



Lend Lease



C5 COMMERCIAL BUILDING

BARANGAROO, STAGE 1

ENVIRONMENTAL, CONSTRUCTION, AND SITE MANAGEMENT PLAN

VOLUMES I AND II

JANUARY 2014

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Please note: Any reference within this report to 'Lend Lease' is intended to refer to either Lend Lease Building Pty Ltd or Lend Lease (Millers Point) Pty Ltd.

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C5 COMMERCIAL BUILDING

ENVIRONMENTAL, CONSTRUCTION, AND SITE MANAGEMENT PLAN

VOLUME I

C5 COMMERCIAL BUILDING IN ISOLATION

JANUARY 2014

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Abbreviations

LL:	Lend Lease (Millers Point) Pty Ltd
LLB:	Lend Lease Building
BDA:	Barangaroo Delivery Authority
ECSMP:	Environmental, Construction and Site Management Plan
EMR:	Environmental Management Representative
EMS:	Environmental Management System
GFA:	Gross Floor Area
LLEMS:	Lend Lease Environmental Management System
MSDS:	Materials Safe Data Sheet
NVA:	Noise and Vibration Assessment
NVMP:	Noise and Vibration Management Plan
PM:	Project Manager
RAP:	Remediation Action Plan
RWP:	Remedial Work Plan
SM:	Site Manager
SWMS:	Safe Work Method Statement
WMP:	Waste Management Plan

1 Executive Summary

This Environmental, Construction and Site Management Plan (ECSMP) has been developed by Cardno in conjunction with Lend Lease Building Pty Ltd for Lend Lease (Millers Point) Pty Ltd (hereafter referred to as Lend Lease) to provide a framework to address environmental issues associated with the *C5 Commercial Building, Planning Application, of Barangaroo South, Millers Point, NSW*.

As part of the works associated with this phase of the project, Lend Lease is aiming to undertake:

- Construction of high-rise building superstructure;
- Cladding and façade works;
- Building services;
- Building finishes; and
- Tenant fitout works.

Subject to Consent Authority approval, works are proposed to be undertaken between the hours of 7.00am and 6.00pm Monday-Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or public holidays.

The site will be enclosed by hoardings along all frontages. Site vehicular access will be from Hickson Road. Lunch, change and ablution facilities will be provided for the use of all site personnel.

All site personnel, including subcontractors and visitors, will be inducted under Lend Lease's Environment, Health and Safety Management System. Records of all induction, ongoing training and reporting will be maintained.

Tower cranes will be erected on site at the building core. A materials handling team member will ensure the efficient management of deliveries and removals and hence minimise disruption to traffic around the site.

Site specific Environmental Management protocols will be established to ensure the company's environmental responsibilities are implemented and documented.

Primary contact(s) to deal with environmental emergencies will be nominated and their 24 hour/day 7 days/week contact details will be prominently displayed on site.

Management and monitoring of the noise and vibration generated from construction activity will be addressed according to the recommendations of the "*Wilkinson Murray, Barangaroo South; Construction of Commercial Building C5, Construction Noise and Vibration Assessment*".

Air Quality Management will be addressed in accordance with the recommendations of the *Barangaroo C5, Commercial Building – Air Quality Impact Assessment (AQIA)* prepared by Aecom.

Dust suppression, as well as erosion and sediment control measures, will be installed prior to detailed excavation works and service installations commencing as part of PA1, Basement works, and these shall be maintained for the duration of construction. Surface and ground water quality, including Harbour water quality, will be assessed and monitored with monitoring in place as part of PA1, Basement works. A Remedial Action Plan (RAP) prepared by AECOM will be implemented for remediation of contaminated soil and water as part of the PA1, Basement works.

Management of construction generated solid and liquid waste will be addressed in accordance with the recommendations of the *Barangaroo South – PA3 – C5 Commercial Building: Waste Management Plan – Project Application* (WMP) prepared by Arup.

Appropriate control measures will be implemented, documented and monitored to control the potential for leakage of hazardous substances and dangerous goods during storage and handling.

Vehicular and pedestrian traffic management and controls will be implemented and monitored to minimise disruptions to site activities, the surrounding road network, as well as the ongoing operation of the passenger terminal. The site haulage route and foreshore Promenade will continue to be managed as reported in the Basement Application documentation.

A comprehensive stakeholder action plan will be implemented to maintain a good neighbour policy with surrounding businesses, residents and special interest groups during construction.

2 Project Understanding

2.1 Introduction

This report supports a Project Application submitted to the Minister for Planning pursuant to Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Application seeks approval for construction of a commercial building (known as Building C5) and associated works (including tenant fitout works) at Barangaroo South as described in the Project Description section of this report.

This ECSMP covers the *C5 Commercial Building Planning Application* and incorporates (but is not limited to) the following general scope:

- Establishment of appropriate environmental protection structures;
- Site establishment including site amenities, hoardings, material and waste storage areas;
- De watering operations, including water treatment, where required;
- Detail excavations for substructure construction;
- Construction associated with substructure components;
- Formwork, falsework and associated construction activities relating to substructure and superstructure construction;
- Construction of columns, beams and post tensioned concrete floor slabs;
- Internal building services, including electrical, hydraulic, mechanical, communications, gas and vertical transportation;
- Fire services systems;
- Façade construction;
- Local detail civil works surrounding the building;
- Landscape elements within and surrounding the building; and
- Tenant fitout works.

2.2 Background

The 22 hectare Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Stage 2 and Barangaroo Stage 1 (herein after referred to as Barangaroo South).

Lend Lease was successfully appointed as the preferred proponent to develop Barangaroo Stage 1 (otherwise known as Barangaroo South) on 20 December 2009.

2.3 Purpose of This Report

This report has been prepared to accompany the Development Application for the C5 Commercial Building and associated works (including tenant fitout works) at Barangaroo South. It addresses the relevant Director-General Requirements for the project.

These Director-General Requirements are discussed in the Environmental Assessment Report (EAR) that has been prepared to support the application.

2.4 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Stage 2 (also known as Barangaroo Central) and Barangaroo South.

The area of land within which development is proposed under this Development Application extends over land generally known and identified in the approved Concept Plan as Block 2 which comprises Lot 5 in DP 876514.

2.5 Project Description

This Project Application seeks approval for the construction of ground floor retail, a commercial lobby, retail and commercial podium area and office tower, provision for associated cars and bicycle parking and the construction of the surrounding ancillary temporary public domain which includes access streets and landscaping.

2.5.1 Project Location

The site is generally described by the Construction Zone Licence plan issued by the Barangaroo Delivery Authority. The supporting plans included in **Appendix A** illustrate the extent of the license area and the location of the C5 Commercial Building Construction area within the site.

