road networks, including the SSFL and the M5 and M7 Motorways
- By increasing the proportion of container freight being transported by rail
- Assisting with alleviating freight related road congestion between Port Botany and Moorebank

23.1.2 Need for the Proposal

The Proposal includes infrastructure which is critical to the on-going distribution of freight throughout the Sydney Metropolitan Area. The warehousing and distribution facilities to be provided as part of the Proposal would reduce freight movements on the external road network due to its proximity to the associated IMT. In turn this will assist in increasing the rail mode share of freight which would result in some positive benefits for the region.

Projected growth in trade volumes is expected to result in an increase in freight movements across the Sydney Greater Metropolitan Area. This will pose substantial challenges for the supply chain which is currently dominated by road transport. To meet these challenges and to allow for increased use of rail, it is necessary to invest in new intermodal terminal capacity and associated facilities such as warehousing that operate in support of the IMTs, to develop dedicated freight rail lines, to widen the orbital motorway network to ideally complete the missing linkages in the current orbital motorway network, and to improve the rail interface at Port Botany.

As the Proposal comprises the construction and operation of warehouse and distribution facilities to support the IMT Facility on the MPE site, it directly assists in fostering IMTs in metropolitan areas. By constructing warehouses on the Proposal site, immediately adjacent to an IMT at Moorebank, the capacity of the freight transport network around Port Botany would be maximised, and would encourage more efficient business operations. In addition to this, the Proposal would include warehousing which would operate 24hrs 7 days a week, facilitating for a 24/7 logistics chain which allows for the re-distribution of road related freight movements outside of peak hours, reducing impacts of freight on passenger services.

The Proposal is consistent with the MPE Concept Approval (as modified) (MP 10_1093), allowing for the development of 300,000m² GFA of warehousing and the provision of associated supporting and ancillary infrastructure on the Proposal site. The Proposal is considered an important component in supporting the set target for a transport modal shift to rail and would support the effective function of an IMT facility on the MPE Project.

23.1.3 Proposal alternatives

Concept Approval for the MPE Project established the framework for the design, construction and operation of the warehouse and distribution facilities on the MPE Site. The Proposal represents the second stage of development approved within the MPE Concept Approval. A key goal of the Proposal was to, where possible, improve the operational efficiency of the warehouse and distribution facilities, and to further reduce the environmental impacts as previously presented in the MPE Concept Approval.

Consideration was given to a number of alternatives as part of the approach and design development for the Proposal. The feasible alternatives considered for the Proposal, include:

- The 'Do-nothing' option – Section 3.2 of this EIS clearly identified the need for the provision of warehouse and distribution facilities to support an IMT on the MPE Site at Moorebank that can provide distribution capacity to the south-west freight catchment. While the 'do nothing' option would result in a reduction of localised environmental impacts around the Proposal site it is not considered a feasible alternative to the Proposal as:
 - it would not improve freight transit for outward or inward bound freight movements between Port Botany and South West and Western Sydney, interstate or intrastate
 - would not deliver any improvements to general transit conditions on the M5 Motorway between Moorebank and Port Botany
 - would not contribute to a reduction in GHG emissions from diesel trucks between Moorebank and Port Botany
 - Would not provide temporary and long-term employment opportunities within the region.
- Consideration of other alternative sites for warehouse and distribution facilities - a number of alternate sites were considered as part of the MPE Concept Plan Approval. The assessment found the MPE Project presents an ideal location for an intermodal facility in south-western Sydney as it is:
 - adjacent to existing industrial areas, and is in a central location relative to major freight markets in the west and south west of Sydney
 - located near the South West Sydney Growth Centre
 - in close proximity to major road and rail freight corridors (including the SSFL, M5 Motorway, near the M7 Motorway and Hume Highway)
 - There is a direct intersection linking the adjacent Moorebank Avenue to the M5 Motorway
 - Buffers are provided between the facility and nearby residential areas
 - It is within the catchment for which there is a demand, resulting in minimal use of road transport between origins/destinations and the IMT
 - It is located a sufficient distance from Port Botany to make rail a commercially viable alternative to road for movements to and from Port Botany
 - It is large enough to handle the number of containers expected and has the space required for the associated warehousing, which will increase the efficiency of the freight service offered and therefore increases the attractiveness of the terminal and its potential to get more freight onto the rail network.
- Refining design for the Proposal site layout and operations - Since the MPE Concept Plan Approval and EPBC Approval, a number of design refinements have been made to the Proposal. Design changes have been made in response to advice and consultation with government authorities, service providers and the community, as well as additional data from more detailed environmental and social investigations. Where a refinement was likely to have wider implications, or where a range of constraints and alternatives was considered, design refinements were identified in the context of environmental considerations. Design refinements included changes to the location of the freight village, traffic circulation within the Proposal and the configuration of warehouses on the Proposal site.

