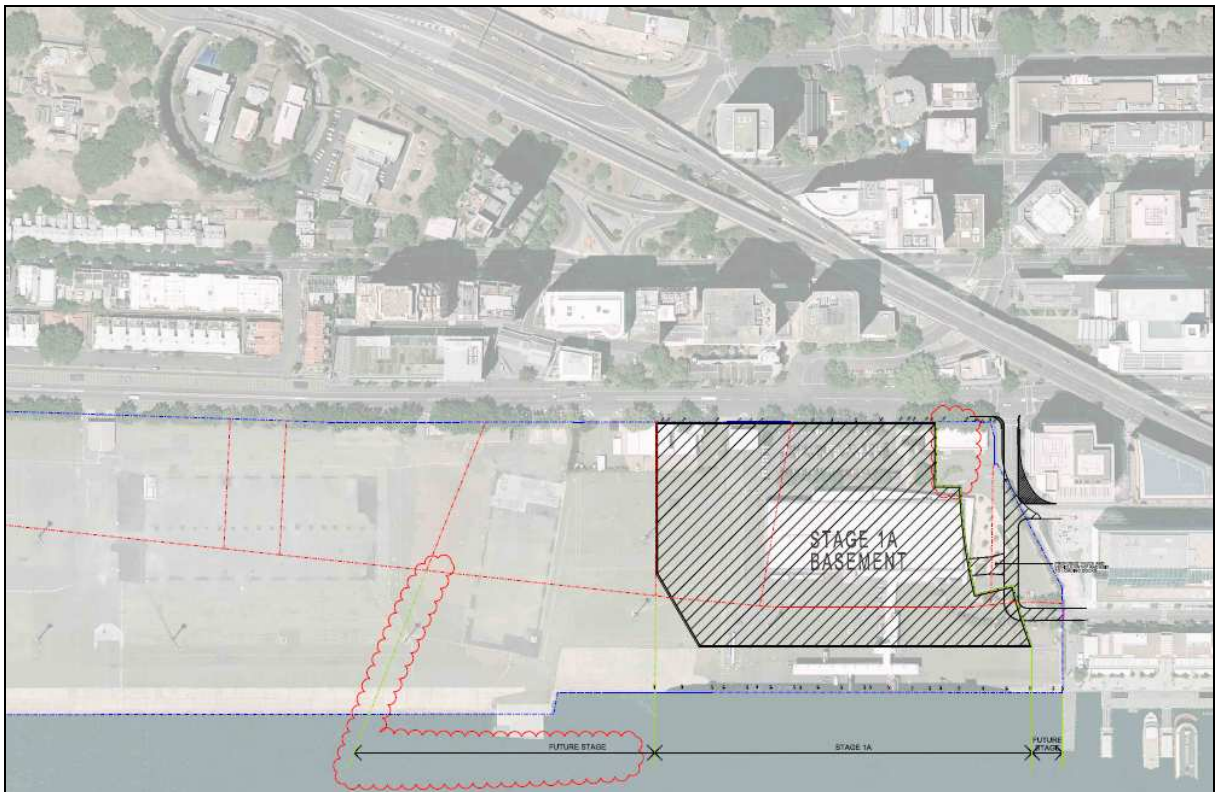


**MAJOR PROJECT ASSESSMENT:
Bulk Excavation and Basement Car Park,
Barangaroo Stage 1
MP 10_0023**



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

October 2010

ABBREVIATIONS

CIV	Capital Investment Value
Department	Department of Planning
DGRs	Director-General's Requirements
Director-General	Director-General of the Department of Planning
EA	Environmental Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPI	Environmental Planning Instrument
MD SEPP	State Environmental Planning Policy (Major Development) 2005
Minister	Minister for Planning
PAC	Planning Assessment Commission
Part 3A	Part 3A of the <i>Environmental Planning and Assessment Act 1979</i>
PEA	Preliminary Environmental Assessment
PPR	Preferred Project Report
Proponent	Lend Lease (Millers Point) Pty Limited
RtS	Response to Submissions

Cover Photograph: Barangaroo South with basement car park area shown hatched

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EXECUTIVE SUMMARY

This report is an assessment of a Project Application seeking approval for bulk excavation, remediation and construction of a basement car park at Barangaroo South, pursuant to Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The CIV of the proposal is \$190,010,000 and the proposal will create 437 construction jobs.

When granting approval for the Concept Plan for the Barangaroo site (MP06_0162) the Minister for Planning determined, pursuant to section 75P(1)(b) of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), that approval to carry out the project or stages of the project with a capital investment value of less than \$5 million, is subject to Part 4 or 5 of the EP&A Act. As the capital investment value of the Project Application is \$190 million, Part 3A of the EP&A Act applies to the proposal and the Minister is the consent authority.

The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the Major Development SEPP. The SEPP zones the Project Application site part B4 Mixed Use and part RE1 Public Recreation. The proposed earth works and basement car park are permissible in both zones with development consent.

The Environmental Assessment (EA) was exhibited for a 30 day period from 7 July 2010 until 5 August 2010. The Department received 28 submissions during the exhibition of the EA - 9 submissions from public authorities and 19 submissions from the general public and special interest groups. Key issues raised in the submissions included:

- the adequacy of the exhibited Noise and Vibration Assessment and predicted noise levels;
- the adequacy of the exhibited Air Quality Impact Assessment and potential air quality and odour impacts;
- proposed construction traffic management arrangements;
- proposed hours of construction;
- water management and water quality impacts;
- contamination, remediation and waste management;
- health impacts;
- landscaping and public domain; and
- relationship with, and potential impacts on, the Interim Metro Corridor.

On 21 September 2010, the Proponent submitted a Preferred Project Report (including a Response to Submissions) to address issues raised by the Department, other government authorities and the public.

The Department has assessed the merits of the project and is satisfied that the impacts of the proposed development have been addressed via the PPR and Statement of Commitments, and can be adequately managed through the recommended conditions of approval.

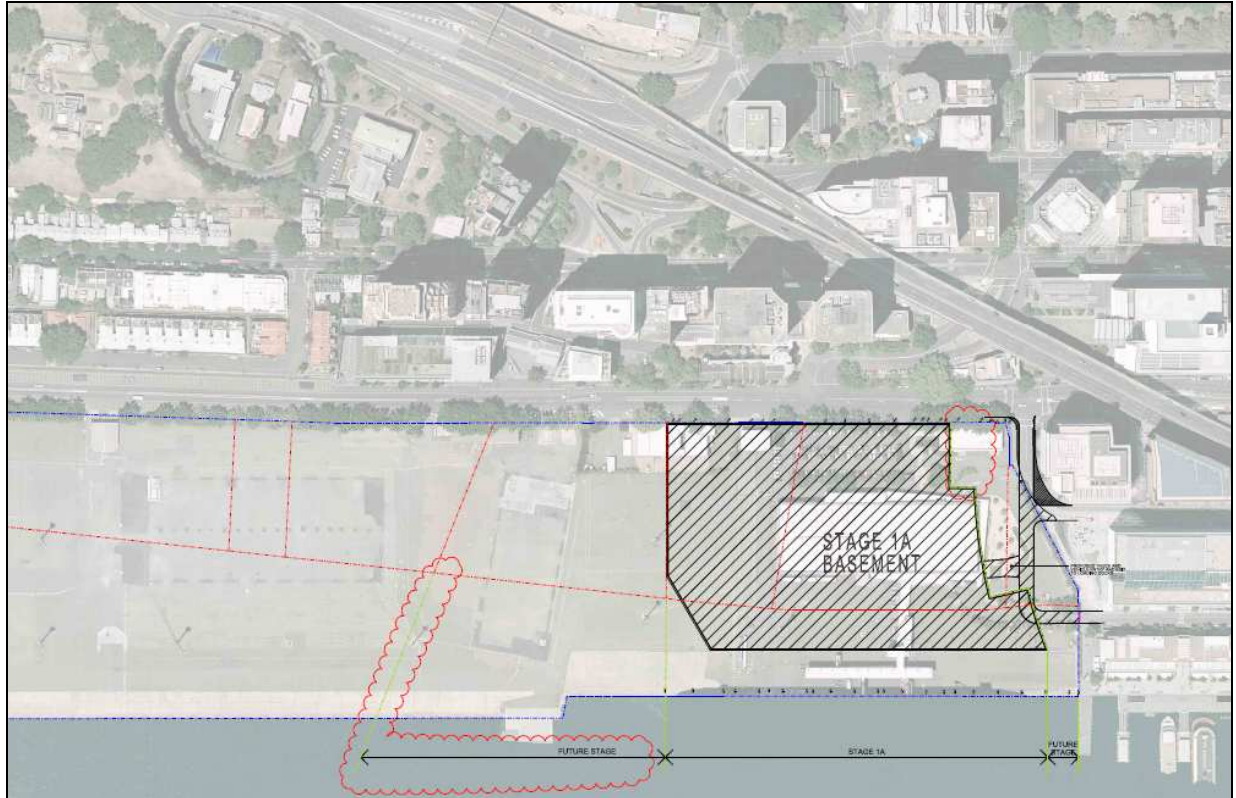
The Department is also satisfied that the site is suitable for the proposed use. The proposal is consistent with strategic planning objectives, including the Metropolitan Strategy and draft Sydney City Subregional Strategy, and will facilitate the future development of the Barangaroo site.

Accordingly, the Department considers the project is in the public interest and recommends that the project be approved, subject to conditions.

1. BACKGROUND

Lend Lease (the Proponent) is seeking approval for bulk excavation, remediation and construction of a basement car park (and associated services and infrastructure) to support the initial phases of the future development of Barangaroo Stage 1. The project location is shown hatched in **Figure 1**.

Figure 1: Project Location



Barangaroo has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Stage 2 ('Barangaroo Central') and Barangaroo Stage 1 ('Barangaroo South'). Lend Lease has been appointed as the preferred Proponent to develop Barangaroo Stage 1.

The area of land the subject of this Project Application forms parts of Barangaroo South and comprises an open concrete apron, which is largely reclaimed over water. The subject site extends over land generally known and identified in the approved Barangaroo Concept Plan as Blocks 1, 2 and 3, and is immediately adjacent to the public foreshore recreation area.

