



SYDNEY INTERNATIONAL CONVENTION, EXHIBITION AND ENTERTAINMENT PRECINCT
THE HAYMARKET – STUDENT ACCOMMODATION AND DARLING DRIVE

LIGHT RAIL ASSESSMENT

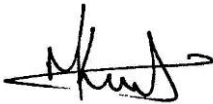
FOR SSDA3



DARLING HARBOUR LIVE

SICEEP – THE HAYMARKET (STUDENT ACCOMMODATION AND DARLING DRIVE)

LIGHT RAIL ASSESSMENT FOR SSDA3

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EXECUTIVE SUMMARY

Hyder Consulting has been engaged by Lend Lease to provide advice relating to the existing light rail infrastructure adjacent to the Student Accommodation site within The Haymarket development at Darling Harbour. This report will support the Stage 2 Development Application for the Student Accommodation and respond to the Director General's Requirements (DGR's).

The DGR's that have been issued for this project request Lend Lease to address any impacts on the Light Rail corridor and western distributor viaducts.

To respond to the DGR's, this report outlines the impact that the construction of the proposed student accommodation building will have on the light rail corridor including but not limited to:

- Building collision protection
- Consideration of interfaces associated with façade maintenance
- Windows openings and balconies
- Noise and vibration
- Use of cranes over the light rail corridor
- Potential services crossings
- Partial demolition of existing footbridge
- Demolition or relocation of the existing Railcorp infrastructure elements

1 INTRODUCTION

This report supports a State Significant Development (SSD) Development Application (DA) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The Application (referred to as SSDA3) follows the submission of a staged SSD DA (SSDA2) submitted in March 2013 to the Department of Planning and Infrastructure that set out a Concept Proposal for a new mixed use neighbourhood at Darling Harbour known as 'The Haymarket'. The Haymarket forms part of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Project, which will deliver Australia's global city with new world class convention, exhibition and entertainment facilities and support the NSW Government's goal to "make NSW number one again".

More specifically this subsequent DA seeks approval for the residential building (student accommodation) within the West Plot (Darling Drive) of The Haymarket and associated public domain works. The DA has been prepared and structured to be consistent with the Concept Proposal DA.

2 OVERVIEW OF PROPOSED DEVELOPMENT

The proposal relates to a detailed ('Stage 2') DA for a residential building (student accommodation) in the Darling Drive Plot of The Haymarket together with associated public domain works. The Haymarket Site is to be developed for a mix of residential and non-residential uses, including but not limited to residential buildings, commercial, retail, community and open space. The Darling Drive Plot is one of six development plots identified in the Concept Proposal DA.

More specifically, this SSD DA seeks approval for the following components of the development:

- Demolition of existing site improvements;
- Associated tree removal and planting;
- Construction and use of one residential building within the Darling Drive Plot, to be used for student accommodation purposes;
- Public domain improvements, including:
 - Realignment and upgrade of Darling Drive (part); and
 - Provision of a new urban square (known as Macarthur Place) located at the termination of the Goods Line.
- Extension, realignment and augmentation of physical infrastructure / utilities as required.

3 BACKGROUND

On 21 March 2013 a critical step in realising the NSW Government's vision for the SICEEP Project was made, with the lodgement of the first two SSD DAs with the Department of Planning and Infrastructure. The key components of these proposals are outlined below.

Public Private Partnership SSD DA (SSD 12_5752)

The Public-Private Partnership (PPP) SSD DA (SSDA 1) includes the core facilities of the SICEEP Project, comprising the new, integrated and world-class convention, exhibition and entertainment facilities along with ancillary commercial premises and public domain upgrades.

The Haymarket Concept Proposal (SSD 13_5878)

The Haymarket Concept Proposal SSD DA (SSDA 2) establishes the vision and planning and development framework which will be the basis for the consent authority to assess detailed development proposals within the Haymarket Site.

More specifically the Stage 1 Concept Proposal seeks approval for the following key components and development parameters:

- Staged demolition of existing site improvements, including the existing Sydney Entertainment Centre (SEC), Entertainment Centre Car Park, and part of the pedestrian footbridge connected to the Entertainment car park and associated tree removal;
- A network of streets, lanes, open space areas and through-site links generally as shown on the Public Domain Concept Proposal, to facilitate reintegration of the site into the wider urban context and connection with the broader SICEEP Site;
- Street layouts;
- Development plot sizes, development plot separation, building envelopes (maximum height in RLs), building separation, building depths, building alignments and a benchmark for natural ventilation and solar provision for the precinct;
- Land uses across the site, including residential and non-residential uses;
- A maximum total gross floor area (GFA) across The Haymarket Site of 197,236m² for the mixed use development (excluding ancillary above ground car parking), comprising of:
 - A maximum of 49,545m² non-residential GFA; and
 - A maximum of 147,691m² residential GFA;
- Above ground parking including public car parking;
- Residential car parking rates to be utilised in the subsequent detailed (Stage 2) Development Applications, being:
 - Zero (0) spaces per studio apartment;
 - Maximum one (1) space per two (2) one bedroom apartments;
 - Maximum one (1) space per one bedroom + study apartment, plus one (1) additional space per five (5) apartments;
 - Maximum one (1) space per two bedroom apartment, plus one (1) additional space per five (5) apartments; and

- Maximum two (2) spaces per 3+ bedroom apartment;
- Design Guidelines to guide future development and the public domain; and
- A remediation strategy.