2.5.2 Project Activities

The initial works associated with the project, the demolition of above ground structures (which are the subject of an existing consent), demolition of existing ground pavements and associated disused in-ground services, site establishment works, archaeological test pitting works, vegetation clearing and trimming, general basement excavation works and associated stormwater drainage works within the Barangaroo South development footprint, and construction of basement car parking, are the subject of a separate planning approval (Bulk Excavation and Basement Car Parking, PA1, MP10_0023).

2.5.3 Project Timing and Scheduling

The expected duration of the project is approximately thirty-six (36) months upon initial substructure installation.

2.6 ECSMP Context

This Environmental, Construction and Site Management Plan outlines the measures to achieve commencement of construction as part of a submission to the NSW Department of Planning. Lend Lease will further develop a detailed Construction Environmental Management Plan before commencing work on site.

This document generally describes the environmental management protocols that will be implemented for this project. The ECSMP is a conceptual management tool that will assist in informing suitable high standards of environmental protection during construction and will provide guidance for environmental controls to be implemented before and during construction.

2.6.1 Project Environmental Studies

The following Studies have been referenced for this plan:

Arup, Barangaroo South – C5 Commercial Building: Building Services Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Climate Change and Sea Level Rise Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Construction Traffic Management Plan – Project Application.

Arup, Barangaroo South – C5 Commercial Building: ESD Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Fire Engineering – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Geotechnical Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Structural Engineering Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Transport Management and Accessibility Plan (TMAP) Supplementary – Planning Application.

Arup, Barangaroo South – C5 Commercial Building: Travel Demand Management Plan – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Waste Management Plan – Project Application.

Cardno, Barangaroo South – C5 Commercial Building: Stormwater Management Plan – Planning Application.

Cardno, Bulk Excavations and Basement Car Parking (PA1) – Barangaroo, South (MP 10_0023): Environmental Construction and Site Management Plan.

Wilkinson Murray, Barangaroo South – Construction of Commercial Building C5, Construction Noise and Vibration Assessment.

Wilkinson Murray, Barangaroo South – C5 Commercial Building: Operational Noise Assessment – Project Application.

2.6.2 Key Issues of the Director General's Requirements

The Director General's Requirements for Application Number MP10_0227 (C5 Commercial Building) describes the Minister of Planning's requirement for an Environmental, Construction and Site Management Plan:

15. Environmental, Construction and Site Management Plan

The EA shall provide an Environmental and Construction Management Plan for the proposed works, and is to include:

- *Community consultation, notification and complaints handling;*
- *Impacts of construction on adjoining development and proposed measures to mitigate construction impacts;*
- *Noise and vibration impacts on and off site;*
- *Air quality impacts on the neighbourhood;*
- *Odour impacts;*
- *Water quality management for the site; and*
- *Waste and chemical management.*

The sections where each of the above requirements are addressed in the ECSMP are shown in **Table 2.1**.

Table 2.1 – Key Issues

Key Issue	Item to be Addressed	Where Addressed
Community Consultation, Notification and Complaints	How the proponent intends to address consultation, notification and complaints.	Section 5.1.10
Construction Impacts	Impacts of construction on adjoining developments and measures to mitigate impacts.	Section 5
Noise and Vibration Impacts	Impacts of noise and vibration on and off site.	Section 5.1.1, 5.1.2,
Air Quality Impacts	Air quality impacts on surrounding neighbourhoods.	Section 5.1.3
Odour Impacts	Impacts of odour on the surrounding environment.	Section 5.1.3
Water Quality	Water quality management controls for the site.	Section 5.1.4, 5.1.5,
Waste Management	Waste management controls for the site.	Section 5.1.6,
Chemical Management	Chemical management controls for the site.	Section 5.1.7
Traffic Management	Traffic Management Controls	Section 5.1.8

2.7 Lend Lease Environmental Policy

2.7.1 Background information

Lend Lease's Construction Management Plan will be implemented through the company's Environmental Management System (EMS). This ECSMP is intended to integrate the requirements of the environmental impacts noted at concept assessment with the operational systems processes of the EMS.

Lend Lease's EMS is integrated with their Safety Management System, operating as an integrated Environment Health and Safety (EH&S) Management System. The Environmental Management System is based on the ISO 14000 model and has been accredited by the Department of Public Works and Services to the NSW Government Environmental Management Systems Guidelines. The management system translates the Lend Lease Environment, Health and Safety Policy into processes so that the environmental responsibilities and performance can be monitored, reported and improved. The processes for monitoring procedures to ensure continual improvement in environmental performance are part of the Lend Lease Environment Health and Safety Management System and are referred to as EH&S throughout this document.

2.7.2 Lend Lease Environment Health & Safety (EH&S) Management System

The Lend Lease EH&S Management System has been developed to focus on the production of a project specific EH&S Plan, which is where the majority of construction activity risks must be identified and managed. Both project environmental and safety

issues are planned and managed within the one management document. An EH&S plan is prepared specific to each project and is based on a company template.

Mandatory company procedures (i.e. risk assessment, reporting, auditing, and emergency / incident management etc.), standard forms and minimum company standards are all included in the template. While there are common management procedures and forms used for environmental and safety assessment, specific safe work method statements and specific Environmental Management Plans are prepared for project specific conditions.

2.7.3 EH&S Standards

Company EH&S Standards and requirements apply to all personnel on the project. Project specific rules are to be developed in accordance with Company EH&S Standards. Project specific requirements will be explained in tender packages and clarified in site inductions.

A visitor's register will be maintained on site at all times with all visitors to sign the register before accessing site with a site inducted person.

2.7.4 Roles and Responsibilities

Project Roles and Responsibilities for EH&S will be detailed in the EH&S Plan.

Key staff and service provider responsibilities for the delivery of the Environment, Health and Safety Policy will be detailed in the EH&S Plan.

More specific Site Management Issues are discussed in **Section 3** and Environmental issues discussed in **Section 4**.

3 Site Management

3.1 Site Establishment

3.1.1 Introduction

The site for the *C5 Commercial Building* project application is illustrated in the architectural drawings scheduled in **Appendix A**. A general arrangement site plan is included with the documentation in **Appendix A**.

3.1.2 Site Working Hours

Subject to Consent Authority approval, works are proposed to be undertaken between the hours of 7.00am and 6.00pm Monday-Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or public holidays.

Work is proposed to be undertaken during the following hours:

- 7am to 6pm Monday to Fridays.
- 7am to 5pm Saturdays.
- Out of hours works would be undertaken as required in emergency situations to ensure safety and environmental protection is maintained, such as the maintenance of environmental protection structures and the like.
- The dewatering and groundwater treatment plant is proposed to operate on a 24 hours per day basis to manage groundwater from the site. These activities are relatively quiet and the treatment equipment will be located on site to ensure it is located away from sensitive receivers.