23.2 Consistency of the Proposal with relevant legislation and statutory approvals

23.2.1 EPBC Approval

EPBC Approval (No.2011/6229) was granted in March 2014 for the MPE Project for impacts on listed threatened species and communities and Commonwealth Land. The EPBC Approval included a number of conditions which were to be implemented within the design, construction and operation of future stages of development of the MPE Project.

This EIS has considered the conditions provided in the EPBC Approval, and where relevant, integrated them into the design or mitigation measures for construction and operation of the Proposal. In particular the following has been prepared to satisfy the EPBC Approval conditions:

- An assessment of impacts to Commonwealth land and threatened flora and fauna, has been included in this EIS at Section 11 (Biodiversity), Section 19.3 (Property and Infrastructure) and Appendix O (Biodiversity Assessment Report) of this EIS. A number of design refinements have been made to the Proposal subsequent to the Concept Plan Approval and EPBC EIS to attempt to reduce and minimise environmental impacts of the Proposal.
- A Preliminary Construction Environmental Management Plan (PCEMP) has been prepared and is included in Appendix G of this EIS. It is intended that the PCEMP and associated management plans would form the basis of the Construction Environmental Management Plan (CEMP) and associated plans to be prepared for the Proposal, prior to construction.
- An Operational Environmental Management Plan (OEMP) would be prepared to provide the overarching framework for the management of all potential environmental impacts resulting from the operation of the Proposal. Additional information is provided in Section 4.5 of this EIS. In addition, operational air quality has been considered in an air quality management plan that has been prepared for the Proposal (refer to Chapter 9 and Appendix M of this EIS for more information).

Section 5 of this EIS provides further discussion on the consistency of the Proposal with the EPBC Approval. Overall, it is concluded that the Proposal is consistent with the relevant conditions of the EPBC Approval.

23.2.2 Concept Plan Approval

MPE Concept Plan Approval (MP 10_0193) was granted by the PAC as delegate of the Minister for Planning and Environment on 29 September 2014 for the 'Concept Plan Approval' of the MPE Project under Part 3A¹ of the EP&A Act.

The Conditions of Approval (for the MPE Concept Approval) included a number of future assessment requirements to be undertaken for future stages of the MPE Project. These Conditions of Approval formed the basis for the SEARs (SSD 16-7628) which were issued by NSW DP&E for the Proposal on 14 July 2016 and later amended and reissued on 24 November 2016.

This EIS has been prepared to satisfy both the MPE Concept Approval, and more specifically, the amended SEARs provided for the Proposal. The environmental assessment included within this EIS provides all of the relevant information required

¹ Part 3A of the EP&A Act was repealed on 31 October 2011. Transitional arrangements for projects (including concept plans) approved under Part 3A of the EP&A Act before its repeal are provided in Schedule 6A of the EP&A Act.

by the MPE Concept Approval and also the amended SEARs which focused particularly on the following key issues:

- Air quality
- Traffic and transport
- Noise and vibration
- Infrastructure upgrade / contributions
- Soil and water
- Aboriginal heritage
- Historic heritage
- Visual amenity, urban design and landscaping
- Biodiversity
- Contamination
- Hazards and risks.