This report has been prepared to support a detailed Stage 2 SSD DA for a residential building (student accommodation) and associated public domain works within The Haymarket (SSDA 3), consistent with the Concept Proposal SSD DA.

4 SITE DESCRIPTION

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west; Harbour side shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south (refer to Figure 1).

The Haymarket Site is:

- located in the south of the SICEEP Site, within the northern portion of the suburb of Haymarket;
- bounded by the Powerhouse Museum to the west, the Pier Street overpass and Little Pier Street to the north, Harbour Street to the east, and Hay Street to the south; and
- Irregular in shape and occupies an area of approximately 43,807m².



Figure 1: SICEEP site Location

The Concept Proposal DA provides for six (6) separate development plots across the Haymarket Site (refer to Figure 2):

1. North Plot;
2. North East Plot;
3. South East Plot;
4. South West Plot;
5. North West Plot; and
6. Western Plot (Darling Drive).



Figure 2 – Concept Proposal Development Plots

The Site area for this Stage 2 DA relates to the West Plot and surrounds as detailed within the architectural and landscape plans submitted in support of the DA (see Figure 3).

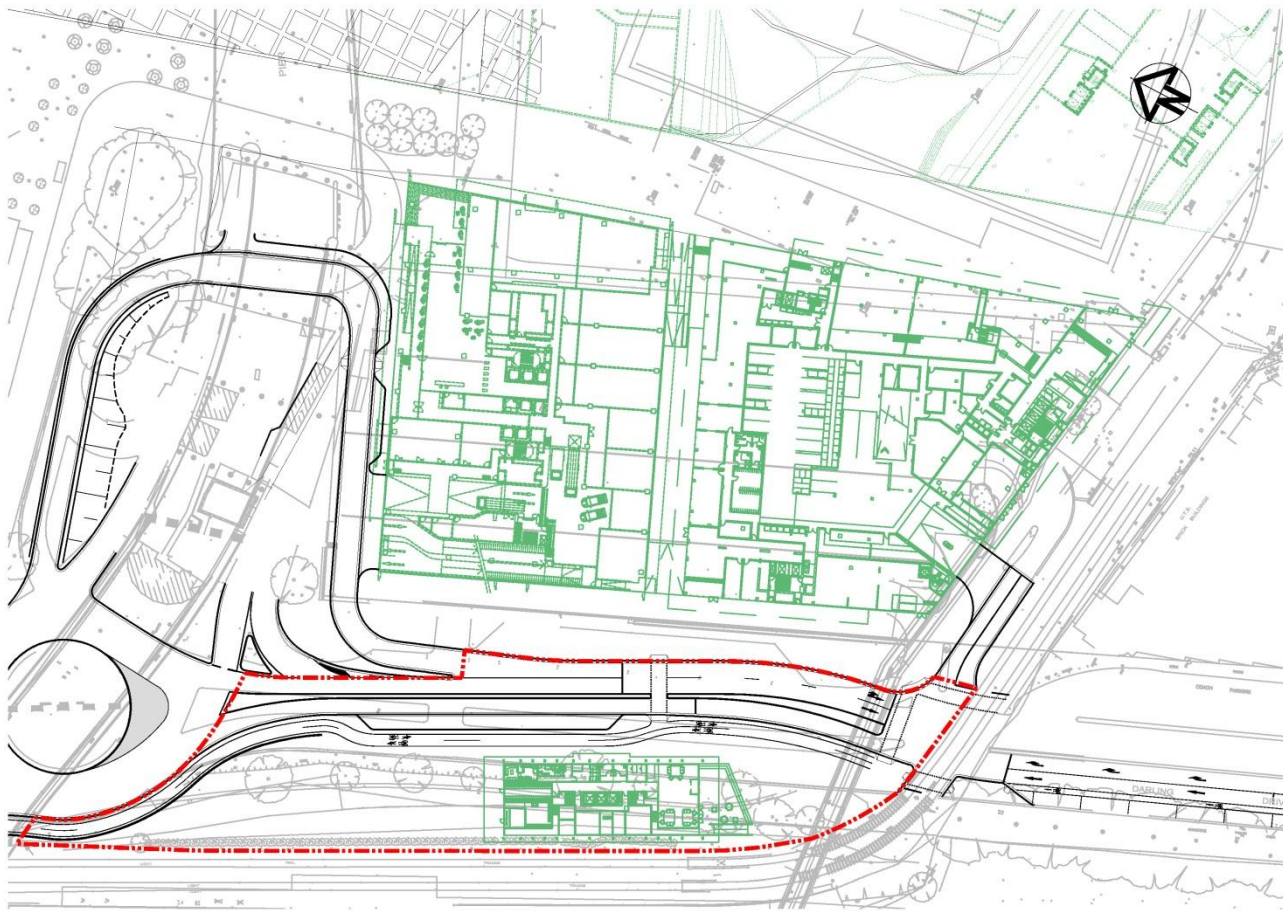


Figure 3: - Works boundary for subject DA

5 PLANNING APPROVALS STRATEGY

The SICEEP Project will result in the lodgement of numerous SSD DAs for the various components of the redevelopment project. SSD DAs have already been lodged for the PPP component of the SICEEP Project (comprising the convention centre, exhibition centre, entertainment facility and ancillary commercial premises and associated public domain upgrades), and the Stage 1 Concept Proposal for The Haymarket. Separate 'Stage 2' SSD DAs for the development of the South West Plot and the North West Plot and associated public domain works will be lodged concurrently with this application. Future applications will be lodged for the Hotel complex, and the remaining development plots of The Haymarket Site.

6 PURPOSE OF THE REPORT

This report has been prepared to accompany the Stage 2 DA for the West Plot component of The Haymarket. It addresses the relevant requirements of the DGRs for the project, issued on the 21st of January 2013 and updated on 27th March 2013. A summary of the relevant DGRs is listed below.

6.1 DIRECTOR GENERAL'S REQUIREMENTS

Table 1 Director General's Requirements

DGR Reference	Key Assessment Requirement
8	Address any impacts on the Light Rail corridor and western distributor viaducts;

7 ASSESSMENT OF LIGHT RAIL IMPACT

The Western (Darling Drive) Plot is situated on land currently owned by Sydney Harbour Foreshore Authority (SHFA) and Railcorp. The Railcorp owned corridor is used for the Metro Light Rail System (formerly known as Sydney Light Rail) which is operated by Veolia Transport. The development proposal seeks to identify all key issues relevant to the development of the student accommodation, identify any impact on the existing Light Rail corridor and all compliance required during and post construction of the buildings.