3.1.3 Contact Details

Contact details for the senior site representative will be displayed on site.

3.1.4 Parking

No on-site parking is proposed to be made available for general tradespersons or site personnel.

3.1.5 Security and Hoarding Management

The site will be enclosed by Class A hoardings for the construction phase as follows:

Hickson Road:

Class A painted hoarding along the Hickson Road Work zone extending north from the Shelley Street intersection. Vehicle gates will be located up the northern end for access to and from site, typically to coincide with existing crossovers associated with the former Port use. This area will be secured by gateman and stop/go personnel to control pedestrian and vehicle traffic.

Personnel security turnstiles will be located at the Northern end of Stage 1 on Hickson Road for access to site.

Shelley Street:

Shelley Street will be protected by a 3m high 'A Class' hoarding until its redevelopment into the Margaret Street extension.

Western Frontage (along the Promenade):

Class A hoarding will be erected along the Western Frontage with an agreed allowance for a public thoroughfare through to King Street wharf.

Public access along the foreshore Promenade will be reduced to a minimum 6m wide corridor to suit major construction activities such as piling, bulk excavation and the basement structure. When necessary, a foreshore promenade will be closed to the public in order to facilitate construction activities such as harbour intakes, outlets and promenade works. The Class A hoarding will be placed between the pedestrians and construction activities with an appropriate buffer zone from the works.

Northern Frontage:

The Northern Frontage adjacent the Passenger Terminal will be protected by a Class A hoarding of minimum 2.4m height. A suitable buffer zone will be provided between the temporary Passenger Terminal and the construction site to reduce the impact of construction activities. Dewatering tanks may be positioned within the buffer zone; however stockpiles and the like will be positioned outside this zone. The width of the buffer zone will be determined in consultation with the Authority and may change during the course of the works.

Access Control

To ensure controlled access is maintained on the project, a security swipe card system will be implemented. All construction workers and visitors will be issued with a swipe card at their induction. This will allow Lend Lease to monitor all onsite personnel at any given time.

3.1.6 Site Sheds and Amenities

Lunch, change and ablution facilities will be provided for the use of all site personnel. Workforce accommodation will be located on the northern side of the site. An indicative location for the site compound and amenities is shown on the drawings in **Appendix A**.

3.1.7 Safety Information

All employees on site must first complete the site induction in accordance with the Lend Lease EH&S management system.

In addition, all subcontractors must induct their employees into their specific safe work procedures and submit evidence of appropriate management mechanisms to Lend Lease.

Lend Lease will periodically conduct its own internal safety audits. The audit team will consist of:

- Lend Lease Safety Manager;
- Site EH&S Safety Coordinator; and
- Subcontractor Representative.

An EH&S information board will be erected and a copy of the Lend Lease EH&S policy will prominently be displayed on the board.

3.1.8 First Aid Facilities

Lend Lease will ensure First Aid Facilities, as specified by OH&S legislative requirements, are provided in accordance with WorkCover requirements. Occupational First Aid facilities will be established on site once the workforce numbers exceed 100.

Subcontractors are to provide a First Aid Officer for their individual company works.

A nominated first aider will be on site whenever work is being carried out. This will be either a Lend Lease or Subcontractor representative.

3.1.9 Approved plans to be on-site

In accordance with the conditions of consent, Lend Lease will maintain a copy of the approved and certified plans, specifications and documents incorporating conditions of approval and certification on site at all times.

3.1.10 Dilapidation Survey

A dilapidation survey will be undertaken for adjacent structures, domains and services infrastructure.

3.1.11 Site Notice

In accordance with the conditions of consent, Lend Lease will display, at the boundaries of the site, the project's certifier and the relevant emergency contact name and contact Number.

3.1.12 Neighbours

Lend Lease has developed a Stakeholder Engagement Strategy (**Appendix B**) as part of ongoing engagement with the local community and key stakeholders. The main objective of this strategy is to provide a process that engages the community and key stakeholders in the delivery of Barangaroo South. The objectives are to:

- Ensure all stakeholders and affected community members are well informed about the Barangaroo South development and are given an opportunity to provide input into the project;
- Minimise impacts to affected residents and stakeholders; and
- Create opportunities for stakeholders to access transparent information on the project and provide forums for feedback and enquires.

Lend Lease has a commitment to an inclusive and pro-active community and stakeholder engagement process, which will be both responsive (to complaints) and proactive (with provision of information). The engagement will take many forms and will be agreed upon in conjunction with the Barangaroo Delivery Authority to align with their existing communications program.

3.2 Construction Methodology

3.2.1 General

The piling for footings and associated foundation works for the C5 Building below finished level will be undertaken in conjunction with the Bulk Excavation, Basement and Car Parking, PA1 works. The foundation and structure works for the C5 Building will involve the completion of a combination of bored piers, concrete Barrett walls, concrete beams and raft slabs to provide the required structural foundation support system for the tower core elements and columns generally and also lift pits and service elements. The construction of these elements will involve the excavation of material from the site below the current approved basement loading dock level. These excavations may extend to a depth of up to 12 metres for lift pits, foundations supports and associated services elements and to in excess of 20 metres for the foundation and related piling systems.

The methodology hereinafter is limited to the works associated with the substructure and superstructure for the C5 Building above the foundations and footings. All works will be carried out to satisfy the Consent Authority's requirements, ensuring safety and continuity of the works. Facilities, hoardings, notices, entrances, etc. will have already been established as part of the PA1 works.

3.2.2 Substructure Construction

On completion of the bulk excavation and installation of the foundations and footings for the C5 Building, tower crane bases shall be prepared with reinforced concrete pads and bored piered bases. The tower cranes shall be erected using mobile cranes operated from within the site.

Temporary services (electricity, water, stormwater and nurse call) shall be installed along with the installation of permanent in-ground services. Detail excavation for in ground services associated with the C5 Commercial Building shall be undertaken using traditional excavators and backhoes. The critical early activity for the building construction is the forming, reinforcing and pouring of the substructure. The earliest possible assembly of foundation systems will be a priority.

Concrete pumps shall be positioned on site as necessary to best serve the element being poured.

3.2.3 Superstructure Construction

The tower construction will follow typical construction methodologies. Conventional high-rise formwork systems will be utilised for the falsework to the suspended levels; jump formwork systems with trailing screens will be employed for placement of the core areas and some structural support column elements. Suspended floors will be constructed with typical falsework / formwork systems progressively recycled up the tower floors as construction proceeds. Penetrations in the suspended floors shall be provided for future construction hoist installation, future formwork hoist installation and around the tower crane towers. Any ancillary formwork or falsework material will be loaded out of the lower floors and recycled onto the upper floors using high speed man and materials hoists / formwork hoists.

