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Darlington Road Terraces Redevelopment

Preliminary Hazard Assessment

22 November 2016

Partner:

THE UNIVERSITY OF SYDNEY

When you think with a global mind problems get smaller

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Darlington Road Terraces Redevelopment

Prepared for
University of Sydney

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1. Introduction

Coffey has been commissioned by the University of Sydney, to prepare a Preliminary Hazard Assessment (PHA) to identify and evaluate potential hazards associated with the development of the Darlington Road terraces, located at Darlington Road, Darlington NSW 2008.

The Darlington Road terraces development includes mixed use building additions and alterations to the Darlington Road terraces and public domain improvements.

1.1. Site location

The development site is located along Darlington Road, Darlington NSW 2008. The site is bounded by Darlington Road to the north, Golden Grove Street to the west, Darlington Lane to the south (the lane is also included in the project works), and Codrington Street to the east. The site consists of a row of thirty-eight (38) late Victorian Terraces with rear gardens backing onto Darlington Lane.

Some of the terraces are privately owned including 88-93, 97 and 120 Darlington Road.

1.2. Proposed building and services

The University of Sydney is proposing building additions and alterations to the existing Darlington Road Terraces and H66 Darlington House for mixed uses integrating affordable student accommodation and other educational establishments.

The development will also include adaptive reuse of the existing Terraces and construction of four (4) separate mixed use buildings within the rear yards for use by residents and the wider University community.

Once completed the mixed use development will provide:

- 337 beds of which there are 192 terraces and 145 new build,
- 161 rooms including:
  - 6 double rooms;
  - 4 twin rooms;
  - 27 loft twin rooms;
  - 269 single rooms (of which 16 are accessible rooms); and
  - 10 RA rooms (per each terrace block and per building).
- Other educational establishment facilities including:
  - Bookable meeting / tutorial rooms;
  - Computer labs/E Learning;
  - Lecture/theatre;
  - Multi-function learning spaces;
  - Study areas;
  - Maker Spaces; and
  - Meeting rooms and informal spaces.
- Communal areas including:
  - Self-catered kitchen;
  - Main dining hall;

  - Lounge;
  - Breakout spaces;
  - Laundry facilities; and
  - Music Rooms.
- Central courtyards,
- Roof top terraces with courtyard views,
- Ground level waste and bike storage,
- Basement level with plant rooms,
- External areas – soft and hard, and
- Operator administration office.

2. Scope and objective

The objective of this PHA is to qualitatively evaluate potential hazards as follows:

- Identification of hazards associated with the handling, storage and disposal of hazardous materials in relation to the proposed Darlington Road terrace development;
- Conduct an analysis of risk scenarios associated with the identified hazardous materials to human health and the surrounding environment (where applicable), in terms of consequences and the likelihood of occurrence; and
- Classify and prioritise the identified hazards.

The risk analysis undertaken in this PHA is specific to the proposed Darlington Road terrace development and its services areas.

This PHA has been undertaken to inform the EIS and to address the requirement of the State Environmental Planning Policy No.33 – Hazardous and Offensive Development (SEPP 33).

3. Adopted approach

The Multi-Level Risk Assessment guideline (NSW Department of Planning and Infrastructure, 2011), provides a detailed framework to determine the level of evaluation required based on the nature, scale and location of the project. The framework, as shown in Figure 1, was developed with the aim of undertaking the hazard analysis only to the level required in order to demonstrate the operation will not pose a significant risk to surrounding land uses.

