

# SIMTA Intermodal Terminal Facility- Stage 1

## Visual Impact Assessment



SIMTA

SYDNEY INTERMODAL TERMINAL ALLIANCE

Part 4, Division 4.1, State Significant  
Development

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# contents

<b>executive summary</b>	4
<b>01 introduction</b>	9
<b>02 assessment methods</b>	14
<b>03 assessment criteria</b>	15
<b>04 visual character of the surrounding area</b>	17
<b>05 visual character of the development</b>	19
<b>06 measures to reduce visual impact</b>	21
<b>07 visual impact of the development</b>	23
<b>08 light spill assessment</b>	98
<b>09 cumulative impact assessment</b>	105
<b>10 conclusion</b>	125
<b>appendix A</b>	127
Copy of Light Spill Study Report by AECOM	
<b>figures</b>	
Figure 1: SIMTA Stage 1 Site Plan	8
Figure 2: Visual Character of the Surrounding Area	16
Figure 3: Land Use Plan	18
Figure 4: Surrounding Topography	20
Figure 5: Indicative SIMTA Stage 1 Site and Landscape Master plan	22
Figure 6: View Locations	24
Figure 7: Philips ComfortVision SNF-11	98
Figure 8: Roadster S400 FT	99
Figure 9: General site layout showing external and internal site light spill isolux curves from static area site lighting	101
Figure 10: Indicative Aerial view of additional MIC Proposal	106
Figure 11: View Locations - Cumulative Impact	110
<b>tables</b>	
Table 1: Viewpoint impact summary	6
Table 2: SEARs (SSD 14-6766) compliance table	10
Table 3: Key terms	11
Table 4: Visual Impact during construction	96
Table 5: Luminaire Schedule	102

# executive summary

Reid Campbell in conjunction with Hyder Consulting and AECOM were appointed by SIMTA (Sydney Intermodal Terminal Alliance - a Qube Holdings & Aurizon joint venture) to undertake a Visual Impact Assessment, including a Light Spill Study of Stage 1 of the proposed SIMTA Moorebank Intermodal Terminal which forms the first stage of the Concept Approval (No. 10\_0193) granted by the Planning Assessment Commission (PAC) on 29 September 2014 under Part 3A of the EP&A Act.

This report has been compiled in accordance with the Secretary's Environmental Assessment Requirements (SEARS) issued under Section 78A(8A) of the *Environmental Planning and Assessment Act 1979* dated December 2014 (SSD 14-6766), specifically responding to Item 11, Visual Amenity, Urban Design and Landscaping under *Key Issues* of the Proposal.

This report seeks to identify and evaluate the visual impacts of the project including an analysis of views from key vantage points and proposed management/mitigation measures to address the visual impact of the Proposal.

It should be read in conjunction with the Landscape Report by Ground Ink Landscape Consultants, which provides a design analysis and justification of the key built form elements of the Proposal.

This Visual Impact Assessment and Light Spill modelling are based on the Stage 1 development of the SIMTA Site Precinct Plan at Figure 1 which describes the maximum development envelope of built-form typologies within each Land Use Zone on the site.

Using the siting, setback, height, landscaping and general design principles described in the Urban Design and Landscape Report, which formed part of the SIMTA Concept plan approval, for all built-form, streetscape, urban and operating elements, a 3-dimensional massing model was generated to inform the likely maximum and realistic visual impact at key view points identified through a digital viewshed analysis.

In addition to the Stage 1 Intermodal Terminal Facility Development, a Visual Impact Assessment was conducted on the proposed Rail link connecting the SIMTA site with the Southern Sydney Freight Line (SSFL). A model of the Rail link within the nominated Rail Corridor (noted on Figure 1) was developed assuming the Rail link area would be of variable width.

Modelling suggests that there would be minimal visual impact due to the proposed Rail link. It would be visible from some view points, however generally these are in locations where the viewing period is very short (i.e. from a road bridge) and the proposed Rail link runs adjacent to existing rail infrastructure.

All simulated Rail link view points fall within the Rail Corridor nominated within the Concept Plan approval formed by the development of the SSFL and East Hills Passenger Line (EHPL).

The Light Spill Study undertaken by AECOM examines the potential lighting requirements for the operation of the SIMTA Stage 1 site and investigates through the modelling of a concept lighting design, its compliance with the Australian Standard AS4282 - 1997 *Control of Obtrusive Effects of Outdoor Lighting*.



The light spill modelling shows that the luminous intensity from lighting within the Stage 1 site can be easily designed to be below the prescribed maximum value of 4 lux (for curfew hours: 11.00pm to 6.00am) at the windows of adjacent residential properties.

An indicative high level cumulative impact assessment of the addition of the proposed Moorebank Intermodal Company (MIC) development has been considered. This is based on available information of the Proposal in the public domain.

The resultant findings of the Visual Impact Assessment and Light Spill Study are:

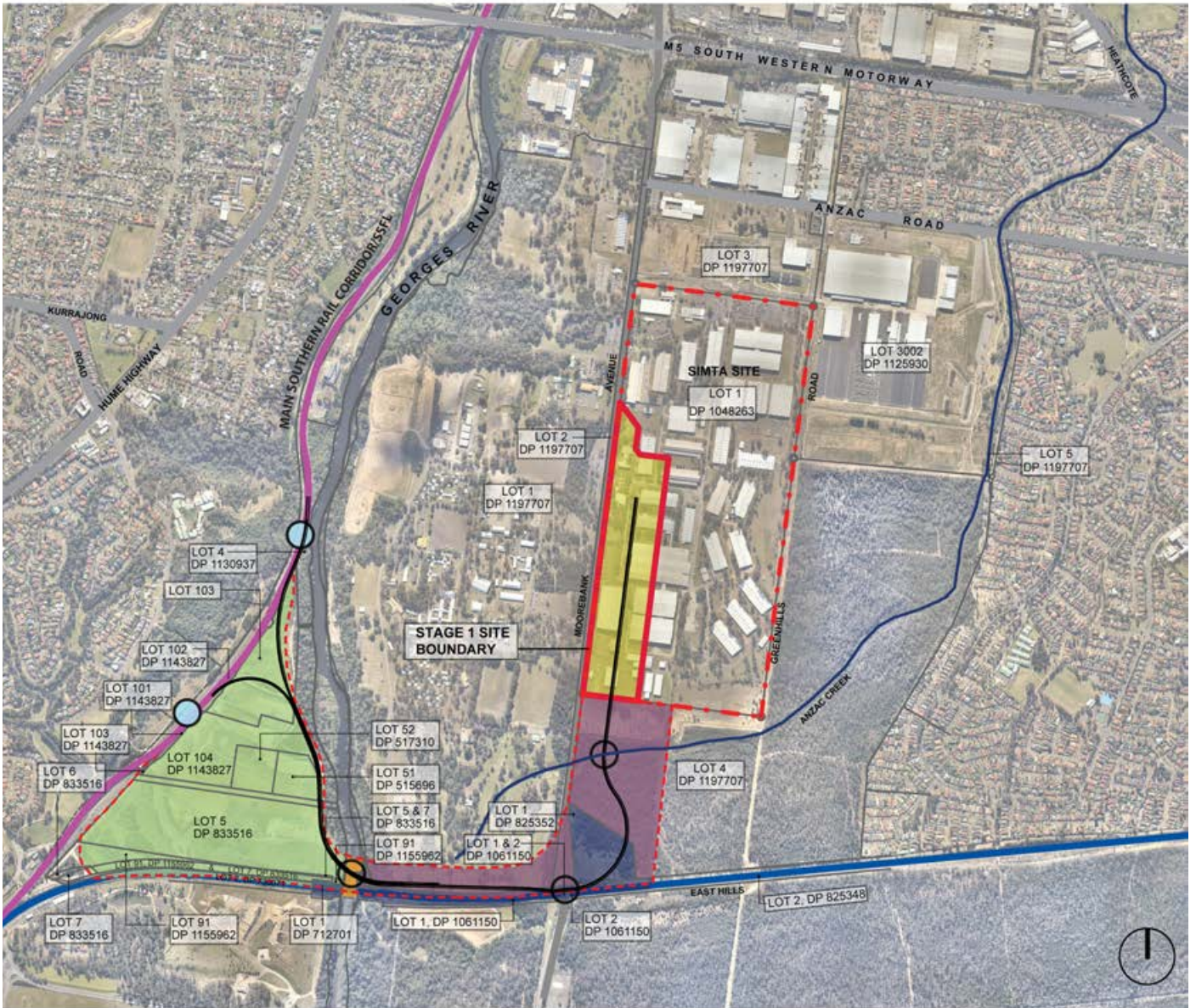
- consistency with the Concept Plan Approval (No. 10\_0193);
- that the Proposal is consistent with general industry and existing development in close proximity to the site and as such the visual amenity at these locations is generally unchanged;
- modelling suggests that there is highly limited visual impact to residential areas due to distance, existing visual barriers and undulating topography;
- in most instances it was found that there was either no visual impact or no change to the general overall visual amenity at simulated view locations in residential areas;
- the most prominent views of the Proposal would be at localised site boundary points, however the visual amenity at these locations is likely to be improved through mitigation measures such as significant and intensive landscaping, screening and architectural elements that do not currently exist or shield the current site operations;
- the impact of light spill to residential properties would be well within the required criteria as specified in Australian Standard AS4282 - 1997 *Control of Obtrusive Effects of Outdoor Lighting*; and
- the cumulative impact of the MIC site may be significant to adjacent communities to this Proposal, however it may in fact provide a 'visual shield' to the bulk of the Stage 1 Proposal.

Table 1 that follows summarises the findings of the visual impacts of the various viewpoints that are assessed in this report.

View Location Name	Area	Type	Visual Impact
View 01	Casula	Residential	No impact
View 02	Casula	Residential	No impact
View 03	Casula	Public park	No impact
View 04	Casula	Public park	Low
View 05	Casula	Public park	Low
View 06	Casula	Residential	No impact
View 07	Casula	Public park	No impact
View 08	Moorebank	Public road/Industrial	Low/Moderate
View 09	Moorebank	Public road/Industrial	No impact
View 10	Wattle Grove	Public road	No impact
View 11	Wattle Grove	Residential	No impact
View 12	Wattle Grove	Residential	No impact
View 13	Wattle Grove	Public park	Low
View 14	Wattle Grove	Residential	No impact
View 15	Wattle Grove	Residential	No impact
View 16	Wattle Grove	Residential	No impact
View 17	Moorebank	Public road	No impact
View 18	Moorebank	Public road/Industrial	Low/Moderate
View 19	Moorebank	Public road/Industrial	Low/Moderate
View 20	Moorebank	Public road/Industrial	Low/Moderate
View 21	Moorebank	Public road/Industrial	No impact
View 22	Moorebank	Public road/Industrial	No impact
View 23	Moorebank	Public road/Industrial	Low/Moderate
View R01	Moorebank	Public road	Moderate
View R02	Moorebank	Public road	Moderate
View R03	Glenfield	Public road	No impact
View R04	Casula	Public park	No impact
View R05	Casula	Public park	No impact
View R06	Casula	Public park	No impact
View R07	Casula	Residential	No impact
View R08	Casula	Public park	No impact
View R09	Casula	Public park	No impact
View R10	Casula	Public park	No impact
View R11	Glenfield	Industrial	Low
View R12	Glenfield	Industrial/River	Moderate

Table 1 - Viewpoint impact summary

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**LEGEND**

- SIMTA SITE BOUNDARY
- STAGE 1 SITE BOUNDARY
- RAIL CORRIDOR BOUNDARY
- MAJOR ROADS AND HIGHWAYS
- PROPOSED RAIL LINK

- FEDERAL**
- COMMONWEALTH
- STATE**
- SYDNEY TRAINS
  - CROWN

- PRIVATE**
- PRIVATE
- ARTC**
- ARTC





# 01 introduction

## 1.1 background

The SIMTA Project involves the development of an intermodal facility, including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank (the SIMTA site). The SIMTA Project also includes a Rail link, within an identified rail corridor (the Rail Corridor), which connects from the southern part of the SIMTA site to the Southern Sydney Freight Line (SSFL) (the entire area, SIMTA site and Rail Corridor referred to as the Project site). The SIMTA Project is to be developed in three key stages:

- Stage 1- Construction of the Intermodal Terminal Facility and Rail link
- Stage 2- Construction of warehouse and Distribution Facilities
- Stage 3- Extension of the Intermodal Terminal Facility and completion of Warehouse and Distribution Facilities.

A summary of the approvals undertaken to date for the SIMTA site, relating to the SIMTA Project, include:

- **EPBC Approval** (No. 2011/6229) granted in March 2014 for the impact of the SIMTA Project on listed threatened species and communities (sections 18 and 18A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) and Commonwealth land (sections 26 and 27A of the EPBC Act).
- **Concept Approval** (No. 10\_0193) granted by the Planning Assessment Commission (PAC) on the 29 September 2014 for the 'Concept Approval' of the SIMTA Project under Part 3A of the EP&A Act.

Both of these approvals involved the preparation of design and environmental assessment documentation.

## 1.2 report purpose

This report has been prepared for approval of the initial stage of the SIMTA Project, known as the Stage 1 Proposal. A summary of the works included in the Stage 1 Proposal is provided below. This report has been prepared to support a State Significant Development (SSD) Application for which approval is sought under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) (ref: SSD 14-6766 and dated December 2014). Table 2 provides a summary of the SEARs and the section where they have been addressed in this report.

Section/Number	SEARs	Where addressed
11. Visual Amenity, Urban Design and Landscaping	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 07
	b) include artist's impressions of the development from key vantage points;	Section 07
	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 key components including container stacking heights, lighting, bridge crossing and views to and from the project;	Section 07
	d) Consider lighting impacts in the local area, analyse and describe the contribution and impacts of the proposed facility on light spill at the local scale and to sensitive receivers;	Section 08
	e) Proposed management/mitigation measures to address the visual impact of the Proposal.	Section 06

Table 2 - SEARs (SSD 14-6766) compliance table

This report also considers the potential cumulative impact of adjacent developments, specifically the proposed Moorebank Intermodal Company (MIC) site (former School of Military Engineering) proposed "Moorebank Intermodal Terminal" (MIT) development.

The purpose of the cumulative impact assessment is to identify any potential increase to visual sensitivity and impact at selected view points due to these additional developments, over and above the impact of the SIMTA Stage 1 Proposal as described in Section 7 of this report.

### 1.3 key terms

Table 3 provides a summary of the key terms which are included within this report.

Section/number	SEARs
Concept Plan Approval	Concept Plan Approval (MP 10_0193) granted on 29 September 2014 for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank. This reference includes the associated Conditions of Approval (CoA) and Statement of Commitments (SoC) which form the approval documentation for the Concept plan Approval.
EPBC Approval	Approval (No. 2011/6229) granted under the EPBC Act on March 2014 by the Commonwealth Department of Environment for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank.
SIMTA Project	The SIMTA Moorebank Intermodal Terminal Facility at Moorebank as approved by the Concept Plan (MP_10_0913).
SIMTA site	Includes the former Defence National Storage and Distribution Centre (DNSDC) site, the land owned by SIMTA which is subject to the Concept Plan Approval (refer to Figure 1).
Rail Corridor	Area defined as the 'Rail Corridor' within the Concept Plan Approval. The Rail link is also included within this area (refer to Figure 1).
Project site	Includes the SIMTA site and the Rail Corridor, i.e. the entire site area which was approved under the Concept Plan Approval (refer to Figure 1).
Stage 1 site	The subject of this EIS, the western part of the SIMTA site which includes all areas to be disturbed by the Stage 1 Proposal (including the Operational area and Indicative Construction area) (refer to Figure 1). This area does <u>not</u> include the Rail Corridor.
Construction area	Extent of construction works, namely areas to be disturbed during construction of the Stage 1 Proposal.
Operational area	Extent of operational activities for the operation of the Proposal (refer to Figure 1).
Proposal site	Includes the Stage 1 site and the Rail Corridor, i.e. the area for which approval (construction and operation) is sought within this EIS.
Rail link	The Rail link including the area on either side to be impacted by the construction works included in the Stage 1 Proposal.
Former DNSDC South	The land to the south of the operational footprint of the Intermodal Terminal, to the boundary fence of the former DNSDC.
Southern Boot Land	Commonwealth owned land to the south of Former DNSDC South, and to the north of the RailCorp Land (part of the Boot Land in the MIC proposal).
RailCorp Land	Lot 1 DP 825352 (part of the Rail Corridor) and owned by RailCorp.
The Proposal	Stage 1 of the SIMTA Moorebank Intermodal Terminal Facility including construction and operation of the intermodal terminal facility and Rail link, i.e. all works and built form for which approval is sought in this EIS/Technical Report.
MIC Proposal	The development of an intermodal facility, associated commercial infrastructure (warehousing) and a Rail link (3 options have been provided) to be located on the MIC site, for which an approval, under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i> . This proposal is currently under assessment by the Department of Planning and Environment.
MIC site	The former School of Military Engineering site to the immediate west of the SIMTA site, across Moorebank Avenue.

Table 3 - Key Terms

## 1.4 Proposal overview

The Proposal involves the construction and operation of the necessary infrastructure to support a maximum container freight road volume of 250,000 TEU (twenty-foot equivalent units) throughput per annum. Specifically, Stage 1 includes the following key components, which together comprise the intermodal terminal facility (IMT):

- Truck processing, holding and loading areas- entrance and exit from Moorebank Avenue;
- Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual handling equipment initially and overhead gantry cranes progressively;
- Administration facility and associated car parking- light vehicle access from Moorebank Avenue.
- The Rail link – located within the Rail Corridor, including a connection to the intermodal terminal facility, traversing of Moorebank Avenue, Anzac Creek and Georges River and connection to the SSFL; and
- Ancillary works- vegetation clearing, remediation, earth works, utilities installation/connection, signage and landscaping.



## 1.5 site description

The SIMTA site, including the Stage 1 site, is located approximately 27 kilometres south-west of the Sydney Central Business District (CBD) and approximately 26 kilometres west of Port Botany. The SIMTA site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West Sub-Region, approximately 2.5 kilometres from the Liverpool City Centre.

The SIMTA site is located approximately 800 metres south of the intersection of Moorebank Avenue and the M5 Motorway. The M5 Motorway provides the main road link between the SIMTA site and the key employment and industrial areas within the West and South Western Sydney Sub-Regions. The M5 Motorway connects with the M7 Motorway to the west, providing access to the Greater Sydney Metropolitan Region and NSW road network. Similarly the M5 Motorway is the principal connection to Sydney's north and north-east via the Hume Highway.