7.1 REFERENCE DOCUMENTS

Hyder have reviewed the following documents to identify key issues and compliance requirements.

- Veolia Transport "Light Rail Contractors Document" March 2011 Doc. Number 10737 Rev 0;
- Veolia Transport "Light Rail Envelope Brief" March 2011 Doc. Number 10738 Rev 0;
- Australian Standard 5100-2004 "Bridge Design" part 1 and part 2;
- Railcorp Engineering Standard ESC 370, 'Air Space Developments'; and
- Railcorp Engineering Standard ESC 380, 'External Developments'
- A guide to working in and around the rail corridor, November 2005, Railcorp

The Veolia Transport documents described above set out the operator's requirements for staff and contractors working on or about the light rail corridor, these requirements will have implications for the construction and ongoing maintenance of the building works proposed and is discussed further in this report.

The Australian Standard 5100-2004 relates to collision of rail vehicles with bridges/ structures, this standard, in absence of a standard for building structures protection from light rail vehicles,

is considered to be relevant but onerous and too conservative for the protection of the student accommodation buildings.

7.2 EXISTING CONDITIONS

7.2.1 TRACK CONFIGURATION

Generally the light rail tracks are standard gauge (1435mm) parallel at approximately 4.0 to 5.0m with OHWs between the tracks which carry the catenary and contact wire(refer to photo below).



The current Metro Light Rail System traverses 7.15km from Central Station to Catherine Street at Lilyfield with the latest extension under construction to Dulwich Hill.

A section of approximately 1.5 kilometres from the intersection of Darling Drive and Hay Street to Central Station runs within the road pavement areas, which means that the light rail and road vehicles are sharing the route along with pedestrians in a pedestrianised portion of Hay Street closest to the Student Accommodation. In this section, the track is recessed into the road pavement and then set into a resilient rubber component, in some cases a floating slab arrangement is utilised. The design speed in this area is limited to 20 kph. For the remaining 5.7km of the route, the light rail has a right of way (ROW) dedicated corridor in which the allowable maximum speed is 70 kph, with further speed restrictions in other areas of tracks due to sharp bends.

The alignment of the light rail in the vicinity of the proposed student accommodation building is on a straight, running parallel to the alignment of Darling Drive. To the south, the track follows a tight curve of approximately 40m radius and crosses, at grade, the signalised intersection of Hay Street and Darling Drive. This alignment forms the southern boundary to the site and it is at this intersection (heading west) that the light rail ROW commences. East of this intersection, the

light rail runs within Hay Street and shares the route with pedestrians and road vehicles at a maximum speed of 20km/h.

