sydney ports corporation

intermodal logistics centre at enfield

visual assessment

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Contents

1 Introduction

Sydney Ports Corporation (SPC) propose to develop the former Enfield Marshalling Yards as an Intermodal Logistics Centre (ILC). The ILC would perform the function of transferring shipping containers between truck and rail transport modes, with the goal of reducing the volume of truck traffic travelling to and from Port Botany.

This report has been prepared as part of the environmental impact assessment of the proposal. It evaluates the visual impacts of the proposal on local residents, workers, and road users. It also includes an evaluation of the impacts of light spill from the necessary floodlighting for the proposal, on the surrounding area.

The report includes the following:

- a description of the methods used to undertake the visual assessment and the light spill assessment;
- a description of the criteria used to determine the likely level of impact;
- an evaluation of the existing visual character of the surrounding area;
- an evaluation of the visual character of the proposal;
- a description of measures being incorporated into the site planning and landscape design to reduce potential visual impacts;
- an assessment of the visual impact of the proposal focussing on an evaluation of specific views and taking into account measures to reduce the level of visual impact; and
- an assessment of the likely impacts of light spill.

2 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) 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.

Site Inspection

A site inspection was carried out 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 proposed development. Photographs were taken from key viewpoints for later use in visual simulations of the development.

Visualisation of the Development

Based on the concept design for the development, a digital three-dimensional model was constructed that included the main components of the development that would potentially be visible beyond the site. Views were generated of the model that matched 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. Potential longer distance views and visual impact during construction were also evaluated.

2.2 Light Spill Assessment

A preliminary lighting concept for the proposal was developed by NDY Light, based on the operational requirements of SPC. The light spill was then modeled using *DIALux* modeling software, based on the light hitting a notional horizontal plane 1.5m above the ground surface.

3 Assessment Criteria

3.1 Visual Assessment Criteria

A qualitative assessment of visual impact has been undertaken for this study. The visual impact of the proposal has been primarily evaluated on the basis of a combination of two main criteria, visual modification and visual sensitivity. These criteria are described below along with the way in which they are combined to identify a level of visual impact.

Visual Modification

Visual modification refers to the change to the landscape that would occur as a result of the development from a given viewpoint. This includes:

- the prominence of the development, which in turn involves the scale of the development in the view and its level of visual contrast with the landscape (the contribution of colour, texture and skylining)
- the compatibility of the development with the landscape, which acknowledges that a higher level of visual modification would occur by the introduction of new industrial elements into a higher amenity landscape (such as a residential or parkland landscape), than in a landscape that is already dominated with a similar industrial character. Landscape compatibility for the purposes of this assessment is regarded as being inherent to the location and independent of the extent to which the development can be seen (as this is described under the prominence of the development referred to above).

Visual Sensitivity

Visual sensitivity refers to the nature and duration of views from a given viewpoint. The level of visual sensitivity is independent of how much of the development can be seen, as this is assessed under *visual modification* (see above). Locations which would potentially have longer duration of views, where there are higher numbers of potential viewers and where visual amenity is important to viewers, can be regarded as having a higher visual sensitivity. 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

Visual impact is described qualitatively on the basis of an assessment of the above criteria. As there are no recognised standards for determining significance of visual impact, the visual impact at each key viewpoint is described in relative terms.

3.2 Light Spill Assessment Criteria

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

4 Visual Character of the Surrounding Area

The site lies within a mosaic of industrial and residential development located on flat to undulating topography close to the geographic centre of Sydney. Major arterial roads, including the Hume Highway, Roberts Road and Punchbowl Road, run to the north, west and south of the site respectively. The existing visual character of the site and surrounding area is shown on Figure 1.

A wide rail corridor comprising the new Enfield Marshalling yards borders the site immediately to the west. The scale of this rail corridor makes it a prominent landscape feature in the area.

A large complex of light industrial and commercial warehousing occurs between Roberts Road and the rail corridor to the west and south-west of the site, while the area west of Roberts Road is predominantly residential development. These residential areas are mostly low density, but also include some medium density development, such as immediately west of Roberts Road to the north-west of the site. Small sportsfields and neighbourhood parks are scattered through these residential areas.

The area to the south of the site comprises a mix of residential, commercial and industrial development. It includes the arterial road corridor of Punchbowl Road.

Adjacent to the south east corner of the site is low density residential development. The Coxs Creek corridor and an associated open space corridor (comprising both passive recreation facilities and sportsfields) separates this residential area from a large industrial area in Strathfield South, which occurs along the eastern perimeter of the site between Coxs Creek and the Hume Highway.

Figure 1

Visual Character of the Surrounding Area

5 Visual Character of the Development

The proposed ILC would be located on the former Enfield Marshalling Yards. The site is approximately 60ha, and is largely disused except for an area under lease to a freight company, a rail locomotive maintenance and wheel lathe facility, and an area leased to a fencing company. The existing character is essentially industrial, with a series of disused industrial buildings and other structures, mostly in an advanced state of disrepair.

There are areas of open grassland and other vegetation that have colonised parts of the site since the rail marshalling activities ceased. Most of this vegetation is exotic, including some invasive weed species that add to the low visual amenity of the site. The site is mostly flat however there are several large areas of mounding that occur (mostly in the southern and eastern parts of the site), which screen much of the site from some surrounding areas.