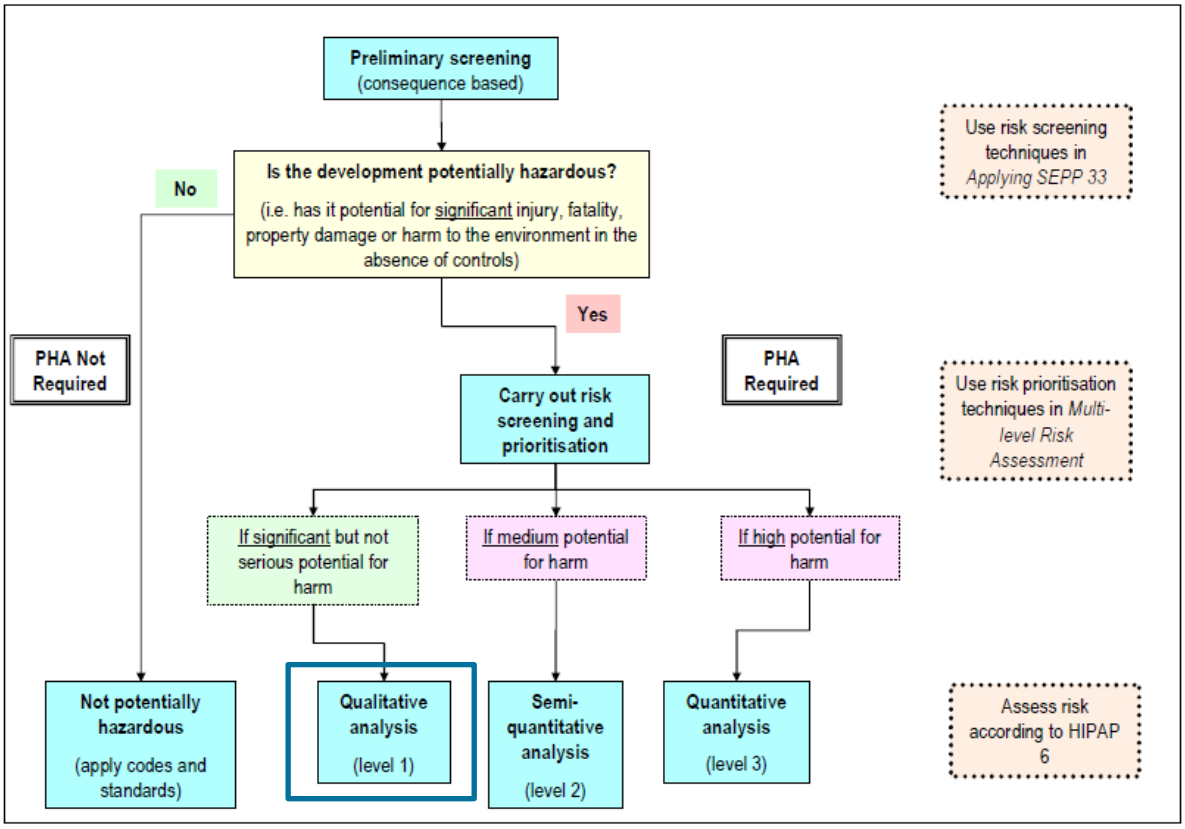

Figure 1: Multi-Level Risk Framework (Source: Multi-level Risk Assessment Guidance, NSW DoPI 2011)

The provision of university residential accommodation and associated uses is not expected to generate hazardous wastes that may harm individuals and the wider community. A qualitative approach has been adopted in this PHA, equivalent to a level 1 risk analysis, on the basis that hazards associated with handling, storage and disposal of student accommodation wastes are generally well understood and safety management systems (including staff training and dedicated waste collection staff) are currently implemented in other existing areas of the University of Sydney campus.

The approach adopted in this PHA is consistent with the Hazardous Industry Planning Advisory Paper No. 6 — Hazard Analysis published by the Department of Planning and is described further in section 7.

4. The Risk Assessment Process

The risk assessment process adopted in this PHA is consistent with the Hazardous Industry Planning Advisory Paper No. 6 — Hazard Analysis published by the Department of Planning, as outlined in Figure 2. The objectives of this PHA are also aligned with this process.