In order to facilitate the most efficient solution for concrete supply and remove up to 40% of concrete truck movements to the site we will be installing a concrete batch plant to supplement the concrete deliveries.

3.2.4 Building Services

Installation of building services will proceed in association with the progress of the superstructure. Access and materials handling will be undertaken via high speed man and materials hoists.

3.2.5 Building Cladding and Façades

Construction of building cladding and facades will proceed in association with the progress of the superstructure, making use of the trailing screens from the jump forms.

3.2.6 Building Finishes

Installation of building finishes will proceed in association with the progress of preceding programming items. Access and materials handling will be undertaken via high speed man and materials hoists.

3.2.7 Materials Handling

The key to the construction of the C5 Building will be well managed and efficient materials handling. A dedicated materials handling team member will manage and supervise deliveries to the project to alleviate congestion of the materials handling areas and ensure minimum disruption to the surrounding road networks. Key aspects of materials handling for the project are as follows:

- Craneage for basement and podium areas will be provided by mobile cranes and / or tower cranes;
- High-speed dual man and materials hoists shall be installed to move persons and materials between all levels of the project;
- Multiple tower cranes will be installed to support the construction of the C5 Building superstructure;
- The efficient removal of rubbish and debris from the work areas is a critical component of providing a safe project. Rubbish will be delivered to the on grade materials handling area via cranes or hoists. Forklifts with a rotator attachment shall be used to empty rubbish skip bins into larger 15 – 18 m³ bins;
- A series of loading platforms will be employed to assist with the delivery and removal of materials and rubbish from the tower;
- A formwork hoist will be installed to facilitate formwork materials recycling on the tower floors; and
- Centralised concrete pumping from the batch plant, to reduce on and offsite truck movements and ease congestion.

4 Environmental Management

4.1 General

This Environmental, Construction and Site Management Plan has been prepared with reference to available project environmental documents, applicable standards and guidelines.

4.2 Environmental Management Structure and Responsibility

The relevant ECSMP responsibilities are generally presented below in **Table 4.1**. The operational controls will be implemented as part of the Lend Lease EH&S Management System.

Table 4.1 - ECSMP Responsibilities

Individual	Responsibility
All Staff including Sub-Contractors	All staff have a responsibility for their own environmental performance and the impact they have on the environmental performance of the development. In particular, all staff should: • Undertake all activities in accordance with the agreed plans of management, procedures and work methods. • Ensure that they are aware of the contact person(s) regarding environmental matters. • Report any activity that has resulted, or has the potential to result, in an environmental incident. • Ensure they attend the environmental training provided.
Lend Lease	Lend Lease has the following responsibilities under the ECSMP: • Provide clear guidance under the Lend Lease EH&S Management System so that work undertaken is consistent with legal and contractual requirements. • Provide adequate resources to allow effective development, implementation and maintenance of the EH&S Management System. • Participate and provide guidance in the regular review of the EH&S Management System and associated documents.
Lend Lease Project Manager	The contractor's project manager will generally nominate the person(s) to fulfil the role intended for an Environmental

Individual	Responsibility
	Management Representative (EMR). The EMR shall have responsibility for the environmental management of the project in accordance with relevant requirements, including: • Prepare documents for the operational deployment of the guidelines of the ECSMP and related documents. • Provide environmental advice on matters specified in the conditions of approval, project contracts, licences and permits. • Comply with the requirements of the environmental documents. • Facilitate induction and training programs for all persons involved in the construction works. • Liaise with all relevant government authorities such as the DECCW, DII (Fisheries) and the Department of Planning. • Update the environmental management system as required. • Implement and review compliance with the environmental management system and associated environmental documents. In addition, the Lend Lease Project Manager is responsible for: • Apprise the Site Foreman of the requirements of the EMS and associated documents, and their responsibilities within them. • Allocate resources to meet the requirements of the EMS. • Investigate complaints to determine effective resolution. • Nominate appropriate pollution control measures for proposed works. • Maintain all necessary monitoring records and reports. • Take action in the event of an emergency and allocating the required resources to minimise the environmental impact. • Report any activity that has resulted, or has the potential to result, in an environmental incident.

Individual	Responsibility
Site Foreman	The Site Foreman is responsible to the Project Manager and has responsibilities under the EMS that include: • Management of the works in accordance with the requirements of the environmental management system, work instructions, and associated documents including the implementation of environmental controls. • Undertake environmental duties as defined by the Project Manager. • Identify environmental risks. • Attend to spills or environmental incidents that may occur on site. • Report activity that has resulted, or has the potential to result, in an environmental incident immediately to the Project Manager. • Issue instructions and related information to employees that relate to environmental risks on site. • Where necessary, coordinate environmental inspections and maintain environmental records as defined by the EMS and work instructions.
Sub-Contract Personnel	All sub-contract personnel must carry out the work in accordance with contract instructions and shall conduct their activities in an environmentally sound manner. All sub-contract personnel will undergo environmental induction before they commence any work on the construction site.

4.3 Reporting

Reporting for environmental issues will generally be undertaken for:

- Pre-construction compliance;
- Construction Monitoring;
- Non-compliance;
- Corrective action;
- Complaint Management;
- Auditing.

The Lend Lease EH&S Management System will address and provide detail on safeguards outlined in this ECSMP. The Lend Lease EH&S Management System will coordinate and consolidate the appropriate protection and / or mitigation controls and directions before, during and after construction. The following items shall generally be considered as part of the Lend Lease EH&S Management System:

-
- Community Consultation;
 - General Hazards and Risk Mitigation;
 - Noise and Vibration Management;
 - Air Quality and Odour Control;
 - Contaminated Soil and Water Management;
 - Stormwater and Erosion Management;
 - Waste Management;
 - Hazardous Goods and Chemical Management; and
 - Traffic Management.

4.4 Environmental Training

4.4.1 Site Induction Training

Site induction will be undertaken in accordance with the Lend Lease EH&S Management System.

Prior to commencing work on the project, all staff and subcontractors shall receive induction training that shall include the following environmental information as a minimum:

- Overall Lend Lease EH&S Management System structure;
- Developer's and Contractor's Environmental Management Policy;
- Roles and responsibilities and site management contact details;
- Relevant legislation as may be deemed appropriate;
- Key environmental issues and controls (covering environmental issues related to air quality, water quality, erosion and sedimentation, noise, traffic and access as necessary);
- Hazards, Risks and Emergency Response Plans, and
- Incident Reporting.