In addition to this a number of other issues have been addressed in this EIS as requested by the MPE Concept Plan Conditions of Approval, the amended SEARs and the Statement of Commitments identified in the MPE Concept Approval.

Appendix A of this EIS provides details of where the MPE Conditions of Approval, the amended SEARs and Statement of Commitments have been addressed in this EIS.

The design prepared for the Proposal has been developed to be consistent with the design provided within the MPE Concept Approval (as amended) and, where possible, further reduce environmental impacts.

Overall, it is concluded that the Proposal, as described and assessed in this EIS, is consistent with the MPE Concept Approval and the amended SEARs.

23.2.3 EP&A Act (Section 79C)

As discussed above, approval is sought for the Proposal under Part 4, Division 4.1 of the EP&A Act. As approval for the Proposal is via a Development Application (DA), and as reiterated in the amended SEARs, the Proposal EIS must comply with the 'matters for consideration' under Section 79C of the EP&A Act. Section 5 of this EIS provides a summary of the Proposal's consistency with Section 79C of the EP&A Act, which is reproduced in Table 23-1.

The Proposal complies with the matters for consideration in Section 79C and therefore is considered suitable for approval under Part 4, Division 4.1 of the EP&A Act.

Table 23-1 Compliance with matters for consideration (Section 79 of the EP&A Act)

Section 79C(1)	Matter for consideration	Comments
(a)	<p>The provisions of:</p> <p>(i) any environmental planning instrument</p> <p>(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been</p>	<p>A detailed assessment of the Proposal, having regard to relevant Acts (Federal and State), EPIs and planning policies has been provided in Chapter 3 and Chapter 5 of this EIS.</p> <p>The Proposal is consistent with State planning policies as it forms part of the MPE Project which facilitates the operation of an IMT Facility with warehouse and distribution facilities at Moorebank, which will lead to an increase in freight movements via rail across the Sydney Greater Metropolitan Area.</p>

Section 79C(1)	Matter for consideration	Comments
	<p>deferred indefinitely or has not been approved), and</p> <p>(iii) any development control plan, and</p> <p>(iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F</p> <p>(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and</p> <p>(v) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979), that apply to the land to which the development application relates,</p>	<p>Further, the assessment of the Proposal provided in this EIS has considered all relevant Acts and EPIs. The Proposal is generally compliant with this legislation and, as relevant, includes mitigation measures to ensure compliance is met throughout construction and operation.</p>
(b)	<p>the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,</p>	<p>This EIS has undertaken a detailed assessment of the potential impacts associated with the construction and operation of the Proposal (refer to Section 7 to Section 19).</p> <p>The assessment of environmental impact presented in this EIS has not identified any significant environmental impacts. Further, the environmental impacts that have been identified would be mitigated through the implementation of the measures summarised in Chapter 21 during construction and operation of the Proposal.</p>
(c)	<p>the suitability of the site for the development</p>	<p>The EA prepared for the MPE Concept Plan Approval considered the suitability of the MPE site for the development of the MPE Project, including warehouse and distribution facilities. The MPE Concept Plan Approval is considered recognition, by State government and the relevant authorities and agencies that, subject to the implementation of appropriate mitigation measures, the MPE site is suitable for the development of the MPE Project, inclusive of the Proposal. Further, as discussed above, the MPE site is considered suitable in that:</p> <ul style="list-style-type: none"> • It is situated in close proximity to the SSFL • There is a direct intersection linking the adjacent Moorebank Avenue to the M5 Motorway • It is zoned as IN1 industrial land for use as industrial warehousing • Buffer zones are provided between the facility and nearby residential areas