Immediately north of the Project Application site is a Remediation Site Declaration Area as declared by DECCW under the *Contaminated Land Management Act 1997*, which will be the subject of a future Project Application for remediation. Barangaroo Central and the Northern Cove and Headland Park are further to the north of the DECCW Declared Area.

To the immediate east of the site is Hickson Road and existing CBD development comprising Lend Lease's headquarters – The Bond, Grafton Bond and The Sussex. Residential development is located east of these buildings, elevated above the site.

South of the site is the remainder of the Barangaroo site, being Block 1 which is proposed for commercial development. Beyond Block 1 lies the KPMG, Macquarie Bank and Amex buildings and the King Street Wharf precinct.

To the west of the site is Sydney Harbour and the waters of Darling Harbour. Further west is Darling Island.

2. PROPOSED PROJECT

2.1 Project Description

Project approval (as modified in the PPR) is sought for:

- demolition of any existing structures and footings, part of an underground cassion wall, hardstand areas, removal of piles, and removal of existing vegetation within Blocks 1, 2 and 3 and within the adjacent public domain area, which have not been previously approved to be demolished or removed under MP 07_0077 Demolition Works;
- site establishment, including provision of concrete crushing infrastructure, environmental protection structures, de-watering infrastructure, and groundwater treatment;
- bulk earthworks for the purposes of excavating for the basement within Concept Plan Blocks 1, 2 and 3 and the adjacent public domain area;
- on-site treatment and remediation of contaminated soils;
- transportation of excavated material to temporary locations to the site of the Headland Park for future placement and land forming by the Barangaroo Delivery Authority under the Headland Park Early Works Project Application (MP10_0047);
- temporary stockpiling of excavated material across the Barangaroo site as required;
- transportation and disposal of material off site, where required;
- structural works, comprising the construction of:
 - foundations (piling, caps and footings);
 - basement levels;
 - perimeter retention system to basement walls; and
 - all associated elements and structures;
- up to 880 car parking spaces which equates to the car parking required to support GFA as envisaged by the approved Concept Plan for Blocks 2 and 3, and part of Block 4 in accordance with the car parking rates approved under the Concept Plan;
- indicative parking layout, loading, plant location, bicycle parking and associated amenities;
- road works, including the extension of Margaret Street (known as Margaret Street West in the approved Concept Plan) and Lime Street;
- construction of temporary vehicular access from Hickson Road and permanent vehicular access from Margaret Street West;
- associated utilities and infrastructure works including decommissioning and/or relocation of services; and
- temporary use of the basement for construction related storage and activity.

The capital investment value of the project is \$190 million.

The proposed basement car park is located predominantly within Blocks 2 and 3 of the Barangaroo site as identified under the approved Concept Plan and has been designed in accordance with the approved Concept Plan.

The basement car park has been designed to maintain maximum flexibility with respect to the potential options for the detailed design and distribution of above ground floor space (commercial, residential, community and retail floor space).

Particularly, the proposed basement car park has been designed such that the building core locations, final car parking provision and layout, and pedestrian and vehicular access arrangements (including lifts and fire stairs) can continue to be concurrently designed whilst having regard to the future built form above the basement car park, which is to be the subject of separate detailed Project Applications in the future.

The proposed basement car park has also been designed such that it is capable of expansion/ connection to additional basement areas at subsequent stages of the development to accommodate additional parking as required to support the proposed gross floor area and land use mix as the overall Barangaroo Stage 1 development proceeds.

The extent of the proposed works can be seen in **Figure 2** below.

Figure 2: Extent of Proposed Basement Car Park

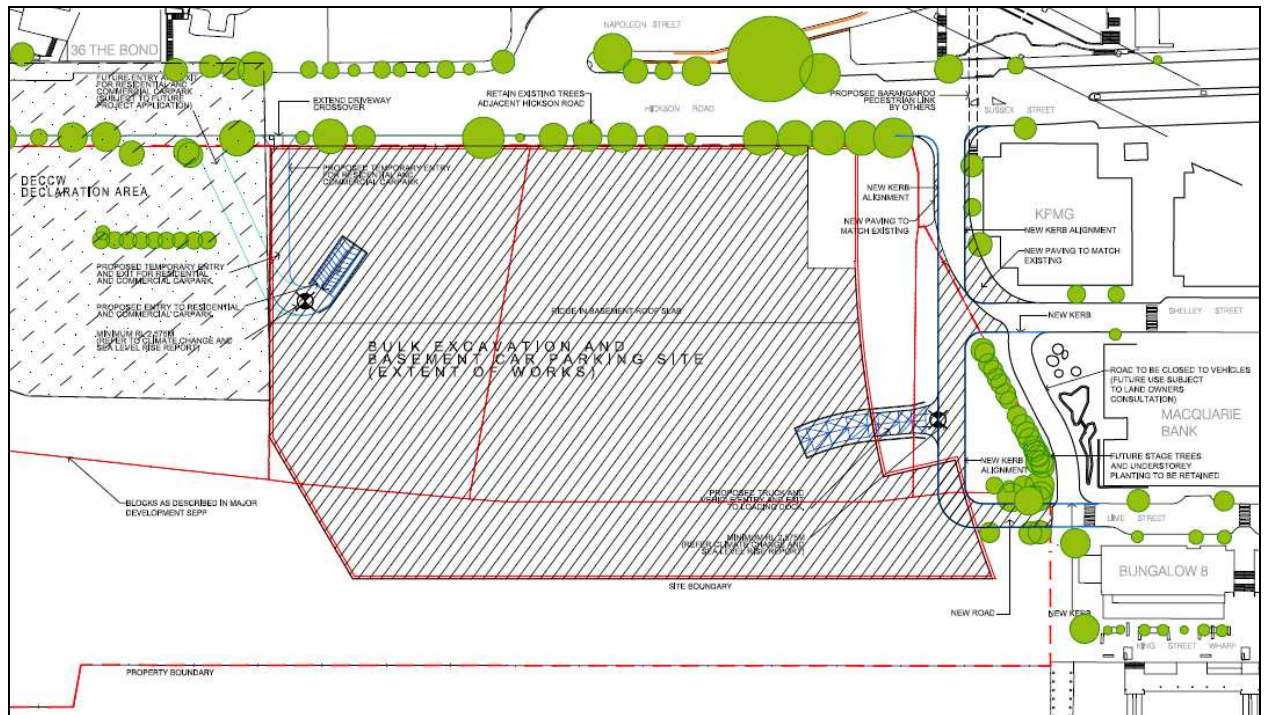


Figure 3 below illustrates the first level of the basement car park, which is primarily for service vehicles and plant equipment.