To the north of the site, the track continues along the straight for a further 300m to the Exhibition Stop where the light rail vehicle stops before continuing outbound. This limited length of track between the Exhibition Stop and the on-street running zone (20km/h), together with the sharp bend of approximately 40m radius at the commencement of the ROW, effectively limits the operation speed of the Light Rail vehicle in the vicinity of the development.

7.2.2 STAKEHOLDER ENGAGEMENT

Ongoing discussions have occurred throughout the production of this Development Application and the Concept Proposal Application (SSDA2) with the asset owner, operator and regulator to understand the interface matters requiring consideration during the design, construction and operational phases of the building.

On 1st May 2013 Hyder attended a meeting with representatives from TfNSW, Veolia Transport, Metro Transport Sydney and Lend Lease where it was agreed that a risk assessment will need to be undertaken during detailed design in regard to impact protection.

7.3 DESIGN APPROACH

7.3.1 LIGHT RAIL ENGINEERING STANDARDS

Enquiries have revealed that there are no Australian impact protection standards written specifically for light rail. TfNSW advised that it is in the process of developing light rail standards however no material has been made publicly available. The TfNSW representative at the 1st May 2013 meeting undertook to seek advice from the Asset Standards Authority (ASA) as to which standards should be followed which is pending confirmation. In the absence of relevant standards support was given to a 'first principles' risk based approach.

Australian Standard 5100-2004 has been written specifically for bridges with heavy rail freight and passenger vehicles in mind and the engineering standards are therefore considered not directly relevant to light rail applications. It does however refer to approval and or agreement by the 'Relevant Rail Authority', in the past RailCorp, or its predecessors have been the 'Relevant Rail Authority' in all passenger rail applications of AS5100-2004 in NSW. However, with the restructuring of the transport authorities in NSW, the responsibility for light rail will rest with Transport for New South Wales (TfNSW). The Director, Metro Rail Services Contracts and Road Agreements, will be the manager responsible within the relevant authority for approval of the 'first principles' approach to engineering.

7.3.2 FIRST PRINCIPLES RISK BASED APPROACH

In the absence of appropriate light rail engineering standards, a 'first principles' risk based approach will be applied to the design interface points scoped in this report.

This will be supported by precedent examples from the existing Metro light rail alignment and its extension (including CBD and inner west) as well as where appropriate:

- Other Australian jurisdictions with light rail in use, particularly Melbourne; and
- Heavy rail corridor examples where appropriate, although it is acknowledged that heavy rail has an elevated risk profile to that of light rail.

It is anticipated that points of interest will include window openings on the building in close proximity to the light rail corridor and use of cranes over the light rail corridor.

With reference to window openings, the example of train operation in close proximity to existing buildings is Yarra trams in Melbourne. The operator does not mandate the type or style of window, nor prevent opening windows on buildings along the tram routes. This principle is expected to be adopted for the extension of the Metro Light Rail System network through existing built up areas in Sydney.

In relation to crane use, procedures have been put in place in the past to allow tower cranes to operate over the rail corridor; one example was during the construction of Chatswood transport interchange and station. Approval to operate a tower crane over the light rail corridor will be sought well in advance of the planned operation of the crane.

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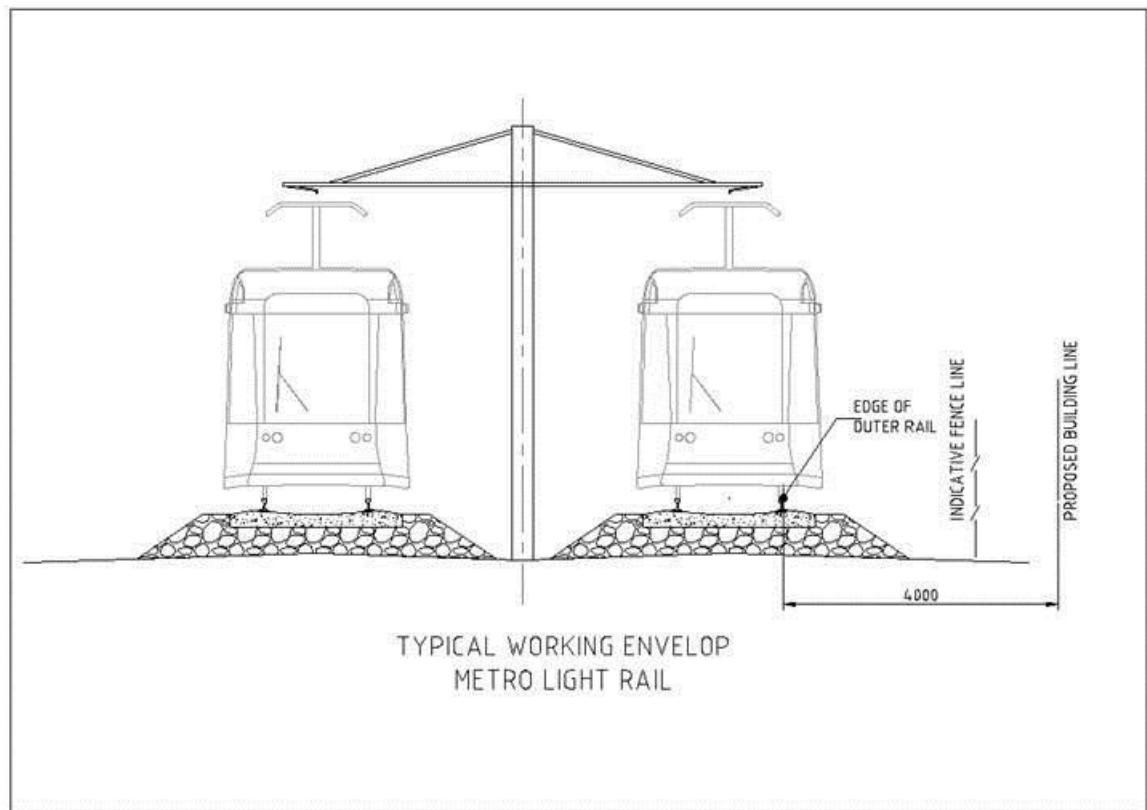
7.4 BUILDING LOCATION