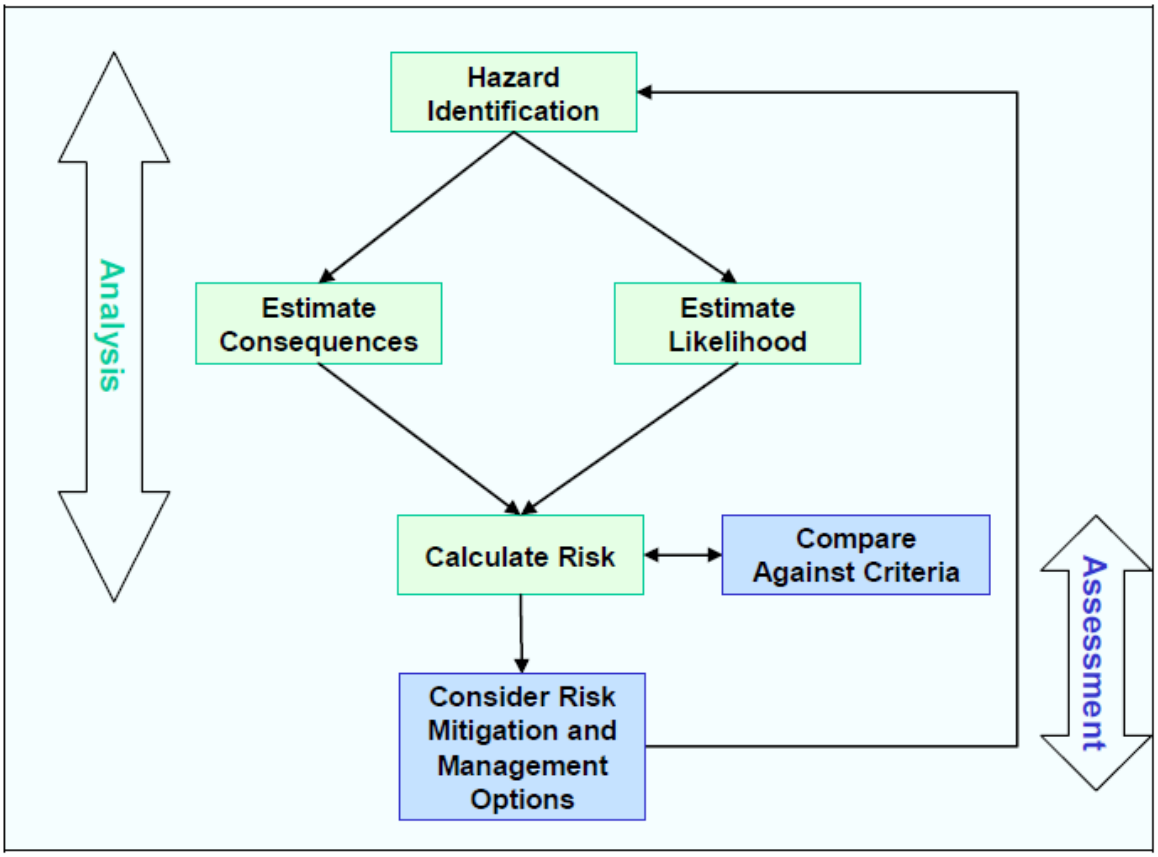

Figure 2: Basic Methodology for Hazard Analysis (Source: Hazardous Industry Planning Advisory Paper No. 6, NSW DoP, 2011)

The hazard analysis methodology consists of the following steps:

- Hazard identification based on any hazardous materials likely to be generated as a result of the services proposed in the Darlington Road terrace development.
- Identification of key scenarios based on the handling processes, storage conditions and location, disposal processes and the site layout.
- Qualitative estimate of potential risks and comparisons with qualitative criteria where appropriate.
- Discussion of protective technical and management measures, including codes and standards.

The PHA is based on the information available at the time of this evaluation. The assessment of potential risks should be considered an iterative process and future changes to the proposed plans for the Darlington Road terrace development and/or services should trigger a review of this PHA.

5. Hazard Identification

Hazards associated with the handling, storage and disposal of hazardous substances or other materials at student accommodation facilities are generally related to general and recyclable waste streams.

Hazards may also be associated with handling and storage of asbestos waste, building cavity waste, synthetic fibre waste, and lead based paint during demolition and construction.

Potential hazards may include some of the electrical switchboards which were determined in a hazard assessment to contain live hazards, and the Plant Room in the basement.

5.1. Waste

The following classes of waste are defined in clause 49 of Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act):

- special waste
- liquid waste
- hazardous waste
- restricted solid waste
- general solid waste (putrescible)
- general solid waste (non-putrescible).

Waste generated by university student accommodation facilities are categorised according to the streams mentioned above and each have a minimum standard of management that would apply, as stipulated in the University of Sydney Accommodation Waste Management Plan (WMP). Current procedures used by University of Sydney staff and waste contractors to manage hazards posed by these waste materials, are generally described in the Student Accommodation WMP.

Waste streams that are considered in this PHA are described as follows:

- General solid waste (putrescible)

  General waste is household waste that contains putrescible organics, disposable nappies, incontinence pads or sanitary napkins, food waste, animal waste, grit or screenings from sewage treatment systems that have been dewatered so that the grit or screenings do not contain free liquids, any mixture of the wastes referred to above.
- General solid waste (non-putrescible)

  Non-putrescible general solid waste includes:
  - glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
  - paper or cardboard
  - grit, sediment, litter and gross pollutants collected in, and removed from, stormwater
  - treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids
  - grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids
  - waste contaminated with lead from educational facilities

  - building cavity dust waste removed from residential premises or educational or childcare institutions, being waste that is packaged securely to prevent dust emissions and direct contact
  - synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste
  - garden waste
  - wood waste
  - virgin excavated natural material
  - building and demolition waste
  - asphalt waste (including asphalt resulting from road construction and waterproofing works)
- Special waste

  Asbestos waste is classified as special waste.