Section 79C(1)	Matter for consideration	Comments
		<ul style="list-style-type: none"> It is within the catchment for which there is a demand, resulting in minimal use of road transport between origins/destinations and the MPE site The location has been identified in both State and Commonwealth planning strategies as the best and only location for an intermodal terminal to service this defined catchment in South-Western Sydney. <p>The MPE site, including the Proposal site, is therefore considered to be suitable for the development of the Proposal.</p>
(d)	any submissions made in accordance with this Act or the regulations	<p>A number of submissions were made by stakeholders (both private and public) during the public exhibition of the MPE Concept Plan Approval (28 March to 28 May 2012 and 4 September to 21 October 2013) and EPBC Approval (9 June 2013 to 13 August 2013 (draft) and October 2013 to 5 December 2013 (final)). Although these submissions received were relating to previous approvals, they have been considered throughout the design of the Proposal, and the preparation of this EIS.</p> <p>During the preparation of this EIS, consultation has been undertaken specific to the Proposal with government stakeholders and the community. The comments received during this consultation have been considered and, as relevant, addressed in this EIS (refer to Section 6).</p> <p>Additional consultation would be undertaken throughout the assessment of the Proposal, in particular, with submissions received during the exhibition of the EIS. Responses to submissions received during the public exhibition of the EIS would be provided in a Response to Submissions report and/or a Preferred Project Report.</p>
(e)	the public interest	<p>As discussed above, this EIS has been prepared based on consultation undertaken with government agencies, service and infrastructure providers, specialist interest groups (including Local Aboriginal Land Councils (LALCs)) and the public. Where possible, the design of the Proposal has been amended to address concerns raised through consultation that has been undertaken to-date, and to reduce the environmental impact of the Proposal on the surrounding biophysical and social environments.</p> <p>The Proposal would result in some positive impacts, which are likely to be experienced more at a regional level. Direct beneficial and</p>

Section 79C(1)	Matter for consideration	Comments
		<p>adverse impacts of the development are expected at a more local level.</p> <p>The Proposal is consistent with State and regional planning policies and includes a number of benefits which would be experienced as a result of the Proposal's operation. Positive economic impacts of the Proposal would be experienced at both a local and regional level.</p> <p>This EIS includes a number of mitigation measures which would further reduce the impact of the Proposal on the surrounding built, social and natural environment.</p> <p>Overall the construction and operation of the Proposal is considered to be in the public interest.</p>

23.2.4 Ecologically sustainable development

An assessment of the Proposal's consistency with the principles of ecologically sustainable development (ESD), identified in the *Environmental Planning and Assessment Regulation 2000* (EP&A Regs), is provided in this EIS (refer to Section 20.4 of this EIS) and summarised in Table 23-2 below.

In summary, the Proposal is consistent with the principles of ecologically sustainable development, within the EP&A Regs

Table 23-2 Consistency of the Proposal with the principles of ecological sustainable development (EP&A regs)

ESD Principles	Discussion
Precautionary principle	<p>A precautionary principle approach has been applied throughout the preparation of the design of the Proposal and all technical studies associated with the Proposal with the intent to minimise environmental impacts. Subject to the implementation of mitigation measures, these specialist studies did not identify any issues that may cause serious and irreversible environmental damage as a result of the Proposal (refer to Sections 7- 20 and 22 of this EIS).</p>
Intergenerational equity	<p>The Proposal has been designed to benefit both existing and future generations through the provision of warehouse and distribution facilities to support an IMT, which would remove freight vehicles from the M5 Motorway, easing congestion on the arterial road network, reduce average delivery distances and support more efficient road transport via a modal shift to rail for freight distribution activities.</p> <p>Reducing the freight traffic volume would have direct and flow-on economic, social and wider environmental benefits, including but not limited to improved inter-regional access, reduced freight and transport costs for industry and businesses and job creation during construction and operation of the Proposal.</p>