7.4.1 BUILDING FOOTPRINT AND PROPOSED BOUNDARY

In accordance with the Stage 1 Concept Proposal, SSDA2, the Student Accommodation building is to be constructed on a site created by the realignment of Darling Drive and the partial transfer of the light rail stratum lot to SHFA. The proposed changes to the light rail stratum are the subject of separate discussions between Infrastructure NSW and Transport for NSW. It is noted that Transport for NSW has provided Land Owners Consent to this Development Application and the preceding SSDA2 as well as in principle agreement to the transfer of land.

To accommodate the proposed building, the existing rail corridor boundary will be realigned to an agreed distance from the nearest track with the ground floor building line setback 4.0m from the nearest rail. The building footprint is proposed to be as close as the Operator's works standards allow, in this case the property boundary is proposed to be outside the kinematic clearance envelope plus 200mm safety margin (refer typical cross section below). A property boundary fence will be constructed between the building and the track which will then return into the building with gated access restricted to building cleaning and maintenance staff only.

The building footprint is within close proximity to an existing OHW anchor mast which is discussed further in Section 7.4.3.



7.4.2 PROPOSED TRACKWORK IN THE AREA

Transport for NSW has an agreed scope to replace the rails in the vicinity of the intersection of Hay Street and Darling Drive and will encase the tracks in concrete around the Darling Drive/Hay Street bend. The relocation of OHW tension pole/s within this section of the track is to be investigated further and could be included with the aforementioned agreed scope (See 7.4.3 below).

It is noted that other light rail related works may take place in the vicinity in the future which may include the construction of a pedestrian thoroughfare across the track, linking to the Powerhouse Museum. This would be the subject of a separate Development Application.

7.4.3 TENSION POLE RELOCATION

As noted in 7.4.1 above, the building footprint is within close proximity to an OHW anchor mast at the southern end of the site that will need to be relocated. Additionally, there is a second anchor mast toward the north of the site which will likely conflict with future development of the building proposed in the Concept Proposal SSDA2. It is assumed that the tension pole is bolted to a footing and, it will be necessary to install a new concrete footing prior to the annual light rail shutdown to enable the relocation of the tension pole/s during the shutdown period. There would be sufficient time in the shutdown to erect a new pole and transfer the wire and remove the redundant pole. It is expected that the tension pole could be moved back toward Hay Street, preferably between the two tracks to clear the proposed building footprint. Insulators in the tension wire could also be cut in closer to the track to isolate the wire running in close proximity to the building. It will be necessary to have an OHW design carried out to confirm the preferred location of the new pull off post and location of wire insulators.



7.5 BUILDING DESIGN

7.5.1 WINDOW OPENINGS & BALCONIES

The DA currently proposes window openings to the western façade of the Student Accommodation building facing the light rail corridor. These narrow window openings will provide appropriate levels of natural ventilation and amenity to residents and are required to achieve the development's Green Star commitment.

During consultation with Veolia Transport, it was advised that their preference is not to have balconies and windows that can open due to the potential for items/rubbish to be dropped onto the light rail tracks/ corridor.

In order to address these issues it is proposed that the following measures be implemented:

- No balconies be incorporated within the building design
- Windows do not open beyond the depth of the window reveal; and
- Opening restrictors preventing >125mm opening.

This approach has been developed in response to the feedback received through the various stakeholder meetings conducted through the design process to date. In consideration of feedback received, the potential for balconies to elevations that could potentially affect the light rail operations have not been pursued with a risk appropriate window solution progressed instead.

It is considered that this would be appropriate as it would eliminate the risk of any large items being dropped and the windows' reveal ledges would catch the smaller items. The small opening eliminates the ability of persons to throw items out the window.