The proposal involves the redevelopment of the site, with most of the existing structures being demolished or relocated. The proposal includes the following main elements:

- Intermodal terminal – open area for the loading and unloading of containers. Shipping containers (typically red and blue coloured) in this area would be stacked up to five containers high (12.5m). Approximately three gantry cranes would be constructed in this area to move containers from rail cars.
- Warehousing – a series of warehouses of various sizes, but all approximately 12m in height and of steel construction. For the purposes of this assessment, it is assumed that warehouses will be of a beige colour.
- Administration building, probably of brick construction approximately 8m high.
- Light industrial/commercial development on Cosgrove Road – will function separately to the ILC but will be developed on the Cosgrove Road frontage. The architectural form of this development is not known at this point, however it is anticipated that it will be of a similar scale and form to existing modern light industrial development that occurs on Cosgrove Road. This development will be the subject of a separate future Development Application.
- Empty container storage facilities – open area for the storage of shipping containers. Containers in this area will be stacked up to 6 containers high (15m).
- Lights - the visualisation carried out for this assessment assumes a light pole height of 30m, however the lighting concept that was developed after the visualisation was carried out identified a likely light pole height of 25m for most lights. Poles would be galvanised steel.
- Rail sidings
- Internal roads – including truck queuing and parking areas
- Diesel and LPG fuel storage tanks (beige steel construction).
- Container washdown area (beige steel construction).
- Community/ecological area at the southern end of the site, along with other landscaped areas.

The proposed site layout and landscape plan is shown in Figure 2. The existing topography of the site would not be subject to major change as a result of the proposal. Flattening of all mounding on the site would however occur, except for the large existing mound that will form part of the community/ecological area.

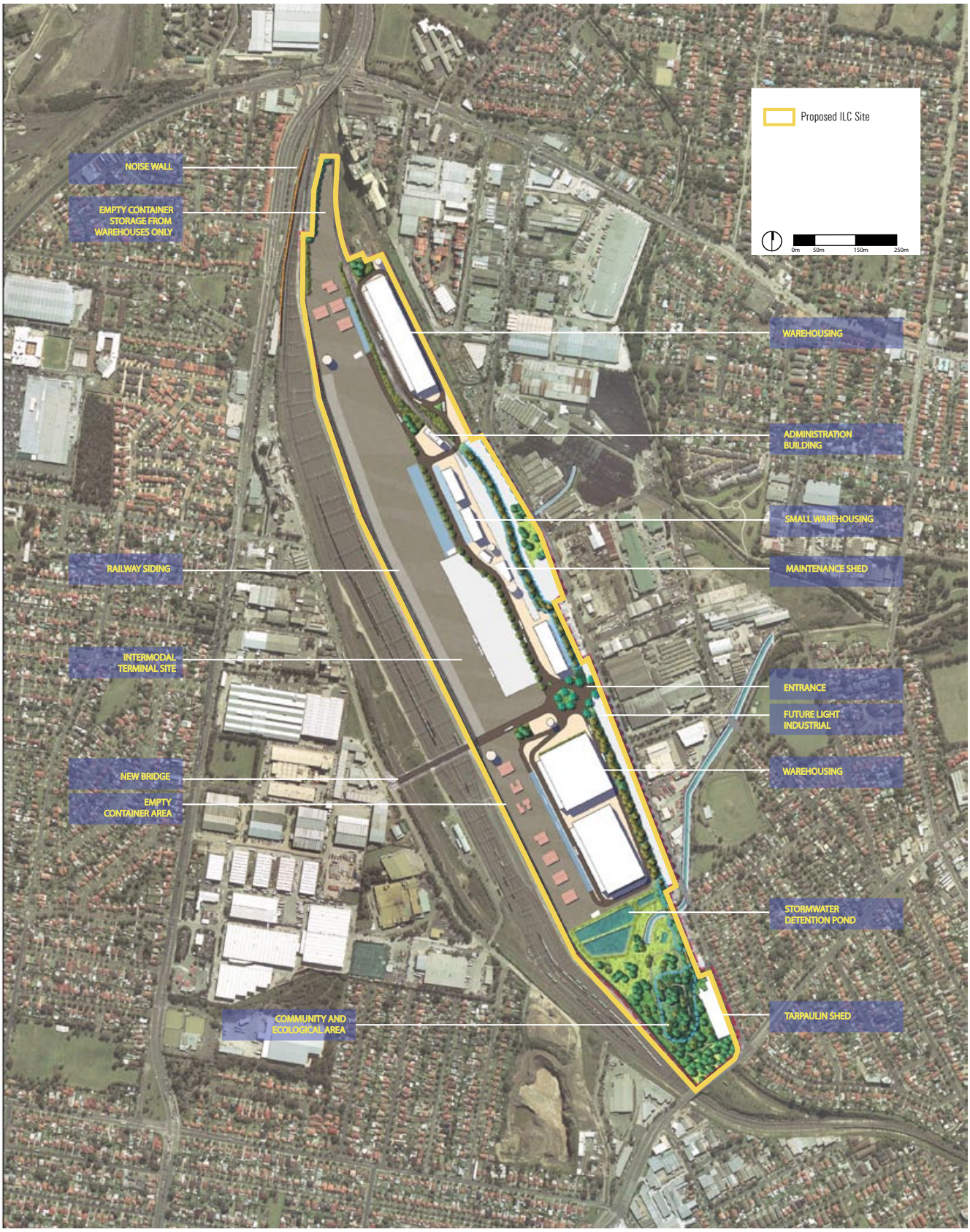


Figure 2

Site Layout and Landscape Master Plan

6 Measures to Reduce Visual Impact

Measures to reduce the visibility of the development were identified in parallel with the landscape and urban design assessment report. These measures would primarily comprise screen planting in key areas. They are summarised below, while further detail can be found in the landscape and urban design report. The landscape concept is shown in Figure 2.