ESD Principles	Discussion
	<p>Overall, the design of the Proposal has incorporated the ESD principle of intergenerational equity through ensuring that the IMT facility and warehousing area can be constructed and operated sustainably to ensure that there is no significant on-going impacts on the surrounding community and future generations.</p>
Conservation of biological diversity and ecological integrity	<p>A comprehensive assessment of the existing local environment at the Proposal site has been undertaken to recognise any potential impacts of the Proposal on local biodiversity. A detailed biodiversity assessment, and associated proposed mitigation measures have been outlined in Section 11 and Appendix O of this EIS. A key element of this mitigation includes the preparation of on-going management plans and areas for biodiversity offset which would contribute to the conservation of the biological diversity and ecological integrity of the surrounding area.</p>
Improved valuation, pricing and incentive mechanisms	<p>Environmental factors have been considered throughout the design development of the Proposal in relation to its construction methodology and operation. As a result, environmental impacts have been avoided or minimised, where possible and mitigation measures as provided in Section 22 of this EIS would be implemented during construction and operation of the Proposal to avoid, minimise and mitigate impacts.</p> <p>While acknowledging that it is often difficult to place a reliable monetary value on the residual, environmental and social effects of the Proposal, the value placed on avoiding and minimising the environmental impacts of the Proposal is demonstrated in the design features incorporated into the Proposal, and the extent of environmental investigations that have been undertaken to inform this EIS.</p> <p>An analysis of the marginal cost of abatement for reducing greenhouse gas emissions generated by the Proposal was undertaken and details of the GHG emissions and potential opportunities to minimise emissions are presented in Section 18 and Appendix V of this EIS. The measures identified to reduce greenhouse gas emissions would be considered by SIMTA and, if implemented, become a cost to the project that is directly attributed to minimising environmental impacts.</p> <p>A Biodiversity Offset Strategy to offset the impacts of the MPE Project on listed threatened species and ecological communities under the EPBC Act and / or TSC Act is currently being developed, which would include the consideration of the biodiversity impacts of the Proposal. A key part of the biodiversity offset process, under the FBA involves the identification of an 'ecological value' for the flora and fauna to be impacted by the Proposal. The offsetting to be undertaken for the MPE Project, inclusive of the Proposal, would result in a cost to SIMTA, thereby ensuring that this environmental impact has been considered as an overall cost to the Proposal, which is consistent with the ESD principle of improved valuation, pricing and incentive mechanisms.</p>

23.3 Conclusion

The Proposal, identified as a State Significant Development, has been subject to an EIS in accordance with the EP&A Act and the amended SEARs. The potential environmental, social and economic impacts, both direct and cumulative, have been identified and thoroughly assessed as part of this EIS.

The preparation of the EIS has identified and assessed the environmental impacts arising as a result of the Proposal, however no significant impacts were identified. The identified environmental impacts identified would be able to be mitigated through the implementation of measures for the construction and operation of the Proposal, and these measures have been included in Section 22 of this EIS.

The Proposal has been assessed against, and has been found to be consistent with, the priorities and targets adopted in relevant draft and published State plans, as well as Government policies and strategies. The Proposal provides regional benefits through the removal of freight transporting heavy vehicles from the M5 Motorway, easing congestion on this arterial road, and by reducing average delivery distances, thus supporting more efficient use of road transport. It would provide up to 300,000m² GFA of warehouse and distribution facilities, as well as ancillary infrastructure to support an IMT facility on the MPE site and would contribute to achieving Federal and State land use, freight and logistics policies.

The Proposal meets the requirements of the amended SEARs and is considered consistent with the MPE Concept Approval and EPBC Approval. The Proposal also complies with Section 79C of the EP&A Act and is consistent with the principles of ecologically sustainable development.

Overall the EIS concludes that the development proposed is in the public interest and approval is recommended.