The Southern Sydney Freight Line (SSFL) is located one kilometre to the west of the proposed SIMTA site. The SSFL is a 36 kilometre dedicated freight line between Macarthur and Chullora.

The SIMTA site was recently operating as the Defence National Storage and Distribution Centre (DNSDC) however Defence has recently relocated this operation and vacated the SIMTA site. The majority of land immediately surrounding the SIMTA site is owned and operated by the Commonwealth and comprises:

- School of Military Engineering (SME), on the western side of Moorebank Avenue directly adjacent to the SIMTA site;
- Holsworthy Military Reserve, to the south of the site on the southern side of the East Hills Passenger Railway Line;
- Commonwealth Residual Land, to the east between the SIMTA site and the Wattle Grove residential area; and
- Defence National Storage and Distribution Centre (DNSDC), to the north and north east of the SIMTA site.

The site to immediate west of the SIMTA site which currently includes the SME is the subject of a Development Application (DA) (SSD-5066), under Part 4, Division 4.1 of the EP&A Act, for the development of an intermodal facility known as the Moorebank Intermodal Terminal Project (MIC Proposal). The EIS for the MIC Proposal has recently been prepared and publically exhibited on 8 October 2014 to 8 December 2014. A Preferred Project Report (PPR) is currently under preparation to respond to submissions received during public exhibition. The MIC Proposal has yet to be determined by the Department of Planning and Environment (DP&E).

A number of residential suburbs are located in proximity to the SIMTA site, including:

- Wattle Grove, located approximately 600 metres from the Stage 1 site and 750 metres from the Rail link to the east;
- Moorebank, located approximately 1700 metres from the Stage 1 site and more than 2,700 metres from the Rail link to the north;
- Casula, located approximately 1,100 metres from the Stage 1 site and 250 metres from the Rail link to the west; and
- Glenfield, located over 1,700 metres from the Stage 1 site and 750 metres from the Rail link to the south-west.

## 02 assessment methods

### 2.1 visual impact assessment

The following steps were undertaken in the assessment of visual impacts of the Proposal.

#### preliminary viewshed analysis

A viewshed analysis was undertaken for the site in Geographical Information System (ArcGIS - Spatial Analyst Extension) by Hyder Consulting to provide an initial indication of which parts of the surrounding area could potentially view some part of the site (in its existing form). The three dimensional ground surface data used for this analysis included the natural terrain as well as buildings and major areas of vegetation (see Figures 4 & 6).

#### site inspection

The consultant team carried out a site inspection to verify the results of the viewshed analysis and to evaluate the existing visual character of the area and specifically identify locations that would potentially be subject to visual impacts from the Proposal. Photographs were taken by Reid Campbell and Hyder Consulting from key viewpoints using a GPS Camera for later use in visual simulations of the development.

#### visualisation of the development

Based on the Stage 1 Proposal in Figure 1, the built form and urban design principles in the Urban Design and Landscape report (in particular maximum height and scale) and the Concept Approval, Reid Campbell developed a digital three-dimensional model using AutoDesk REVIT that included the likely components of the development that would potentially be visible beyond the site. Views were generated of the model that matched the camera positions of photographs taken from the key viewpoints and combined with the photographs to create simulated views of the Proposal from each of these key viewpoints.

#### assessment of visual impact

The visual impact from the key viewpoints was then assessed qualitatively on the basis of the criteria described in Section 3. Views at a variety of distances from the site were considered, however it is noted that the SIMTA site is primarily surrounded by vast amounts of vegetation to the east and the MIC site (formerly School of Military Engineering site) to the west (see Figure 2 & 6) providing an extensive buffer to local residential areas and other existing developments.

The Rail link has also been assessed from key viewpoints identified on the basis of a Rail link being constructed within the proposed Rail Corridor area.

### 2.2 light spill assessment

A lighting concept for the Proposal was developed by AECOM, based on the operational requirements of SIMTA 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.

## 03 assessment criteria

### 3.1 visual impact assessment criteria

The visual impact of the selected viewpoints in this study have been evaluated on a qualitative basis. The visual impact of the Proposal has been assessed using a range of criteria against which the relative importance of each observer location can be described, including: context, setting, site elements, site character, adjacent development, distance to view (foreground, middleground and background), land use, visual prominence of the development, and potential changes to the view setting. For each observer location, these criteria have been addressed under three category headings: 'visual adaptation', 'visual sensitivity' and the resulting 'visual impact'. A comparative description of each category used in the visual impact evaluation process is summarised below:

#### 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, including:

- the prominence of the Proposal and its individual components with regard to scale, form, colour and texture in contrast with the surrounding landscape; and
- the compatibility of the development within the context of the particular landscape zoning/primary use (such as residential, parklands and other non-industrial related uses) on the basis that integration of the proposed development is likely to incur a higher visual impact in those zones which are inhabited by non-industrial related activity. To this extent, 'compatibility' relates only to the specific viewpoint locations and not the degree to which the development can be seen as described under 'prominence' above.

#### 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 sensitivity is expressed in relative terms in this study with residential areas being of higher visual sensitivity and industrial areas having a lower sensitivity. Other areas of higher sensitivity include roads where, despite a short duration of views, there are large numbers of potential viewers and parks where the duration of views is not particularly long, but where a high degree of importance is placed on visual amenity.

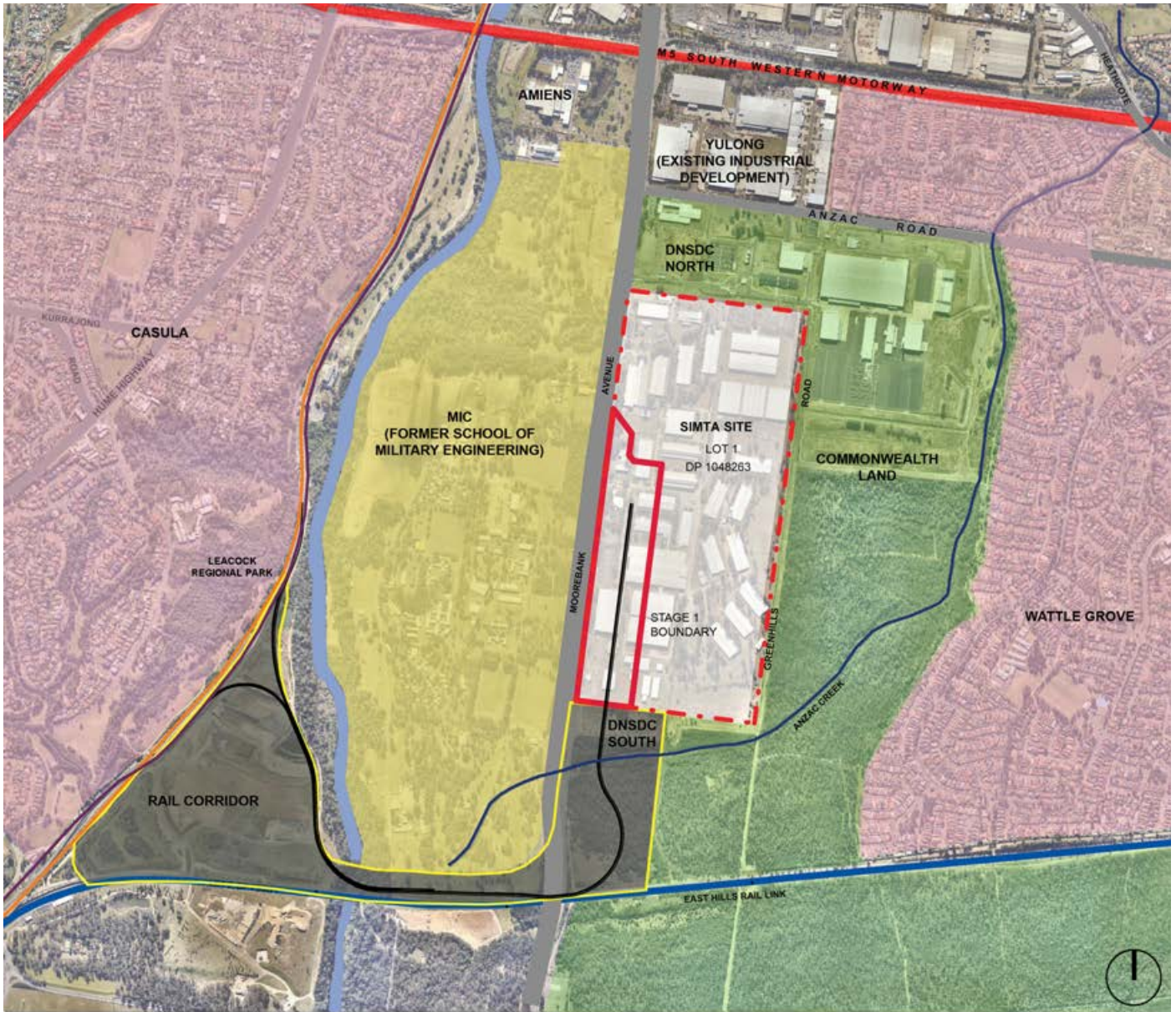
#### visual impact

The resulting visual impact is summarised on a qualitative basis against the above criteria.

### 3.2 light spill assessment criteria

Light spill at the edge of the site has been digitally modelled by AECOM and is expressed quantitatively in terms of light intensity.





**LEGEND**

- |                                                                                     |                          |                                                                                     |               |                                                                                     |                                             |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------------------------------------|
|  | SIMTA SITE BOUNDARY      |  | MIC SITE      |  | RESIDENTIAL AREA                            |
|  | STAGE 1 SITE BOUNDARY    |  | COMMONWEALTH  |  | RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE    |
|  | RAIL CORRIDOR BOUNDARY   |  | RAIL CORRIDOR |  | RAIL LINE - SHARED PASSENGER & FREIGHT LINE |
|  | MAJOR ROADS AND HIGHWAYS |  | GEORGES RIVER |  | RAIL LINE - DEDICATED PASSENGER LINE        |
|  | PROPOSED RAIL LINK       |  | MOTORWAYS     |                                                                                     |                                             |



## 04 visual character of the surrounding area

The SIMTA site is surrounded by land owned and occupied by the Department of Defence and MIC. This includes the MIC site (Former School of Military Engineering) to the west, the Defence National Storage and Distribution Centre (DNSDC) to the north and east, and further Commonwealth of Australia Land to both the east and the south. The outer proximity toward the north includes existing Moorebank industrial developments known as 'Amiens' and 'Yulong'. The residential suburb of Wattle Grove is located to the north-east and east. The Casula residential area is approximately 1-1.5 km west of the SIMTA site divided by the MIC Site, the Georges River and the SSFL.

The site is within relatively close proximity to the M5 Motorway, which intersects with Moorebank Avenue approximately 800 metres to the north of the north-east site boundary. Moorebank Avenue runs in a north-south direction and provides a direct connection between the Liverpool City Centre and M5 Motorway on/off ramps to the north and the Glenfield/ Macquarie Fields residential areas to the south.

Approximately 900m west from the site, the SSFL and passenger rail line run in a north-south direction and are bounded by the Casula residential area. To the south of the site, the existing EHPL runs in an east-west direction.

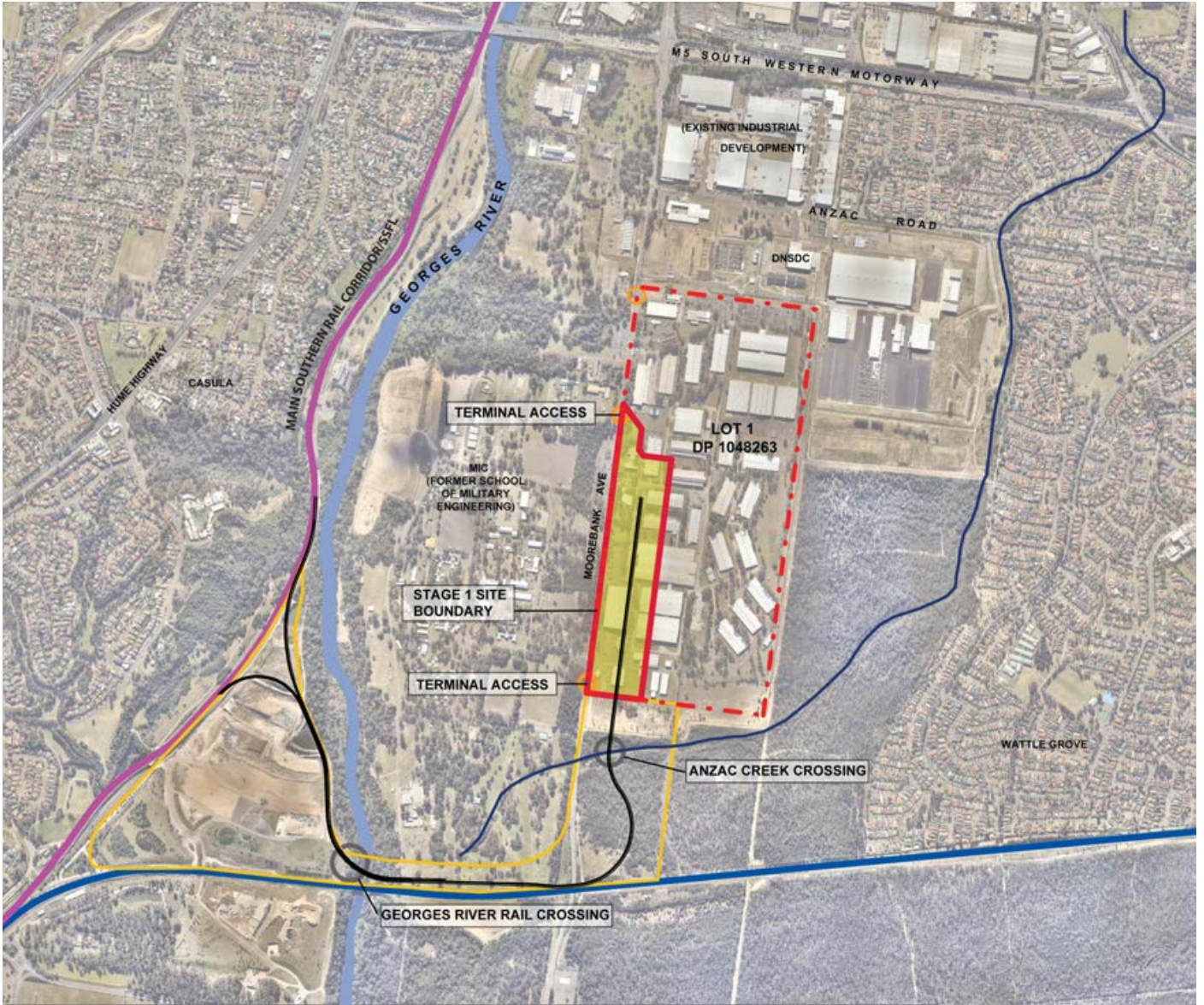
The outer area to the east and north of the site comprises the Wattle Grove residential area (primarily low density), extensive commercial and industrial developments and major motorways.

Surrounding natural elements include:

- Georges River which runs along the western boundary of the MIC Site;
- Leacock Regional Park, which is a publically accessible recreation area, is located on the western side of the Georges River;
- Anzac Creek which runs along the eastern boundary of the Commonwealth owned land and traversing it to the South of the Stage 1 site as well the MIC site; and
- Existing landscape and vegetation running along approximately one half of the eastern boundary and full length of southern boundary of the SIMTA site (the Bootland), forming a physical barrier to the area to the East of the SIMTA site. This bushland is primarily regenerated vegetation and includes Anzac Creek. The density of the bushland provides significant screening to much of the south and east of the site from surrounding areas.

The existing visual character of the site and surrounding area is shown on Figure 2.





**LEGEND**

- |                                                                                     |                        |                                                                                     |                                          |
|-------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
|  | SIMTA SITE BOUNDARY    |  | RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE |
|  | STAGE 1 SITE BOUNDARY  |  | RAIL LINE - DEDICATED PASSENGER LINE     |
|  | RAIL CORRIDOR BOUNDARY |                                                                                     |                                          |
|  | PROPOSED RAIL LINK     |                                                                                     |                                          |



## 05 visual character of the development

Stage 1 of the SIMTA development involves the redevelopment of part of the SIMTA site, with some of the existing structures being demolished. The existing site character is essentially industrial, consisting of a number of large buildings used for warehouse and distribution purposes. The existing site topography (Figure 4) is generally flat with a low hill located within the middle section of the eastern boundary of the site. The most prominent natural feature located near the site is Anzac Creek lying off the southern boundary. There is existing bushland on both the eastern and southern boundaries of the site.

The Stage 1 development would include primary container storage areas, visible operating elements and landscape buffer zones (Figure 5) which are consistent with the Urban Design and Landscape report that formed part of the Concept Plan Approval (MP 10\_0193).

**Rail link:** Fundamental to the operation of the SIMTA Moorebank Intermodal Terminal Facility is a rail connection to the SSFL. The exact dimensions are subject to final detail design, however for the purpose of evaluation a Rail link within the Rail Corridor has been included in this report to determine the likely visual impact.

**Intermodal Terminal:** The intermodal terminal would be located on the western part of the site, adjacent to Moorebank Avenue. The total terminal area is approximately 18ha including the following key elements:

- Four Rail sidings of up to approximately 700 metres in length within the Stage 1 site to accommodate trains of upto 650m in length.
- Container hardstand to be used for container sorting and storage (up to 5 containers high or 13m)
- Administration offices and ancillary operational facilities (probably of steel and cladding construction approximately 15m high)

The intermodal terminal is anticipated to operate 24 hours a day, 7 days a week. The terminal would include:

- Gantries to move containers from rail cars (approx 32m high);
- Gantries for container movement within the terminal;
- Modern container and secondary freight handling equipment;
- Ancillary facilities and amenities;
- 500 sqm Terminal management office (approx.); and
- Refuelling facilities.

**Lighting:** The visualisation carried out for this assessment assumes a light pole heights varying between 13.5 to 21m. Poles would be galvanised steel.

Further information regarding heights, colours and material finishes of the Stage 1 Development are available in the Plans and Documents under EIS Section - 4.