Figure 3: Basement Plan Level B1

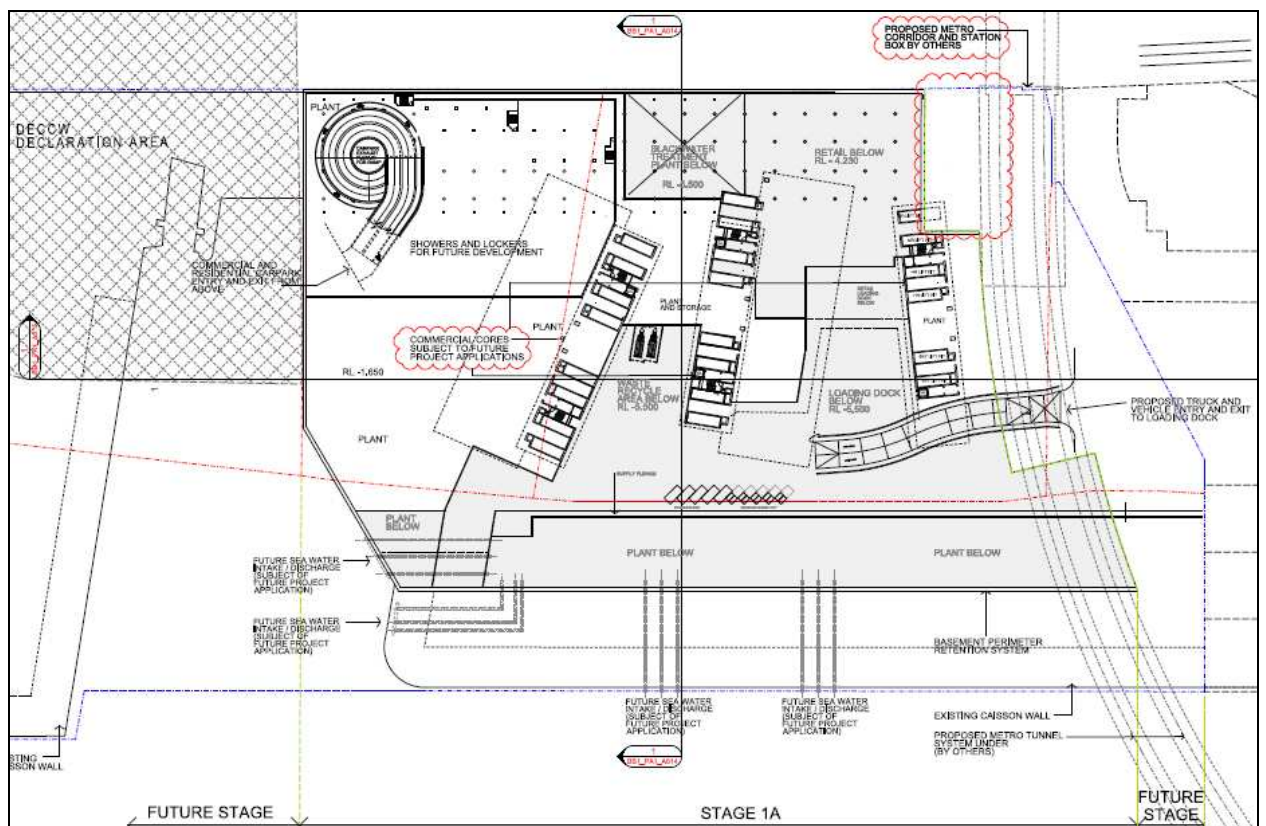
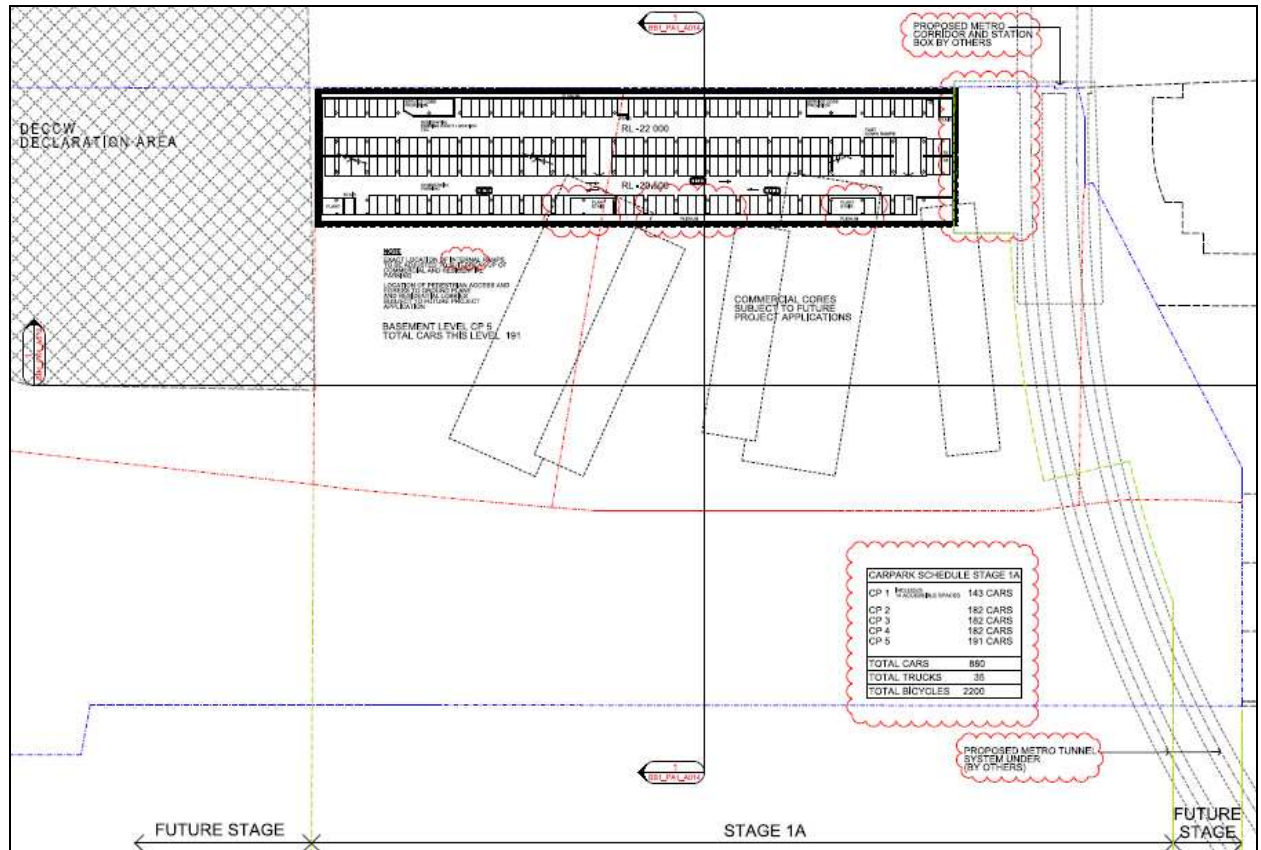
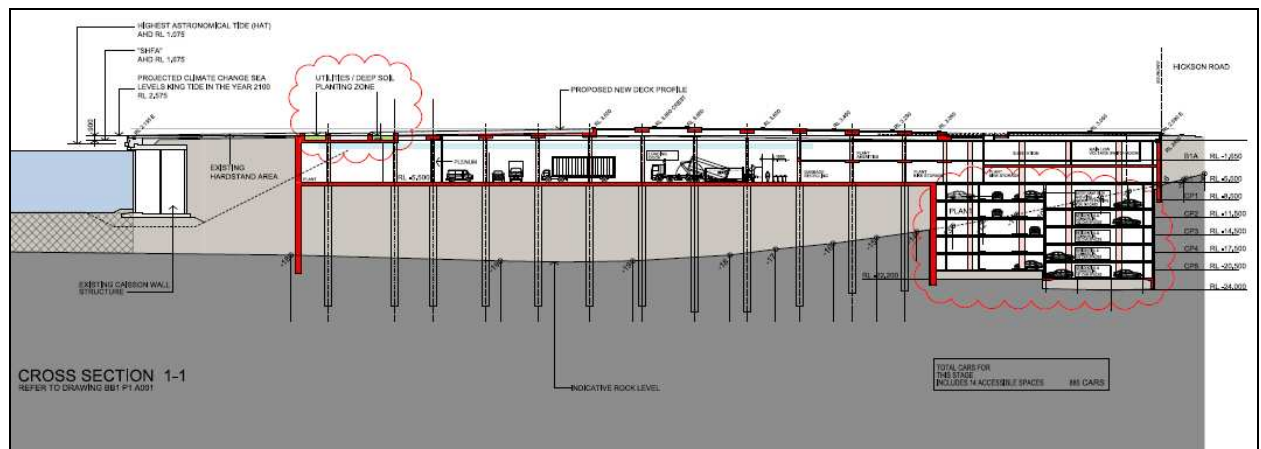


Figure 4 illustrates a typical car parking level, noting that vehicles are concentrated on the east side of the basement car park. This can also be seen in section in **Figure 5** following.

Figure 4: Typical Car Park Level**Figure 5: Cross Section of Basement Car Park**

It is important to note that this Project Application **does not** seek consent for the following development, which will be the subject of separate future Project Applications:

- building works, including the core/foundations for future commercial and residential buildings and the public domain above the basement level;
- the final total number and allocation of car parking spaces relevant to the amount and land use mix of GFA ultimately approved within the overall Stage 1 development;
- detailed layout and operation of the car parking associated with each building;
- any retail uses in the basement;
- any precinct infrastructure services other than those identified in this Project Application;
- permanent access to the basement from Hickson Road, which is proposed to be provided once remediation of the DECCW Declaration Area has occurred; construction of any future basement areas outside the Project Application Site; and
- detailed landscaping and public domain works, which will be the subject of future Project Applications for Blocks 1-4 and the public domain/ foreshore precinct.

2.2 Project Need and Justification

This Project Application forms the first of a series of individual Project Applications that Lend Lease will be submitting to deliver Stage 1 of the Barangaroo development. This Project Application is consistent with the approved Concept Plan for Barangaroo.

Barangaroo is identified as an important part of the "Global Sydney" Strategic Centre within the NSW Government's Metropolitan Strategy, *City of Cities, A Plan for Sydney's Future*.

Regionally, there are limited sites which can provide significant new foreshore open spaces and linkages within the CBD that could deliver significant amounts of new commercial and residential floor space. Barangaroo's waterfront location, size, and location on the western edge of the CBD means it presents an opportunity to deliver significant new commercial floor space and recreational opportunities. Coupled with significant infrastructure improvements and recreational and cultural activities, the redevelopment of Barangaroo can contribute to the sustained growth and enhance the position of Sydney within the Asia-Pacific region and the global market more generally.

The proposal is also consistent with the Draft Sydney City Subregional Strategy as it will provide the first step in facilitating the delivery of the Barangaroo site, which itself will help meet the following key planning challenges in the Sydney CBD precinct:

- accommodating new jobs;
- ensuring sufficient capacity for office and hotel development in keeping with the city's global status;
- maintaining and improving amenity and cultural opportunities;
- encouraging the development of lifestyle and entertainment activities;
- maintaining and improving accessibility within the Sydney CBD; and
- facilitating the clustering of appropriate mutually supporting land uses.

2.3 Planning History

Barangaroo Concept Plan MP 06_0162

The Minister for Planning approved the Barangaroo Concept Plan (MP 06_0162) on 9 February 2007. The Concept Plan approval allowed for:

- a mixed use development involving a maximum of 388,300m² of gross floor area (GFA) contained within 8 blocks on a total site area of 22 hectares;
- approximately 11 hectares of new public open space/public domain, including a 1.4km public foreshore promenade;
- a maximum of 8,500m² GFA for a passenger terminal and a maximum of 3,000m² GFA for active uses that support the public domain within the public recreation zone;
- built form design principles, maximum building heights and maximum GFA for each development block within the mixed use zone;
- alteration of the existing seawalls and creation of a partial new shoreline to the harbour;
- retention of the existing Sydney Ports Corporation Port Safety Operations and Harbour Tower Control Operations including employee parking; and
- an underground car park beneath the northern headland, containing approximately 300 car parking spaces.

The Capital Investment Value of the approved Concept Plan was \$1.5 billion with up to 16,000 operational jobs.

MP 06_0162 MOD 1

On 25 September 2007 the Executive Director, Strategic Sites and Urban Renewal, as delegate of the Minister for Planning, approved a minor modification to the approved Concept Plan to correct minor typographical errors and reword the design excellence modification.

MP 06_0162 MOD 2

On 16 February 2009, the Minister for Planning approved a second modification to the Barangaroo Concept Plan to increase the GFA of commercial uses by 50,000m² to 120,000m² in Blocks 2, 3, 4 and 5. The modification increased the total maximum GFA for Barangaroo to 508,300m².

MP 06_0162 MOD 3

On 11 November 2009, the Minister for Planning approved a third modification to the Barangaroo Concept Plan for the following:

- the reinstatement of a headland at the northern end of the site with a naturalised shape and form including a build up of height and a landscaped connection to physically link Clyne Reserve to allow direct pedestrian access from Argyle Place;
- an enlargement of the northern cove to achieve a greater naturalised shape, form and edges;
- the re-alignment of Globe Street to turn right towards Hickson Road immediately south of the enlarged cove, rather than continuing north around the headland;
- the removal of development Block 8 and part of Block 7 and redistribution of the associated land use mix;
- the demolition of three heritage items being the Sandstone Seawall; the Sydney Ports Harbour Control Tower; and the MWS & DB Sewage Pumping Station; and
- amendments to the Statement of Commitments relating to the preparation of relevant plans and strategies so that work can commence in stages.