24 REFERENCES

- Archaeological and Heritage Management Solutions (AHMS) (2012) *Aboriginal Cultural Heritage Assessment: SIMTA Moorebank Intermodal Terminal Facility*. Unpublished Report for Arcadis
- AHMS (2015) *Aboriginal Heritage Impact Assessment (Draft): SIMTA Intermodal Terminal Facility- Stage 1*. Unpublished Report for Hyder Consulting Pty Ltd.
- ALS (2011), *Transitional Part 3A Concept Plan Application: Assessment of the Sydney Intermodal Terminal Facility, Moorebank: Aquatic Ecology*. Australian Laboratory Services, Penrith. Prepared for Sydney Intermodal Terminal Alliance
- Arcadis (2016), MPW Stage 2 Environmental Impact Statement
- Artefact (2013), Transitional Part 3A Concept Plan Application: Non-Indigenous Heritage Assessment, prepared for Sydney Intermodal Terminal Alliance
- ALS (2011), *Assessment of the Sydney Intermodal Terminal Facility, Moorebank: Aquatic Ecology*
- Bannerman S.M. & Hazelton P.A. (1990), Soil Landscapes of the Penrith 1:100,000 Map Sheet, Soil Conservation Service NSW
- Bureau of Meteorology (BOM) (2016) *National Atlas of Groundwater Dependent Ecosystems* <accessed September 2016> <accessed from:<http://www.bom.gov.au/water/groundwater/gde/map.shtml> Accessed 20 October 2016>
- BTM WBM (2008), *Anzac Creek Floodplain Risk Management Study and Plan*, May 2008
- Commonwealth of Australia (2012), *National Land Freight Strategy-A place for freight* <accessed online July and August 2016> <accessed from: <http://transportinfrastructurecouncil.gov.au/publications/>>
- Department of the Environment (DoE) (2014a) National Greenhouse and Energy Reporting (NGER) System Measurement, Technical Guidelines for the estimation of greenhouse gas emissions by facilities, Commonwealth of Australia, Canberra.
- DoE (2014b), Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia: National Greenhouse and Energy Reporting (Measurement) Determination 2008, Commonwealth of Australia 2014
- DoE (2016a), State and Territory Greenhouse Gas Inventories 2014: Australia's National Greenhouse Accounts, Commonwealth of Australia
- DoE (2016b) National Greenhouse Accounts (NGA) Factors, Commonwealth of Australia, Canberra ACT.
- Department of Environment & Climate Change (DECC) (2009), *Interim Construction Noise Guidelines*
- Department of Environment, Climate Change and Water (DECCW) (2009) *Action for Air*
- Department of Environment and Conservation (DEC) (2006), *Assessing Vibrations: A technical guideline*
- Department of Planning (DoP) (2011), *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*
- ENVIRON (2015), *SIMTA Moorebank Intermodal Facility - Air Quality Impact Assessment*
- Fairfull S. & Witheridge G. (2003) *Why do fish need to cross the road? Fish Passage requirements for Waterway Crossings*

Freight Infrastructure Advisory Board (2015), *Railing Port Botany's Containers: Proposals to Ease Pressure on Sydney's Roads*

GHD (2015), *Former DNSDC, Moorebank NSW Stage 2 investigation report*

GHD (2016), *Former DNSDC, Moorebank NSW Environmental Management Plan*

Hyder Consulting (2011), *Transitional Part 3A Concept Plan Application: Potential hazard and risks assessment*, prepared for Sydney Intermodal Terminal Alliance

Hyder Consulting (2012), *Transitional Part 3A Concept Plan Application*, prepared for Sydney Intermodal Terminal Alliance

Hyder Consulting (2013a), *Transitional Part 3A Concept Plan Application: Flora and Fauna Assessment*, prepared for Sydney Intermodal Terminal Alliance

Hyder Consulting (2013b), *SIMTA Moorebank Intermodal Terminal Facility - Climate Change Risk Assessment*, prepared for SIMTA

Hyder Consulting (2013c). *Transitional Part 3A Concept Plan Application, Waste Management Strategy (WMS)*, prepared for Sydney Intermodal Terminal Alliance

Hyder Consulting (2013d). *Transitional Part 3A Concept Plan Application: Utilities Strategy Report*, prepared for Sydney Intermodal Terminal Alliance, Sydney.