Those elements of the Lend Lease EH&S Management System that directly relate to the work to be carried out by the person or persons being inducted, shall be covered as part of the induction.

Records detailing the attendees and content of the induction / training shall be maintained.

4.4.2 Specialist Environmental Training

In addition to the induction program, specialised training shall be provided to personnel, when deemed necessary, to present them with the knowledge, skills and awareness to minimise impact of site activities on the environment.

4.4.3 Training Records

Training Records will be maintained to include information on:

- Who was trained;
- When the training was undertaken;
- Name of trainer;
- General description of training content.

4.5 Emergency Contacts and Response

4.5.1 General

An environmental incident is an unplanned event, such as an oil or chemical spill that occurs on site and could cause significant adverse environmental impacts. The Lend Lease EH&S Management System will nominate specific persons to be the primary contact for environmental emergencies. The nominated persons will be available 24-hours/day, 7-days/week.

4.5.2 Emergency Contacts

Emergency contacts are to be clearly displayed within the Site Office and to be accessible by the project team, e.g. Project Noticeboard. The accident and corresponding contact will be clear and concise as shown below in **Table 4.2**.

Table 4.2 – Example Emergency Contacts

Accidents and Emergencies	Contact Telephone Number
Fire Brigade	000
Police	000
Ambulance	000
EPA Pollution Line	131 555
Dangerous Good Licensing Hotline	131 050
Work Cover	(02) 9827-8600

4.5.3 Site Information for Hazardous Materials

Specific guidance for storage and handling of hazardous materials on site will be implemented as part of the Project EH&S Plan. Management of hazardous substances and dangerous goods is discussed in **Section 5.1.7**.

5 Implementation

5.1 Environmental Management Activities and Controls

5.1.1 Construction Generated Noise

Management of noise generated by construction of the C5 Commercial Building will generally be addressed in accordance with the recommendations of the *Construction of C5 Commercial Tower – Noise and Vibration Management Plan* (NVMP) prepared by Wilkinson Murray. The NVMP will be used to manage impacts from all construction activities, with particular reference to those activities that might generate emissions greater than the targets outlined in the NVMP.

The processes adopted in the Management Plan are intended to minimise noise emissions, to meet the objectives of Department of Environment, Climate Change and Water (DECCW) Interim Construction Noise Guideline, minimising and ameliorating impacts caused by these activities to the extent that it is feasible and reasonable.

In determining the management controls, Lend Lease has commissioned Wilkinson Murray to produce a noise and vibration assessment of the proposed construction works, *Construction of C5 Commercial Tower – Noise and Vibration Assessment* (NVA).

A survey of potentially affected sensitive commercial and residential receivers has been conducted and the following locations have been identified:

- King Street Wharf – Commercial premises including offices and outdoor restaurants/cafes;
- Napoleon Street – Commercial premises including Aon Australia and Symantec; and
- Hickson Road – Residential receivers.

In all commercial premises considered as part of the survey, such as office buildings with closed windows and air conditioning, the predicted worst case noise levels would not exceed the Noise Affected Management Level and therefore do not adversely affect the receivers.

However, in the case of commercial premises with external activities / occupancies having operable windows or external spaces and residential receivers; the predictions indicate, in worst case situations, some of the construction activities may exceed the noise goals.

Exceedances of noise controls would primarily be caused by sheet (and other forms of) piling and hydraulic hammering operations during the excavation and foundation stages; the management of these types of activities is discussed in the ECSMP for PA1, Barangaroo South. Typical exceedances over the general construction phase of works for the C5 Building would primarily be caused by the cumulative effect of general construction activities on site. The NVA notes that the exceedances predicted are relatively small and would occur for only limited periods.

5.1.1.1 Management Controls and Mitigation Measures

The noise goals for the proposed construction activities are enumerated in the NVA.

Should noise emission exceed these control limits, the NVMP applies a dynamic decision tree management approach to addressing exceedance of noise limitation requirements:

1. Can an alternative appliance or process be applied?

2. Can acoustic barriers or acoustic dampening be applied?
3. Can silencing devices be applied?
4. Can the appliance or process be relocated?
5. Can other strategies be implemented such as modifying hours of operation?
6. Can a combination of methods be applied?
7. As a final option, should other mitigation measures prove ineffective, agreement will be sought with the affected party to determine an acceptable management process.

The NVMP also provides specific abatement guidance for the cumulative construction noise condition, which is the most likely process to exceed control limits.

The NVMP further suggests that static plant and equipment such as dewatering facilities, groundwater treatment facilities and temporary plant such as concrete crushers etc. are placed as far away from sensitive receptors as possible.

5.1.1.2 Monitoring

Noise monitoring would be conducted:

- Intermittently, as an ongoing indicator of noise emissions from the site;
- In response to complaints; and
- Where specific monitoring is needed. For example, where noise emission is produced near sensitive structures to confirm safe working distances.

Attended or unattended long term monitoring may be used as appropriate.

As noted in the NVMP, as a minimum, it is recommended to take attended noise measurements at sensitive receiver locations at the commencement of significant noise producing activities and thereafter at monthly intervals. The monitoring should identify the levels of noise emitted from the site and the noise sources present and comment on the noise levels in relation to the established noise goals.

5.1.2 Construction Generated Vibration

The scope of works for the construction of the C5 Commercial building subject to this environmental assessment include those works above the foundation structures. Activities associated with the excavation of the basement car park have already been addressed in Cardno's previous ECSMP for PA 1, Barangaroo South.

Management of vibration associated with the construction of the C5 Commercial Building will generally be addressed in accordance with the recommendations of the *Construction of C5 Commercial Tower – Noise and Vibration Management Plan* (NVMP) prepared by Wilkinson Murray. The NVMP will be used to manage impacts from all construction activities, with particular reference to those activities that might generate emissions greater than the targets outlined in the NVMP.

The processes adopted in the Management Plan are intended to minimise vibration emissions, to meet the objectives of the "Assessing Vibration" technical guide within the Department of Environment, Climate Change and Water's (DECCW's) Interim Construction Noise Guideline. The aim of these processes is to minimise and ameliorate any impacts caused by construction activities to the extent that it is feasible and reasonable.

In determining the management controls, Lend Lease has commissioned Wilkinson Murray to produce a noise and vibration assessment of the proposed construction works, *Construction of C5 Commercial Tower – Noise and Vibration Assessment* (NVA).

5.1.2.1 Management Controls and Mitigation Measures

The vibration goals for the proposed construction activities are enumerated in the NVA.