**LEGEND**

- |                                                                                     |                        |                                                                                     |                                          |
|-------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
|  | SIMTA SITE BOUNDARY    |  | PROPOSED RAIL LINK                       |
|  | STAGE 1 SITE BOUNDARY  |  | RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE |
|  | RAIL CORRIDOR BOUNDARY |  | RAIL LINE - DEDICATED PASSENGER LINE     |

High  
TOPOGRAPHY  
Low





## 06 measures to reduce visual impact

Appropriate measures to reduce the visual impact of the Stage 1 development were identified in parallel with the Concept Plan Approval. These measures would primarily comprise screen planting in key areas and visual buffers. Further detail can be found in the Concept Plan Approval (MP 10\_0193) and its guidelines. An indicative Stage 1 site plan and landscape plan is shown at Figure 5 which demonstrates potential built form, facility and operations frontages in accordance with the Concept Plan Approval. Figure 5 is indicative only and provides a representation of the potential maximum built-form impact for the purposes of conducting the Visual Assessment.

To mitigate and minimise any visual impacts, a high quality landscape through reinforcement and extension of the surrounding natural context and ecological qualities is proposed. The landscape treatment would visually and physically connect with the existing landscape and vegetation adjacent to the site.

Along the Moorebank Avenue frontage, an 18m wide corridor of screening vegetation and a bio-retention swale 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.

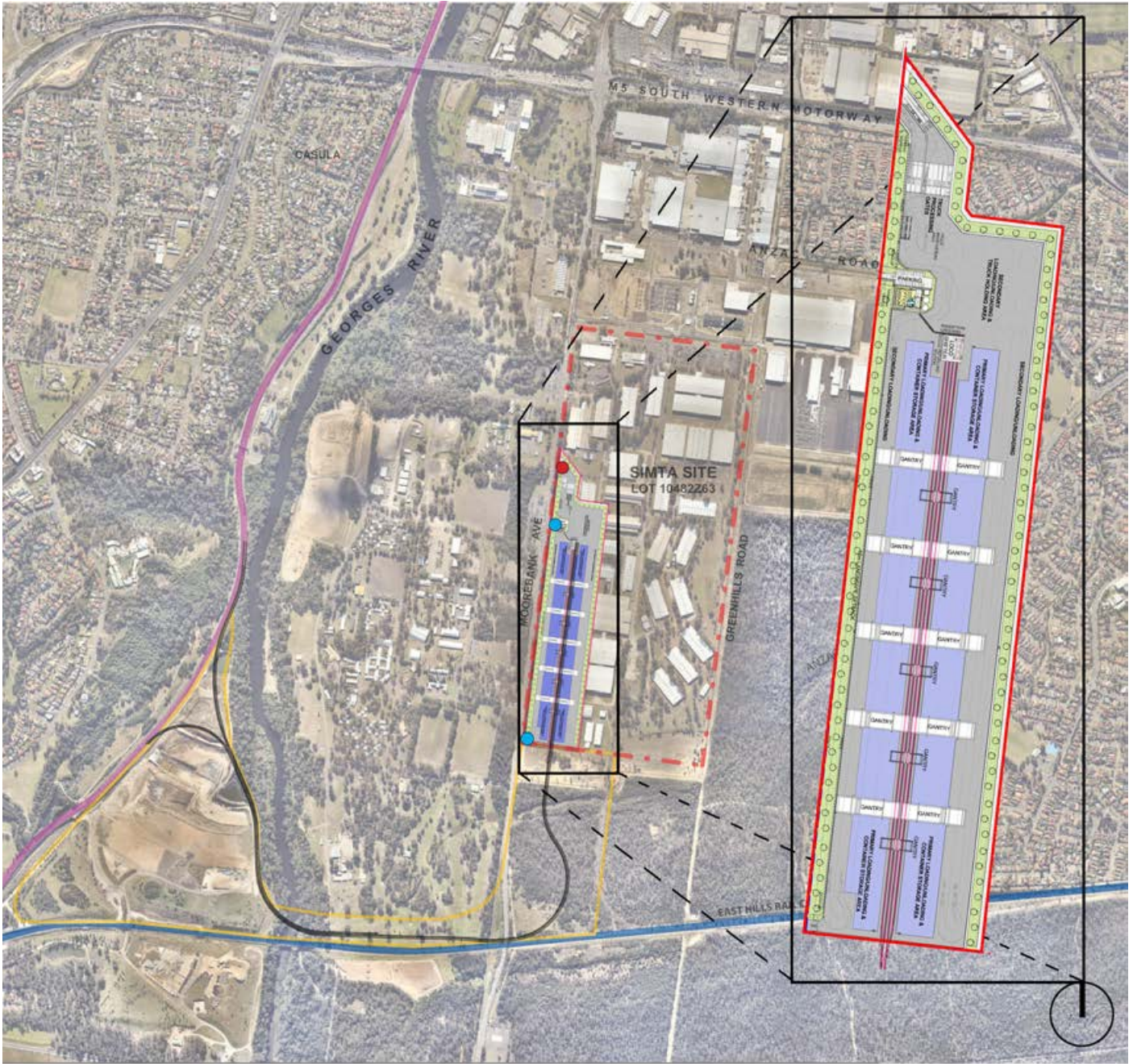
The key nodal points along Moorebank Avenue is distinguished into 3 locations: A primary entry point, an administration entrance and emergency exit point to the Stage 1 site. These access points would include additional features to enhance the arrival experience through the use of a series of selected native plants and recycled materials (where possible) in built-form to create visual interest (See Figure 5).

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.

Where landscaping is clear of railway lines, planting would consist of mixed tree planting used to create natural feeling through landscape zones and mixed under-storey planting consisting of native shrubs and ground covers to form a virtually impenetrable barrier when mature. 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.

Mitigation measures incorporated during the construction phase are discussed separately under section 7.2.

Overall, the proposed landscape treatments would result in an improvement in the visual amenity of the entire site and would increase the current level of screening of the site.



**LEGEND**











- |                                                                                     |                                                    |                                                                                     |                                          |                                                                                     |                                                                                |
|-------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|  | SIMTA SITE BOUNDARY                                |  | PROPOSED RAIL LINK                       |  | LANDSCAPE BUFFER ZONE                                                          |
|  | STAGE 1 SITE BOUNDARY                              |  | RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE |  | PRIMARY ENTRY TO INTERMODAL TERMINAL WITH ENTRY SIGNAGE                        |
|  | RAIL CORRIDOR BOUNDARY                             |  | RAIL LINE - DEDICATED PASSENGER LINE     |  | SECONDARY ENTRY TO INTERMODAL TERMINAL WITH DIFFERENTIATING PLANTING TREATMENT |
|  | PRIMARY LOADING/UNLOADING & CONTAINER STORAGE AREA |                                                                                     |                                          |                                                                                     |                                                                                |



Figure 5 - Indicative SIMTA Stage 1 Proposal and Landscape Master Plan  
Inset: Stage 1 Site Plan

## 07 visual impact of the development

The visual impact of the development has been assessed by evaluating the views to the development from identified key viewpoints on the basis of the visual impact assessment criteria described in Section 3.

The extensive native bushland areas, DNSDC facilities on neighbouring lands, the proposed MIC site and the general pattern of industrial type development surrounding the site screen the development from much of the greater sensitive surrounding areas - primarily residential.

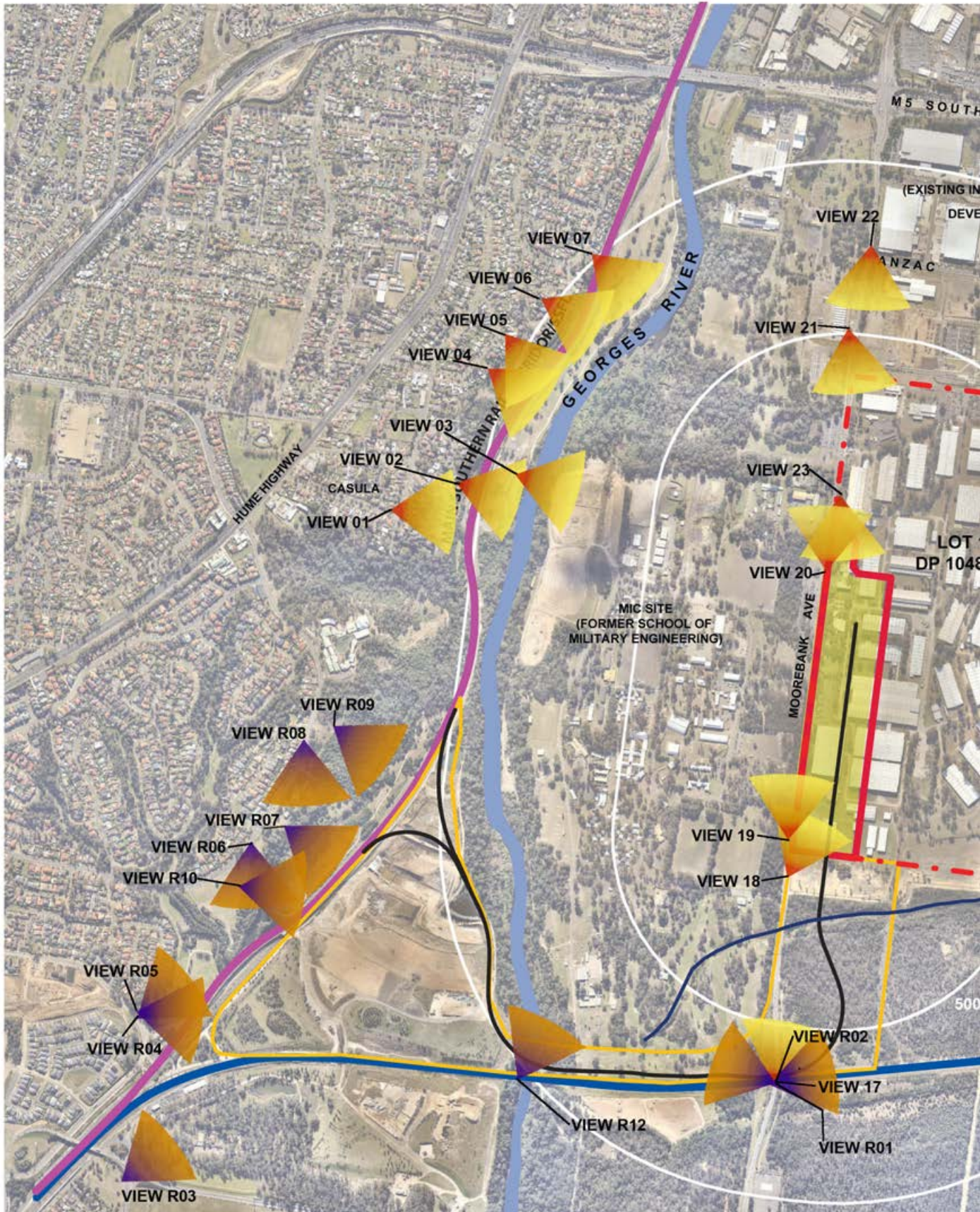
Potential viewpoints do occur along viewing corridors created by streets bounding the site (Moorebank Avenue and Anzac Road), and where topography provides some elevation above potential obstructions to views such as Casula area to the west.

The identified view points are all within 2km of the site. The digital viewshed analysis does not suggest that any significant further views of the development exist.

This section of the report assesses the visual impact from individual key viewpoints identified through the digital viewshed analysis during daylight hours at which it is assumed would be consistent with peak operations.

Night time visual impacts are discussed in Section 8 as part of the light spill assessment. There would also be potential visual impacts during the construction of the Proposal. These are discussed at the end of this section.

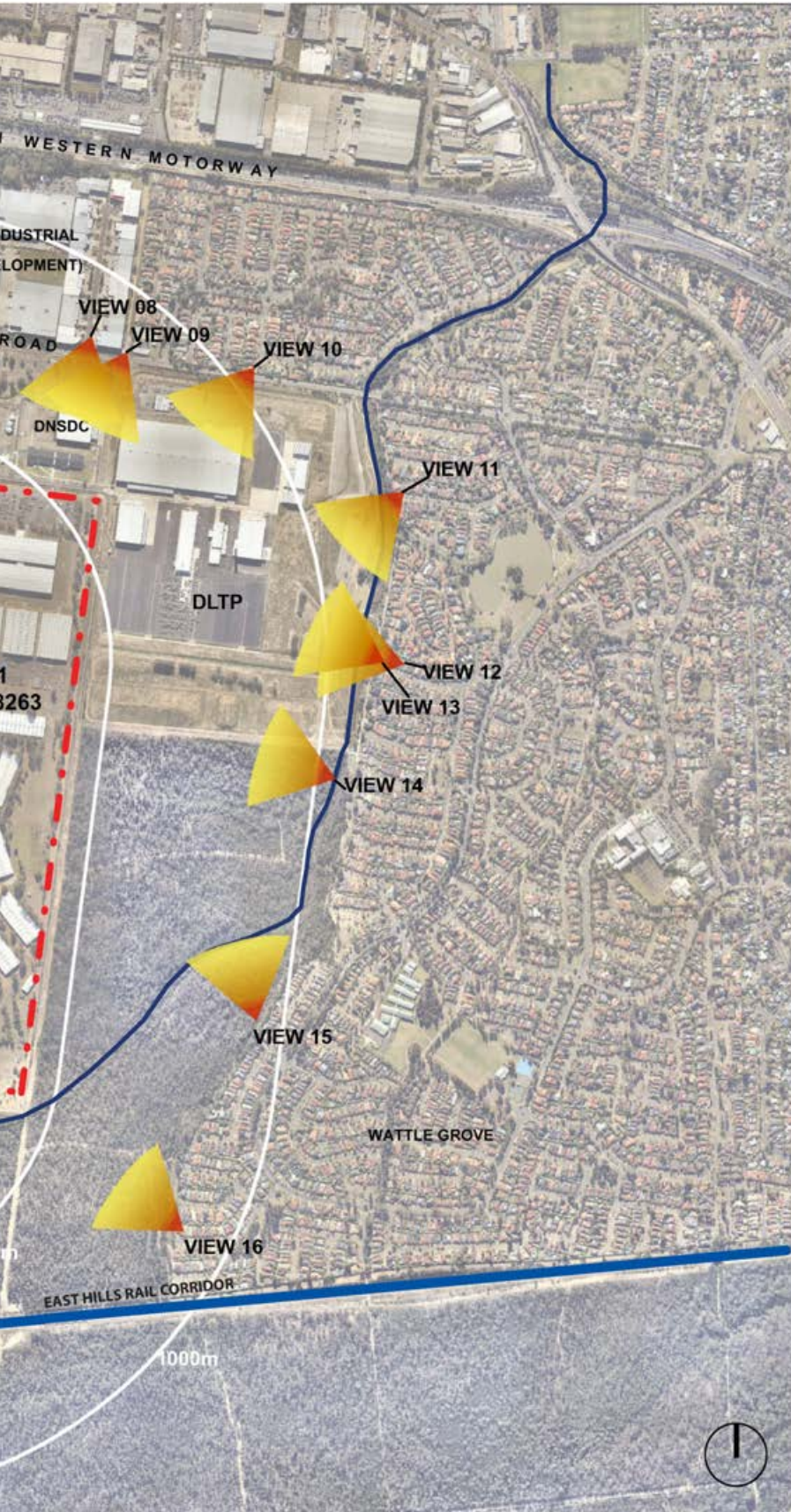













24 Figure 6 - View Locations



view locations



LEGEND

-  SIMTA SITE BOUNDARY
-  STAGE 1 SITE BOUNDARY
-  RAIL CORRIDOR BOUNDARY
-  PROPOSED RAIL LINK
-  INTERMODAL TERMINAL FACILITY
-  RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE
-  RAIL LINE - DEDICATED PASSENGER LINE
-  VIEWPOINT: TO STAGE 1 SITE
-  VIEWPOINT: TO RAIL LINK

# Viewpoint R11 is out of image bounds







Existing View



Simulated View

# view 01

<b>Viewing Location</b>	West of site, Corner of Casula Rd. and Canberra Avenue, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,300m to site boundary (approx.)
Prominence of the Development	<p>This view location has been taken from a suburban street within the Casula residential area. It lies west of the Proposal on the corner of Casula Road leading into Canberra Avenue.</p> <p>The view corridor is looking east towards the SIMTA site. Although it is elevated above the stage 1 development site, the view corridor is shielded by existing mature and relatively dense vegetation as well as one and two storey residential dwellings.</p> <p>There is no evidence to suggest that the Proposal would be visible from this view location.</p>
Landscape Compatibility	<p>The existing landscape from this location comprises one and two storey residential dwellings with established high and low lying mature street vegetation lining either side of the street.</p> <p>There are trees in the foreground as well as large trees behind the residential dwellings that are highly prominent.</p>
<b>Visual Sensitivity</b>	Being a residential area the visual sensitivity would be relatively high. Several houses within the area would be subject to minimal views of the development, however the prominence of the Proposal within these views would be low. Most views would be of short duration therefore the visual amenity would be relatively unchanged.
<b>Visual Impact</b>	<p>There would be limited or no visibility from this viewpoint east across the Georges River to the Proposal.</p> <p>The visual amenity would be unchanged within this view corridor as the landscape amenity would remain unaffected, therefore there would be no visual impact.</p>





Existing View



Simulated View



# view 02

<b>Viewing Location</b>	West of site, Rushton Place, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m to site boundary (approx.)
Prominence of the Development	<p>This view location is from Rushton Place looking toward an existing rail station and powerhouse. Beyond this lies Georges River and the Proposal which is heavily obscured by background vegetation.</p> <p>The pedestrian rail bridge and railway are the most prominent features in the foreground of this viewpoint. Casula Powerhouse Arts Centre is completely obscured by vegetation to the left of the overpass with the exception of the redundant oil and water tanks</p> <p>The stage 1 terminal facility would not be visible from this location. The viewpoint is at a slightly higher elevation than that of the site, although the vegetation in the background completely screens the proposed development.</p>
Landscape Compatibility	<p>The existing landscape from this location comprises of Casula Railway station in the foreground. Directly beyond the railway station lies the now unused oil and water tanks of the now decommissioned Casula Powerhouse. The background dominated by large woodland trees. This large vegetation screens the industrial and infrastructure zoned land beyond as well as the terminal facility further beyond.</p> <p>The existing landscape is highly compatible with proposed additional terminal development.</p>
<b>Visual Sensitivity</b>	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 relatively low.
<b>Visual Impact</b>	Existing built elements in the foreground dominate this view corridor. There would be little or no visibility of the Proposal from this viewpoint, which in any case would be compatible with foreground structures. There would be no visual impact at this location.