Hyder Consulting (2014), *Transitional Part 3A Concept Plan Application: Submissions report*, prepared for Sydney Intermodal Terminal Alliance

Hyder Consulting (2015), *SIMTA Intermodal Terminal Facility- Stage 1: Biodiversity Assessment Report*

Infrastructure Australia (2011), *National Ports Strategy* <accessed online July and August 2016> <accessed from:

<https://www.coag.gov.au/search/node/national%20ports%20strategy>>

Infrastructure Australia (2015), *Australian Infrastructure Audit Report*, <accessed online July and August 2016> <accessed from

<http://infrastructureaustralia.gov.au/policy-publications/publications/Australian-Infrastructure-Audit.aspx>>

Infrastructure Australia (2016a), *Australian Infrastructure Plan*, <accessed online July and August 2016> <accessed from: <http://infrastructureaustralia.gov.au/policy-publications/publications/Australian-Infrastructure-Plan.aspx>>

Infrastructure Australia (2016b), *Infrastructure Priority List* <accessed online July and August 2016> <accessed from: <http://infrastructureaustralia.gov.au/policy-publications/publications/Australian-Infrastructure-Plan.aspx>>

Intergovernmental Panel on Climate Change (IPCC) (2014), *Climate Change 2014 Synthesis Report: Synthesis Report of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, IPCC in conjunction with World Health Organisation and United Nations Environment Program

Landcom (2004), *Managing Urban Stormwater: Soils and Construction Handbook*

Moorebank Intermodal Company (2013), *'Why we need the terminal'*, <accessed online Month-YEAR> <access from: <http://www.micl.com.au/the-terminal/why-we-need-the-terminal.aspx>>

NEPC (1998), *National Environmental Protection Measure for Ambient Air Quality*.

NEPC (2003), *National Environmental Protection Measure (Ambient Air Quality)*, as amended, made under the National Environment Protection Act 1994

NEPC (2015), *Variation to the National Environment Protection (Ambient Air Quality) Measure*

NSW Department of Premier and Cabinet (2011), *NSW 2021: A plan to make NSW number one*, <accessed July and August 2016> <accessed from: http://www.facs.nsw.gov.au/about_us/media_releases/media_release_archive/nsw_2021_a_plan_to_make_nsw_number_one?SQ_DESIGN_NAME=print>

NSW Department of Premier and Cabinet (2012), *State Infrastructure Strategy 2012-2032*, <accessed July and August 2016> <accessed from: <http://www.infrastructure.nsw.gov.au/expert-advice/state-infrastructure-strategy-2012.aspx>>

NSW Department of Premier and Cabinet (2014), *State Infrastructure Strategy Update 2014*, <accessed July and August 2016> <accessed from: <http://www.infrastructure.nsw.gov.au/expert-advice/state-infrastructure-strategy-update-2014.aspx>>

NSW Department of Environment and Climate Change (DECC) (2007), *Floodplain Risk Management Guideline Practical Consideration of Climate Change*, October 2007

NSW Department of Environment, Climate Change and Water (2009), *Action for Air* <accessed July and August 2016> <accessed from: <http://www.epa.nsw.gov.au/air/actionforair/ActionforAir2009.htm>>

NSW Department of Environment, Climate Change and Water (DECCW) (2011), *NSW Road Noise Policy*

NSW DP&E (2014), *A Plan for Growing Sydney* <accessed July and August 2016> <accessed from: <http://www.planning.nsw.gov.au/Plans-for-Your-Area/Sydney/A-Plan-for-Growing-Sydney>>

NSW Department of Planning (2009), *Draft South West Subregional Strategy*

NSW Environment Protection Authority (EPA) (2000), *NSW Industrial Noise Policy*

NSW Environment Protection Authority (EPA) (2005), *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*

NSW Environment Protection Authority EPA (2012), *Technical Report No. 6. Air Emissions Inventory for the Greater Metropolitan Region in New South Wales. 2008 Calendar Year. Off Road Mobile Emissions: Results*