Predictions made within the NVA indicate that the recommended vibration levels will not be exceeded given the distance separating the construction activities from most sensitive structures or occupancies. The NVA also notes that typical site activities associated with the construction of the Building tower will not cause significant vibrations which would affect the amenity or integrity of nearby structures.

5.1.2.2 Monitoring

Vibration monitoring would be conducted:

- Intermittently, as deemed appropriate, to provide an ongoing indication of vibration emissions from the site; and
- In response to complaints.

It is recommended that, as a minimum, attended measurements at sensitive receiver locations occur where rock hammering (or other similar vibration producing activities) occurs within 20m of another structure. This type of activity is not expected during the PA3, C5 Building construction works.

5.1.3 Construction Activities Affecting Air Quality and Odours

An Air Quality Impact Assessment (AQIA) will be prepared in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2005) to assess potential air and odour issues generated during the excavation, construction, and remediation works. This assessment will make reference to the following guidance documents:

- *Assessment and Management of Odour from Stationary Sources in NSW: Technical Framework* (DEC 2006); and
- *Management of Odour from Stationary Sources in NSW: Technical Notes* (DEC 2006).

According to the findings of the AQIA, air quality management will address the following key issues as appropriate:

- Air quality impact sources and minimisation/mitigation thereof;
- Controls for air quality impact sources;
- Air quality management response procedures;
- Progressive contingency measures; and
- Monitoring;

Management techniques will be proposed within an analytical, risk and opportunities based approach.

Odour management will be addressed to include planning for odour emission during excavations associated with PA1, Basement works. Odour management for PA3, C5 Building works is not expected to be significant at all.

Management of wind-blown dust for PA3, C5 Building works is not expected to be as significant as that for PA1, Basement works.

5.1.3.1 Management Controls and Mitigation Measures

The minimisation of air-borne pollution is a key component for environmental management of the site. Construction phase air quality impacts shall be minimised or avoided by incorporation of appropriate air quality control measures as directed by the AQIA.

The installation and application of air quality controls during the construction phase shall be in accordance with the following principles:

- All equipment used and all facilities erected on site are to be designed and operated to control the excessive emission of smoke, dust, fumes and any other air impurity into the atmosphere;
- Spray earthworks, roads and other surfaces as necessary with water to reduce dust generation;
- Maintain the condition of temporary haul roads, as appropriate, which will be in use for prolonged periods;
- Provide adequate truck washdown and wheel washing facilities on site to prevent tracking of muds / sediment onto public roadways and generation of dust;
- Transport routes and traffic areas shall be clearly defined by marker posts or other suitable barriers to prevent unnecessary vehicle movement onto other areas. These roads shall operate under defined speed limits;
- A water cart will be employed, as required, to dampen work areas and exposed soils to prevent the emission of excessive dust from the site;
- Trucks transporting material from the site shall be covered after loading to prevent windblown dust emissions and spillages;
- All access roads shall be surfaced in appropriately selected materials;
- Subcontractors will maintain all construction equipment to reduce exhaust emissions;
- No waste material shall be burnt on the site;
- Implement odour assessment criteria and techniques in accordance with the AQIA; and
- Implement odour management controls in accordance with the findings of the AQIA.

5.1.3.2 *Monitoring*

The Site Manager (SM) will visually monitor levels of dust deposition and air quality, the effectiveness of dust emission controls and the construction site and the impacts of any nuisance on adjoining properties.

5.1.4 Stormwater and Erosion Management

The majority of erosion and sediment controls will be implemented as part of the PA1, Basement works. Supplementary erosion and sediment controls will be implemented, as required, to facilitate collection and treatment of surface run-off to temporary sediment basins during the C5 construction works.

Surface water management is considered critical to minimise site environmental impacts. Surface water flows and stormwater will be managed by segregating clean water from impacted water and introducing measures to prevent the inflow of surface water to excavation areas using surface bunds, silt fences and drainage diversions. The preferred hierarchy for management of water on-site is as follows:

- Minimising the volume of contaminated water during the works wherever possible by directing surface water away from excavations, depressions, pits and stockpiles by the construction of drainage works such as bunds and diversion drains. Sediment basin(s) may be employed as deemed necessary for the collection of surface water for maintenance of water quality and/or re-use;
- Recycling water, where possible, by re-using on-site as dust suppression or for other site operations including wheel washing and truck washing subject to suitable treatment measures; and
- Discharging to stormwater via overland flow or formal reticulation to sewer, with or without treatment, will be as per regulatory guidelines.

Dewatering and treatment of ground water, where required, will be undertaken as part of the bulk excavation works for the PA1, Basement works.

5.1.4.1 *Management Controls and Mitigation Measures*

The objectives of the erosion and sediment controls proposed for the development site are to ensure:

**Adequate erosion and sediment control measures are implemented prior to the commencement of construction and are maintained during the construction stage; and
Developed site run-off is appropriately treated in accordance with the requirements of The City of Sydney Council and the Department of Environment, Climate Change and Water (DECCW) requirements.**

Prior to any detailed earthworks or building works commencing on site, all erosion and sediment control measures will need to be implemented generally in accordance with the above specifications. These measures shall generally include supplementary erosion and sediment controls implemented as part of the PA1, Basement works as deemed necessary:

1. Installation of additional sediment fencing;
2. Installation of silt arrestors to collect site runoff and retain suspended particles; and
3. Placement of hay bales around and along proposed catch drains and stormwater drainage pits.

Surface water associated with the C5 Commercial Building works shall be directed to sediment basins constructed as part of the initial earthwork operations on site. Diversion works associated with external stormwater drainage systems traversing the site shall be undertaken to ensure basement excavations are not affected by external stormwater surface and piped flows. These works shall form part of PA1, Basement works.

The sediment basins, as constructed during the bulk earthwork operations, shall be maintained to ensure they operate effectively in accordance with NSW Department of Housing Manual, "Managing Urban Stormwater - Soils & Construction" 2004. The water in the sediment basins shall be lowered by pumping to maintain the minimum storage volume at the lower level of the settling zone identified by pegs to clearly show the level at which design storage capacity is available.

Water pumped from the sediment basin shall be conveyed for treatment and then stored either for re-use or discharge into the existing sewer drainage network within Hickson Road. Trade waste applications will be negotiated with Sydney Water as appropriate. Sediment collected in the proposed facilities will require periodic removal, and shall be stockpiled, treated and either transported off site or re-stockpiled for future re-use.

Sediment filters placed around drainage structures within Hickson Road, Sussex Street and Shelley Street to capture sediments from the surrounding road network as part of the PA1, Basement works shall be adequately maintained and / or replaced throughout the project duration.