Existing View



Simulated View

# view 03

<b>Viewing Location</b>	West of site, adjacent to Casula Powerhouse
<b>Visual Adaptation</b>	
Approximate Viewing Distance	900m to site boundary (approx.)
Prominence of the Development	<p>This view location looks directly from the Western bank of the Georges River towards the Proposal. Both sides of the river are of lower elevation than the site.</p> <p>The development 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>
Landscape Compatibility	<p>Tall trees and thick vegetation along the Georges River bank block a major portion of the landscape beyond including the river itself.</p> <p>Directly beyond this is a large expanse of industrial and infrastructure zoned land. This land consists of open fields, existing buildings, and large amounts of existing vegetation.</p> <p>The Proposal is highly compatible with the existing landscape beyond. This is due to the similar land use of both the industrial and infrastructure zoned land in the middle ground, and that of the Proposal.</p>
<b>Visual Sensitivity</b>	<p>The industrial land use beyond Georges River (Moorebank Southern Industrial precinct) creates a low visual sensitivity. Most of the views from this area would be from a location directly adjacent to Casula Powerhouse Arts Facility hence being a location of low visual sensitivity.</p>
<b>Visual Impact</b>	<p>There is no visibility of the terminal facility from this view location.</p> <p>Natural elements dominate the view corridor to undeveloped industrial zoned land (the MIC site) beyond Georges River leading to the Proposal site.</p> <p>The Stage 1 site is obscured by this existing vegetation.</p> <p>There would be no visual impact.</p>





Existing View



Simulated View

# view 04

<b>Viewing Location</b>	West of site, Carroll Park, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to site boundary (approx.)
Prominence of the Development	The view location is taken from a highly elevated point at Carroll Park in the West looking down toward the main Southern Sydney rail corridor and the proposed terminal development site beyond.
Landscape Compatibility	<p>The existing landscape from this location comprises a Rail line and Arts Centre (formerly Casula Powerhouse) in the foreground and an expanse of industrial and infrastructure zoned land-use beyond along with existing vegetation.</p> <p>The existing landscape is highly compatible with the proposed additional development. Therefore there would be little to no alteration within the landscape amenity.</p>
<b>Visual Sensitivity</b>	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 minimal views of the development, however the prominence of the Proposal site within these views would be low. Most views would be of short duration therefore the visual amenity would be relatively unchanged.
<b>Visual Impact</b>	There would be limited visibility from this viewpoint east across the Georges River to the Proposal. The existing landscape amenity would have little to no change therefore suggesting that there would be relatively low to no visual impact.



Existing View



Simulated View



# view 05

<b>Viewing Location</b>	West of site, Carroll Park, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to site boundary (approx.)
Prominence of the Development	<p>The Proposal, similar to the previous viewpoint would be only slightly visible from this location. The viewpoint is higher in elevation than that of the site resulting in the gantry elements being partially visible above the existing tree line.</p> <p>The majority of the development would be obscured by existing industrial development, infrastructure and vegetation.</p>
Landscape Compatibility	<p>The existing landscape from this location comprises of a Rail line and arts centre (formerly Casula Powerhouse) in the foreground and an expanse of industrial and infrastructure zoned land-use beyond along with existing vegetation.</p> <p>The existing landscape is highly compatible with the proposed additional development. Therefore there would be little to no alteration within the landscape amenity.</p>
<b>Visual Sensitivity</b>	<p>Being a residential area the visual sensitivity would be relatively high. Several houses within the area would be subject to minimal views of the development, however the prominence of the Proposal within these views would be low.</p> <p>Most views would be of short duration therefore the visual amenity would be relatively unchanged.</p>
<b>Visual Impact</b>	<p>There would be limited visibility from this viewpoint east across the Georges River to the Proposal.</p> <p>The existing landscape amenity would have little to no change therefore suggesting that there would be relatively low to no visual impact.</p>



Existing View



Simulated View



# view 06

<b>Viewing Location</b>	West of site, Buckland Road, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to site boundary (approx.)
Prominence of the Development	<p>This view location along Buckland Road is slightly elevated, however modelling suggests that the proposed stage 1 development would not be visible from this location.</p> <p>One and two storey residential dwellings are more prominent in the foreground of this moderately vegetated streetscape.</p> <p>Further east lies dense bushland which obscures a direct line of sight toward the Proposal.</p>
Landscape Compatibility	<p>The existing landscape from this location comprises of residential dwellings. It is a residential zoned area.</p> <p>There are some trees in the foreground as well as large trees behind the residential dwellings that screen the Proposal.</p>
<b>Visual Sensitivity</b>	<p>Being a residential area the visual sensitivity would be relatively high. There are some expansive views from this area. The large amounts of vegetation in the background effectively screen the Proposal.</p>
<b>Visual Impact</b>	<p>There would be no change to the visual amenity or views at this location, therefore this would result in no visual impact.</p>



Existing View



Simulated View

# view 07

<b>Viewing Location</b>	North-west of site, adjacent to St. Andrews Boulevard, Casula
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m to site boundary (approx.)
Prominence of the Development	<p>This view location adjacent to St. Andrews Boulevard is looking toward the proposed stage 1 development site. There is a highly vegetated area obscuring any direct view of the site.</p> <p>The Proposal would not be visible from this location.</p> <p>The SSFL in the foreground runs within close proximity to Georges River and is the more prominent built feature in this view corridor.</p> <p>The entire development would be screened by the large amounts of existing vegetation in the background.</p>
Landscape Compatibility	In the foreground is a existing Rail line with its associated service access road and power lines above. Directly beyond is Georges River. On the other side of the Georges River is a large expanse of industrial and infrastructure zoned land that is currently heavily vegetated. This vegetation completely screens the Proposal.
<b>Visual Sensitivity</b>	<p>Being a publicly accessible park in a residential area. the visual sensitivity in this location would be high.</p> <p>The view location is from a residential zoned area. However, the railway line in the foreground lowers the visual sensitivity.</p>
<b>Visual Impact</b>	The development would not be visible from this location. Therefore there would be no visual impact.





Existing View



Simulated View

# view 08

<b>Viewing Location</b>	North of site, Corner of Yulong Close and Anzac Road
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m to site boundary (approx.)
Prominence of the Development	<p>There is a relatively unobstructed view from the corner of Anzac Road and Yulong Close to the northern half of the Proposal.</p> <p>The gantries servicing the proposed intermodal terminal and the primary container storage yard are highly visible from this viewing location.</p>
Landscape Compatibility	<p>The addition of any new industrial development within this viewpoint would have little to no impact on the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible.</p> <p>It is proposed that there would be landscape treatment and a buffer zone along the eastern and northern boundary which would help reduce any change to the existing landscape amenity and prominence of the development.</p>
<b>Visual Sensitivity</b>	<p>The industrial land-use at this location creates a moderate visual sensitivity (Moorebank Southern Industrial precinct).</p> <p>Most views from within this area looking south towards the Proposal would be from existing industrial areas or from commuters travelling along Anzac Road for brief durations.</p>
<b>Visual Impact</b>	<p>The Proposal would be highly prominent at this location from Anzac Road looking south onto the site.</p> <p>There is low to moderate visual sensitivity from this viewpoint as the viewpoint is within an already established industrial zone. Therefore there would be a low to moderate visual impact from this viewpoint.</p>



Existing View



Simulated View



# view 09

<b>Viewing Location</b>	North of site, Corner of Greenhills Road and Anzac Road
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m to site boundary (approx.)
Prominence of the Development	<p>The development would have little to no prominence from this particular location.</p> <p>The Proposal would not be visible and both existing structures, namely the zone substation in the foreground and vegetation would be more prominent.</p>
Landscape Compatibility	<p>This viewpoint is dominated by an industrial character. Any additional industrial development would be compatible with this landscape.</p> <p>It is unlikely that there would be a negative effect on the visual amenity at this location as the view corridor to the development would only be slightly altered.</p>
<b>Visual Sensitivity</b>	<p>There would be low visual sensitivity as this viewpoint is located in a zoned industrial area (Moorebank Southern Industrial precinct). Most views from within this area looking south towards the Proposal would be from already existing built up industrial areas therefore not changing in anyway the already existing landscape amenity.</p>
<b>Visual Impact</b>	<p>The landscape change from this viewpoint would be barely perceptible due to the viewing distance and the fact that proposed built form elements which would be potentially visible would be similar to the existing elements that they would replace in the view.</p> <p>There would be no visual impact at this location.</p>



Existing View



Simulated View

# view 10

<b>Viewing Location</b>	North-East of site, Anzac Road
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,100m to site boundary (approx.)
Prominence of the Development	The recent development of the DNSDC North site in the foreground completely obstructs views beyond. The Proposal would not be visible from this location along Anzac Road.
Landscape Compatibility	The landscape character at this location comprises mainly open vegetated space and industrial elements (namely warehousing). Any inclusion of visible industrial elements would not change the existing landscape amenity.
<b>Visual Sensitivity</b>	<p>The visual sensitivity would be relatively high as the view location is sitting along Anzac Road within a low density residential zone (RE2).</p> <p>The existing landscape amenity would not change as the Proposal would be not be visible along this section of Anzac Road.</p>
<b>Visual Impact</b>	<p>The landscape change from this viewpoint would be minimal due to the foreground massing and the fact that new elements which would be potentially visible would be similar to the existing elements character in the view.</p> <p>There would be no visual impact at this location.</p>





Existing View



Simulated View



# view 11

<b>Viewing Location</b>	North-East of site, Castlerock Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,300m to site boundary (approx.)
Prominence of the Development	Due to thick vegetation in the foreground and viewing distance, there are no views of the Proposal from this viewpoint.
Landscape Compatibility	The landscape character at this location comprises mainly open vegetated space and minor elements of infrastructure. Any inclusion of visible industrial elements would change the existing landscape amenity.
<b>Visual Sensitivity</b>	The visual sensitivity would be relatively high as the view location is within a low density residential zone. The existing landscape amenity would not change as the Proposal would not be visible from this location.
<b>Visual Impact</b>	The Proposal would not be visible at this location.  There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View

# view 12

<b>Viewing Location</b>	East of site, Martindale Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to site boundary (approx.)
Prominence of the Development	<p>Due to thick vegetation in the foreground and viewing distance, there are no views of the Proposal from this viewpoint.</p> <p>The existing vegetation partially screens the Proposal.</p>
Landscape Compatibility	The landscape character at this location comprises mainly open vegetated space and elements of infrastructure. Any inclusion of visible industrial elements would change the existing landscape amenity.
<b>Visual Sensitivity</b>	<p>The visual sensitivity would be relatively high as the view location is within a low density residential zone (RE2).</p> <p>The existing landscape amenity would not be changed as the Proposal would not be visible from this location.</p>
<b>Visual Impact</b>	<p>The Proposal would not be visible at this location.</p> <p>There would be no change to the visual amenity at this location, therefore this would result in no visual impact.</p>





Existing View



Simulated View



# view 13

<b>Viewing Location</b>	East of site, Martindale Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to site boundary (approx.)
Prominence of the Development	The Proposal site would be partially visible from this location.  The development would however be partially screened by existing vegetation and the DNSDC site
Landscape Compatibility	The existing landscape from this location comprises of open vegetated space and industrial elements. Any inclusion of visible industrial elements would change the existing landscape amenity.
<b>Visual Sensitivity</b>	The visual sensitivity would be relatively high as the view location is within a low density residential zone (RE2).  However, most of the views from this area would be of a limited depth, would include existing industrial elements and the vegetation partially screens the Proposal. Therefore the overall visual amenity would be low.
<b>Visual Impact</b>	The Proposal is partially visible at great distance at this location, therefore the visual impact would be low.



Existing View



Simulated View

# view 14

<b>Viewing Location</b>	East of site, Gracemere Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m to site boundary (approx.)
Prominence of the Development	<p>The Proposal would not be visible from this location.</p> <p>The Proposal is entirely screened by the vast amount of heavy vegetation.</p>
Landscape Compatibility	<p>The existing landscape directly in front of this location comprises of infrastructure zoned land that is heavily vegetated.</p> <p>The Proposal is beyond this infrastructure zoned land.</p> <p>The immediate landscape directly behind the viewing location is residential zoned land comprising of residential dwellings.</p>
<b>Visual Sensitivity</b>	<p>Although the view is of an industrial zoned land, any change to the current landscape amenity would result in high visual sensitivity, considering the view is from a residential area.</p> <p>The Proposal would not be visible from this location, therefore the visual amenity would be unchanged.</p>
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View

# view 15

<b>Viewing Location</b>	East of site, adjacent to Corryton Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	900m to site boundary (approx.)
Prominence of the Development	The Proposal would not be visible from this location.  The Proposal is entirely screened by the vast amount of heavy vegetation.
Landscape Compatibility	The existing landscape directly in front of this location comprises of infrastructure zoned land that is heavily vegetated.  In the foreground is Anzac Creek. The Proposal is beyond this infrastructure zoned land.  The immediate landscape directly behind the viewing location is residential zoned land comprising of residential dwellings.
<b>Visual Sensitivity</b>	Although the view is of an industrial zoned land, any change to the current landscape amenity would result in high visual sensitivity, considering the view is from a residential area.  The Proposal would not be visible from this location, therefore the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View



# view 16

<b>Viewing Location</b>	South-East of site, Somercotes Court, Wattle Grove
<b>Visual Adaptation</b>	
Approximate Viewing Distance	900m to site boundary (approx.)
Prominence of the Development	<p>The Proposal would not be visible from this location.</p> <p>The Proposal is entirely screened by the vast amount of heavy vegetation.</p>
Landscape Compatibility	<p>The existing landscape directly in front of this location comprises of infrastructure zoned land that is heavily vegetated.</p> <p>The Proposal is beyond this infrastructure zoned land.</p> <p>The immediate landscape directly behind the viewing location is residential zoned land comprising of residential dwellings.</p>
<b>Visual Sensitivity</b>	<p>Although the view is of an industrial zoned land, any change to the current landscape amenity would result in high visual sensitivity, considering the view is from a residential area.</p> <p>The Proposal would not be visible from this location, therefore the visual amenity would be unchanged.</p>
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View

# view 17

<b>Viewing Location</b>	South of site, Moorebank Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	700m to site boundary (approx.)
Prominence of the Development	<p>The Proposal would not be visible from this location.</p> <p>The Proposal is entirely screened by the heavy vegetation.</p>
Landscape Compatibility	<p>The landscape on this part of Moorebank Avenue comprises of infrastructure zoned land that is heavily vegetated on either side of the road.</p> <p>The Proposal is further down Moorebank Avenue, but it is not visible from this location because of the bend in the road and the large trees that screen the Proposal.</p>
<b>Visual Sensitivity</b>	<p>The infrastructure zoned land results in a low sensitivity in this location.</p> <p>The Proposal from this location would not be visible, therefore the visual amenity would be unchanged.</p>
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View\*

# view 18

<b>Viewing Location</b>	South of site, Moorebank Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	250m to site boundary (approx.)
Prominence of the Development	<p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the south-western corner of the Proposal.</p> <p>The container yard with associated gantries would be highly prominent.</p>
Landscape Compatibility	<p>The addition of any new industrial development within this viewpoint would have a moderate impact on the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible.</p> <p>The proposed gantries and container yard would be of a larger scale than the existing industrial buildings.</p> <p>There would be an 18m landscape buffer zone and estate entry point with built form elements to provide visual interest which would help reduce any change to the existing landscape amenity and prominence of the development.</p>
<b>Visual Sensitivity</b>	<p>The industrial land-use at this location creates a low visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal site would be from existing industrial areas or from commuters travelling along Moorebank Avenue for nominal durations.</p>
<b>Visual Impact</b>	<p>The Proposal would be highly prominent at this location. However, the landuse compatibility creates a low visual sensitivity and therefore there would be a low to moderate visual impact from this viewpoint.</p>



Existing View



Simulated View\*



# view 19

<b>Viewing Location</b>	South of site, Moorebank Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	50m to site boundary (approx.)
Prominence of the Development	<p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the south-western corner of the Proposal.</p> <p>The container yard with associated gantries would be highly prominent.</p>
Landscape Compatibility	<p>The addition of any new industrial development within this viewpoint would have a moderate impact on the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible.</p> <p>The proposed gantries and container yard would be of a larger scale than the existing industrial buildings.</p> <p>There would be an 18m landscape buffer zone and estate entry point with built form elements to provide visual interest which would help reduce any change to the existing landscape amenity and prominence of the development.</p>
<b>Visual Sensitivity</b>	<p>The industrial land-use at this location creates a low visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal site would be from existing industrial areas or from commuters travelling along Moorebank Avenue for nominal durations.</p>
<b>Visual Impact</b>	<p>The Proposal would be highly prominent at this location. However, the landuse compatibility creates a low visual sensitivity and therefore there would be a low to moderate visual impact from this viewpoint.</p>



Existing View



Simulated View\*

# view 20

<b>Viewing Location</b>	West of site, Moorebank Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	20m to site boundary (approx.)
Prominence of the Development	There is a relatively unobstructed view from this portion of Moorebank Avenue to the south-western corner of the Proposal site. The truck processing gates and entry point would be highly visible. For the purposes of creating a realistic assessment of the potential visual impact of the container yard and operating equipment, container heights have been staggered generally at maximum stacking height.
Landscape Compatibility	<p>The addition of any new industrial development within this viewpoint would have a moderate impact on the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible.</p> <p>The proposed gantries and container yard would be of a larger scale than the existing industrial buildings.</p> <p>There would be an 18m landscape buffer zone and estate entry point with built form elements to provide visual interest which would help reduce any change to the existing landscape amenity and prominence of the development.</p>
<b>Visual Sensitivity</b>	The industrial land-use at this location creates a low visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal site would be from existing industrial areas or from commuters travelling along Moorebank Avenue for nominal durations.
<b>Visual Impact</b>	The Proposal would be highly prominent at this location. However, the landuse compatibility creates a low visual sensitivity and therefore there would be a low to moderate visual impact from this viewpoint.