To mitigate this visual impact it is proposed to plant a 50m wide belt of screening vegetation in the area between the Punchbowl Road overpass and the existing mound, at the southern end of the site. Additionally, a 10m wide belt of vegetation is to be located adjacent to the new Enfield Marshalling Yards on the western boundary of the site, running approximately 320m from the northern tip of the site . Where this belt is clear of railway lines, the planting will consist of tall tree species capable of growing to a height of 20m interdispersed with medium trees, which when mature will form a visually impenetrable barrier. This treatment will mitigate views from Punchbowl Road, and the existing tree planting along Roberts Road in conjunction with proposed screening and noise walls, will screen a large proportion of potential views from the north-west.

There is also a proposed mound 2-5m high and with a belt of planting approximately 17m wide behind the proposed light industrial areas running parallel to Cosgrove Road. This planting will help to provide some screening of the proposed warehouses for users of Cosgrove Road.

The community/ecological area in the southern part of the site, while not specifically designed to screen the development, would provide an improvement in the landscape amenity of this part of the site. This will assist in minimising the visual impact of the development.

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

7 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 assessment criteria described in Section 3.

The pattern of development surrounding the site will screen the development from much of the surrounding area. Potential views do occur however along viewing corridors created by streets near the site and where topography provides some elevation above potential obstructions to views.

The identified viewpoints are all within 1km of the site. A digital viewshed analysis suggested that there may be some more distant views of the development (from immediately north of Strathfield Golf Course and on higher ground at Strathfield South, immediately west of Coronation Parade). Closer examination of these potential viewpoints however suggest that views would be extremely limited with the distance from the site making any elements of the site virtually imperceptible. The location of key viewpoints is shown on Figure 3.

The evaluation of visual impact from these key viewpoints follows. This describes the daytime visual impacts during operation of the development. 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.

Figure 3

View Locations

view 1

Existing view

Simulated view

view 1

Viewing situation	Gould Street Strathfield South, looking south
Visual modification	
Approximate viewing distance	50-750m
Prominence of the development	The southern end of Gould Street is close to the edge of the site and would have clear views to structures at the north eastern corner of the development. Warehousing and the administration building would be highly prominent at this location, while light poles are also likely to be visible.
Landscape compatibility	Gould Street is within an industrial area. Additional industrial development would be compatible with this landscape and would replace some existing industrial structures within the site. It is not likely that there would be a negative effect on the visual amenity at this location
Visual sensitivity	The industrial land use on Gould Street creates a low visual sensitivity. Most views would be of short duration and be from the street and footpaths.
Visual impact	The ILC would be highly prominent at this location. The compatibility of the development with the existing landscape and the low visual sensitivity however suggests there would be a relatively low visual impact at Gould Street.

view 2

Existing view

Simulated view (indicating possible maximum scale of future light industrial development - not architectural detail)

view 2

Viewing situation	Cosgrove Road Strathfield South, looking south west
Visual modification	
Approximate viewing distance	50-750m
Prominence of the development	Cosgrove Road bends to a directly north-south alignment north of Cleveland Street. This provides a view corridor to the south and south west looking towards the central part of the development. The future light industrial development on Cosgrove Road is likely to be the main feature viewed from this area. If the ILC is developed prior to this light industrial development, some components of the ILC are likely to be visible though not highly prominent, including warehousing, the administration building and light poles. A landscaped mound in front of the ILC would soften these views.
Landscape compatibility	This part of Cosgrove Road is within an industrial area. Additional industrial development would be compatible with this landscape and would replace some existing industrial structures within the site.
Visual sensitivity	The industrial land use at this location creates a low visual sensitivity. Most views would be of short duration and be from the street and footpaths.
Visual impact	The ILC would not be highly visible at this location, however future light industrial development would be prominent. The compatibility of the development with the existing landscape and the low visual sensitivity suggests there would be a relatively low visual impact at this part of Cosgrove Road.

view 3

Existing view

Simulated view

view 3

Viewing situation	Cleveland Street Strathfield South, looking west
Visual modification	
Approximate viewing distance	50-400m
Prominence of the development	Cleveland Street would look toward the central part of the development. It looks towards a proposed landscaped area adjacent to Cosgrove Road. The future light industrial development would occur to the north and south of this view and would be unlikely to be visible. A landscaped mound would screen most elements of the ILC however some warehousing may be able to be seen from this location.
Landscape compatibility	Cleveland Street is within an industrial area and although the existing amenity is enhanced by street tree planting, additional industrial development would be compatible with this landscape. Proposed landscape treatments in this area would add to its visual amenity.
Visual sensitivity	The industrial land use at this location creates a low visual sensitivity. Most views would be of short duration and be from the street and footpaths.
Visual impact	The ILC would not be highly visible at this location. The proposed improvements to the landscape and the low visual sensitivity suggests there would be a relatively low visual impact at Cleveland Street.