NSW Environment Protection Authority EPA, (2014), *NSW Waste Classification Guidelines*. NSW. Sydney

NSW Rural Fire Service (in co-operation with the Department of Planning) (2006), *Planning for Bush Fire Protection*, ISBN 0 9751033 2 6

NSW Ports (2015), *Navigating the Future NSW Ports 30 Year Master Plan* <accessed July and August 2016> <accessed from: <http://www.nswports.com.au/publications/>>

Office of Environment and Heritage (OEH) (2013), *The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area*

Office of Environment and Heritage (OEH) (2014), *Framework for Biodiversity Assessment*

PAE (2012), *Transitional Part 3A Concept Application: Air Quality Impact Assessment*, prepared for Sydney Intermodal Terminal Alliance, Sydney

Pacific Environment (2013), *Transitional Part 3A Concept Application: Air Quality Impact Assessment*, prepared for Sydney Intermodal Terminal Alliance, Sydney

PAEHolmes (2013), *Air Quality Appraisal Tool (AQAT) – Final Report*

Parsons Brinckerhoff (2014), *Moorebank Intermodal Freight Terminal – Ecological Impact Assessment*

Parsons Brinckerhoff (2015), *Moorebank Intermodal Terminal: Biodiversity Offset Areas Biodiversity Assessment Report*

Reid Campbell (2012), Transitional Part 3A Concept Application: Urban Design and Landscape Report, prepared for Sydney Intermodal Terminal Alliance, Sydney

Reid Campbell (2013), *SIMTA Moorebank Intermodal Facility Concept Plan Environmental Assessment -Urban Design and Landscape Report*

Sea Freight Council of NSW / Jays Corporate Services (2004), *NSW Import Export Container Mapping Study*

Soil Conservation Service NSW (1989), *Penrith Soils Landscape Map*

Sydney Ports Corporation/Connell Wagner (1998), *Port Botany Origin-Destination Study*

Sydney Ports Corporation (2012), *Logistics Review 2010/2011*

Sydney Ports Corporation / Thompson Clarke (2010), *Metropolitan Sydney International Container Origin/Destination Analysis*

Sydney Ports Corporation / University of Victoria (2010), *Container Origin and Destination Study*

Transport for NSW (2012), *NSW Long Term Transport Master Plan*, <accessed July and August 2016> <accessed from <http://www.transport.nsw.gov.au/content/nsw-long-term-transport-master-plan>>

Transport for NSW (2013), *NSW Freight and Ports Strategy*, <accessed July and August 2016> <accessed from: <http://www.transport.nsw.gov.au/operators/freight>>

Toxicos (2012), *Preliminary screening health risk assessment and literature review. Moorebank*

Intermodal Freight Terminal

Urbis (2012), *SIMTA Moorebank Intermodal Facility Concept Plan Environmental Assessment*

Urbis (2013), Transitional Part 3A Concept Plan Application: *Economic Assessment*, prepared for Sydney Intermodal Terminal Alliance, Sydney

Urbis (2013b), Transitional Part 3A Concept Plan Application: *Social Impact Commentary*, prepared for Sydney Intermodal Terminal Alliance, Sydney

US EPA (1998), AP-42 Emission Factor Database, Chapter 11.9 Western Surface Coal Mining

US EPA (2004), *User's Guide for the AMS/EPA Regulatory Model – AERMOD*

US EPA (2006), *AP-42 Emission Factor Database, Chapter 13.2.5 Industrial Wind Erosion*

Wilkinson Murray Pty Ltd (2013), *Transitional Part 3A Concept Plan Application: Noise and Vibration Impact Assessment*. Prepared for Sydney Intermodal Terminal Alliance, Sydney

World Resources Institute/World Business Council for Sustainable Development (2004), *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard*, Revised Edition

World Steel Association (2016), 'Steel and Raw Materials Fact Sheet', <accessed July and August 2016><accessed from: worldsteel.org>

This page has been left blank intentionally