Existing View



Simulated View

# view 21

<b>Viewing Location</b>	North-West of site, Moorebank Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	500m to site boundary (approx.)
Prominence of the Development	<p>This portion of Moorebank Avenue consists of industrial facilities on either side of the road.</p> <p>The road is lined with large trees on either side which entirely screen the Proposal site.</p>
Landscape Compatibility	The addition of new industrial elements to this landscape would be very compatible with this landscape.
<b>Visual Sensitivity</b>	<p>The industrial land-use results in a low visual sensitivity in this location.</p> <p>The Proposal site would not be visible from this location, hence the visual amenity would be unchanged.</p>
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View



# view 22

<b>Viewing Location</b>	North of site, Corner of Moorebank Avenue and Anzac Road
<b>Visual Adaptation</b>	
Approximate Viewing Distance	750m to site boundary (approx.)
Prominence of the Development	<p>This portion of Moorebank Avenue consists of industrial facilities on either side of the road.</p> <p>The road is lined with large trees on either side which entirely screen the Proposal site.</p>
Landscape Compatibility	The addition of new industrial elements to this landscape would be very compatible with this landscape.
<b>Visual Sensitivity</b>	<p>The industrial land-use results in a low visual sensitivity in this location.</p> <p>The Proposal site would not be visible from this location, hence the visual amenity would be unchanged.</p>
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View\*

# view 23

<b>Viewing Location</b>	Corner of Moorebank Av. and Road marked as DS NNSW LMA
<b>Visual Adaptation</b>	
Approximate Viewing Distance	50m to site boundary (approx.)
Prominence of the Development	<p>This portion of Moorebank Avenue consists of industrial facilities on either side of the road.</p> <p>The truck processing gates and entry point to the stage 1 site would be highly prominent. The container yard and associated gantries would be visible in the background. The road is lined with large trees on either side which partially screen the Proposal.</p>
Landscape Compatibility	<p>The addition of any new industrial development within this viewpoint would have a small impact on the existing landscape amenity. There is little existing vegetation and the existing industrial elements sitting within the boundary of the Proposal are highly visible.</p> <p>The truck processing gates and entry points provide a break in the landscape along Moorebank Avenue. The proposed gantries and container yard would be of a larger scale than the existing industrial buildings.</p> <p>There would be an 18m landscape buffer zone and estate entry point with built form elements to provide visual interest which would help reduce any change to the existing landscape amenity and prominence of the development.</p>
<b>Visual Sensitivity</b>	The industrial land-use at this location creates a low to moderate visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal site would be from existing industrial areas or from commuters travelling along Moorebank Avenue for nominal durations.
<b>Visual Impact</b>	The Proposal would be highly prominent at this location. However, the landuse compatibility creates a low visual sensitivity and therefore there would be a low to moderate visual impact from this viewpoint.





Existing View



Simulated View

# view R01

<b>Viewing Location</b>	South of site, Moorebank Avenue (rail overpass)
<b>Visual Adaptation</b>	
Approximate Viewing Distance	60m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	<p>The Moorebank Avenue rail overpass is located 800m south of the Stage 1 site.</p> <p>It has unobstructed elevated views of the existing city rail passenger railway line.</p> <p>The proposed Rail link is adjacent to the existing railway line and would be highly prominent from this location. No other part of the development would be visible from this location.</p>
Landscape Compatibility	<p>The landscape on either side of the railway lines (existing and proposed) is highly vegetated, consisting of large trees and shrubs.</p> <p>The addition of the proposed Rail link would moderately detract from the existing landscape amenity.</p>
<b>Visual Sensitivity</b>	Traffic that passes along this portion of Moorebank Avenue would have prominent views of the proposed Rail link. However, due to the views being predominantly brief and the importance of amenity to the viewers not being significant, the visual sensitivity at this location would be moderate.
<b>Visual Impact</b>	<p>The addition of the proposed Rail link is not a substantial change to the existing landscape amenity.</p> <p>The visual impact at this location would be moderate.</p>





Existing View



Simulated View



# view R02

<b>Viewing Location</b>	South of site, Moorebank Avenue (rail overpass)
<b>Visual Adaptation</b>	
Approximate Viewing Distance	50m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	<p>The Moorebank Avenue rail overpass is located 650m south of the Proposal.</p> <p>It has unobstructed elevated views of the existing city rail passenger railway line.</p> <p>The proposed Rail link is adjacent to the existing railway line and curves to the Rail Corp land, south of the Stage 1 site.</p>
Landscape Compatibility	<p>The landscape on either side of the railway lines (existing and proposed) and the former DNSDC rail spur are highly vegetated, consisting of large trees and shrubs.</p> <p>The addition of the proposed Rail link would moderately detract from the existing landscape amenity.</p>
<b>Visual Sensitivity</b>	Traffic that passes along this portion of Moorebank Avenue would have prominent views of the proposed Rail link. However, due to the views being predominantly brief and the importance of amenity to the viewers not being significant, the visual sensitivity at this location would be moderate.
<b>Visual Impact</b>	<p>The addition of the proposed Rail link has a moderate impact to the existing landscape amenity.</p> <p>Considering the moderately sensitive visual sensitivity in this location, the visual impact at this location would be moderate.</p>



Existing View



Simulated View

# view R03

<b>Viewing Location</b>	South-west of site, Corner of Canterbury Road and Cambridge Avenue
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,200m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The Proposal is not visible from this location. The proposed Rail link would be entirely screened by the heavy vegetation and existing dwellings.
Landscape Compatibility	In the foreground is the intersection of Cambridge Avenue and Canterbury Road.  The existing landscape comprises of some heavy vegetation. Amongst this vegetation are some existing dwellings.
<b>Visual Sensitivity</b>	Being a roadway the visual sensitivity in this location is low. The views would be from passing traffic through the intersection, and would be of short duration.  Because the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View

# view R04

<b>Viewing Location</b>	South-west of site, Glenfield Road
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond this park is the existing city rail passenger railway line and the elevated SSFL. Further beyond the existing railway line is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	Considering the existing landscape amenity, the visual sensitivity in this location is very high. As the proposed Rail link would not be visible, the visual amenity would remain unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View



# view R05

<b>Viewing Location</b>	South-West of site, Glenfield Road (within Leacock Regional Reserve)
<b>Visual Adaptation</b>	
Approximate Viewing Distance	1,000m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond this park is the existing city rail passenger railway line and the elevated SSFL. Further beyond the existing rail way line is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	Considering the existing landscape amenity, the visual sensitivity in this location is high. As the proposed Rail link would not be visible, the visual amenity would remain unchanged.
<b>Visual Impact</b>	The Rail link cannot be seen from this view point.  There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View

# view R06

<b>Viewing Location</b>	South-west of site, Leacocks Lane
<b>Visual Adaptation</b>	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	On account of being a publicly accessible park close to a residential area, the visual sensitivity in this location is high. However since the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View

# view R07

<b>Viewing Location</b>	South-West of site, Leacocks Lane
<b>Visual Adaptation</b>	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	On account of being a publicly accessible park close to a residential area, the visual sensitivity in this location is high. However since the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View



# view R08

<b>Viewing Location</b>	West of site, Leacocks Lane
<b>Visual Adaptation</b>	
Approximate Viewing Distance	470m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	On account of being a publicly accessible park close to a residential area, the visual sensitivity in this location is high. However since the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.



Existing View



Simulated View

# view R09

<b>Viewing Location</b>	West of site, Leacocks Lane
<b>Visual Adaptation</b>	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	On account of being a publicly accessible park close to a residential area, the visual sensitivity in this location is high. However since the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View

# view R10

<b>Viewing Location</b>	West of Site, Leacock Park
<b>Visual Adaptation</b>	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is not visible from this location.
Landscape Compatibility	In the foreground is Leacock Regional Park. Beyond the park is some heavy vegetation, the existing passenger railway line and the elevated SSFL that totally screens the proposed Rail link.
<b>Visual Sensitivity</b>	On account of being a publicly accessible park close to a residential area, the visual sensitivity in this location is high. However since the proposed Rail link would not be visible, the visual amenity would be unchanged.
<b>Visual Impact</b>	There would be no change to the visual amenity at this location, therefore this would result in no visual impact.





Existing View



Simulated View



# view R11

<b>Viewing Location</b>	Georges River Bridge on Cambridge Avenue, South of the proposed Georges River Rail link crossing
<b>Visual Adaptation</b>	
Approximate Viewing Distance	600m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of the Development	The proposed Rail link is partially visible from this location. It is obscured from view by the existing EHPL River crossing.
Landscape Compatibility	In the foreground is Cambridge Avenue. Beyond is the Georges River with thick vegetation on either bank. The existing EHPL River crossing is seen in the background
<b>Visual Sensitivity</b>	Considering the view location is from a public road, the visual sensitivity in this location is moderate. The predominant views would be of short duration by persons travelling along Cambridge Avenue. The importance of the amenity would be relatively low, and therefore the overall visual amenity is considered to be of moderate impact.
<b>Visual Impact</b>	The addition of the proposed Rail link crossing would not have a major impact on the existing landscape amenity as the crossing would only be partially visible. Therefore the visual impact would be low.



Existing View



Simulated View<sup>1</sup>

1 This view is not reflective of a view which would be perceivable in the public domain. This photomontage has been taken from private property. In particular, due to access constraints, a view from the EHPL (which is the only public view receptor at this location) was not able to be provided.

# view R12

<b>Viewing Location</b>	Beneath EHPL, South of the proposed Georges River Crossing
<b>Visual Adaptation</b>	
Approximate Viewing Distance	50m from viewpoint line of sight to proposed Rail link / bridge (approx.)
Prominence of the Development	The proposed Rail link is prominent from this location. The viewpoint is directly under the existing EHPL rail bridge.
Landscape Compatibility	In the foreground is the Georges River. The proposed bridge is similar to the existing rail bridge. The banks of the river are thickly vegetated obscuring the view of the bridge beyond the waterway.
<b>Visual Sensitivity</b>	<p>Although the visual sensitivity in this location is high (considering the existing landscape amenity and the view from boats travelling on the Georges River), the view location is not publicly accessible by land and it closely resembles existing bridge elements of the rail bridge for the EHPL. Hence, the visual amenity would be moderate.</p> <p>EHPL traffic that passes along the existing bridge would have prominent views of the proposed railway crossing. However, as passengers would be elevated (travelling on the EHPL) their brief views would differ from that shown in view R12. Hence, the importance of amenity to the viewers being relatively low, the visual sensitivity at this location would be moderate.</p>
<b>Visual Impact</b>	<p>The visual impact would be moderate in this location considering its location and the existing surrounding landscape.</p> <p>The addition of the proposed Rail link is not a substantial change to the existing landscape amenity.</p>



## 07.2 visual impacts during construction

The following construction works are likely to be visible from surrounding areas and have been considered:

- Vegetation clearing and building demolition;
- Establishment and decommissioning of ancillary facilities, including batch plant;
- Earthworks;
- Installation of drainage and utilities;
- Construction of rail sidings, locomotive shifter and refuelling area;
- Construction of overhead gantries;
- Construction of access and egress points connecting to Moorebank Avenue, including signage and truck processing gates;
- Construction of the administration office and services; and
- Construction of the z including a new bridge over the Georges River.

During the above construction works, the most visible elements are likely to be equipment such as cranes and piling rigs. These are likely to be 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 and that 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 tend to create highly localised visual impacts primarily along Moorebank Avenue.

Based on the their location and the works proposed, the visual impact during construction has been assessed for the following viewpoints:

View Location Name	Area	Type	Visual Adaptation	Visual Sensitivity	Visual Impact
View 19	Moorebank	Public Road/ Industrial	Moderate	Low	Low/Moderate
View 23	Moorebank	Public Road/ Industrial	Moderate	Low	Low/Moderate
View R01	Moorebank	Public Road	Moderate	Moderate	Moderate

Table 4 - Visual Impact during Construction

The following mitigation measures would be implemented to reduce the overall visual impact during construction phase

- Existing vegetation around the perimeter of construction sites would be retained where feasible and reasonable;
- The early implementation of landscape planting would be investigated in order to provide visual screening along Moorebank Avenue during the construction of the Proposal;
- Elements within construction sites would be located to minimise visual impacts as far as feasible and reasonable, e.g. setting back large equipment from site boundaries;
- 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; and
- Where required for construction works, cut-off and directed lighting would be used and lighting locations considered to ensure glare and light spill are minimised.

# 08 light spill assessment

## 8.1 Introduction

The lighting of the outdoor areas of the Stage 1 of the SIMTA Moorebank Intermodal Terminal facility is provided by high pressure sodium lighting. The advantages of high pressure sodium lighting include the high energy efficiency and a light spectrum that has a lesser visual impact than white light sources including LED.

## 8.2 Methodology

The methodology for the light spill assessment has been undertaken with an understanding of the proposed work processes and site usage to realise the limitations within which the lighting can be provided. That is to provide for safe work practice, avoid potential interference with equipment used on site and at the same time minimise light spill from the site. As such the pole positions, luminaire mounting heights, luminaire selection and luminaire aiming angles have been derived to provide an optimum result within the restrictions of the site.

The lighting design is provided in accordance with code and modelled using industry standard lighting design software, AGi32. The results are provided in this report.

It should be noted that transitory lighting such as vehicle headlights do not form part of the site lighting assessment.

## 8.3 Lighting Standards

The Proposal is lit in accordance AS/NZS 1680.5:2012 Australian and New Zealand Interior and workplace lighting, Part5: outdoor workplace lighting.

The Proposal is also designed in accordance with *AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting*.

## 8.4 Lighting Design

### 8.4.1 Luminaire Selection

Minimisation of any direct light spill requires selection of a luminaire that essentially has a horizontal front glass when aimed and fixed in position. This requires a floodlight with an asymmetric distribution with a peak intensity of at least 60 to 65 degrees above the nadir. A floodlight such as the Philips ComfortVision SNF111 (see Figure 7) narrow beam with twin 400W high pressure sodium lamps will provide that high degree of control.



Figure 7 - Philips ComfortVision SNF 11



A similar principle applies to the entry and exit points plus the car parking area where traditional roadlighting style luminaires Sylvania Roadster S400 FT (see Figure 8) are proposed with a forward throw distribution to ensure maximum light distribution across the site and minimum backwards light spill out of the site.



Figure 8 - Sylvania Roadster S400 Ft

For maintenance simplicity, minimisation of stock and cost all lamps are 400W high pressure sodium.

#### 8.4.2 Luminaire Position and Mounting Height

The position and mounting height of the luminaire are equally important to luminaire selection to ensure the minimum environmental light spill and to provide outdoor lighting to the Stage 1 site.

The pole height is set as a maximum of 21 metres being the same as the maximum future warehousing and less than the height of proposed overhead gantry cranes.

Minimising the height has an added advantage of reducing the extent of light spill. There are 4 poles that are 21m high to provide light for the large truck holding area. One 18m pole is required on the edge of the loco shifter area. All of the poles have SNF111 2x400HPS floodlights with the front glass tilted only 5 degrees above the horizontal to minimise light spill.

There are also 18m poles down each boundary parallel with each future arrangement of container stack and each pole has a single SNF111 2x400HPS floodlight directed in towards the centre of the site with the front glass tilted only 5 degrees above the horizontal to minimise backwards light spill.

At the entries and exits 13.5m poles provide mounting spigots for Sylvania Roadster S400 FT road lighting luminaires with 400W high pressure sodium lamps.

As an added safety feature, all luminaires are mounted off the poles with no outreach arms so that no luminaire obstructs the free travel of gantry cranes.

#### 8.4.3 Compliance with AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting

The Proposal is a 'commercial area' in accordance with AS4282-1997, with 25 lux being the limit for light spill before curfew at the boundary of adjacent residential properties and 4 lux at the windows of adjacent residential properties during curfew. The calculations of light spill in a vertical plane directed back towards the centre of the site as indicated in Figure 9 show that the combination of lighting design, appropriate luminaire selection, positioning and aiming produce results that are completely in compliance with the requirements of AS4282-1997. The results shown in Figure 9 are much better than the requirements of AS4282-1997.

#### 8.4.4 Mobile and Transitory Lighting

Lighting associated with mobile gantries will generally be of two types. One type will be overhead weatherproof highbay/floodlight type luminaires aimed directly downwards so that the gantry operator can see the containers and the vehicles etc below. This type of lighting is unlikely to provide light spill as it has fixed downward aiming and the loading/unloading operation cannot be performed close to the site boundary. The second type of lighting would also have fixed aiming and the luminaires would be attached to the external access stair on the overhead gantry for workers to climb up to the operator location in safety at night.

Other smaller mobile vehicles may have headlights and rotating light warning beacons.

Mobile and transitory lighting effects are not included in the permanent site lighting spill light calculations.