view 4

Existing view

Simulated view (indicating possible scale of future light industrial development - not architectural detail)

view 4

Viewing situation	Hope Street Strathfield South, looking west
Visual modification	
Approximate viewing distance	50-400m
Prominence of the development	Hope Street would look directly onto the future light industrial development. The precise form this development would take is not known yet, however the likely scale is indicated in the simulation opposite. The light industrial development is likely to be a dominant landscape feature from this location. If the ILC is developed before the light industrial development, prominent views to warehousing within the ILC would be likely, which would be softened by a proposed landscaped mound in front.
Landscape compatibility	Hope Street is within an industrial area and although the existing visual amenity is enhanced by street tree planting, additional industrial development would be compatible with this landscape. It is likely that landscape works would be undertaken to maximise the visual amenity of future industrial development.
Visual sensitivity	The industrial land use at this location creates a low visual sensitivity. Most views would of short duration and be from the street and footpaths.
Visual impact	The development would be prominent from this location, however its compatibility with the existing landscape and the low visual sensitivity suggests there would be a relatively low visual impact at Hope Street.

view 5

Existing view

Simulated view

view 5

Viewing situation	Corner of Cecily and Blanche Streets Strathfield South, looking north west
Visual modification	
Approximate viewing distance	150-700m
Prominence of the development	The development is likely to be visible from this location due to there being a view corridor between houses and vegetation. The top of warehousing at the southern end of the development is likely to be visible on the horizon. Some of the future light industrial development may also be visible directly in front of the ILC warehousing.
Landscape compatibility	Residential development and large street trees are the dominant landscape features in this location. None of the existing industrial development in the vicinity of Cosgrove Road is currently visible. The introduction of new industrial elements would not be compatible with the existing landscape character.
Visual sensitivity	Being a residential area, the visual sensitively of this location is high. Several houses may be subject to views of the development, with other views occurring from the street and footpaths near the corner the two streets.
Visual impact	The development would not be a prominent feature on the landscape, but some parts of the development are likely to be clearly visible from this location. When the limited landscape change is combined with the high visual sensitivity of this location, there is potentially a low to moderate level of visual impact.

view 6

Existing view

Simulated view

view 6

Viewing situation	Cosgrove Road Strathfield South, looking north west
Visual modification	
Approximate viewing distance	20-500m
Prominence of the development	The residential area at the southern end of Cosgrove Road borders the site and currently looks on to the tarpaulin shed, It is unlikely that much of the ILC will be visible from this location due to the screening effect of the tarpaulin shed and other structures and vegetation on Cosgrove Road. Warehousing may be visible to the north west of the tarpaulin shed.
Landscape compatibility	Mature trees along Cosgrove Road add to the visual amenity and reduce the negative impacts on visual amenity from the tarpaulin shed and other industrial elements in the landscape. New industrial elements if they were visible, would be generally compatible with this landscape due to the existing industrial elements present, but may detract slightly from its visual amenity.
Visual sensitivity	Being a residential area, the visual sensitivity of this end of Cosgrove Road is higher than adjoining industrial areas.
Visual impact	The limited visibility of the development and the presence of existing industrial elements in the landscape (despite a higher visual sensitivity) suggests a relatively low level of visual impact at this location.

view 7

Existing view

Simulated view

view 7

Viewing situation	Punchbowl Road rail overpass, looking north west
Visual modification	
Approximate viewing distance	0-2500m
Prominence of the development	The Punchbowl Road rail overpass is located on the southern boundary of the site and has unobstructed elevated views of the site to the north-west. Most elements of the development would be prominent from this location, with the ecological area in the foreground being the most dominant component of the development on the landscape. Of the elements associated with the ILC itself, the container stacks, warehousing and light poles at the southern end of the ILC would be the most prominent.
Landscape compatibility	The landscape character from the Punchbowl Road rail overpass reflects the disused character of the former Enfield Marshalling Yards and the wide rail corridor and associated structures of the new Enfield Marshalling Yards. The landscape amenity is generally low and the introduction of new industrial elements to the landscape would not detract from its visual amenity. The establishment of the ecological/community area would result in an improvement in the visual amenity of this component of the landscape.
Visual sensitivity	High volumes of traffic cross the Punchbowl Road rail overpass, with the alignment of the road allowing eastbound vehicle users to view the development most readily, although expansive potential views are available to westbound vehicle users as well. The high number of potential viewers suggests that the visual sensitivity at this location would be high, however due to views being predominantly brief and the importance of amenity to viewers not being great, the visual sensitivity at this location would be moderate.
Visual impact	The high level of visual modification and the moderate visual sensitivity are moderated by the overall improvement to the visual amenity provided by the ecological/community area. A low to moderate visual impact would be expected.

view 8

Existing view

Simulated view

view 8

Viewing situation	Minnie Street Belmore, looking north west
Visual modification	
Approximate viewing distance	300-2500m
Prominence of the development	Because Minnie Street is at a higher elevation than the site and has a relatively unobstructed longitudinal view along its western edge, many of the elements of the development would be visible from this location. While the southern boundary of the site is approximately 300m from Minnie Street, the nearest structures would be approximately 600m away (the southern portion of the site comprising the landscaped ecological area). The development would be visible from this location but not dominant in the landscape.
Landscape compatibility	The existing landscape from this location comprises a broad expanse of industrial and infrastructure land uses, with residential character in the foreground. The existing landscape amenity is relatively compatible with additional industrial elements. The establishment of the ecological/community area would improve the amenity of the overall view towards the site
Visual sensitivity	Minnie Street is a residential street and therefore has a higher visual sensitivity to modification to the landscape. Views toward the site occur from several properties on the street and from the street itself.
Visual impact	There is a higher visual sensitivity at this location and some development components would be visible but distant. When the overall improvement to the landscape amenity provided by the ecological/commmunity area and the presence of existing industrial elements is taken into account, the visual impact at this location would be expected to be low.