MP 07_0077 Demolition of Existing Structures

On 15 November 2007, the Minister for Planning approved a Project Application for demolition of existing structures on the Barangaroo site, including Transit Sheds 3, 4, 5 & 6 and associated structures, 13 street light towers, Sydney Ports Amenities Building, Sydney Ports Office Building and Wharf 8 Passenger Terminal.

3. STATUTORY CONTEXT

3.1 Major Project

When granting approval for the Concept Plan for the Barangaroo site (MP06_0162) the Minister for Planning determined, pursuant to section 75P(1)(b) of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), that approval to carry out the project or stages of the project with a capital investment value of less than \$5 million, is subject to Part 4 or 5 of the EP&A Act. The capital investment value of the Project Application is \$190 million. Accordingly, Part 3A of the EP&A Act applies to the proposal and the Minister is the approval authority.

3.2 Permissibility

The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the Major Development SEPP. The SEPP zones the Project Application site part B4 Mixed Use and part RE1 Public Recreation. The proposed earth works and basement car park are permissible in both zones with consent.

3.3 Environmental Planning Instruments

Under Sections 75I(2)(d) and 75I(2)(e) of the EP&A Act, the Director-General's report for a project is required to include a copy of, or reference to, the provisions of any State Environmental Planning Policy (SEPP) that substantially governs the carrying out of the project, and the provisions of any environmental planning instruments (EPI) that would (except for the application of Part 3A) substantially govern the carrying out of the project and that have been taken into consideration in the assessment of the project.

The Department's consideration of relevant SEPPs and EPIs is provided in Appendix D.

3.4 Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The relevant objects are:

- (a) *to encourage:*
- (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
 - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
 - (iii) *the protection, provision and co-ordination of communication and utility services,*
 - (iv) *the provision of land for public purposes,*
 - (v) *the provision and co-ordination of community services and facilities, and*

- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- (vii) *ecologically sustainable development, and*
- (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The Department has considered the objects of the EP&A Act and considers that the application is consistent with the relevant objects. The assessment of the application in relation to these relevant objects is provided in Section 5 of this report.

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) *the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*
 - (i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
 - (ii) *an assessment of the risk-weighted consequences of various options,*
- (b) *inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
- (c) *conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
- (d) *improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as:*
 - (i) *polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
 - (ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
 - (iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Detailed assessment of the economic and environmental issues associated with the project is provided in Section 5. On the basis of this assessment, the Department is satisfied that the proposal encourages ESD, in accordance with the objects of the EP&A Act.

3.5 Statement of Compliance

In accordance with Section 75I of the EP&A Act, the Department is satisfied that the Director-General's environmental assessment requirements have been complied with.

3.6 Consistency with approved Concept Plan

The Project Application seeks approval for the carrying out of excavation, construction of the basement levels to accommodate up to 880 car parking spaces, and associated servicing and infrastructure works. The Project Application does not seek approval for the detailed layout and operation of car parking spaces, loading dock and servicing areas, or for other uses within the basement levels.

The detailed layout and operation of the basement levels will be addressed in a series of future Project Applications relating to the built form ultimately proposed above the basement areas. Notwithstanding this, an indicative layout has been designed and the car parking rates that have been approved by the Barangaroo Concept Plan (as modified) have been adopted to demonstrate that the proposed basement levels will adequately accommodate a suitable provision of car parking in relation to the GFA and land use mix of the approved Concept Plan.

The Project Application has been designed to facilitate early delivery of the first stage of the overall development on the site. The proposed basement car park and associated plant and services has been specifically designed to allow works to commence whilst maintaining maximum flexibility until such time as the detailed design and distribution of the above ground floor space (commercial, residential, community and retail floor space) is finalised. In particular, the building core locations, car parking rate and provision, and pedestrian and vehicular access arrangements (including lifts and fire stairs) are not influenced by the ongoing design process being undertaken for the above ground buildings, and as such the construction of the basement levels can proceed prior to those applications being finalised.

Importantly, the excavation and construction of basement levels is consistent with the approved Concept Plan (as modified). Modification B3 of the Concept Plan approval requires the new Southern Cove to be enlarged beyond the approved location of the proposed Globe Street. The enlargement of the Southern Cove water intrusion, in conjunction with the planning and design requirements imposed by Modification B3, have consequently provided Lend Lease with the opportunity to further reconsider the overall concept for Barangaroo South, including the configuration of the internal street and public domain networks, arrangement of land uses across the site, and the distribution of the approved GFA and heights across the entire site. This will be detailed in future Project Applications for the site.

In addition, Modification C1 of the Concept Plan approval permits the redistribution of any GFA between Blocks 2, 3, 4 and 5 that is displaced by the encroachment of the enlarged Southern Cove (Modification B3), as long as the total GFA permitted on those blocks is not exceeded. This current Project Application is a direct response to the combined effect of Modifications B3 and C1 and accordingly is complying with the terms of the Concept Plan approval.

The Project Application is therefore generally consistent with the terms of approval of the approved Concept Plan for Barangaroo.

4. CONSULTATION AND SUBMISSIONS

4.1 Exhibition

Under Section 75H(3) of the EP&A Act, the Director-General is required to make the environmental assessment (EA) of an application publicly available for at least 30 days. After accepting the EA, the Department publicly exhibited it from 7 July 2010 until 5 August 2010 (30 days) on the Department's website, and at the Department's Information Centre and the City of Sydney Council office. The Department also advertised the public exhibition in the Sydney Morning Herald and the Daily Telegraph on the 7 July 2010, and notified landholders and relevant State and local government authorities in writing.

The Department received 28 submissions during the exhibition of the EA – 9 submissions from public authorities and 19 submissions from the general public and special interest groups.

A summary of the issues raised in submissions is provided below.

4.2 Public Authority Submissions

Nine (9) submissions were received from public authorities. A summary of the issues raised in the submissions is provided below and a link to the submissions is included in Appendix B. The Department's consideration of key issues raised in submissions is contained in Section 5 of this report. Appropriate conditions of consent have been recommended where requested by agencies.

Sydney Water

Sydney Water has raised no objections to the proposal, however, provided some general comments as summarised below.

- The proposed development may require amplifications to the local water supply and existing wastewater system.
- Sydney Water will further assess the impact of the proposed development when the developer applies for a Section 73 Certificate.

Industry and Investment NSW

I&I NSW has raised no objections to the proposal, however, provided some general comments as summarised below.

- Sections 7.2 and 7.3 within the draft Statement of Commitments and the Environmental, Construction and Site Management Plan are to be implemented in order to mitigate potential impacts on the aquatic environment.

Department of Environment, Climate Change & Water (DECCW)

DECCW has raised a number of matters in the original EA which require additional assessment, correction, completion and further clarification prior to being able to provide the full range of recommended consent conditions. Specifically, the key issues are highlighted below.

- Contamination – the need to ensure completion of and compliance with the relevant plans (i.e. Remediation Action Plan and Human Health and Ecological Risk Assessment, including addressing all issues raised by the Site Auditor).
- Waste management – the Waste Management Plan included in the EA is lacking sufficient detail for a proper analysis, consequently DECCW recommends that the Proponent be required to prepare an updated and more comprehensive Waste Management Plan as a condition of any approval.
- Noise and vibration – additional assessment and revision of the potential for exceedances of DECCW's criteria (and potentially occupational health and safety criteria) for noise goals during construction activities. Investigations of alternative (less noisy) excavation and construction methods are required.
- Air – additional assessment and revision of air impacts relating to the prediction of potential release of dust, vapours and odours, and greater details on how these may be controlled.
- Water management – all practicable and feasible measures must be put in place to ensure the prevention of discharges of contaminants to one of Australia's premier waterways. DECCW recommends that the Proponent be required to develop and implement a comprehensive Water and Stormwater Management Plan as a condition of any approval.
- Community engagement – DECCW recommends that the community is fully apprised of all aspects of the development and the measures the Proponent intends to undertake to mitigate temporary environmental and amenity impacts.

Sydney Ports

Sydney Ports has raised a number of areas where the proposed development has the potential to impact on Sydney Ports' landholdings and port operations at the Harbour Control Tower (HCT), Moores Wharf facility and the interim Cruise Passenger Terminal (CPT), outlined below.

- Noise – a noise assessment should be undertaken to determine the impacts of proposed construction works on the interim CPT and that effective noise mitigation measures be implemented to manage noise impacts during cruise vessel operations.
- Traffic – the Construction Traffic Management Plan should be updated to include specific impacts on the CPT and HCT, and the Plan reviewed and agreed to by Sydney Ports prior to construction works commencing.
- Air quality – odour monitoring should also be conducted at the CPT, and the HCT and Moores Wharf site should be included as part of the recommended air quality monitoring programme.
- Risks & safety – confirmation is required that the proposed development does not pose a health risk to port operational staff who may be present on site on a day to day basis throughout the period of the proposed works.
- Cumulative impacts – further information is required regarding the cumulative impacts of the proposed development to ensure Sydney Ports' landholding and port operational facilities at Barangaroo are not significantly impacted upon.

NSW Maritime

NSW Maritime is generally satisfied with the level of assessment of the various impacts and notes that land owners consent is required from NSW Maritime prior to determination of the application.

Transport NSW

Transport NSW is generally supportive of the commitment to low levels of car parking, in accordance with the approved Barangaroo Concept Plan. TNSW has also recommended that a number of

conditions of development consent be imposed regarding: protection of the approved Interim Metro Corridor; traffic signal changes at the intersection of Sussex Street and Lime Street; and construction vehicle access to the site.

Leichhardt Council

Council has raised concerns regarding noise, vibration and air quality, as detailed below.

- Noise and vibration – the Noise and Vibration Management Plan should specifically detail how and when the noise levels will be verified; how the relevant noise generating plants will be selected; and what criteria will be utilised to trigger a review of plant selection, strategies and acoustic treatments. The Noise and Vibration Management Plan should also include a detailed community consultation plan, including a complaint management system.
- Air quality – to ensure that appropriate air quality monitoring is undertaken, it is important that site location selection for the monitoring equipment is undertaken in conjunction with DECCW. A complaints handling system should also be developed in consultation with DECCW.