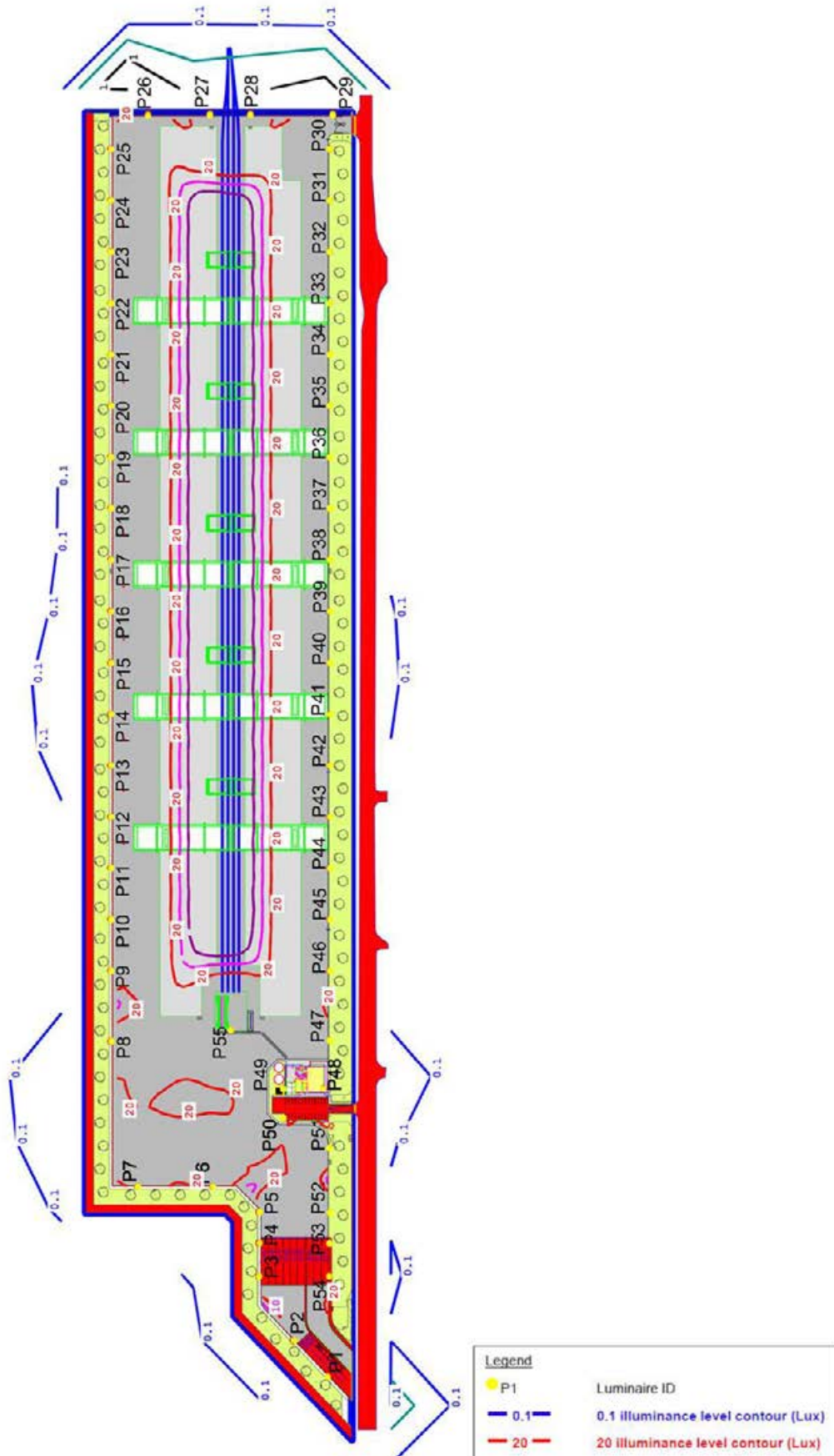


Figure 9 - General site layout showing light spill isolux curves external to site as well as internal site lighting isolux curves from the static area site lighting design as noted above.



## 8.5 Luminaire Schedule

With reference to Figure 9 the light spill assessment has been based on the luminaires provided in Table 5 below:

Pole	height (m)	Sylvania roadster Roadster S400C FT - 206007	Philips SNF111 2x400W HPS N beam
P1	13.5	1	
P2	13.5	1	
P3	13.5	1	
P4	13.5	1	
P5	13.5	1	
P6	21		2
P7	21		2
P8	21		2
P9	18	1	
P10	18	1	
P11	18	1	
P12	18	1	
P13	18	1	
P14	18	1	
P15	18	1	
P16	18	1	
P17	18	1	
P18	18	1	
P19	18	1	
P20	18	1	
P21	18	1	
P22	18	1	
P23	18	1	
P24	18	1	
P25	13.5	1	
P26	13.5	1	
P27	18	1	
P28	18	1	
P29	13.5	1	
P30	13.5	1	
P31	18	1	
P32	18	1	
P33	18	1	

Table 5 - Luminaire Schedule

Pole	height (m)	Sylvania roadster Roadster S400C FT - 206007	Philips SNF111 2x400W HPS N beam
P34	18	1	
P35	18	1	
P36	18	1	
P37	18	1	
P38	18	1	
P39	18	1	
P40	18	1	
P41	18	1	
P42	18	1	
P43	18	1	
P44	18	1	
P45	18	1	
P46	18	1	
P47	21		2
P48	13.5	1	
P49	13.5	1	
P50	13.5	1	
P51	13.5	1	
P52	13.5	1	
P53	13.5	1	
P54	13.5	1	
P55	18		3

Table 5 - Luminaire Schedule continued

## 8.5 Results of Assessment

The light source type, the luminaire make and model, luminaire aiming, pole positions and heights assessed in this report ensure the minimal direct light spill from the static site lighting as demonstrated in Figure 9.

Minimal effect on adjacent properties and on the environment can be achieved by the appropriate selection of light source, luminaire, luminaire mounting height and luminaire aiming in accordance with the details noted above.

The permanent static site lighting included in the Stage 1 Proposal would provide minimal light spill and be well below the limits stated in AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting.



# 09 cumulative impact assessment

## 09.1 introduction

This section considers the potential cumulative impact of adjacent developments, specifically the proposed Moorebank Intermodal Company (MIC) site (former School of Military Engineering) proposed MIC Proposal.

The purpose of the cumulative impact assessment is to identify any potential increase to visual sensitivity and impact at selected view points due to these additional developments, over and above the impact of the SIMTA Stage 1 Proposal as described in Section 7 of this report.

It is important to note that information regarding the MIC Proposal is based on the MIT Project Environmental Impact Statement (EIS) published in October 2014, and therefore the cumulative assessment of this development is confined to broad visual descriptors based on publicly available information at the time of authoring and known land boundaries for each development.

For information purposes, an indicative aerial view of the proposed MIC development Proposal showing possible building and infrastructure outlines is shown at Figure 10. The detail of the Proposal has been compiled from publicly available masterplans and documents<sup>1</sup>.

## summary of MIC planned works

The MIC Proposal on behalf of the Department of Finance and Deregulation (DoFD) and the Department of Infrastructure and Regional Development, proposes the development of an intermodal terminal and logistics centre known as the 'Moorebank Intermodal Terminal' (MIT).

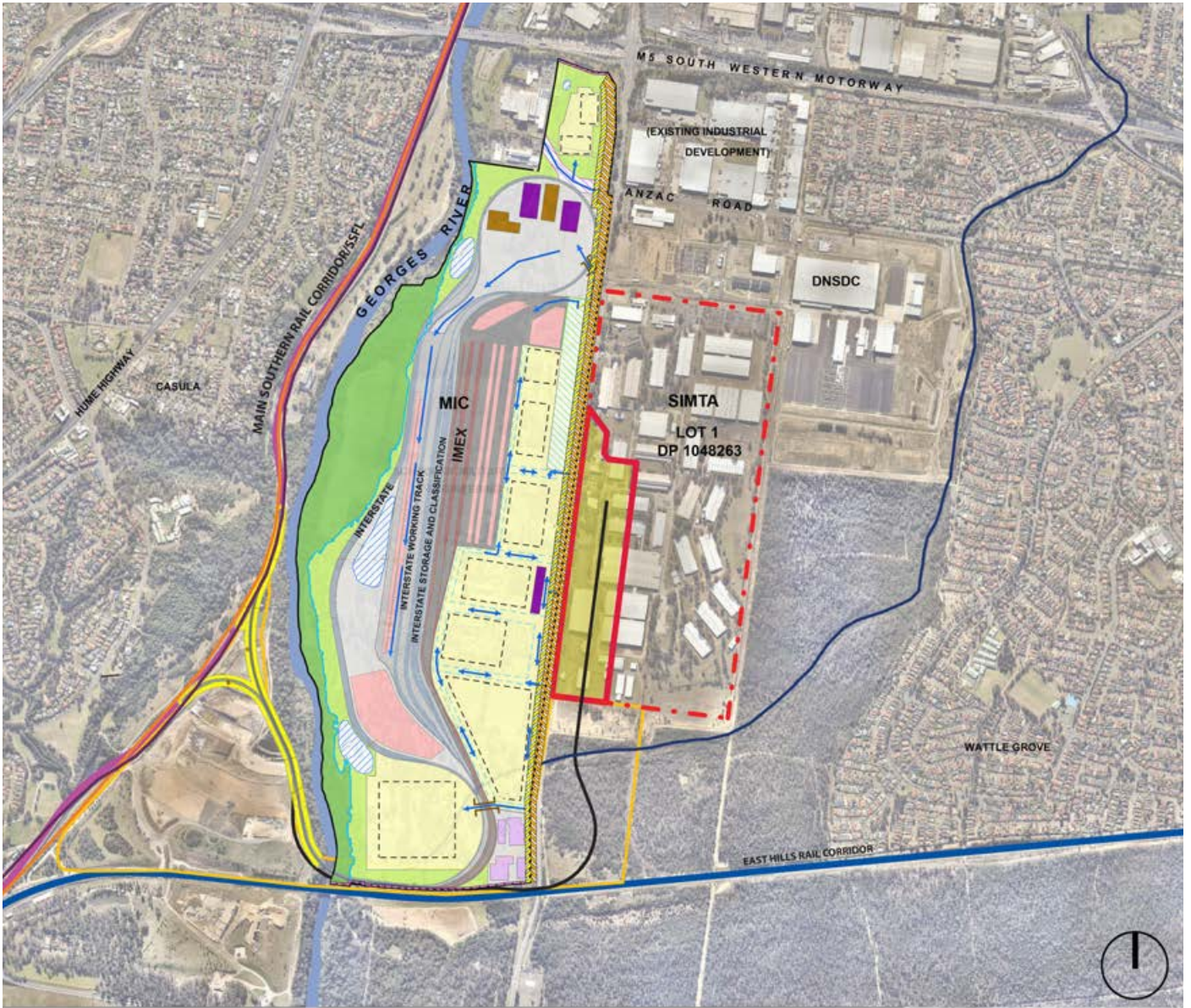
The Proposal includes the redevelopment of approximately 220 hectares of land previously occupied by the Department of Defence School of Military Engineering (SME) and is located on the opposite side of Moorebank Avenue to the SIMTA Stage 1 Proposal.

A document created by Parsons Brinkerhoff on behalf of the MIC titled '*Moorebank Intermodal Terminal Project Environmental Impact Statement*', dated October 2014 describes the MIC planned works to include:

- A port shuttle terminal area and an interstate terminal area, which would both include:
  - working tracks for the movement of rail freight, and the loading and unloading of containers within the site;
  - storage tracks for the storage of freight carriages within the site; and
  - container laydown/storage areas;

<sup>1</sup>The following websites are referenced for use of publicly available materials utilised in this section of the report at the time of authoring:

- <http://www.defence.gov.au/jlc/infrastructure/sites/moorebank.html> (Department of Defence)
- <http://www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/index.html> (Finance)
- <http://www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/environmental-planning.html> (Finance)
- <http://leptracking.planning.nsw.gov.au/PublicDetails.aspx?Id=915> (DoPI)



**LEGEND**

- |                                                                                     |                        |                                                                                     |                                          |
|-------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
|  | SIMTA SITE BOUNDARY    |  | PROPOSED RAIL LINK                       |
|  | STAGE 1 SITE BOUNDAR   |  | INTERMODAL TERMINAL FACILITY             |
|  | RAIL CORRIDOR BOUNDARY |  | RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE |



Figure 10 - Indicative Aerial view of the additional MIC proposal (Southern Crossing option depicted)

- Internal site roads, stormwater management infrastructure, power and utilities;
- A commercial development area, including warehousing provisions;
- Support (administrative and rail/container maintenance/repair) functions for the terminal;
- An environmental conservation zone on the eastern bank of the Georges River;
- Rail link and bridge span crossing the Georges River at the South-western area of the site (as well as notes to alternative Rail configurations);
- Vehicle access, including for heavy and light vehicles, into the site off Moorebank Avenue; and
- Potential upgrades to Moorebank Avenue including the Anzac Road intersection.

It is also noted that a separate Proposal titled '*Planning Proposal: Proposed Amendment to Liverpool Local Environment Plan 2008*', date January 2013, was lodged to the then NSW Department of Planning and Infrastructure by Parsons Brinkerhoff on behalf of the DoFD in relation to the MIT, seeking changes to land zoning, floor space ratios, permissible building heights and minimum lot sizes. This amendment forms part of the MIC EIS for the Proposal.



## 09.2 cumulative impact of Proposals

This Section of the report provides a cumulative impact assessment for the following:

- Enabling works for MIC Proposal (proposed in SSD-5066) and SIMTA Stage 1 operation
- Operation of MIC Proposal and Stage 1 Proposal (which provides an update to the information presented in the Concept Plan Approval).

As detailed information is not available for the purposes of providing a visual analysis the cumulative assessment provided is considered suitable for both of the scenarios discussed above.

The previous sections of this report have identified that the SIMTA Stage 1 Proposal is likely to have a very limited visual impact to surrounding communities and development, primarily due to distance to visual receivers, existing visual barriers, vegetation, and undulating topography.

Further, the Stage 1 Proposal is generally consistent with existing land use and development patterns and therefore the overall visual sensitivity of the Proposal on its own is relatively low.

The MIC Proposal is predominant to the west of the SIMTA site, and coupled with the dense vegetation to the south-east and Anzac Creek, an effective visual shield is created to nearly all receptor viewpoints. The viewpoints for the cumulative assessment as seen in Figure 11 are based on the evaluation of viewpoints where both the Stage 1 and MIC sites are visible.

Based on publicly available development descriptions and concept planning, it appears that the MIC Proposal contains infrastructure similar to that of the SIMTA Stage 1 site. The MIC Proposal would also include industrial buildings and warehousing in line with elements expected within an already established industrial zone. Therefore the cumulative impact of the addition of MIC Proposal in terms of visual impact and sensitivity to visual receptors to the west of the SIMTA site and predominantly Casula residences could be estimated to be moderate to high.

Although (as restricted sites) there is limited information available for the MIC Proposal to undertake a viewpoint analysis utilising digital three-dimensional modelling and photomontage compilation, a series of predominant viewpoints have been selected from this report and an indicative land boundary for the site has been graphically overlaid to demonstrate the likely land effected in each view by the addition of the MIC Proposal.

### methodology

The likely land effected and the potential visual cumulative impact by the inclusion of the MIC site is demonstrated by pursuing the following general approach and methodology:

- Selection of appropriate / representative viewpoints to the Stage 1 site previously addressed in Section 7 of this report (see Figure 11);
- Overlay of indicative land boundary of the MIC site, noting that the boundary lines are notional ; and
- A written description comparing the SIMTA Stage 1 Proposal alone against the cumulative impact of the MIC Proposal reviewed in line with the assessment criteria set out in this report and the Proposal description in section 9.01.

### 09.3 limitations of cumulative assessment

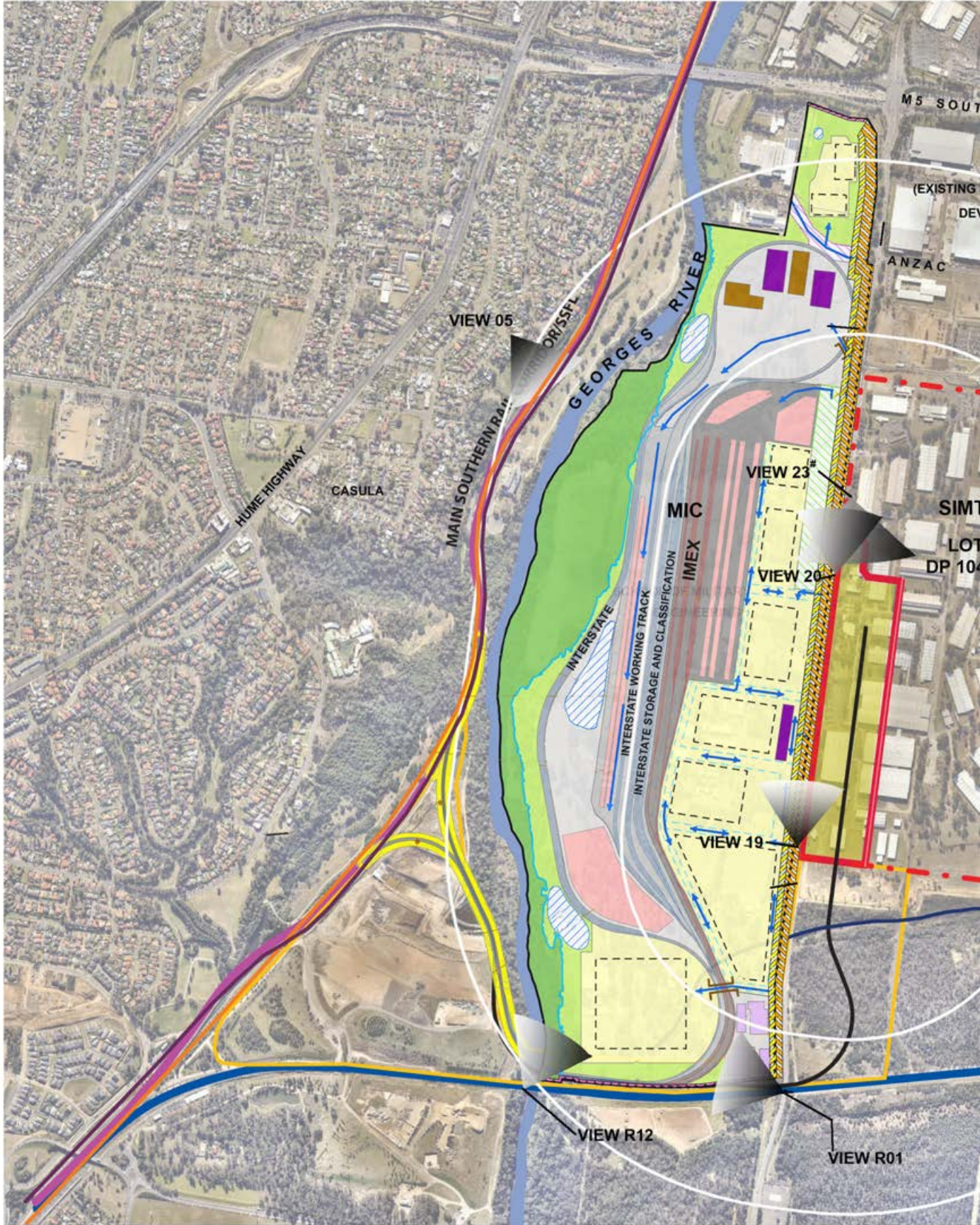
It is important to note that the requested assessment of the potential cumulative impact of the MIC Proposal is limited by a set of broad based assumptions and is provided to inform the reader of the likely cumulative scale of development in the Moorebank precinct of both these Proposals proceeding.

In this regard, the assessment should not be relied upon for accuracy and is indicative only based upon the limited publicly available information on the MIC Proposal at the time of authoring.