This approach to limit the extent to which windows can be opened is consistent with other Light Rail precedents in Sydney and to a lesser extent Heavy Rail, such as the Era by Mirvac project in Chatswood.

In the context of light rail, the Melbourne light rail operator Yarra Trams does not limit, in any way, windows overlooking tram corridors. Furthermore, at the time of writing, there was no evidence of any proposals to retrofit window opening limiters to new or extended light rail routes within Sydney by Metro Transport Sydney or by TfNSW.

Accordingly, standards which have been applied to recent heavy rail examples have informed this development, although it is our belief that they are onerous and conservative and are not consistent with the urban environment in which light rail is designed to operate.

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7.5.2 NOISE AND VIBRATION

The light rail tracks adjacent to the Student Accommodation Building may require noise mitigation treatment dependant on predicted noise levels within the buildings.

We understand that the tight curves cause rail squeal and vibration which may be reduced as a result of the proposed trackwork noted above in 7.4.2, as well as maintenance procedures adopted for the tight curves such as rail lubrication.

For further information and details refer to the *Renzo Tonin Noise & Vibration Report (SSDA3)*, *G.Wheatley, 2013* accompanying this development application regarding noise and vibration assessment.

7.5.3 IMPACT PROTECTION

In the absence of Light Rail standards for impact protection, this report refers to the Australian Standard AS 5100.1-2004, Bridge Design, including structures other than bridges, that are required to support or resist road or railway traffic loads e.g. retaining structures, deflection walls, or structures built over or adjacent to railways, or both (refer Australian Standard AS 5100.2- 2004 clause 1(f) and 1(g)). A number of clauses of the Standard nominate that some of the requirements of those clauses shall be confirmed as accepted by the relevant authority or the owner of the structure before the design process is commenced.

The issue of collision protection requires consideration as part of the Student Accommodation Building design due to the close proximity of the buildings to the light rail tracks (4m at ground). Australian Standard AS 5100.2- 2004 Clause 11.3.2 refers to the design of deflection walls protecting structures and AS5100.2-2004 Clause 10.4.4 which refers to the structure clearances required from the track centreline (10m horizontally and 5m vertically) where the structure protection is not required. It is noted that these clearances are based on a heavy rail environment and there may be an appropriate design solution to reduce the level of collision protection if the relevant light rail authority is in agreement.

As part of the detailed design process for the building, a risk assessment workshop with the stakeholders and the designers will be held to identify the likelihood and risks of possible light rail vehicle derailment and to discuss the options and opportunities for mitigating the impact of a derailed vehicle. The key to this analysis will be an assessment of the consequences and likelihood of a derailment. It is possible that a derailed light rail vehicle would stop within the ballast area due to the slow speeds in the vicinity of the building.

One of the possible options to mitigate a derailment is to provide derailment containment throughout the light rail track. This approach is to contain a derailed train generally parallel to the running rails and within the immediate track environment to minimise other infrastructure

damage. Another possible option is to construct a guide rail on the existing up track along the length of the buildings if deemed necessary.

7.5.4 ELECTRO- MAGNETIC FIELDS (EFM)

Veolia Transport has indicated the light rail systems and rolling stock are unlikely to be affected by the building. However, the building systems may be affected by the light rail harmonics. Any electronic equipment installed in the Student Accommodation Building will need to consider the light rail environment and if affected by EMF may require filters to be installed to the building's electrical circuit.

7.5.5 NORTH SOUTH CROSSING

The proposed north south pedestrian/bike crossing on the western footpath of Darling Drive across the light rail tracks may require a minor relocation of the poles that support the RMS road signals, overhead wiring structure and light rail overhead tension cables. It is unlikely that the light rail signals will be affected; however RMS will be consulted regarding the road signals that include pedestrian signals. Veolia and Metro Transport Sydney will be consulted if the tension poles have to be relocated.

7.6 BUILDING CONSTRUCTION

7.6.1 HOARDING LINE

It is proposed that the Student Accommodation building is constructed 4 metres from the nearest rail. Construction at this distance will necessitate installation of temporary non-conductive or earthed hoarding for the full length of the construction site to a height agreed by the operator Veolia. Similar hoarding has been put in place on RailCorp construction projects in close proximity to live overhead lines and operating trains.

It is proposed that the hoarding line is set up at a 2.0m distance from the near rail. The hoarding line encroaches the light rail operator's clearance envelope which is defined as 3.0m from the near rail. It is anticipated that approval would be sought from the operator to occupy the zone for the duration of construction works. The distance of 2.0m from the rail is acceptable if no parallel access with the track is required. The kinematic envelope of the light rail vehicles plus 200mm safety margin will fit within the provided space to the hoarding line. It is preferable if the hoarding line is clear from the ballast edge, in this case the proposed hoarding line is outside the ballast edge. During the construction period while the hoarding is in place there may be maintenance implications, such as access, which will need to be addressed and agreed with the Light Rail Authority.