A truck wash down facility constructed at the exit of the work site as part of the PA1, Basement works shall be utilised during the project duration. All trucks and associated construction vehicles exiting the site to Hickson Road will undertake cleaning, as required, prior to accessing the public road network. Water from the wash down area shall be reticulated to a treatment and storage system for reuse.

Groundwater encountered during detailed excavation will require management in conjunction with surface water management. Control walls will be installed to minimise groundwater infiltration into excavations as part of the development, where required. Dewatering and control of groundwater seepages will also be required. Groundwater collected from the excavations will be transferred to the on-site water treatment plant (if required) prior to discharge to sewer / stormwater with appropriate approvals. Trade waste applications will be negotiated with Sydney Water as appropriate.

5.1.4.2 Monitoring

Surface and ground water management structures will be monitored by regular review and checking by site staff as part of the Lend Lease EH&S Management System.

Overall water quality shall be assessed with harbour monitoring. Harbour monitoring locations are indicatively noted on drawing **DA-225** included in **Appendix A**. Final locations of harbour monitors will be to future detail.

5.1.5 External Catchments and Drainage Networks

A discussion of the project specific considerations associated with the external catchment and drainage network and management thereof has been provided in the ECSMP for PA1, Basement works. The matters to be addressed as part of the PA1, Basement works include:

- Temporary Diversion of the existing trunk drainage network traversing the site from the external upper catchment areas of Kent and Margaret Streets. It is not proposed to upgrade the in-ground pipe or overland flow route capacity of the existing road network as part of the temporary works; however, this will be addressed during the detail design and documentation phase; and
- Ultimate Drainage Network amendments may be required to ensure the drainage system surrounding the development has adequate capacity to convey the design events, both piped and overland, as nominated by the City of Sydney Council. A detailed drainage assessment shall be undertaken as part of the detail design and documentation process.

5.1.6 Waste Management: Solid and Liquid Waste

Management of construction generated solid and liquid waste will generally be addressed in accordance with the recommendations of the *Barangaroo Stage 1 - C5 Commercial Building: Waste Management Plan – Project Application* (WMP) by Arup. The WMP will be used to manage impacts from all construction activities, with particular reference to those activities that might generate waste outcomes outside the recommended control levels.

The WMP identifies waste sources during construction and proposes measures to manage waste in a way that satisfies all legislative requirements.

The key purposes of the WMP are to:

- Address the waste management requirements for the proposal to a standard suitable for approval;
- Provide guidance for the project in waste minimisation from construction activities;
- Nominate effective waste separation, recycling and re-use measures;
- Develop management requirements for construction and operation.

In line with Lend Lease's successful waste management on other projects, the objectives of the Waste Management Plan are based on the hierarchy of avoidance/reduce, re-use, recycle, treat and dispose as outlined in the National Waste Minimisation and Recycling Strategy. Lend Lease's waste management strategy has been developed from best practice models. Waste Materials generated on site are to be managed such that recycling is maximised and the volume of waste transported to landfill is minimised.

Waste management during demolition of the existing structures is the subject of a separate planning application.

Excavation

Waste management of the site during excavation works is addressed in the WMP for the Bulk Excavation and Basement Car Parking Planning Application (MP10_0023), which is included in the ECSMP for PA1, Basement works.

Construction

The goal for construction waste management is primarily the reduction of waste generated. Waste reduction is the responsibility of all on site, as it relates to materials procurement, handling, storage and use. Waste generated during construction will be reused, recycled or disposed to landfill.

Waste collection during building works will be appropriately managed through the staged nature of construction and the use of known quantities of materials. The majority of recyclable material that could be recovered during construction is likely to be off cuts and discards of concrete reinforcement (steel), metal off cuts, drainage pipes, telecommunication and electrical cabling, plastics, paint and timber.

5.1.7 Hazardous Substances and Dangerous Goods Management

Hazardous materials and chemical management will be undertaken in accordance with Lend Lease's standard site policies. All chemicals and hazardous materials will be received, stored, utilized, handled and disposed of in an environmentally appropriate manner in order to prevent any contamination of site work areas and adjoining property, including aquatic ecosystems, by chemicals and fuel used on the construction site.

Hazardous material on the project site will exist in solid, gaseous and liquid forms. These materials may include bulk fuels and chemicals used or stored during the construction.

The nearest receptor for pollutants coming from the Site is Darling Harbour, which is part of the larger Sydney Harbour ecosystem. The harbour is considered a 'highly disturbed system' under the ANZECC (2000) guidelines; hence, any escape of these substances is likely to have potentially significant consequences on the environmental and human health. Appropriate management measures will be instituted to prevent environmental incidents such as:

- Leak/spill from site storage containers of dangerous goods such as fuels that breaches the site boundary or remains within the site;
- Exposure of site workers or personnel to dangerous goods or hazardous substances; and
- Inappropriate disposal of dangerous goods.

As an associated issue, limitations on truck parking and re-fuelling are noted in **Section 5.1.8**.

5.1.8 Traffic Management

Access to the site amenities and general access to the construction zone is proposed from two (2) entry and exit locations along Hickson Road with deliveries associated with the C5 Commercial Building construction works accessing the site from these controlled entry and

exit points. The access locations shall be managed in accordance with the staging of construction works, and it is envisioned that the most northern access point will be maintained for the duration of construction activities with the southern access point ultimately being removed as construction progresses.

As part of construction activities, traffic management and controls shall be implemented both within and surrounding the development site.

Refuelling performed on site will be for the excavators and other plant / equipment operating on site. Haulage or delivery trucks will be refuelled off site. Delivery vehicles will be permitted to park overnight on site.

The following minimum goals have been identified in relation to site and surrounding traffic management:

- Provide a safe environment during construction for those associated with construction activities;
- Provide a safe environment for motorists, cyclists and pedestrians utilising the existing road network;
- Provide a safe environment for activities associated with the temporary passenger terminal; and
- Limit delay times within the surrounding road network.

Traffic management and control measures shall be implemented within the site to clearly identify proposed haul road location(s). The placement of water filled barriers and fencing shall provide a safe environment for construction vehicles and pedestrians. Associated signage will supplement physical structures within the site. Traffic management and control measures will be employed where the on site dedicated haul route between the Barangaroo South bulk earthworks area and the site of the proposed Headland Park passes through the eastern perimeter of the passenger terminal.

Pedestrian and vehicular access from Hickson Road to the passenger terminal will be controlled by appropriate signage, fencing and gates to avoid conflict with the site haulage operations.

During cruise ship days, pedestrian and vehicular access from Hickson Road to the Passenger Terminal will be man-controlled, and the public foreshore pedestrian walk will be closed by Sydney Ports Corporation between the Terminal and the cruise ship for safety, security and customs requirements. Refer to Drawings DA-230, 231, 232 in **Appendix A**.