view 9

Existing view

Simulated view

view 9

Viewing situation	Wentworth Street Greenacre, looking north
Visual modification	
Approximate viewing distance	200-1000m
Prominence of the development	The section of Wentworth Street that runs in north/south direction is subject to diagonal views across the central part of the site. A railway noise wall at the end of the street provides some visual screening, however the visibility of container stacks, warehousing and light poles would be likely to make the development clearly visible from this location.
Landscape compatibility	There is some landscape amenity provided by the mature trees along Wentworth Avenue at this location. Railway and industrial elements are also prominent in the landscape. A small effect on the character of the landscape at this location would be expected with increased prominence of industrial features.
Visual sensitivity	This part of Wentworth Avenue is residential and therefore has a higher visual sensitivity. Most views would be from outside residential properties with the street itself being subject to the most direct views.
Visual impact	The higher visual sensitivity and visibility of the development from this location is counteracted by the unlikelihood of a major change in landscape character. A moderate visual impact would occur at this location.

view 10

Existing view

Simulated view

view 10

Viewing situation	Mayvic Street Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	Vegetation along Wentworth Street acts as a screen between this viewpoint and the site. Some elements are likely to be visible (but not highly prominent) from this location including light poles and the tops of warehouses.
Landscape compatibility	Although the foreground consists of light industrial buildings, the outlook from Mayvic Street beyond the immediate surrounds is effectively screened from the rail and industrial character to the east by the trees along Wentworth Avenue. The addition of new industrial elements to this landscape would have a small impact on the landscape amenity.
Visual sensitivity	The industrial land use suggests a low visual sensitivity in this location. Views will be from workers and road users in the area and mostly of relatively short duration.
Visual impact	The development would not be highly prominent from this location, which when combined with its low visual sensitivity, would result in a relatively low visual impact.

view 11

Existing view

Simulated view

view 11

Viewing situation	Naughton Street Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	There is a relatively unobstructed view from Naughton Street to the development, with warehousing likely to be prominent in the view as well as light poles and possibly container stacks.
Landscape compatibility	The landscape looking east from Naughton Street comprises light industrial development in the foreground and rail infrastructure beyond. The development would add industrial elements to landscape, which would be compatible with the existing industrial landscape.
Visual sensitivity	The industrial land use suggests a low visual sensitivity in this location. Views will be from workers and road users in the area and mostly of relatively short duration.
Visual impact	Despite various elements of the development being prominent, the existing industrial character of the landscape along with the low visual sensitivity, would result in a relatively low visual impact at this location

view 12

Existing view

Simulated view

view 12

Viewing situation	Ford Street Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	Ford Street looks across the central part of the site, towards the Toll Lease area. It could be expected that a range of components of the development would be prominent including light poles, warehousing and container stacks. Some screening is provided by trees on the western side of the railway.
Landscape compatibility	The landscape looking east from Ford Street is industrial, with light industry in the foreground and a range of more distant industrial elements occurring to the east. Added industrial elements in this landscape would be generally compatible with the existing character
Visual sensitivity	The industrial land use suggests a low visual sensitivity in this location. Views will be from workers and road users in the area and mostly of relatively short duration.
Visual impact	Despite various elements of the development being visible, the existing industrial character of the landscape along with the low visual sensitivity, would result in a relatively low visual impact at this location

view 13

Existing view

Simulated view

view 13

Viewing situation	Norfolk Road Greenacre (east of Roberts Road), looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	The eastern end of Norfolk Street looks towards the central part of the development. Light poles, warehousing and container stacks are potentially visible from this location and may be prominent in the landscape.
Landscape compatibility	The foreground character at this location comprises light industrial development, while electric rail gantries are prominent on the skyline. Additional industrial elements in this landscape would be compatible.
Visual sensitivity	The industrial land use suggests a low visual sensitivity in this location. Views will be from workers and road users in the area and mostly of relatively short duration.
Visual impact	While the development may be prominent from this part of Norfolk Road, the limited change to the character of the area and its low visual sensitivity would result in a relatively low visual impact.