Housing NSW

Housing NSW has raised concerns regarding impacts on human health, as detailed below.

- The predicted noise levels will adversely impact on the amenity of public housing tenants in parts of Millers Point, High and Kent Streets, and Dalgety Road and Merriman Street.
- Vibration caused by earthworks and other construction may cause structural damage to heritage listed residential properties located adjacent to the Barangaroo site. The Proponent should therefore extend the pre-assessment of building conditions to Housing NSW's properties in Millers Point.
- Health impacts such as air quality and dust are also of concern. As there are contaminated soils on the site careful management of remediation is required. The assessment should also consider any ongoing implications of air pollution that may arise from car parking associated with the development proposal. Ongoing monitoring of any proposed mitigation measures should also be carried out.

City of Sydney Council

The City of Sydney has raised a number of issues with the proposal. The key issues are summarised below.

- The proposal should be amended to provide deep soil planting corridors under all public streets and public spaces. Conditions of consent should ensure that basement structures are set well down under the above streets and spaces to allow for an appropriate soil depth for the growth of large trees.
- The location of bulk excavation and car parking areas should relate to the location of buildings above.
- Prior to approval of any road works, additional analysis and design work is required to ensure that the Metro 'Barangaroo Pedestrian Link' bridge can be accommodated whilst maintaining adequate space for pedestrian movement at ground level.
- Hoardings should provide a high level of design quality, particularly along the foreshore walk.
- Healthy mature trees should be retained where possible according to Council's Tree Preservation Order.
- Vibrations from rock excavation may have an impact upon the fabric of a number of heritage items within the vicinity. A Dilapidation Survey should be undertaken of surrounding heritage items.
- An interpretation plan is to be developed for the site, and the results of the archaeological program, with all its types of evidence, needs to be incorporated into the interpretation plan. Also, a strategy should be developed for recording as much of the gasworks as possible within the constraints of the contamination to human health and safety.
- The Proponent must undertake traffic generation and traffic modelling for the split of uses used to calculate the car parking numbers. This should be done to ensure the driveway locations are suitable and that they don't need to be changed once the future DAs are assessed.

- Further justification is requested as to why such a large level of parking is proposed in an area that the Traffic Report acknowledges as being well served by a number of public transport modes. Minor discrepancies have also been picked up in the proposed demand and supply of car parking, particularly in relation to residential and retail spaces.
- All bicycle parking and end-of-trip facilities (such as showers and lockers) that are proposed to be located within the basement area must be provided as part of this development application.
- Prior to any works beginning on the Barangaroo site, traffic signals at Napoleon Street and Hickson Road must be installed.
- Any future application for any building on the site must investigate the existing capacity on the public transport network and any upgrades must be in place prior to the occupation certificate being granted should the investigation reveal a shortfall.
- Any future application for any building on the site must include an investigation of the pedestrian desire lines and required surface upgrades between the site and Wynyard Station.
- The Proponent must relocate the loading dock entry to access and egress onto the future Napoleon Street extension.
- All entry and exit to the site from Hickson Road must use existing driveways. This includes construction of the site and entry and exit to the proposed basement car park.
- The Proponent should commit to developing a new TMAP based on the outcomes of the light rail study that TNSW is currently undertaking. This study will provide information on bus and light rail movements pertinent to Barangaroo.
- The design of the basement must ensure the following provisions within the public domain are allowed for:
 - Adequate soil depth for street trees and other soft landscaping – at grade;
 - Adequate soil depth for the provision of public domain services and structures including laying of conduits for street lighting, free standing footings for street lights, flag poles, bus stops, retaining walls, seating and similar elements;
 - Desired finished level of the public domain – grading of streets and footways, at grade planting, drainage;
 - Integration between the new public domain and existing public domain infrastructure including junction with Hickson Road, Margaret Road and Lime Street – proposed new road levels must marry into existing road network;
 - Adequate drainage of future public domain areas and overland flow provision; and
 - Maintain / improved stormwater drainage of surrounding areas including maintaining adequate overland flow from Hickson Road to the harbour.
- City standard minimum (or greater) footway and road widths are to be provided to the Margaret Street extension, Shelly Street connection, and Lime Street extension.
- A more detailed flood and drainage study is required that addresses the need for an overland flow path leading from the low point. Full drainage/flooding analysis and design details are required for the construction of any additional drainage pits that may be required in Hickson Road.
- The excavation noise, construction noise and vibration assessment conducted by Acoustic Logic Consultancy dated 15 June 2010 should be amended to include the following details, and be site specific:
 - selection and maintenance of all mechanical plant in relation to the acoustic output of such plant;
 - details on how and when predicted noise levels are to be verified and objective actions that will trigger a review of plant selection, work strategies, acoustic treatments and noise levels;
 - a detailed community consultation plan that should include but not be limited to the following:
 - noise monitoring techniques and method of reporting results to the community;
 - details of work schedules for all work phases;
 - review process during works;
 - site induction details for all employees and contractors;
 - formal complaint management system; and
 - community involvement plan.

- Community concerns regarding the proposal should be referred to DECCW for review and confirmation as to the efficacy of the Air Quality Impact Assessment and Health Impact Assessment in addressing the air quality and health impacts of the proposal, in light of the Department's regulation of pollution concerns from the site.
- Additional clarification is to be sought from the Proponent regarding estimation of truck movements that will be involved in removal of waste from the site, in order to confirm consistency in the submitted reports with regard to traffic movements and estimations of dust emissions from the proposal.

4.3 Public Submissions

Nineteen (19) submissions were received from the public. This included submissions from the following special interest groups:

- Millers Point, Dawes Point, The Rocks Resident Action Group;
- Kent Street Residents Group; and
- Barangaroo Action Group.

Of the 19 public submissions, 14 (74%) raised objection to elements of the project, and 5 (26%) did not object but raised concerns. The key issues raised in public submissions are listed in Table 1.

Table 1: Summary of Key Issues Raised in Public Submissions

Issue	Proportion of submissions (%)
Construction noise, vibration and air quality (dust/odour)	58%
Proposed hours of construction deemed excessive	47%
Contamination, waste disposal, pollution and public health concerns	58%
Construction traffic management arrangements	37%
Location of loading dock adjacent to Macquarie Bank and KPMG building	5%
Visual impact and construction hoardings	5%
Inclusion in Stakeholder Engagement Plan / ongoing monitoring programme	10%
Location of basement entry/exit on Hickson Road inappropriate	5%
Exact number of proposed parking spaces is unclear / inconsistent in documentation	10%
Should be an additional entry/exit point for vehicles at the Southern end of the site, off Margaret Street rather than Hickson Road	5%
Cruise ship terminal should be retained	10%
Proposal is inconsistent with approved Concept Plan	10%
Temporary stockpiles of excavated material should be located away from Hickson Road and adjacent residential buildings	5%
Pest control measures should be introduced	10%

The Department has fully considered the issues raised in submissions in its assessment of the project.

4.4 Proponent's Response to Submissions

The Proponent provided a response to the issues raised in submissions on 21 September 2010 (see Appendix C). The response included a Preferred Project Report which detailed the following key changes to the proposal:

- inclusion of the southern retention wall down to rock, which had been shown on the exhibited plans as a conventional wall;
- basement level CP6 has been deleted to reduce the depth of excavation required by 3 metres from RL-27.000 to RL-24.000;
- the car spaces have been re-allocated across all levels of the basement parking areas to ensure a maximum of 880 cars are shown;
- some plant areas have been displaced as a result of the car parking reconfiguration and accordingly have been deferred to a future Project Application (for built form), noting that the allocation of plant areas has always been proposed to be confirmed with future applications for buildings;

- spatial allocation for the Interim Metro Corridor station/services box has been included in the plans (refer to south eastern corner of site), resulting in a marginal reduction in the size of the basement;
- deep soil zones and tree pits have been clearly shown on drawings A014 and A015 – coloured in green with a note (previously no colour or notes shown); and
- reduction in the proposed hours of construction from 7:00am to 8:00pm Monday to Friday to 7:00am to 6:00pm, while the proposed construction hours for Saturday remain the same.

In addition, the updated reports appended to the PPR and the revised Statements of Commitments further detail the scope of amendments and ongoing commitments relating to the Project Application. An addendum to the PPR was further submitted to the Department on 20 October 2010. The supplementary report:

- provides further information in relation to the application of graphics / artwork to the hoardings that are proposed to be erected on the site; and
- makes additional minor adjustments and additions to the Statement of Commitments, some of which are in response to matters raised by Sydney Ports and Sydney City Council upon review the PPR.

5. ASSESSMENT

The Department considers the key environmental issues for the project to be:

- remediation and waste management;
- noise, vibration and hours of construction;
- air quality and odour;
- health impacts;
- water management and quality;
- traffic, transport and access;
- trees, landscaping and public domain;
- tri-generation;
- climate change and sea level rise; and
- the public interest.

5.1 Remediation and Waste Management

Barangaroo has been used for wharf/ port related activities since the 1800s. Original finger wharves were removed and the site was largely filled in 1961-1968 for the construction of longshore berthage, with some additional filling in the north of the site (area of former Southern Cove) in the late 1980s or early 1990s. The primary potential for contamination at Barangaroo is associated with uncontrolled fill used in various stages of site reclamation and potential migration of contamination from the former gasworks site located to the north and northeast. Based on soil and groundwater testing, the relevant contaminants of concern are:

- **Fill:** could include metals, TPH, BTEX, PAHs, PCBs, OCPs, VOCs, SVOCs, asbestos.
- **Gasworks:** could include metals, TPH, BTEX, PAHs, phenols, sulphate, cyanide, ammonia.

There is also potential for Acid Sulphate Soils (ASS) and hazardous building materials such as lead, PCBs, asbestos to be present.

It is important to note, however, that no part of the site the subject of this Project Application falls within the DECCW Declaration Area associated with the former gasworks site. As detailed previously in this report, a separate Project Application will be submitted in the future for the remediation of this land.

The *Overarching Remedial Action Plan* for Barangaroo prepared by ERM and *Remedial Action Plan Other Remediation Works (South) Area* prepared by AECOM establish the endorsed remediation activities for Stage 1 of the Barangaroo development including the subject site. The proposed remediation works will be undertaken in conformance with these two RAPs and the detailed Human Health and Ecological Risk Assessment (HHERA).