Adequate directional and warning signage shall be installed surrounding the development site to clearly inform motorists, cyclist and pedestrians of the approaching changes within Hickson Road, Sussex Street and Shelley Street. Signage shall also inform delivery drivers of the proposed entry and exit gate locations.

All proposed traffic management and controls shall be documented in the detailed design stage by accredited Roads and Traffic Authority (RTA) traffic control designers and where required, the approval obtained by the necessary statutory approval organisations. Road occupancy certificates shall be obtained prior to any works commencing where appropriate.

5.1.9 Management of Existing Services

Existing services within the development area consist of electrical, communications, gas and stormwater drainage conduits. The majority of these services shall be made redundant and shall be removed as part of the demolition works for the PA1, Basement works. Existing electrical services to structures remaining, north of the Barangaroo South construction area, shall be investigated and alternative supply feeds implemented prior to the decommissioning and demolition of the existing substation located within the Barangaroo South construction area. Associated drainage, sewer and communication services shall be diverted from within the construction area with temporary connections made, as required.

5.1.10 Consultation Strategy and Management

A comprehensive action plan to engage with stakeholders in relation to the construction works programme will be developed to establish appropriate processes for engaging stakeholders and managing complaints and enquiries. Management of stakeholders will be undertaken in accordance with the **Lend Lease Stakeholder Engagement Statement of Commitment & the Stakeholder Engagement Strategy (Appendix B)** in order to maintain a good neighbour policy with the existing adjoining properties and other local facilities, residents and special interest groups by reducing disturbances and confining any potential loss of amenity.

The proposed works are expected to generate social and economic benefits to the local and broader metropolitan community through provision / creation of this world-class mixed-use precinct. The potential for negative environmental and amenity impacts during construction, although over a relatively short duration, needs to be managed through environmental monitoring during construction, ongoing community engagement of environmental performance and provision of project information such as operating hours and traffic circulation routes.

Due to the nature of the proposed construction works and the proximity of the site to the local community, appropriate mitigation measures and safeguards are required to avoid the potential for impacts such as:

- Noise and vibration generated during construction activities, which affects adjoining properties;
- Dust generated from the construction activity, which affects adjoining properties; and
- Vehicles leaving the construction site depositing dirt/mud on public roads after rain periods.

Existing properties directly affected by the construction program will be advised of works and provided with contact details, which will be supported by a community relations team that will provide:

- A contacts database for registering, managing and reporting complaints & enquiries;
- A 1300 number for enquiries & complaints;
- A website with a dedicated email address and feedback forms; and

-
- Specific information in the form of letters, fact sheets and newsletters for the local community.

The intent is for all works to be conducted within approved working hours; however, if works are expected to extend beyond these hours, we will notify the appropriate stakeholders prior to these activities.

5.2 Environmental Management Plans

The plans and drawings included in **Appendix A** generally identify the following, as appropriate:

- Environmentally Sensitive Areas;
- Waterways including drains;
- Erosion and Sediment Control Measures;
- Works areas, machinery or vehicle parking, spoil dumps, fuel and chemical stores;
- Restrictions on traffic movements;
- Monitoring Locations.

The plans inform the discussions of the previous sections of this document, and they have been referenced where applicable.

The plans will be updated with further details added and additional plans added as necessary during construction and as part of the implementation of the Lend Lease EH&S Management System procedures.

A general site layout is included with the drawings in **Appendix A**.

The indicative location of the site compound is shown on drawings **DA-231** and **DA-232**. The compound is generally located to the northern extent of the development site adjacent Hickson Road, and shall include:

- Site sheds;
- Meeting room facilities;
- Ablutions;
- Kitchen and lunchroom facilities;
- Canteen;
- Etc.

Visual and amenity impacts are expected to be minimal. Any impact shall be mitigated by the installation of suitable hoardings located along the boundary alignment. Class A hoardings will be installed to segregate the site from surrounding areas. The hoardings will be covered with an appropriate screening material to mitigate sight impacts on surrounding roads, footways, and public domain areas.

6 Auditing, Monitoring and Review

6.1 Environmental Monitoring

The monitoring of environmental activities will be undertaken according to the procedures outlined in the Lend Lease EH&S Management System.

6.1.1 Environmental Monitoring Sign-Off

The environmental monitoring protocols will be incorporated into the Lend Lease EH&S Management System for the project. Sign-off for the monitoring will also be incorporated in to the Lend Lease EH&S Management System.

6.1.2 Environmental Monitoring Administration

Monitoring records shall be collated, distributed, and stored as part of the EMS.

6.2 Environmental Auditing

Auditing will be undertaken to review the effectiveness and implementation of the Lend Lease EH&S Management System at regular intervals.

Audit methodology will be a review of written procedures and implementation activities on site to assess the effectiveness of the management system and control activities.

Audit results will be reviewed and corrective action taken, as necessary. Where corrective action or updates are required, subsequent auditing will be undertaken to confirm the appropriateness of the corrections or updates.

7 References

Arup, Barangaroo South – C5 Commercial Building: Building Services Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Climate Change and Sea Level Rise Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Construction Traffic Management Plan – Project Application.

Arup, Barangaroo South – C5 Commercial Building: ESD Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Fire Engineering – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Geotechnical Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Structural Engineering Report – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Transport Management and Accessibility Plan (TMAP) Supplementary – Planning Application.

Arup, Barangaroo South – C5 Commercial Building: Travel Demand Management Plan – Project Application.

Arup, Barangaroo South – C5 Commercial Building: Waste Management Plan – Project Application.

Cardno, Barangaroo South – C5 Commercial Building: Stormwater Management Plan – Project Application.

Cardno, Bulk Excavations and Basement Car Parking (PA1) – Barangaroo, South (MP 10_0023): Environmental Construction and Site Management Plan.

Cardno, Bulk Excavations and Basement Car Parking (PA1) – Barangaroo, Stage 1 (MP 10_0023): Environmental Construction and Site Management Plan.

NSW DIPNR (2004), Guidelines for the Preparation of Environmental Management Plans.

Standards Australia (2007), AS/NZS 4360 2004: Risk Management, Adopted 20 August 2004.

Standards Australia (2010), *AS/NZS ISO 31000:2009: Risk Management - Principles and Guidelines*, Adopted 16 October 2009.

Wilkinson Murray, *Barangaroo South – Construction of Commercial Building C5, Construction Noise and Vibration Assessment*.

Wilkinson Murray, *Barangaroo South – C5 Commercial Building: Operational Noise Assessment – Project Application*.