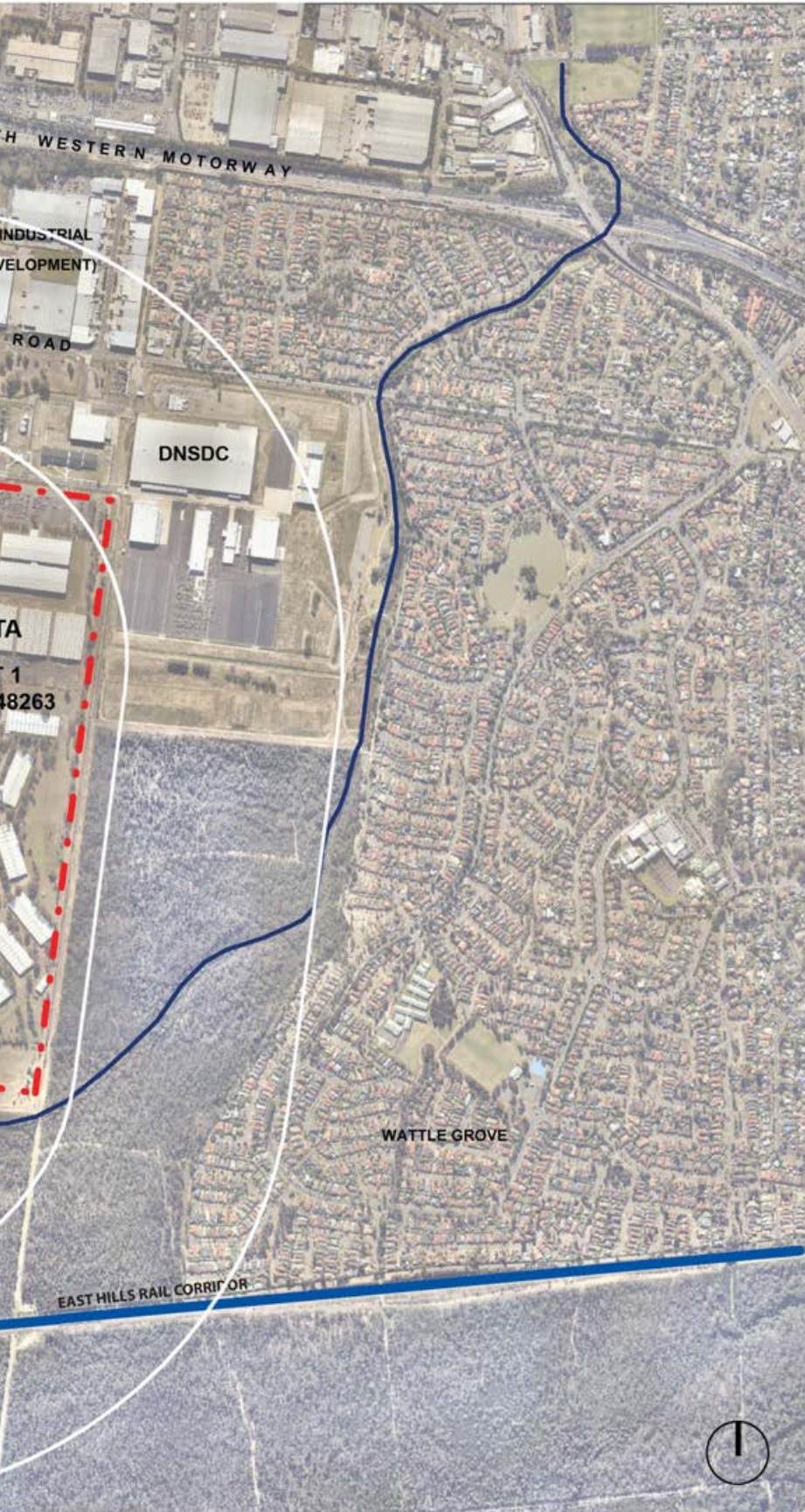
Specifically, the following limitations should be considered in the cumulative evaluation of the MIC Proposal in this report:

- The visual assessment has been based on, what is believed to be the most likely option for the MIC Proposal, which involves the southern rail crossing. Notwithstanding this, there are two other options which propose other rail crossing locations and built form arrangements.
- The extent of planned works for each site, land boundaries, bulk and scale of fixed and movable components of each project are based around limited and conceptual information in the public domain at the time of authoring. SIMTA and its consultants have not been privy to any further detail planning or changes to planning that may effect this assessment at present or in the future;
- View points being the subject of the SIMTA Stage 1 Proposal visual impact assessment were selected via a viewshed analysis which was undertaken for the site in Geographical Information System (ArcGIS - Spatial Analyst Extension) by Hyder Consulting. A selection of these view points where elements of the Stage 1 Proposal are likely to have some prominence were used for the evaluation of the cumulative assessment. It is likely and evident in Figures 10 and 11 that there are possibly other view points that may be subject to degrees of visual impact due to the MIC Proposal, primarily due to their proximity to surrounding existing and established residential areas and other developments;
- The cumulative visual impact is based on information which is available on the MIC Proposal in the public domain, and in particular the Moorebank Intermodal Terminal Project - Environmental Impact Statement; and
- It is not known if the MIC Proposal includes provisions for substantial visual shielding of the development in the form of soft or hard landscaping, buffering elements or other devices, however in particular given the topography and location of the MIC Proposal it is likely to be prominent from the Casula residential area assuming zero visual shielding.

















**LEGEND**

-  SIMTA SITE BOUNDARY
-  STAGE 1 SITE BOUNDARY
-  RAIL CORRIDOR BOUNDARY
-  PROPOSED RAIL LINK
-  INTERMODAL TERMINAL FACILITY
-  RAIL LINE - SOUTHERN SYDNEY FREIGHT LINE
-  RAIL LINE - DEDICATED PASSENGER LINE
-  VIEWPOINT: CUMULATIVE IMPACT



**view locations - cumulative impact**





Simulated View - SIMTA Proposal



Cumulative Impact

Foreground Boundary Line - Land affected by MIC Proposal

# view 05

<b>Viewing Location</b>	West of Stage 1 site, Carroll Park, Casula
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	1,200m to SIMTA Stage 1 site boundary (approx.)
Prominence of Cumulative MIC Proposal	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>Assuming the absence of visual shielding as a worst case scenario, it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that an extensive array of fixed and movable structures and vehicles including materials handling equipment, containers, rail tracks, freight trains, warehousing, ancillary facilities, heavy and light vehicles would be visible.</p>
Prominence of Stage 1 Development	<p>The prominence of the SIMTA Stage 1 development in this viewpoint remains unchanged and is as previously described in Section 7 of this report.</p> <p>It is likely that the MIC Proposal would provide a visual buffer to the Stage 1 site and therefore the prominence of the SIMTA Stage 1 development alone would be relatively low.</p>
<b>Cumulative Visual Sensitivity</b>	<p>Being a residential area the visual sensitivity would be relatively high. Several houses within the area would be subject to minimal views of the development, however the prominence of the proposed development within these views would be low.</p> <p>Most views would be of short duration therefore the visual amenity would be relatively unchanged.</p>
<b>Cumulative Visual Impact</b>	<p>The Stage 1 site is only slightly visible while the MIC Proposal would be prominent at this location.</p> <p>The change in the landscape amenity coupled with the zoning in which the viewpoint is situated would make this visual impact moderate to high.</p>





Simulated View - SIMTA Proposal



Cumulative Impact  
Foreground Boundary Line - Land affected by MIC Proposal

# view 19

<b>Viewing Location</b>	South of Stage 1 site, Moorebank Avenue
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	50m to SIMTA Stage 1 site boundary (approx.)
Prominence of Cumulative MIC Proposal	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the MIC Proposal fronting Moorebank Avenue. Assuming the absence of any visual shielding it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that a number of medium and large format warehouses, heavy and light vehicle entry points and car parks may be visible.</p>
Prominence of Stage 1 Development	The prominence of the SIMTA Stage 1 development in this viewpoint remains unchanged and is as previously described in Section 7 of this report.
<b>Cumulative Visual Sensitivity</b>	The industrial land-use at this location creates a low cumulative visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal would be from existing industrial areas or from commuters travelling along Moorebank Avenue.
<b>Cumulative Visual Impact</b>	Both the Stage 1 SIMTA and MIC developments would be highly prominent at this location. It is shown that there is little to no visual sensitivity from this viewpoint as the viewpoint is within an already established industrial zone. Therefore there would be a low to moderate cumulative visual impact from this viewpoint.





Simulated View - SIMTA Proposal



Cumulative Impact \*

Foreground Boundary Line - Land affected by MIC Proposal



# view 20

<b>Viewing Location</b>	West of Stage 1 site, Moorebank Avenue
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	20m to SIMTA Stage 1 site boundary (approx.)
Prominence of Cumulative MIC Proposal	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the MIC Proposal fronting Moorebank Avenue, and assuming the absence of visual shielding as a worst case scenario it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that a number of medium and large format warehouses, heavy and light vehicle entry points and car parks may be visible.</p>
Prominence of Stage 1 Development	The prominence of the SIMTA Stage 1 development in this viewpoint remains unchanged and is as previously described in Section 7 of this report.
<b>Cumulative Visual Sensitivity</b>	The industrial land-use at this location creates a low cumulative visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal would be from existing industrial areas or from commuters travelling along Moorebank Avenue.
<b>Cumulative Visual Impact</b>	Both the SIMTA Stage 1 and MIC developments would be highly prominent at this location. It is shown that there is little to no visual sensitivity from this viewpoint as the viewpoint is within an already established industrial zone. Therefore there would be a low to moderate cumulative visual impact from this viewpoint.



Simulated View - SIMTA Proposal



Cumulative Impact

Foreground Boundary Line - Land affected by MIC Proposal

# view 23#

<b>Viewing Location</b>	Corner of Moorebank Av. and Road marked as DS NNSW LMA
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	50m to SIMTA Stage 1 site boundary (approx.)
Prominence of Cumulative MIC Proposal	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the MIC Proposal fronting Moorebank Avenue, and assuming the absence of visual shielding as a worst case scenario it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that a number of medium and large format warehouses, heavy and light vehicle entry points and car parks may be visible.</p>
Prominence of Stage 1 Development	The prominence of the SIMTA Stage 1 development in this viewpoint remains unchanged and is as previously described in Section 7 of this report.
<b>Cumulative Visual Sensitivity</b>	The industrial land-use at this location creates a low cumulative visual sensitivity (Moorebank Southern Industrial precinct). Most views from within this area looking north towards the Proposal would be from existing industrial areas or from commuters travelling along Moorebank Avenue.
<b>Cumulative Visual Impact</b>	Both the SIMTA Stage 1 and MIC developments would be highly prominent at this location. It is shown that there is little to no visual sensitivity from this viewpoint as the viewpoint is within an already established industrial zone. Therefore there would be a low to moderate cumulative visual impact from this viewpoint.

# viewpoint angle has been digitally widened to include MIC site.





Simulated View - SIMTA Proposal



Cumulative Impact

Foreground Boundary Line - Land affected by MIC Proposal

# view R01

<b>Viewing Location</b>	South of Stage 1 site, Moorebank Avenue (rail overpass)
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	60m from viewpoint line of sight to proposed Rail link (approx.)
Prominence of Cumulative MIC Development	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>There is a relatively unobstructed view from this portion of Moorebank Avenue to the MIC Proposal, and assuming the absence of visual shielding as a worst case scenario it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that an extensive array of fixed and movable structures and vehicles including materials handling equipment, containers, rail tracks, freight trains, warehousing, ancillary facilities, heavy and light vehicles would be visible.</p>
Prominence of Stage 1 Development	<p>Only the proposed SIMTA Stage 1 Rail link is visible from this location. The SIMTA Stage 1 Terminal development Proposal is not. The prominence and visual impact of the Proposal remain unchanged from the description provided in Section 7 of this report.</p>
<b>Cumulative Visual Sensitivity</b>	<p>Traffic that passes along this portion of Moorebank Avenue would have access to prominent views of the MIC Proposal. Although the views would likely be brief, the importance of amenity to the viewers may need to be considered due to the possible removal of significant vegetation. As such the visual sensitivity at this location may be considered moderate.</p>
<b>Cumulative Visual Impact</b>	<p>The addition of the MIC Proposal may be a substantial change to the existing landscape amenity.</p> <p>The cumulative visual impact of the MIC Proposal and the Stage 1 development at this location would be considered to be moderate to high, however is limited due to the brevity of viewing times.</p>





Simulated View - SIMTA Proposal



Cumulative Impact

Background Boundary Line - Land affected by MIC Proposal



# view R12

<b>Viewing Location</b>	Beneath EHPL, South of the proposed Georges River crossing
<b>Cumulative Visual Adaptation</b>	
Approximate Viewing Distance	50m from viewpoint line of sight to proposed Rail link / bridge.
Prominence of Cumulative MIC Proposal	<p>The adjacent image shows an indicative view of the land area which would notionally be utilised for the development of the MIC Proposal.</p> <p>There is a relatively unobstructed view to the MIC Proposal, and assuming the absence of visual shielding as a worst case scenario it is likely given the extent and angle of the view to the Proposal that the visual prominence would be significant.</p> <p>Based on the MIC concept masterplan, it is likely that an extensive array of fixed and movable structures and vehicles including materials handling equipment, containers, rail tracks, freight trains, warehousing, ancillary facilities, heavy and light vehicles would be visible.</p>
Prominence of Stage 1 development	Only the proposed SIMTA Stage 1 Rail link river crossing is visible from this location. The SIMTA Stage 1 Terminal development Proposal is not. The prominence and visual impact of the Proposal remain unchanged from the description provided in Section 7 of this report.
<b>Cumulative Visual Sensitivity</b>	<p>The visual sensitivity at this location is high (for boat traffic as location is publicly inaccessible by land) considering the existing landscape amenity.</p> <p>EHPL traffic that passes along the existing bridge would have prominent views of the MIC development. However, due to the views being predominantly brief and the importance of the amenity to the viewers not being great, the visual sensitivity at this location would be moderate.</p>
<b>Cumulative Visual Impact</b>	<p>The addition of the MIC Proposal and the Stage 1 development may be a substantial change to the existing landscape amenity.</p> <p>The cumulative visual impact of the MIC Proposal at this location would be considered to be moderate to high, however is limited due to the brevity of viewing times.</p>

## 09.4 cumulative assessment conclusion & recommendations

A high level assessment of the cumulative impact of the SIMTA Stage 1 and MIC developments has been undertaken to inform the reader of the possible visual sensitivity to the surrounding area based on likely developments combined scale within the Moorebank Precinct.

As outlined in detail in the previous section, conceptual information publicly available for the MIC Proposal was utilized to undertake a comprehensive and reliable assessment on the potential cumulative visual impact of the developments.

It is envisaged that the MIC Proposal as well as the bushland to the south, south-east, and part of the eastern boundary of the SIMTA site would create a 'visual shield' to the bulk of the SIMTA Stage 1 Proposal, to an extent negating any visual impact that the SIMTA Stage 1 Proposal may have on its own.

It is anticipated that the MIC Proposal may have a greater visual impact on surrounding existing residential areas and developments due to the proximity of their land boundary to these communities assuming zero visual shielding.

# 10 conclusion

The SIMTA Stage 1 Proposal is to be developed on a site that has been occupied by the Department of Defence for many years and has been primarily utilised for warehouse and distribution/ logistics related activities. Many of the facilities on the existing site have reached or are beyond their useful life.

Besides secure perimeter fencing there is very little landscaping or other visual screening to shield operations from the public view and that of surrounding developments.

The site is surrounded by expansive areas of natural dense bushland and other lands owned and occupied by the Department of Defence for industrial and Military related uses.

The next closest developments to the site are also largely industrial, with the closest residential areas being Wattle Grove to the north and east, and Casula approximately 1km to the west across the Georges River.

The Proposal would generally be in keeping with the existing character of the area. Some relatively high and/or bulky structures/ equipment may however increase the visibility of the site beyond its current levels, with some limited and highly localised visual impacts.

The pattern of development surrounding the site described above would screen the development from much of the surrounding area. Potential views do occur along viewing corridors created by streets bounding the site (Moorebank Avenue and Anzac Road), and where topography provides some elevation above potential obstructions to views.

Visual impact has been assessed from locations with potential views of the development as identified through a digital viewshed analysis. The anticipated visual impact of each viewpoint has been analysed using a range and combination of qualitative criteria.

Given the nature of the Proposal and its consistency with general industry within the local area, higher visual impact locations would be primarily those in residential areas that have prominent views of site elements. This study found minimal visual impact to residential areas.

The limited visual impact to residential areas is mainly due to distance, existing visual barriers and undulating topography between the site and these residential zones.

The most prominent views of the development would occur at localised boundary points such as Moorebank Avenue and Anzac Road, however these impacts are regarded as relatively low because of their existing and unobstructed views of the DNSDC operations which are reasonably compatible with the proposed SIMTA Stage 1 development.



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.

The light spill assessment concludes that minimal effect on adjacent properties and on the environment can be achieved, through appropriate selection of light source, luminaire make and aiming as well as pole positions and height from static site lighting, well within the limits stated in AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting.

A high level cumulative impact assessment of the addition of the proposed Moorebank Intermodal Company (MIC) has been considered.

**appendix A**  
**Light Spill Study Report**  
**AECOM**

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# SIMTA Intermodal Terminal Facility- Stage 1 Light Spill Study Report



**SIMTA**

SYDNEY INTERMODAL TERMINAL ALLIANCE

Part 4, Division 4.1, State Significant  
Development

# Moorebank Intermodal Terminal Facility - Stage 1

## Light Spill Report

Client: Sydney Intermodal Terminal Alliance (SIMTA)

ABN: 14 149 723 053

### Prepared by

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## Quality Information

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## Table of Contents

1.0	Introduction	1		
	1.1	Background	1	
	1.2	Report purpose	1	
	1.3	Key Terms	3	
	1.4	Proposal overview	6	
	1.5	Site Description	6	
2.0	Light Spill Assessment	7		
	2.1	Introduction	7	
	2.2	Methodology	7	
	2.3	Lighting Standards	7	
	2.4	Lighting Design	7	
		2.4.1	Luminaire Selection	7
		2.4.2	Luminaire Position and Mounting Height	8
		2.4.3	Compliance with AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting	8
		2.4.4	Mobile and Transitory Lighting	9
	2.5	Luminaire Schedule	11	
3.0	Results of Assessment	12		

## 1.0 Introduction

AECOM was engaged by the Sydney Intermodal Terminal Alliance (SIMTA), to assess the Light Spill from the Stage 1 operational Moorebank Intermodal Terminal for the State Significant Development Application for Stage 1 of the proposed Moorebank Intermodal Terminal facility (SIMTA proposal). AECOM has prepared this technical note to document the potential light spill to the SIMTA site, its development from the scheme proposed under the Concept Plan Approval (MP10\_0193), and to respond to the Secretary's Environmental Assessment Requirements (SEARs) received in December 2014 from the Department of Planning and Environment (DPE), for the project.