The preferred remediation strategy for the Project Application site is to remediate the contaminated soil which is either a source of groundwater contamination and/or a risk to human health. Therefore the remedial process is focused on soil remediation technologies. Active groundwater remediation is not currently proposed as the groundwater contamination will be addressed by removing the contaminated soil.

The treatment of contaminated material is proposed to be through the ex-situ solidification or stabilisation of materials. Chemical additives will be blended into the contaminated soil to reduce its toxicity and limit solubility and mobility. This is a proven method of treating a broad range of contaminants including petroleum hydrocarbons, PAHs and metals.

Suitably treated and excavated material will be re-used across the broader Barangaroo site to minimise the need to import fill for public domain works, and the creation of the Headland Park. The treated material will be validated to ensure suitability for use at the Headland Park, or any other parts of the Barangaroo site as appropriate (subject to further necessary approvals). Temporary stockpiling may be required across the Barangaroo site to store excavated and (where relevant) suitably treated material. Material unsuitable or unavailable for re-use on-site will be disposed offsite at a suitable waste management facility.

In their submission to the Department on the exhibited EA, DECCW highlighted that the exhibited Waste Management Plan (WMP) lacked sufficient detail. DECCW consequently recommended a condition of approval be imposed on any Project Approval requiring the Proponent to prepare a revised Waste Management Plan that addresses:

- the management of stockpiles, contamination and sediment;
- the in-situ classification of waste material, including the proposed sampling locations and methodology that will be used to classify waste, and in particular contamination hotspots;
- the concrete crushing and screening plant proposed to be installed on site during construction, and in particular:
 - the location and dimensions of the concrete crushing plant;
 - estimated quantities of concrete to be crushed per day;
 - measures that will be employed to prevent or minimise dust emissions associated from concrete crushing; and
 - measures that will be employed to prevent or minimise noise impacts arising from concrete crushing activities;
- the means and frequency of transporting waste within, and from, the site;
- the proposed de-watering process, including details of any on-site water treatment plant; and
- any contingencies that will be implemented to manage and mitigate excavation activities and contaminated soil treatment operations, particularly in relation to the expected volumes of materials excavated at the site.

In addition, DECCW requested the Proponent comply with DECCW's Classification Guidelines and commit to retaining all collected sampling and classification data for the life of the project.

In response, Proponent submitted as part of the PPR a revised version of the exhibited WMP, with a number of minor anomalies corrected. The Statement of Commitments has also been revised by the Proponent to require the preparation of a more detailed WMP prior to commencement of construction works, addressing all of the matters identified by DECCW in its submission on the EA, including compliance with DECCW's Classification Guidelines.

This approach is considered satisfactory to the Department and DECCW, and the proposed approval has been conditioned accordingly.

5.2 Noise, Vibration and Hours of Construction

The extent of construction noise impacts due to the proposed construction activities has been raised as a matter of concern by DECCW, Sydney Ports, NSW Housing, Leichhardt Council, and in public submissions. The basis for concern includes:

- the background noise levels have not been derived appropriately in the Noise and Vibration Assessment Report submitted with the original EA;
- the predicted noise assessment criteria have not been derived appropriately and accordingly the proposed noise management levels, particularly for residential premises, have not been estimated correctly;
- the proposed hours of construction have not been appropriately justified, particularly as the appropriate assessment criteria have not been adopted;
- alternative construction methodologies that may result in lower construction noise impacts have not been adequately explored; and
- the omission of noise impacts from the proposed works on the temporary Cruise Passenger Terminal.

As a consequence, a supplementary *Excavation and Construction Noise and Vibration Assessment* (ECNVA) and *Environmental Construction and Site Management Report* have been prepared and submitted as part of the Proponent's PPR. The supplementary *Excavation and Construction Noise and Vibration Assessment* has been prepared to determine the potential noise and vibration impacts at surrounding receivers.

Noise objectives for construction have been established based on DECCW procedures, and will be adopted by the Proponent as targets to work towards in minimising noise impacts at surrounding residences and other identified sensitive receivers.

The ECNVA defined surveyed noise levels for daytime, evening and night periods using DECCW's Interim Construction Noise Guidelines (ICNG). The locations of the surveyed noise logging sites are illustrated in **Figure 6**. The ECNVA then presented the applicable noise criteria at residential, commercial (including the temporary CPT) and pre-school receivers in the vicinity of Barangaroo South, predicted construction noise levels and expected exceedances.

Figure 6: Noise Logging Sites



The supplementary ECNVA has found that noise from construction activities during the day period will potentially exceed established construction noise management goals identified in DECCW's Interim Construction Noise Policy (ICNP), as summarised below:

- **Residential Receivers**

A review of the predicted noise levels due to construction reveals that during daytime the greatest potential exceedance at residences, up to 11 dBA (or predicted noise level of 66 dBA), is likely to occur during extended hours on Saturdays when construction noise objectives are the most stringent for the daytime.

It is noted that all construction noise levels are well below the maximum construction noise level of 75 dBA as per the DECCW ICNG.

The most potentially affected residences are:

- Hickson Road and other residences overlooking residences immediately to the East of the Site particularly on Saturday afternoons;
- High Street and Dawes Street Residences during periods when haulage to the park occurs; and
- Western Residences of the site, represented by the Darling Island receivers. It is predicted that the noise from stationary plant such as the Bentonite plant will result in an exceedance of night time criteria.

▪ **Commercial Receivers**

General compliance with the 70 dBA noise objective is indicated at surrounding commercial premises. The exceptions are properties at Shelley Street where exceedances up to 7 dBA are predicted. These premises are generally of modern construction and do not have operable windows such that a facade reduction of 30 dBA can be expected. As a result internal noise levels in the order of 47 dBA are predicted. Noise levels of this magnitude are not uncommon for office areas. Therefore, whilst audible, noise from construction at these premises is not expected to result in disruption to most office type activities.

It is noted that commercial receivers which have operable windows would be subjected to construction noise levels approximately 10 dBA louder if windows were open. Therefore windows may need to be closed during intensive periods of construction.

In the case of restaurants and cafes at the northern end of Lime Street and the Shelley Street precinct, construction noise levels up to 65 dBA are predicted. The provision of plywood hoardings is recommended on the southern site boundary to improve the acoustic amenity of outdoor eating areas. These barriers will reduce noise levels by 5 dBA bringing construction noise levels to or below existing LAeq noise levels.

Again, it is likely that as the basement excavation depth increases during excavation, that the shielding effect of the excavation depth and perimeter excavation faces will act to diminish potential noise exceedances at the restaurants and cafes of Lime and Shelly Streets.

▪ **Preschools**

Construction noise levels in play areas of identified Preschools are predicted to comply with the 65 dBA noise objective for active recreation area. In the case of internal areas an exceedance of internal noise objectives by up to 6 dBA when windows are open is expected. Therefore windows may need to be closed during intensive periods of construction.

Again, it is likely that as the basement excavation depth increases during excavation, that the shielding effect of the excavation depth and perimeter excavation faces will act to diminish potential noise exceedances.

▪ **Temporary Cruise Ship Passenger Terminal**

Maximum noise levels of up to 65 dBA are predicted during construction when fill is transported from the site to the Headland Park Site. At these noise levels effective communication will be achieved in the terminal at distance of up to 1m between persons in the terminal using a normal voice effort.

The planning and management of construction activities must take into account the sensitivities of surrounding residents so as to minimise the impact of construction activities at these receivers. Subject to the implementation of the following management and mitigation measures, noise impacts will be reduced to within acceptable levels through:

- installation of barriers between the construction site and the temporary Cruise Passenger Terminal;
- localised treatments of fixed plant such as the bentonite plant and installation of barriers on the western (water) side of the site;
- installation of noise barriers on the southern and western boundaries of the site;
- use of rocksaws and rippers, and smaller rockbreakers with quiet "cityhammers", where feasible;
- provision of respite from noise producing activities during extended hours of operation, where practicable;
- selection and maintenance of "quiet" equipment and plant with noise control kits installed where practicable;

- auditing of plant to select equipment that generates the lowest commercially available noise levels;
- appropriate planning of construction activities to provide respite to residences from noise activities; and
- effective community consultation and complaints management.

DECCW has reviewed the supplementary reports and proposed mitigation measures as part of their assessment of the PPR and commented as follows:

"DECCW notes that noise emissions have been significantly reduced as a consequence of changed piling and excavation work methods. DECCW notes also that ambient long term background noise monitoring has now been undertaken, and Construction Noise Management Levels (CNML) have satisfactorily been derived following the guidelines in the Interim Construction Noise Policy (ICNP)."

The requirement to prepare and implement a detailed *Construction Noise and Vibration Management Plan* (CNVMP) for each stage of the project, to the satisfaction of DECCW and the Department, has been included as a recommended condition of development consent. The CNVMP will be required to address in detail the above recommendations of the ECNVA.

Other issues, such as cumulative noise impact and OH&S, have also been reviewed and assessed in the supplementary information submitted with the PPR and have been determined as being manageable. Furthermore, the impact from traffic along the local road network is not considered to be acoustically significant due to the fact the majority of the truck will haul spoil within the boundaries of the site rather than using the public road network.

A revised *Noise and Vibration Management Plan* has also been prepared to assist the Proponent in managing the environmental issues associated with this project. Further, the *Environmental Construction and Site Management Plan* has been updated to adopt the findings and the recommendations of the supplementary ECNVA and to specifically detail the reasonable and feasible management measures and community consultation that will be employed by the Proponent during construction works.

In addition, the Proponent has further considered alternative excavation construction techniques and these have been adopted as part of the supplementary ECNVA. While some limited percussive piling may be required as part of the works, it is envisaged by the Proponent that the majority of basement perimeter retention systems will now be constructed utilising cast in ground/displacement concrete piling techniques such as reinforced concrete diaphragm and augured reinforced concrete piled wall systems. The elimination or significant reduction of percussive piling to the basement perimeter retention systems, and its replacement with cast in situ concrete piling and wall techniques, will significantly reduce the noise impacts arising from basement excavation works.