7.6.2 USE OF CRANES

Use of cranes over the light rail corridor will require approval. From a heavy rail perspective, RailCorp will generally prefer not to allow cranes to operate over the operating rail corridor; however procedures have been put in place in the past to allow tower cranes to operate over

the rail corridor where other options are not available, as is the case with this project. One example of this was during the construction of Chatswood transport interchange and station and the associated Mirvac residential developments along the track alignment.

7.6.3 PEDESTRIAN FOOTBRIDGE PARTIAL DEMOLITION

The existing pedestrian access way and footbridge crossing above the light rail is proposed for demolition as part of a separate development application, SSDA5.

The existing footbridge will be terminated on the western side of the existing light rail, with stairs and a lift installed to provide access to The Goods Line pedestrian and cycle link, south of Macarthur Street. As a result, the footbridge over the light rail and next to the exiting car park will be removed.

Consultation with Veolia will be undertaken to mitigate any risks or disruptions to the rail operations and infrastructure as part of SSDA5.

7.6.4 POTENTIAL SERVICES CROSSINGS

The requirements for site wide infrastructure may necessitate new service crossings to the light rail. Any crossing would be subject to a separate Development Application.

7.7 BUILDING OPERATION AND MAINTENANCE

Maintenance of the completed structure will be considered during design and is anticipated to cover regular/ program cleaning and maintenance as well out of sequence maintenance requirements.

7.7.1 WINDOW CLEANING

Window cleaning by abseiling will not be permitted over the light rail side of the buildings therefore an alternate method for cleaning windows on the light rail side will need to be developed and agreed with Veolia. Veolia have indicated that they will consider use of a window cleaning platform (suspended gondola system) that is limited to prevent it approaching the electrical danger zone.

7.7.2 FAÇADE MAINTENANCE

Long term maintenance on the building facade may need to be carried out during light rail maintenance periods. The life cycle maintenance for the building facade should be fully understood with routine and out of sequence maintenance procedures agreed with the operator during the design phase. The window cleaning platform noted above could also be used for façade inspection and maintenance.

7.7.3 MAINTENANCE AND CLEANING OF LOWER LEVELS

Maintenance and cleaning of the lower levels of the student accommodation buildings could be performed from the ground within the property boundary. The proposed building façade at ground and first level could be 1.0m from the boundary fence which would be a secure area with restricted access for cleaning and maintenance personnel.

8 RECOMMENDATIONS

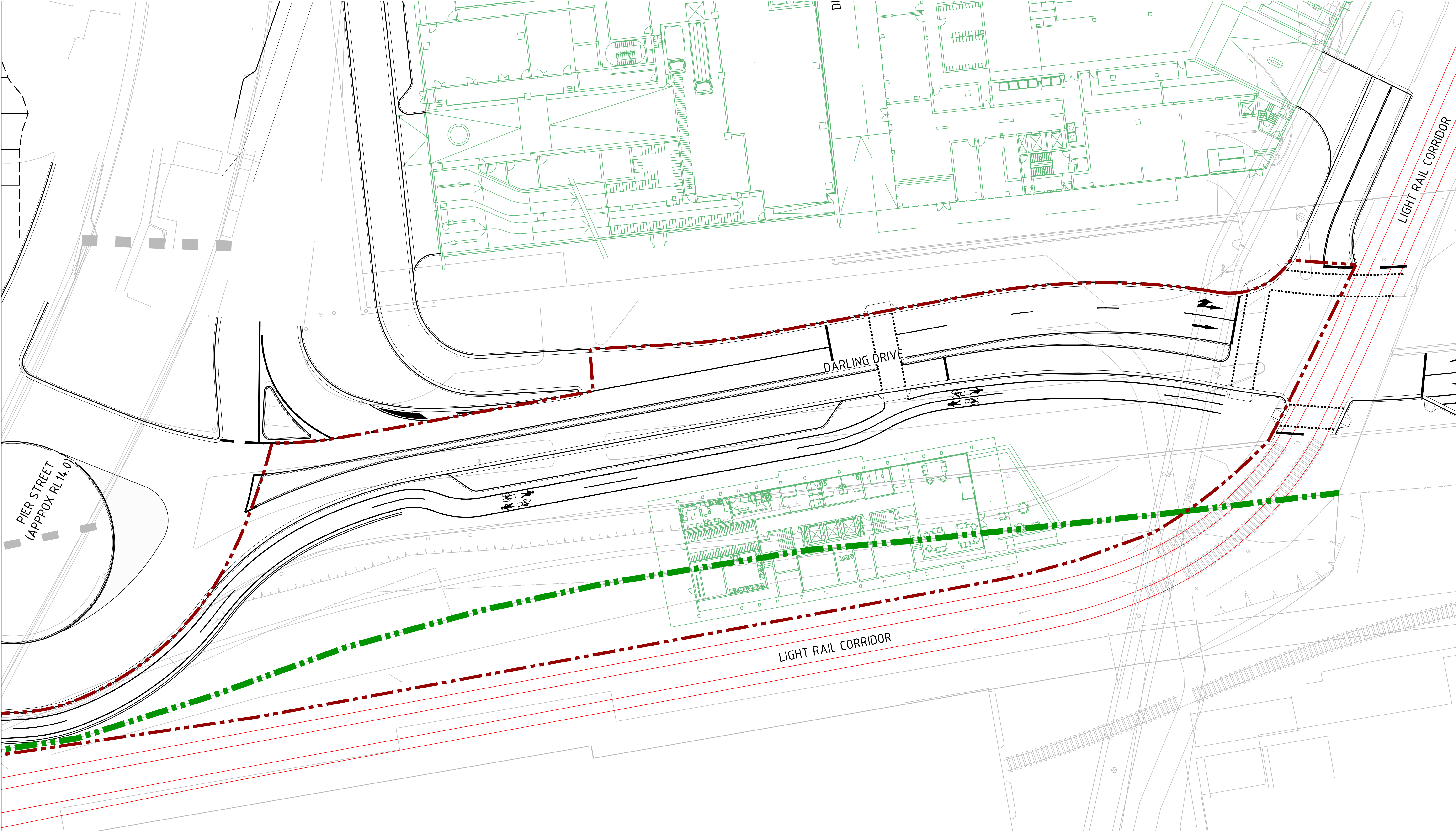
Hyder Consulting recommendations are set out below:

1. A risk assessment workshop should be undertaken to identify and mitigate the risks regarding the impact protection of the buildings from the light rail vehicles in the event of derailment.
2. Lend Lease should seek approval from the “Relevant Rail Authority” for a first principals design approach to construct building collision protection in lieu of adopting AS5100-2004, which is relevant to bridge protection.
3. Lend Lease should consult with Veolia Transport in regard to construction requirements including:-
 - Construction hoarding 2 metres from the adjacent rail tracks;
 - Operation of tower cranes over the live light rail corridor in accordance with established procedures;
 - Window cleaning procedures and maintenance requirements based on the window opening design principle set out in this report;
 - Routine and unscheduled building facade maintenance procedures;
4. The works within the light rail corridor should comply with the approach set out in this report and the procedures set out in the Veolia Transport “Light Rail Contractors Document” March 2011 Doc. Number 10737 Rev 0 and Veolia Transport “Light Rail Envelope Brief” March 2011 Doc. Number 10738 Rev 0.

These documents set out the system access requirements, working procedures, permits required and costs associated with undertaking work which impacts on the operations and assets of the light rail operator. The documents cover basic clearance restrictions, notice for planned works, permits required, costs and responsibilities. The ‘Light Rail Contractors Document’ described above covers construction requirements in more detail and should be read in conjunction with the ‘Light Rail Envelope Brief’.

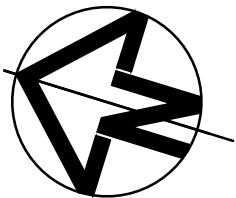
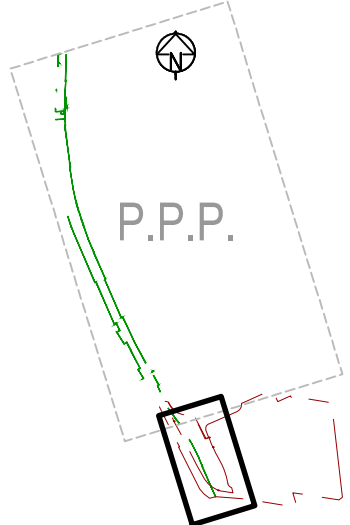
APPENDIX A

LIGHT RAIL PLAN



DARLING HARBOUR LIVE

REFERENCE MAP



NOTES:

1. DO NOT SCALE FROM DRAWINGS. WORK TO WRITTEN DIMENSIONS ONLY.
2. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
3. ALL COORDINATES TO MGA. ALL LEVELS TO AHD.
4. ALL DIMENSIONS, COORDINATES AND LEVELS TO BE VERIFIED ON SITE BEFORE PROCEEDING WITH WORK. HYDER SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
5. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS AND DRAWINGS.



1 : 250

DRAFT

REV	DESCRIPTION	DATE
01	DRAFT ISSUE	02/05/2013

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PROJECT

**SICEP - DARLING HARBOUR
HAYMARKET (PDA)
STUDENT ACCOMMODATION**

DRAWING TITLE

LIGHT RAIL PLAN

STATUS

PRELIMINARY ONLY

SCALE @ A1	DRAWN	DESIGNED	REVIEWED	APPROVED
1 : 250	RD	-		
PROJECT NUMBER	DRAWING NUMBER	REV		
AA004399	PD-CI-4601	01		