General solid waste (putrescible) and general solid waste (non-putrescible), as defined by the *Protection of the Environment Operations (Waste) Regulation 2014* are not considered to be dangerous when separated and disposed/recycled appropriately.

5.1.1. Current waste management

Waste segregation practises at the point of generation are currently undertaken throughout the University of Sydney campus.

The waste streams likely to be generated by the Darlington Road terrace development, and subsequent management procedures prior to collection for off-site disposal by waste contractors are summarised below.

Waste Collection, Storage and Transport

General waste is expected to be generated in all areas of the Darlington Road terraces and will be stored in the dedicated waste storage area located on the ground level prior to collection and disposal / recycling.

The bins will be collected as per the current waste collection schedule for the University of Sydney.

6. Identification of potential hazards and potentially hazardous activities

Hazards associated with the proposed student accommodation development in Darlington Road, as outlined in Section 1, are considered to be related to the handling, storage and collection of the following materials:

- **Asbestos:** can enter the lungs via inhalation.
- Waste contaminated with lead from **lead based paint:** Exposures occur predominantly via ingestion and to a lesser extent via inhalation of particular matter.
- **Building cavity dust** waste removed from residential premises or educational or childcare institutions, being waste that is packaged securely to prevent dust emissions and direct contact
- **Synthetic fibre** waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste.

In addition the following hazards have been identified:

- **Electrical switchboards:** Exposure to live wires may occur during construction and maintenance.
- Ground floor **waste storage area.**
- **Plant room** in basement**.**

Based on the above, the potentially hazardous activities are identified as follows:

- Exposure to asbestos in demolition waste materials, where management controls for the removal, storage, collection and transport of asbestos waste are insufficient;
- Exposure to lead based paint, where management controls for the removal, storage, collection and transport of lead based paint waste are insufficient.
- Exposure to building cavity dust, where management controls for the removal, storage, collection and transport of are insufficient.
- Exposure to synthetic fibres, where management controls for the removal, storage, collection and transport are insufficient.
- Exposure to electrocution during electrical works.
- Exposure to infectious diseases via unauthorised entry/disturbance of waste storage/management area;

7. Risk Analysis Methodology

The methodology used to evaluate the identified hazards is based on the Australian/New Zealand Standard for Risk Management – Principles and Guidelines, AS/NZS ISO 31000:2009. The standard provides principles and guidelines that can be applied to any project or activity to effectively manage risk. The risk management process comprises the following steps and it is noted steps 1 and 2 were undertaken in Sections 5 and 6 of this report:

1. Establish the Context (refer to sections 1 to 4)
2. Risk Identification (refer to sections 5 and 6)
3. Risk Analysis
4. Risk Evaluation
5. Risk Treatment

The analysis and evaluation process in the PHA utilises a Risk Assessment Matrix to assess each identified risk on the basis of Likelihood (the chance of something happening) and Consequence (the severity or impact if something happened. The descriptors used to classify the likelihood and consequences in the qualitative risk assessment process are outlined in Table 7-1 to Table 7-3.

Table 7-1: Qualitative Measures of Likelihood

Likelihood	Description
Almost certain	The event is expected to occur in most circumstances.
Likely	The event will probably occur in most circumstances.
Possible	The event could occur.
Unlikely	The event could occur but is not expected.
Rare	The event may only occur in exceptional circumstances.

Table 7-2: Qualitative Measures of Consequence

Consequence	Description
Insignificant	Minor health effect - No treatment required
Minor	Acute or short term health effect – First aid treatment required
Moderate	Short to medium term health effect – Lost time requiring medical treatment or admission to hospital.
Major	Chronic or serious irreversible human health effects.
Catastrophic	Fatality or permanent disability

The level of risk for each potential health or environmental effect is then determined by combining likelihood and consequence using the matrix in Table 7-3.

Table 7-3: Risk evaluation matrix

	Consequences				
Likelihood	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	Medium	High	Extreme
Possible	Low	Low	Medium	High	High
Unlikely	Negligible	Low	Low	Medium	High
Rare	Negligible	Negligible	Low	Medium	Medium

Source: Adapted from AS/NZS 4360:2004.

The resulting qualitative risk levels can then be used as a decision tool to assess whether the risk needs mitigation or further assessment, and guides prioritisation.