The initial Construction Noise Impact Assessment was undertaken on the basis of extensive excavation of rock using heavy rockbreakers at the surface level across the majority of the proposed basement. Recently completed geotechnical investigative works by the Proponent have now determined that the extent of rock at the existing surface is minimal and that the forecast construction noise levels arising from rockbreakers can be significantly reduced. As such, vibration associated with excavation activities is predicted to comply with established human comfort criteria and not result in damage to surrounding structures.

The proposed hours of construction for this application have been reduced from 7:00am to 8:00pm Monday to Friday to 7:00am to 6:00pm in the PPR, while the hours on Saturday remain the same as originally proposed (7:00am to 5:00pm). While the proposed hours for Saturdays exceed the standard construction hours recommended in DECCW's Interim Construction Noise Guidelines, they are considered reasonable by the Department for this project, and they are consistent with similar projects approved by the Minister such as the Carlton United Breweries site. Further, the extended hours will enable the major noise and vibration generating activities to be carried out in a more efficient manner, thereby shortening the overall construction period for these works to which sensitive receptors will be exposed. The revised construction hours are also consistent with the standard hours applied by Sydney City Council.

The Department is satisfied that the Proponent's PPR has addressed outstanding issues regarding noise and vibration impacts associated with the proposed development. Detailed conditions of development consent have been recommended by DECCW regarding noise and vibration impacts, which have been incorporated into the recommended conditions of approval for the project application. The Proponent's Statement of Commitments will also ensure that construction works are undertaken

in accordance with the findings, recommendations and mitigation strategies of the *Supplementary Excavation and Construction Noise and Vibration Assessment*.

5.3 Air Quality and Odour

An Air Quality Impact Assessment (AQIA) was submitted as part of the EA. The AQIA identifies the potential construction activities and associated primary pollutants of concern, the nearest sensitive receivers, and assesses the air quality impacts in accordance with the relevant DECCW guidelines and policies.

Dispersion modeling within the AQIA predicted that there will be short-term exceedences of PM₁₀ and NO₂ levels as a result of the basement retention system excavations and the bulk excavation emplacement works, with exceedences of the annual total suspended particulate matter (TSP) criterion also predicted at three ground level receptors for the bulk excavation scenario.

The exceedences were primarily predicted at receptors located closest to the site (i.e. those located across Hickson Road and adjacent to the emplacement activities proposed at Headland Park). The exceedences primarily affected commercial properties, which are likely to be serviced by air conditioning. As such, actual effects on people within those buildings would be determined by the locations of the air conditioning intakes.

The AQIA recommends that a review should be undertaken of potentially affected buildings to determine whether intake valves are located on the sides of buildings closest to the Barangaroo site. If the valves are not located on the western side of the buildings then the emissions from the site are not likely to significantly affect air quality within the buildings.

In the event that the intake valves are located on the sides of buildings closest to the Barangaroo site, the AQIA makes a number of recommendations, which have been incorporated into the Environmental, Construction and Site Management Plan (ECSMP), to minimise and mitigate any impacts of the activities on these receptors.

In particular the AQIA recommends a monitoring program be implemented that includes continuous monitoring of PM₁₀ levels, which will allow reactive management of elevated dust concentrations, and monitoring of TSP concentrations using high volume air samplers, which will additionally allow the analysis of heavy metals concentrations to validate the modeling results.

Furthermore, the monitoring program also includes odour monitoring along the boundary of the bulk excavation works and at adjacent sensitive receptor locations, again to validate the modeling results and ensure no adverse effects on neighbouring properties. The proposed monitoring plan has also been incorporated into the ECSMP prepared for the site.

While no exceedences of the odour criterion of contaminants were predicted to occur, monitoring of these parameters is recommended to verify the modeling results.

Concerns were raised in submissions from Sydney Ports, DECCW and Leichhardt Council, and in public submissions, in relation to air quality and odour, primarily relating to:

- the appropriateness of the baseline assumptions and criteria adopted to model and predict air quality and odour impacts;
- the adequacy and range of the recommended control measures and any proposed contingencies;
- greater clarification regarding the number and location of exceedences predicted for each sensitive receptor; and
- the need to include additional properties into the area captured by the Air Quality Impact Assessment (AQIA), and any subsequent air quality monitoring program, such as:
 - KPMG and ground floor tenancies;
 - Macquarie Bank;
 - King Street Wharf retail precinct;
 - temporary Cruise Passenger Terminal; and
 - Harbour Control Tower and Moores Wharf site.

In response, an updated AQIA has been prepared in accordance with DECCW's requirements and provided as part of the PPR for the project.

Dispersion modeling was undertaken as part of the updated AQIA to predict the potential effects of the proposed excavation, construction and remediation works.

The AQIA also now provides a detailed modelling scenario, whereby proposed controls are demonstrated to effectively control emissions and no additional exceedences of the relevant

assessment criteria are predicted. Modifications to the methodology and assumptions have been made to ensure the assessment better reflect site practices and conditions.

In response to the specific concerns raised by authorities and in public submissions:

- The revised AQIA has been updated to address the cumulative impacts on Sydney Ports' landholding and port operational facilities at Barangaroo South and concludes that no exceedances of accepted criteria are anticipated at the Passenger Terminal, subject to the implementation of the industry standard management and mitigative measures.
- Whilst the Proponent agrees that any air quality monitoring program should be expanded to include the Harbour Control Tower and Moores Wharf, air quality impacts at these receptors are likely to be largely derived from the works under MP 10_0047 Headland Park Early Works. Accordingly, air quality monitoring should be undertaken by the Barangaroo Delivery Authority as the Proponent of the Headland Park Early Works.
- The AQIA has also been updated to more comprehensively address the cumulative impacts arising from the Headland Park works under MP 10_0047. The AQIA concludes that *"on the basis of the cumulative pollutant concentrations predicted by AECOM, which include emissions from both the bulk excavation and emplacement activities, particulate emissions from the bulk excavation works are not considered likely to substantially affect particulate concentrations at Headland Park"*.
- The updated AQIA directly responds to DECCW's technical specification and has provided a detailed modelling scenario whereby proposed controls are demonstrated to effectively control emissions, predicting no additional exceedances of the relevant assessment criteria.
- The Proponent's Remedial Action Plan proposes a number of odour control, suppression and management strategies during the excavation of odorous material, where practicable.
- The AQIA commits the Proponent to the treatment of contaminated material on site (where required) within negative pressure temporary structures (fitted with appropriate controls).
- The AQIA has demonstrated that it is not necessary in all cases to undertake excavation of odorous materials within negative pressure temporary structures (fitted with appropriate controls) and that other odour mitigation techniques may be more appropriate. Such alternate techniques are discussed in the updated AQIA.
- Financial compensation to adjoining properties for possible future maintenance and cleaning is beyond the scope of the Project Application, particularly given the demonstration of acceptable impacts arising from the Project Application, described above.

The Statement of Commitments has also been revised, requiring the Proponent to manage odour and air quality issues in accordance with the strategies identified in both the RAP and the updated AQIA.

DECCW have detailed that while the PPR satisfactorily addresses their outstanding issues with regard to air and odour impacts, the Proponent is still required to develop and implement an Air Quality Management Plan (AQMP). The AQMP will be the main instrument for controlling emissions from the site and therefore DECCW considers it is critical that a robust AQMP is in place to ensure there are no off-site impacts. An appropriate condition of consent is recommended regarding the provision of an AQMP to the satisfaction of DECCW prior to the commencement of works on site.

The Department is satisfied that matters of concern relating to air quality and odour have been satisfactorily addressed by the Proponent in the PPR. DECCW has provided a number of relevant conditions which, in combination with the Proponent's Statement of Commitments, will ensure that the appropriate air quality management plan and monitoring program is established.

5.4 Health Impacts

Sydney Ports, DECCW, Housing NSW and the public have raised the following concerns regarding potential health impacts of the proposed development:

- confirmation is required that the proposed bulk excavation works and basement car park construction activities, and particularly the remediation works, do not pose a health risk to Sydney Ports operational staff;
- the protection of all site personnel, neighbouring communities and cruise terminal passengers needs to be ensured, particularly where prolonged exposure to noise and dust emissions and contaminant vapours may occur; and

- general health impacts that may arise from air quality and dust impacts.

The Health Impact Assessment prepared as part of the original EA has been updated to address the various authority and public submissions and submitted as part of the PPR. Further, updated Construction Noise and Air Quality assessments have been prepared as part of the PPR (as detailed previously in Section 5.1 and 5.2 of this report).

The updated *Human Health Impact Assessment* indicates that the main potential for human health impacts is considered to be through the inhalation of dust originating from contaminated soil. Dermal (skin) contact and oral ingestion of deposited dust are considered to pose insignificant health risk. Construction workers, nearby residents and children staying at the childcare facility at 30 The Bond on Hickson Road may potentially encounter site derived dust or odours.

To ensure that potential human health impacts on nearby sensitive receptors are minimised, the Proponent has committed to the implementation of pollutant management measures listed in Table 4 of the updated *Human Health Impact Assessment* (reproduced below as **Table 2** of this report). With the implementation of these effective control measures, it is expected that the risk of exposure to harmful pollutant concentrations would be low and within acceptable limits.