view 14

Existing view

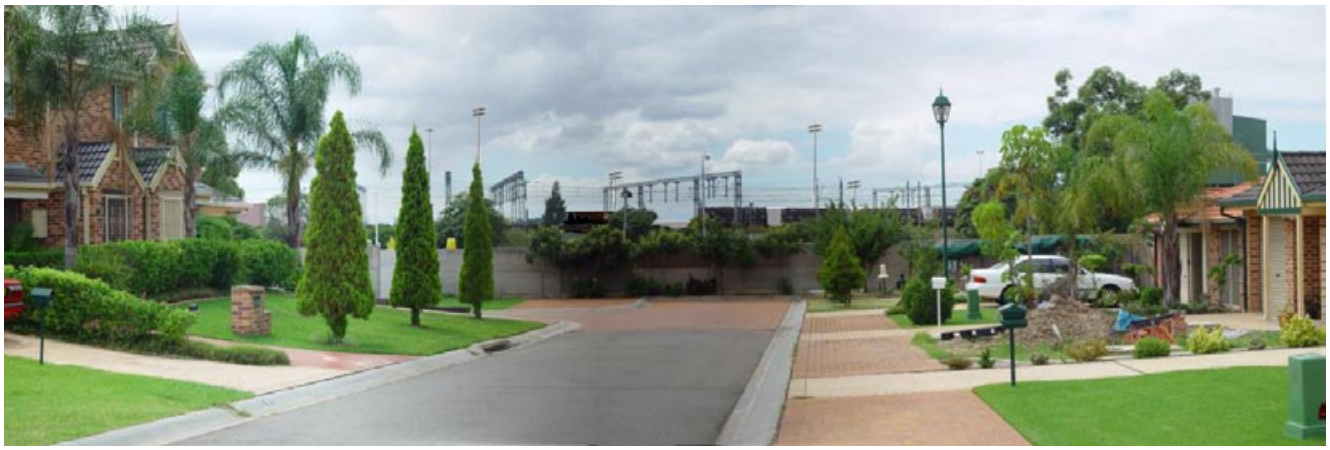
Simulated view

view 14

Viewing situation	Norfolk Road Greenacre (around Maiden Street), looking east.
Visual modification	
Approximate viewing distance	750-1000m
Prominence of the development	Warehousing is likely to be visible at the end of a long view corridor from this high point on Norfolk Road. The development would be below the horizon from this viewpoint and would visually replace existing industrial development that is located to the east.
Landscape compatibility	The landscape on this part of Norfolk Road is dominated by a residential character with street trees being prominent in the foreground and middleground. The addition of industrial elements would generally be incompatible with this type of landscape,
Visual sensitivity	The visual sensitivity would be relatively high at this location because it is a residential area where visual amenity is important and the potential duration of views is long. Views to the site would however almost exclusively be from Norfolk Road itself.
Visual impact	The landscape change from this viewpoint would be barely perceptible due to the viewing distance and the fact that new elements that are potentially visible would be similar to the existing elements that they would replace in the view. Despite the visual sensitivity of the area, the lack of visibility of the development from within properties which combined with the minimal level of visual modification suggests there would be a relatively low level of visual impact.

view 15

Existing view



Simulated view (warehousing is partially obscured by the train in this view)

view 15

Viewing situation	Angophora Grove Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	Angophora Grove is several metres below the railway embankment on the western boundary of the site, which would therefore provide a visual screen from this location. It is likely however that some light poles would be visible along with the tops of warehousing and container stacks (depending on their precise location).
Landscape compatibility	The landscape from this location contains residential development in the foreground, with rail infrastructure being prominent on the horizon. Additional industrial elements in this landscape would have some consistency with the existing outlook, however they would detract from the residential amenity.
Visual sensitivity	The visual sensitivity would be relatively high at this location with the residences on Angophora Grove subject to long term views. Top floor views from residences at the eastern end of the street would be most subject to views while other views from this location would be from the street and from the front of properties.
Visual impact	The potential visibility of the development from Angophora Grove and the high visual sensitivity suggest low to moderate visual impacts are possible at this location.

view 16

Existing view

Simulated view

view 16

Viewing situation	McDonald Way Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	The view from MacDonald Way is across the roof of the Shell Service Station towards the central intermodal terminal area which screens some of the site from this location. Some light poles are likely to be visible along with possibly the tops of container stacks. These would not be highly prominent because of the screening provided by the service station and its associated landscaping.
Landscape compatibility	Landscape amenity in the outlook towards the site from this location is provided by mature trees planted at the rear of the service station. Commercial and infrastructure elements are however prominent in the landscape, including the roof of the service station and electric railway gantries. Further industrial elements in this landscape would potentially detract from its amenity but would not be entirely incompatible.
Visual sensitivity	The visual sensitivity would be relatively high at this location with the residences on Mc Donald Way subject to views of long duration. The residences closest to Roberts Road would have the greatest viewing potential, while other views from this location would be from the street and from the front of properties.
Visual impact	Although this location has a high visual sensitivity, the low prominence of the development suggests that visual impacts at this location would be relatively low to moderate.

view 17

Existing view

Simulated view

view 17

Viewing situation	Tweedie Park Greenacre, looking east.
Visual modification	
Approximate viewing distance	250-500m
Prominence of the development	The development would have minimal visibility from this location due mainly to the screening effect of vegetation and buildings in the foreground and middleground. Several light poles are likely to be visible. The tops of container stacks and warehouses may be visible however if these are visible, they are likely to be barely perceivable.
Landscape compatibility	The existing view is of a relatively high visual amenity and not compatible with increased visibility of industrial development. Most existing industrial development in the area is screened by vegetation and residential development.
Visual sensitivity	Residences on Lawford Street and Rebecca road subject to long term views and park users subject to short term views, suggesting a relatively high visual sensitivity. A number of houses face towards a limited view corridor to the development created by Tweedie Park.
Visual impact	The Tweedie Park area has a high visual sensitivity, however the minimal visual modification to the landscape at this location would result in a relatively low visual impact.