### 1.1 Background

The SIMTA Project involves the development of an intermodal facility, including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank (the SIMTA site). The SIMTA Project also includes a rail link, within an identified rail corridor (the Rail Corridor), which connects from the southern part of the SIMTA site to the Southern Sydney Freight Line (SSFL) (the entire area, SIMTA site and Rail Corridor referred to as the Project site). The SIMTA Project is to be developed in three key stages:

- Stage 1- Construction of the Intermodal Terminal Facility and Rail Link
- Stage 2- Construction of Warehouse and Distribution Facilities
- Stage 3- Extension of the Intermodal Terminal Facility and completion of Warehouse and Distribution Facilities.

A summary of the approvals undertaken to date for the SIMTA site, relating to the SIMTA Project, include:

- EPBC Approval (No. 2011/6229) granted in March 2014 for the impact of the SIMTA Project on listed threatened species and communities (sections 18 and 18A of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)) and Commonwealth land (sections 26 and 27A of the EPBC Act).
- Concept Approval (No. 10\_0193) granted by the Planning Assessment Commission (PAC) on the 29 September 2014 for the 'Concept Approval' of the SIMTA Project under Part 3A of the EP&A Act.

Both of these approvals involved the preparation of design and environmental assessment documentation.

### 1.2 Report purpose

This report has been prepared for approval of the initial stage of the SIMTA Project, known as the Stage 1 Proposal. A summary of the works included in the Stage 1 Proposal is provided below. This report has been prepared to support a State Significant Development (SSD) Application for which approval is sought under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) (ref: SSD 14-6766 and dated December 2014). Table 1 provides a summary of the SEARs and the section where they have been addressed in this report.

**Table 1 SEARs (SSD 14-6766) Compliance Table**

Section / Number	SEARs	Where addressed
11	Visual Amenity, Urban Design and Landscaping – including but not limited to:  An assessment of visual impacts. The assessment shall	
11 (d)	consider lighting impacts in the local area, analyse and describe the contribution and impacts of the proposed facility on light spill at the local scale and to sensitive receivers.	This report specifically assesses the potential light spill for the operation of the Moorebank Intermodal Facility – Stage 1.



### 1.3 Key Terms

Table 2 provides a summary of the key terms which are included within this report. Figure 1 also provides an indication of the site areas discussed in this table.

**Table 2 Key Terms**

Term	Description
Concept Plan Approval	Concept Plan Approval (MP 10_0193) granted on 29 September 2014 for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank. This reference includes the associated Conditions of Approval (CoA) and Statement of Commitments (SoC) which form the approval documentation for the Concept Plan Approval.
EPBC Approval	Approval (No. 2011/6229) granted under the EPBC Act on March 2014 by the Commonwealth Department of Environment for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank.
SIMTA Project	The SIMTA Moorebank Intermodal Terminal Facility at Moorebank as approved by the Concept Plan (MP_10_0913).
SIMTA site	Includes the former Defence National Storage and Distribution Centre (DNSDC) site, the land owned by SIMTA which is subject to the Concept Plan Approval (refer to Figure 1).
Rail Corridor	Area defined as the 'Rail Corridor' within the Concept Plan Approval. The rail link is also included within this area (refer to Figure 1).
Project site	Includes the SIMTA site and the Rail Corridor, i.e. the entire site area which was approved under the Concept Plan Approval (refer to Figure 1).
Stage 1 site	The subject of this EIS, the western part of the SIMTA site which includes all areas to be disturbed by the Stage 1 Proposal (including the Operational area and Indicative Construction area) (refer to Figure 1). This area does <u>not</u> include the Rail Corridor.
Construction area	Extent of construction works, namely areas to be disturbed during construction of the Stage 1 Proposal (refer to Figure 1).
Operational area	Extent of operational activities for the operation of the the Proposal (refer to Figure 1).
Proposal site	Includes the Stage 1 site and the Rail Corridor, i.e. the area for which approval (construction and operation) is sought within this EIS.
Rail Link	The Rail Link including the area on either side to be impacted by the construction works included in the Stage 1 Proposal.
Former DNSDC South	The land to the south of the operational footprint of the Intermodal Terminal, to the boundary fence of the former DNSDC.
Southern Boot Land	Commonwealth owned land to the south of Former DNSDC South, and to the north of the RailCorp Land (part of the Boot Land in the MIC proposal).
RailCorp Land	Lot 1 DP 825352 (part of the Rail Corridor) and owned by RailCorp.

Term	Description
The Proposal	Stage 1 of the SIMTA Moorebank Intermodal Terminal Facility including construction and operation of the intermodal terminal facility and rail link, i.e. all works and built form for which approval is sought in this EIS/Technical Report.
MIC Proposal	The development of an intermodal facility, associated commercial infrastructure (warehousing) and a rail link (3 options have been provided) to be located on the MIC site, for which an approval, under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i> . This proposal is currently under assessment by the Department of Planning and Environment.
MIC site	The former School of Military Engineering site to the immediate west of the SIMTA site, across Moorebank Avenue.



Figure 1 Key terms and proposal locations



## 1.4 Proposal overview

The Proposal involves the construction and operation of the necessary infrastructure to support a container freight volume of 250,000 TEU (twenty-foot equivalent units) throughput per annum. Specifically, Stage 1 includes the following key components, which together comprise the intermodal terminal facility (IMT):

- Truck processing, holding and loading areas- entrance and exit from Moorebank Avenue.
- Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual handling equipment initially and overhead gantry cranes progressively. .
- Administration facility and associated car parking- light vehicle access from Moorebank Avenue.
- The rail link – located within the Rail Corridor, including a connection to the intermodal terminal facility, traversing of Moorebank Avenue, Anzac Creek and Georges River and connection to the SSFL.
- Ancillary works- vegetation clearing, remediation, earth works, utilities installation/connection, signage and landscaping.

## 1.5 Site Description

The SIMTA site, including the Stage 1 site, is located approximately 27 kilometres south-west of the Sydney Central Business District (CBD) and approximately 26 kilometres west of Port Botany. The SIMTA site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West Sub-Region, approximately 2.5 kilometres from the Liverpool City Centre.

The SIMTA site is located approximately 800 metres south of the intersection of Moorebank Avenue and the M5 Motorway. The M5 Motorway provides the main road link between the SIMTA site and the key employment and industrial areas within the West and South Western Sydney Sub-Regions. The M5 Motorway connects with the M7 Motorway to the west, providing access to the Greater Sydney Metropolitan Region and NSW road network. Similarly the M5 Motorway is the principal connection to Sydney's north and north-east via the Hume Highway.

The Southern Sydney Freight Line (SSFL) is located one kilometre to the west of the proposed SIMTA site. The SSFL is a 36 kilometre dedicated freight line between Macarthur and Chullora.

The SIMTA site was recently operating as the Defence National Storage and Distribution Centre (DNSDC) however Defence has recently relocated this operation and vacated the SIMTA site. The majority of land immediately surrounding the SIMTA site is owned and operated by the Commonwealth and comprises:

- School of Military Engineering (SME), on the western side of Moorebank Avenue directly adjacent to the SIMTA site.
- Holsworthy Military Reserve, to the south of the site on the southern side of the East Hills Passenger Railway Line.
- Commonwealth Residual Land, to the east between the SIMTA site and the Wattle Grove residential area.
- Defence National Storage and Distribution Centre (DNSDC), to the north and north east of the SIMTA site.

The site to immediate west of the SIMTA site which currently includes the SME is the subject of a Development Application (DA) (SSD-5066), under Part 4, Division 4.1 of the EP&A Act, for the development of an intermodal facility known as the Moorebank Intermodal Terminal Project (MIC Proposal). The EIS for the MIC Proposal has recently been prepared and publically exhibited on 8 October 2014 to 8 December 2014. A Preferred Project Report (PPR) is currently under preparation to respond to submissions received during public exhibition. The MIC Proposal has yet to be determined by the Department of Planning and Environment (DP&E).

A number of residential suburbs are located in proximity to the Stage 1 site, including:

- Wattle Grove, located approximately 600 metres from the Stage 1 site and 750 metres from the rail link to the east.
- Moorebank, located approximately 1,700 metres from the Stage 1 site and more than 2,700 metres from the rail link to the north.
- Casula, located approximately 1,100 metres from the Stage 1 site and 250 metres from the rail link to the west.
- Glenfield, located over 1,700 metres from the Stage 1 site and 750 metres from the rail link to the south-west.

## 2.0 Light Spill Assessment

### 2.1 Introduction

The lighting of the outdoor areas of the Stage 1 of the SIMTA Moorebank Intermodal Terminal facility is provided by high pressure sodium lighting. The advantages of high pressure sodium lighting include the high energy efficiency and a light spectrum that has a lesser visual impact than white light sources including LED.

### 2.2 Methodology

The methodology for the light spill assessment has been undertaken with an understanding of the proposed work processes and site usage to realise the limitations within which the lighting can be provided. That is to provide for safe work practice, avoid potential interference with equipment used on site and at the same time minimise light spill from the site. As such the pole positions, luminaire mounting heights, luminaire selection and luminaire aiming angles have been derived to provide an optimum result within the restrictions of the site.

The lighting design is provided in accordance with code and modelled using industry standard lighting design software, AGI32. The results are provided in this report.

It should be noted that transitory lighting such as vehicle headlights do not form part of the site lighting assessment.

### 2.3 Lighting Standards

The proposal is lit in accordance AS/NZS 1680.5:2012 Australian and New Zealand Interior and workplace lighting, Part5: outdoor workplace lighting.

The Proposal is also designed in accordance with AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting.

### 2.4 Lighting Design

#### 2.4.1 Luminaire Selection

Minimisation of any direct light spill requires selection of a luminaire that essentially has a horizontal front glass when aimed and fixed in position. This requires a floodlight with an asymmetric distribution with a peak intensity of at least 60 to 65 degrees above the nadir. A floodlight such as the Philips ComfortVision SNF111 (see Figure 2) narrow beam with twin 400W high pressure sodium lamps will provide that high degree of control.



Figure 2 – ComfortVision SNF 111

A similar principle applies to the entry and exit points plus the car parking area where traditional road lighting style luminaires Sylvania Roadster S400 FT (see Figure 3) are proposed with a forward throw distribution to ensure maximum light distribution across the site and minimum backwards light spill out of the site.



Figure 3 – Roadster S400 FT

For maintenance simplicity, minimisation of stock and cost all lamps are 400W high pressure sodium.

#### 2.4.2 Luminaire Position and Mounting Height

The position and mounting height of the luminaire are equally important to luminaire selection to ensure the minimum environmental light spill and to provide outdoor lighting to the Stage 1 site.

The pole height is set as a maximum of 21 metres being the same as the maximum future warehousing and less than the height of proposed overhead gantry cranes.

Minimising the height has an added advantage of reducing the extent of light spill. There are 4 poles that are 21m high to provide light for the large truck holding area. One 18m pole is required on the edge of the loco shifter area. All of the poles have SNF111 2x400HPS floodlights with the front glass tilted only 5 degrees above the horizontal to minimise light spill.

There are also 18m poles down each boundary parallel with each future arrangement of container stack and each pole has a single SNF111 2x400HPS floodlight directed in towards the centre of the site with the front glass tilted only 5 degrees above the horizontal to minimise backwards light spill.

At the entries and exits 13.5m poles provide mounting spigots for Sylvania Roadster S400 FT road lighting luminaires with 400W high pressure sodium lamps.

As an added safety feature, all luminaires are mounted off the poles with no outreach arms so that no luminaire obstructs the free travel of gantry cranes.

#### 2.4.3 Compliance with AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting

The Proposal is a 'commercial area' in accordance with AS4282-1997, with 25 lux being the limit for light spill before curfew at the boundary of adjacent residential properties and 4 lux at the windows of adjacent residential properties during curfew. The calculations of light spill in a vertical plane directed back towards the centre of the site as indicated in Figure 4 show that the combination of lighting design, appropriate luminaire selection,



positioning and aiming produce results that are completely in compliance with the requirements of AS4282-1997. The results shown in Figure 4 are much better than the requirements of AS4282-1997.

#### **2.4.4 Mobile and Transitory Lighting**

Lighting associated with mobile gantries will generally be of two types. One type will be overhead weatherproof highbay/floodlight type luminaires aimed directly downwards so that the gantry operator can see the containers and the vehicles etc below. This type of lighting is unlikely to provide light spill as it has fixed downward aiming and the loading/unloading operation cannot be performed close to the site boundary. The second type of lighting would also have fixed aiming and the luminaires would be attached to the external access stair on the overhead gantry for workers to climb up to the operator location in safety at night.

Other smaller mobile vehicles may have headlights and rotating light warning beacons.

Mobile and transitory lighting effects are not included in the permanent site lighting spill light calculations.

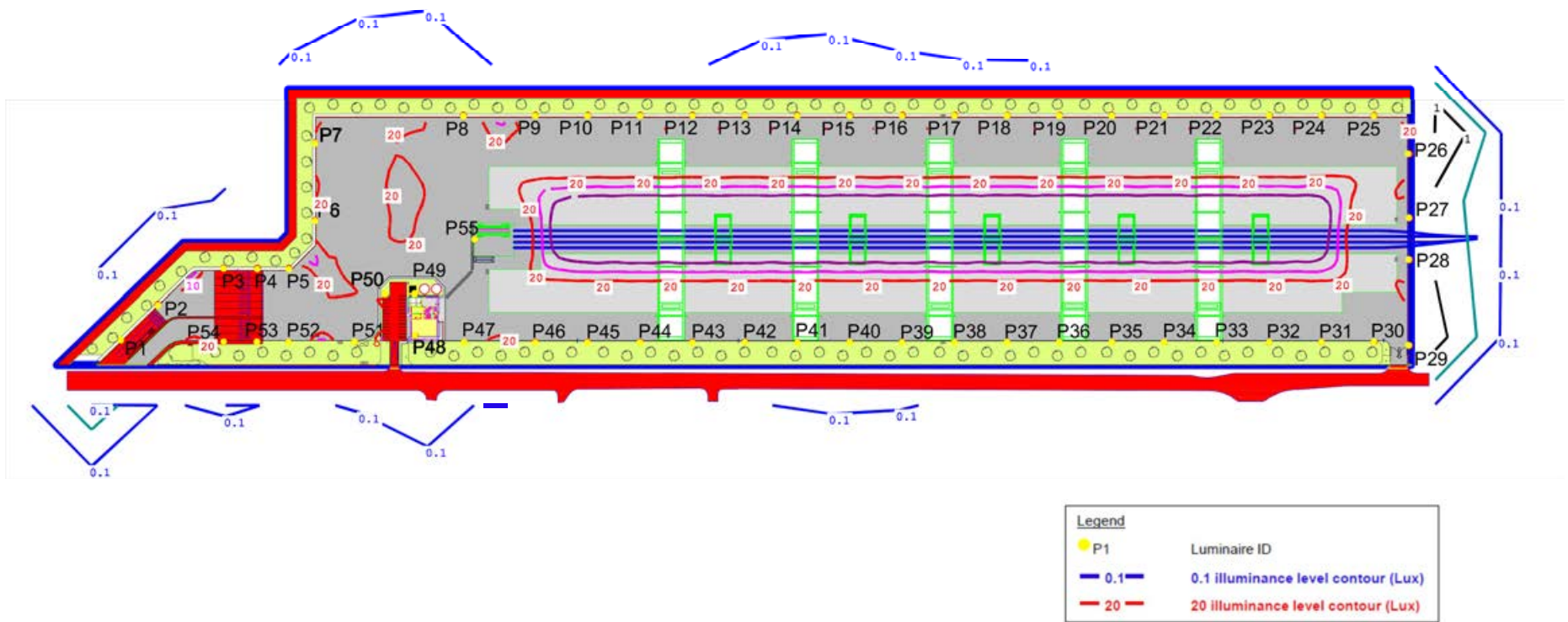


Figure 4 - General site layout showing light spill isolux curves external to site as well as internal site lighting isolux curves from the static area site lighting design as noted above.

## 2.5 Luminaire Schedule

With reference to Figure 4 the light spill assessment has been based on the luminaires provided in Table 3.

**Table 3 Luminaire Schedule**

Pole	height (m)	Sylvania roadster Roadster S400C FT - 206007	Philips SNF111 2x400W HPS N beam
P1	13.5	1	
P2	13.5	1	
P3	13.5	1	
P4	13.5	1	
P5	13.5	1	
P6	21		2
P7	21		2
P8	21		2
P9	18	1	
P10	18	1	
P11	18	1	
P12	18	1	
P13	18	1	
P14	18	1	
P15	18	1	
P16	18	1	
P17	18	1	
P18	18	1	
P19	18	1	
P20	18	1	
P21	18	1	
P22	18	1	
P23	18	1	
P24	18	1	
P25	13.5	1	
P26	13.5	1	
P27	18	1	
P28	18	1	
P29	13.5	1	
P30	13.5	1	
P31	18	1	
P32	18	1	
P33	18	1	



Pole	height (m)	Sylvania roadster Roadster S400C FT - 206007	Philips SNF111 2x400W HPS N beam
P34	18	1	
P35	18	1	
P36	18	1	
P37	18	1	
P38	18	1	
P39	18	1	
P40	18	1	
P41	18	1	
P42	18	1	
P43	18	1	
P44	18	1	
P45	18	1	
P46	18	1	
P47	21		2
P48	13.5	1	
P49	13.5	1	
P50	13.5	1	
P51	13.5	1	
P52	13.5	1	
P53	13.5	1	
P54	13.5	1	
P55	18		3

### 3.0 Results of Assessment

The light source type, the luminaire make and model, luminaire aiming, pole positions and heights assessed in this report ensure the minimal direct light spill from the static site lighting as demonstrated in Figure 4.

Minimal effect on adjacent properties and on the environment can be achieved by the appropriate selection of light source, luminaire, luminaire mounting height and luminaire aiming in accordance with the details noted above.

The permanent static site lighting included in the Stage 1 Proposal will provide minimal light spill and be well below the limits stated in AS 4282 - 1997 Control of the obtrusive effects of outdoor lighting.