- Risks rated as negligible are deemed as acceptable or unlikely to require mitigation.
- Risks rated as low, medium or high require further assessment and/or controls in order to manage the risk to a tolerable level. Priority should be given to the implementation of controls to manage high and then medium risks over low risks.
  Likewise the type of controls required for high and medium risks may be more involved (and costly) than measures required for low risks. For example, a high risk may require a floor plan change in order to control the risk to a tolerable level, whereas a low risk is more likely to be effectively mitigated by lower order control measures such as implementing procedural controls.
- Risks identified as extreme are likely to make the proposed service unsuitable for the ASB, unless significant mitigation measures are implemented.

8. Preliminary Hazard Analysis

The determination of the level of risk is expressed by the combination of the likelihood of something occurring and the consequence. The initial risk rating (IRR) for each identified hazard scenario and the revised rating (MRR) following management or procedural controls is presented in Table 8-1.

Table 8-1: Preliminary Hazard Analysis

Hazard	Likelihood	Consequence	Initial Risk Ranking	Controls	Managed Risk Ranking	Comments
Exposure to asbestos due to insufficient management controls	Unlikely	Major - catastrophic	Low – Medium	• Asbestos should be removed by a Safework licensed asbestos assessor who will undertake air monitoring, clearance inspections or the issuing of clearance certificates for removal of friable asbestos. • Asbestos waste must be stored in an environmentally safe manner, including wetting down and sealing in heavy-duty plastic prior to transportation. • Bonded asbestos material must be securely packaged at all times. (Bonded asbestos material means any material [other than friable asbestos material] that contains asbestos.) • Friable asbestos material must be kept in a sealed container. (Friable asbestos material means any material that contains asbestos and is in the form of a powder or can be crumbled, pulverised or reduced to powder by hand pressure when dry.) • Asbestos-contaminated soils must be wetted down. • All asbestos waste must be transported in a covered, leak-proof vehicle. • Asbestos waste must be disposed of at a landfill site that can lawfully receive this waste. • If volume of asbestos waste is over 100 kilograms or 10 square metres, the person transporting the load needs to	Low	The handling and storage of asbestos waste at worksites is regulated by WorkCover NSW under the provisions of the Work Health and Safety Regulation 2011.

Hazard	Likelihood	Consequence	Initial Risk Ranking	Controls	Managed Risk Ranking	Comments
				create a unique consignment number and report it to the EPA using WasteLocate.		
Exposure to lead in lead based paint	Possible	Moderate - Major	Medium	Waste is handled by trained specialists. Waste is securely contained. Appropriate PPE is worn during removal and waste is securely contained.	Low	
Electrocution	Possible	Major - catastrophic	Medium	Electrical switchboards are repaired by licensed electricians. Areas are made inaccessible until safety works are completed.	Low	
Exposure to infectious diseases due to entry/disturbance of waste management area;	Unlikely	Moderate - Major	Low – Medium	Waste storage areas are secured at all potential entry points to ensure authorised access only.	Low	USYD to confirm/audit physical security structures, access procedures
Exposure to dust from building cavity during construction	Possible	Moderate - Major	Medium	Waste is handled by trained specialists. Waste is securely contained. Appropriate PPE is worn during removal.	Low	
Synthetic fibre exposure	Possible	Moderate - Major	Medium	Waste is handled by trained specialists.	Low	

Hazard	Likelihood	Consequence	Initial Risk Ranking	Controls	Managed Risk Ranking	Comments
				Package securely to prevent dust emissions. Appropriate PPE is worn during removal.		
Fire in plant room	Unlikely	Moderate - Major	Low – Medium	Plant Room area is secured at all potential entry points to ensure authorised access only.	Low	USYD to confirm/audit physical security structures, access procedures

9. Discussion

Based on the information provided and the assumptions of the hazard and exposure identification process, the Preliminary Hazard Assessment indicates there is a low risk associated with the development of the Darlington Road terraces. It is noted a low risk is only attainable when identified hazards are managed appropriately. The University of Sydney is responsible for undertaking internal and/or external audits to ensure all hazards identified are controlled or managed in line with international best practice.

10. References

Australian and New Zealand Standard *Adapted* from AS/NZS 4360:2004

Australian/New Zealand Standard for Risk Management – Principles and Guidelines, AS/NZS ISO 31000:2009

NSW Department of Planning 2011, Hazardous Industry Planning Advisory Paper No. 6 — Hazard Analysis

NSW Department of Planning and Infrastructure, 2011. Multi-Level Risk Assessment Guidelines
NSW Health 1998, Waste Management Guidelines for Health Care Facilities, - August 1998, Reviewed 25 January 2016.

SEPP 33, State Environmental Planning Policy No.33 – Hazardous and Offensive Development