view 18

Existing view

Simulated view

view 18

Viewing situation	Jean Street Greenacre, looking east.
Visual modification	
Approximate viewing distance	100-300m
Prominence of the development	Container stacks will be potentially visible and prominent above the existing vegetation along Roberts Road. Establishment of the additional vegetation screen between the ILC and the new Enfield Marshalling Yards may reduce the prominence of these container stacks but would be unlikely to fully screen them.
Landscape compatibility	The existing landscape is a mix of residential and industrial elements, while the trees along Roberts Road are also a prominent feature. Additional industrial elements would be somewhat compatible with the existing landscape, however there is some potential loss of visual amenity.
Visual sensitivity	Several residences would be subject to long term views. The properties on the corner of Roberts Road would be most subject to views of the development. Otherwise most views would be from Jean Street itself or the front boundary of properties.
Visual impact	The higher visual sensitivity of this location and the potential prominence of container stacks in this area suggest that Jean Street would be potentially subject to higher visual impacts. The existing landscape screening will partially conceal the proposed container stacks. A moderate visual impact would therefore result.

view 19

Existing view

Photographic simulation showing possible noise wall.

view 19

Viewing situation	Roberts Road Greenacre, looking south east. Predominantly from south-bound vehicles, but some more limited views from north-bound vehicles.
Visual modification	
Approximate viewing distance	50m to 1.5km
Prominence of the development	Several light poles are likely to be visible on the skyline and the northern part of the noise wall will be potentially prominent. There is likely to be limited views of warehousing and container stacks. Screening provided by existing roadside vegetation and structures in Railcorp property will reduce the overall visibility of the development.
Landscape compatibility	Additional industrial elements would be consistent with existing industrial character associated with Railcorp property and surrounding industrial activities.
Visual sensitivity	There are high volumes of traffic on Roberts Road, with southbound vehicle users having the most direct views of the development. The short duration of views and the low importance of visual amenity to vehicle users results in a low visual sensitivity at this location.
Visual impact	There would be a perceivable modification to the views from this location, primarily due to the visibility of several light poles and the noise wall. The high traffic volumes on Roberts Road creates a large number of potential viewers, the brief duration of these views and the focus of most road users on the road directly ahead, suggests that the visual impact from this location would be low.

Visual Impacts During Construction

Construction would occur over an approximately 27 month period and therefore is temporary in nature. Construction cranes would be the most visible element during construction and would be potentially viewed from most of the key viewpoints discussed above. Other sources of visual impact during construction, such as the establishment of hoardings and construction fencing would tend to create highly localised visual impacts.

8 Light Spill Assessment

Lighting Concept

A preliminary lighting concept was developed for the purposes of modeling light spill. This concept is described below.

Light poles would be spaced 80m apart in the empty container areas, with the fittings placed at 25m high. Three fittings would be fitted to each pole, with the poles installed along the perimeter of the site with the heads put in a "T" shape - all directed into the site to obtain minimum spillage into the surrounding areas. 1000W lamps would be used in the areas to achieve a vertical illuminance of 25 lux average in the area.

In the Intermodal Terminal site, the average illuminance required is 50 lux. The poles would be spaced 60m apart with 2000W lamps to obtain these levels. The fittings again would be placed at 25m high. Four fittings would be fitted to each pole, in a "+" configuration. This is to allow the railway track to be illuminated in that area for the removal of the container from the tracks into the site. Another row of lights would be installed along the perimeter of the road in a "T" configuration, again with all lighting directed into the site.

Both lighting solutions are based on the Philips MVP 507 series fittings. A combination of wide beam and medium beam reflectors would be used in the fittings to contain the lighting to a specific area without creating significant *bright spots* on site.

Light Spill Modeling

Light spill was modeled based on the above lighting concept. The light spill was modeled from the empty container areas at the northern and southern ends of the ILC as these would be the closest parts of the ILC closest to residences. The modeled light spill level at a series of points (shown in Figure 4) correlating with the closest residences are listed below.

Location 1	0.02 lux
Location 2	0.01 lux
Location 3	0.01 lux
Location 4	0.02 lux*
Location 5	0.00lux

* *the light model did not extend to Location 4. The reading is taken from the nearest available point (approximately 90m closer to the development). Light spill levels at Location 4 would therefore be likely to be less than the level shown above.*

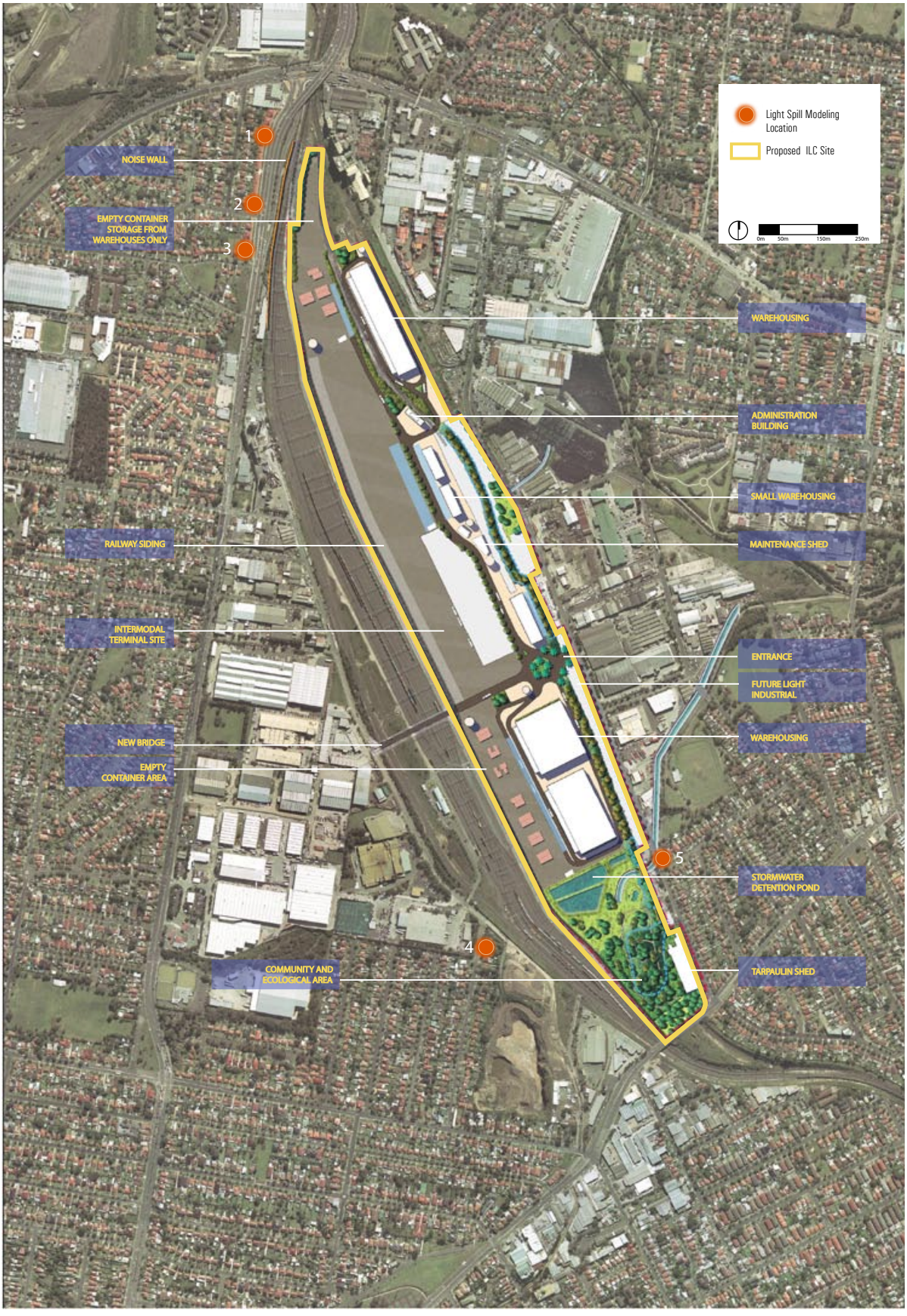


Figure 4

Light Spill Modeling Points

The light modeling indicates that the proposed lighting would be successful in containing light within the site. The light levels predicted at the nearest residential levels would be virtually imperceivable to people in these areas. The modeling indicates that anywhere beyond approximately 140m from the site boundary would be subject to no measurable light spill.

Direct Views of Lights

Light fittings will be visible at night from most of the key viewpoints discussed in Section 6. Generally these would not be expected to change the night landscape as the lights would be focused downwards and would be part of a landscape already containing a large number of light sources. The development may be relatively prominent at night however, from locations where a large proportion of the lights can be seen. Viewpoints 7 and 8 would fit into this category.

9 Conclusion

The proposed ILC would be located on a site that has been traditionally subject to industrial activities and which has become generally derelict in appearance. The immediate surrounds of the site are also largely industrial however some residential areas in Greenacre, Belmore, and Strathfield South border the site or are located in relatively close proximity. The site development would generally be in keeping with the existing character of the area. Some relatively high and/or bulky structures will however increase the visibility of the site beyond its current levels, with some limited visual impacts.

The pattern of development surrounding the site will screen the development from much of the surrounding area. Potential views do occur however along viewing corridors created by streets near the site and where topography provides some elevation above potential obstructions to views.

Visual impact has been assessed from locations with potential views of the development. The level of visual impact is based on a combination of *visual modification* (the predicted change to the landscape that would occur at a given location), and *visual sensitivity* (the number of viewers, duration of views and importance of visual amenity at a given location).

Those areas subject to higher visual impacts in relative terms would be those in residential areas that have prominent views of site elements. There are few locations where this occurs, however parts of Greenacre to the immediate north west of the site may be subject to higher impacts where some light poles and container stacks may be prominent. Most of the residential areas with potential views to the site would be subject to lower impacts because the change to the landscape created by the development would be minimal due to the limited visibility of the development.

The most prominent views of the development would occur from some of the industrial areas on the eastern and western sides of the site. The visual impacts in these areas are regarded as relatively low however, because of their low visual sensitivity and the compatibility of additional industrial elements with the existing industrial landscape.

There are a range of proposed landscape measures, including planting and mounding, that would reduce the visibility of the development and improve visual amenity. The most notable of these would be the establishment of the community/ecological area in the southern part of the site, which would provide a large area with improved landscape amenity that would be prominent from Punchbowl Road and residential areas to the south.

The light spill from the site has been modelled based on a preliminary lighting concept. This indicates that the light spill into neighbouring areas will be virtually undetectable. Direct views of lights would be possible at night from many of the potential viewpoints discussed on the visual

assessment. The light fittings would be designed to focus illumination downwards and minimise lateral light spill and glare. The lights would therefore be expected to create minimal change to the night time landscape from most locations, given the existing urban setting.