Trigger	Impact	Pollutants	Control Measure
Fuel combustion emissions from vehicles and equipment	Increased risk to human health	NO _x CO Suspended particulates BTEX PAHs TPHs	Turn engines off whilst parked onsite
			Vehicular access confined to designated access roads
			Equipment, plant and machinery regularly tuned, modified or maintained to minimise visible smoke and emissions
			Site speed limits implemented
			Minimising haul road lengths
Fugitive dust and odour from exposed surfaces and vehicles	Nuisance (dust and odour) Discoloration of buildings or structures Increased risk to human health	Suspended particulates Odour	Covering exposed stockpiles, and exposed surfaces where practicable, at the end of each shift and during dry / windy conditions
			Covering loads during transport
			Erection of windbreak barriers on the Site boundary
			Watering of exposed surfaces and roads
			Surface stabilisation to minimise windblown dust
			Control roadway use i.e. defined road access to minimise dust
			Regular clean up of spills
			Implement a complaints management system
			Adjust work practices (as required) based on wind observations
			Adjust work practices (as required) based on real time dust monitoring results
Hazardous and other air pollutants (from disturbance of potentially contaminated ground)	Increased risk to human health Nuisance (dust and odour)	BTEX PAHs TPHs Metals	Covering exposed stockpiles, and exposed surfaces where practicable, at the end of each shift and during dry / windy conditions
			Covering loads during transport
			Erection of windbreak barriers at the site boundary
			Watering of exposed surfaces and roads
			Surface stabilisation to minimise windblown dust

Table 2: Pollution Minimisation Strategies (source: AECOM)

The updated Human Health Impact, Air Quality Impact and supplementary Construction Noise Impact Assessments set out appropriate management measures and mitigation controls to be implemented (where required) for circumstances where prolonged exposure of site personnel, neighbouring

residents and works and the temporary Cruise Passenger Terminal to construction noise, dust emissions and contaminant vapours, is anticipated. Further protection will be achieved through:

- most workers along Hickson Road and south of the site are indoors, reducing exposure duration and intensity through buildings;
- covering of trucks hauling soil within and from the site;
- on-site water-spraying of exposed soil areas for dust control;
- minimising the stockpiling of soil within the site;
- volatile emissions minimisation using, where practicable, vapour tents over relevant areas;
- placement of tarpaulins over stockpiles; and
- utilisation of perimeter hoardings and barriers.

In addition, for workers on and adjacent to the site, health risks are considered moderate but manageable through:

- on-site dust control measures;
- contaminated soil work area zoning;
- use of appropriate personal protective equipment;
- dust migration off-site site being controlled; and
- further dilution of dust occurring prior to reaching receptors.

The Statement of Commitments has also been amended in the PPR to ensure the Proponent manages potential long term exposure of noise and dust emissions and contaminant vapours in accordance with the updated Human Health Impact, Air Quality Impact and supplementary Construction Noise Impact Assessments provided with the PPR.

The Department of Planning, Sydney Ports and DECCW are generally satisfied with the supplementary information provided by the Proponent and the mitigation measures described in the PPR and Statement of Commitments, subject to the imposition of appropriate conditions of development consent.

5.5 Water Management and Quality

A *Water Quality Monitoring Requirements Report* (WQMRR) was submitted in support of the EA to specifically address potential hydrology and water management issues associated with the development. The WQR concluded that the proposed works are not expected to result in any significant water quality impacts in Sydney Harbour given:

- the works will be carried out landward of the existing outer sea wall; and
- once the basement retention systems are constructed, they will limit and act to control any movement of groundwater between the construction area and the Harbour. Water quality risks will therefore be negligible once construction of the retention systems has been completed.

However, the report does identify the potential for water quality impacts associated with the earthworks, such as material stockpiles, silt and dust may have sedimentation impacts; and dewatering. To manage the potential sedimentation and dewatering impacts the following water quality management, mitigation and monitoring measures can be implemented in accordance with best practice. The measures, which are detailed in the WQMRR include:

- Appropriate excavation methods;
- Turbidity (silt curtains);
- Erosion and sediment control measures;
- Dewatering and water treatment - it is proposed to collect and treat (to the standard required) the water that will infiltrate the excavation before it is discharged into the stormwater or sewer system;
- Routine visual inspections;
- Water quality monitoring; and
- Monitoring weather and tides.

An assessment of the impacts of the proposal on the estuarine water quality and aquatic ecology with the implementation of the WQMRR also demonstrated that the proposed works are unlikely to have any direct interaction with the water or bed of the Harbour as:

- all works will be undertaken on land that is set back from the existing caisson walls and the rock embankment beneath the existing wharf; and

- the majority of the excavation and remediation works, which have the greatest potential to cause impact to the water and the Harbour, will largely be undertaken upon completion of the basement perimeter retention systems.

The WQMRR does identify that there is a low risk of groundwater or sediment movement through or under the shoreline structures during construction of the basement retention systems because these are set back from the existing foreshore alignment. As such, the WQMRR recommends that the detailed design of the retention systems consider and minimise any potential for disruption to the gravel foundations below the caisson structures. It is further recommended that a silt curtain be used during construction of the basement retention system structures.

DECCW and the City of Sydney Council have raised the following issues in submissions to the Department following exhibition of the EA in relation to water quality impacts:

- water management options have not been proposed;
- criteria have not been provided to determine water treatment and discharge;
- additional information is required in relation to:
 - water quality;
 - water volume management;
 - anticipated volumes of water generated on-site including potential volumes of groundwater and stormwater discharges;
 - volumes of wastewater to be treated on-site;
 - volumes for recycling/reuse; and
 - volumes to be discharged to sewer; and
- the need for the Proponent to demonstrate that best practice urban stormwater management including WSUD principles will be implemented.

DECCW requested that the following additional information be provided in relation to water monitoring:

- criteria for nominating areas/sources of site water as clean or contaminated;
- protocols and decision criteria for whether site water will be directed to stormwater, a water treatment plant, to sewer or to a liquid waste facility;
- water discharge criteria and monitoring frequencies;
- details of a more intensive monitoring program for sediment basins, stormwater discharges; reuse water and ambient waters;
- details of specific discharge and monitoring points for onsite waters including collected groundwater seepage into excavations, sediment basins for clean or contaminated areas, discharge points to stormwater drains, and ambient monitoring locations in Darling Harbour and Johnstons Bay;
- suitability of Johnstons Bay as a reference for turbidity data or a monitoring plan to determine its suitability;
- consideration of tidal currents, circulation patterns in Darling Harbour and the position of stormwater discharge points with regard to monitoring location(s) outside the turbidity curtain; and
- potential criteria for wastewater discharges.

In addition, DECCW has requested the Proponent provide the following additional information in relation to stormwater and sediment controls and operational procedures:

- better description of stormwater and sediment control measures for specific locations on the site;
- sediment control systems to be implemented on site;
- an operational plan for contaminated water and sediment control systems;
- a fuller description of the water management measures; and
- proposed controls to prevent contaminated water being discharged to Darling Harbour, including alternatives.

The WQMRR submitted with the EA has been updated in the PPR to address DECCW's and City of Sydney's issues. The revised report nominates criteria for the future Water Monitoring Plan. The Proponent has also committed to the preparation of a detailed *Water and Stormwater Management Plan* (WSMP) which will be submitted for the approval of DECCW to address:

- water volume management;

- anticipated volumes of water generated on-site, including potential volumes of groundwater and stormwater discharges;
- volumes of wastewater to be treated on site;
- volumes of recycling/reuse; and
- volumes to be discharged to sewer.

The WSMP will also detail:

- criteria for nominating areas and different sources of site water as clean or contaminated;
- water monitoring protocols and decision criteria for whether site water will be directed to stormwater, a water treatment plant, to sewer or to a liquid waste facility;
- water discharge criteria and monitoring frequency for parameters listed in the *Water Quality Monitoring Requirements* document prepared as part of the exhibited EA;
- details of a more intensive monitoring program for sediment basins, stormwater discharges, reuse water and ambient waters to help determine potential water quality impacts and ongoing monitoring protocols;
- details of specific discharge and monitoring points for onsite waters including for collected groundwater seepage into excavations, sediment basing for clean or contaminated areas, discharge points to stormwater drains, and confirmation of ambient monitoring locations in Darling Harbour and Johnstons Bay;
- suitability of chosen reference site(s) based on turbidity data from a proposed monitoring program;
- consideration of tidal currents, circulation patterns in Darling Harbour and the position of stormwater discharge points with regard to the positioning of monitoring location(s) outside the turbidity (silt) curtain; and
- criteria development for wastewater discharges that would trigger a review of water management systems.

DECCW considers that the development and implementation of a comprehensive WSMP is critical to ensure that all contaminated water from the site is suitably treated to ensure that environmental goals are met and the receiving environment protected. The WSMP must also include a detailed proposal for monitoring water quality. Accordingly, a condition is recommended by the Department requiring the Proponent to prepare and submit to DECCW a satisfactory SWMP prior to the commencement of works on the subject site for the relevant stage.

In response to the City of Sydney Council's WSUD related comments, and as stated in the exhibited EA, the Proponent is aiming to exceed national best practice in regard to reduction of suspended solids and nutrients. Gross pollutant traps, swales and bio-retention systems will be considered for the design of the treatment process (under future Project Applications). The Statement of Commitments has been revised to reiterate the Proponent's WSUD targets. Additional commitments have also been provided in the PPR to reaffirm the Proponent's commitment to implementing the recommendations of the revised WQMRR.

5.6 Parking, Access, Traffic and Transport

5.6.1 Parking and Loading

The Project Application seeks approval for up to 880 car parking spaces. **Table 3** summarises the assumptions that the calculation of the 880 car parking spaces is based upon, using parking rates approved as part of the Concept Plan.

Table 3: Parking allocation by land use

Land Use	Concept Plan Parking Rate	No. of Spaces
Residential – 312 apartments	1 bedroom – 0.5 spaces (Concept Plan rates) 2 bedroom – 1.2 spaces 3+ bedroom – 2 spaces	354
Retail – 30,000m ²	City of Sydney rates (as per Concept Plan)	63
Commercial – 277,900m ²	1 space/600m ² (Concept Plan rates)	463
Total		880

The final number of car parking spaces and their allocation to specific uses/buildings will be determined as part of a series of future Project Applications relating to the above ground built form. It is proposed that each subsequent Project Application for Barangaroo (which requires the provision of car parking) will seek approval for an allocation and operation of a specific number of car spaces out of the total 880 spaces proposed within the basement car park under this Project Application.

The operation of the car parking spaces will therefore commence in stages following approval of each of the relevant Project Applications that propose allocation of the spaces to approved GFA. The approved allocation of parking will remain consistent with the car parking rate approved under the Concept Plan. The proposed car parking spaces will not be utilised for commercial or other parking purposes until the construction and occupation of the commercial, retail and/or residential buildings. It is proposed as part of this Project Application, however, that the basement car park will be used temporarily for construction related activities, facilities and accommodation until such time as it is required to facilitate operation of the commercial, retail and residential development.

The proposed quantum of parking area has been calculated on the approximate number of car spaces that has been identified as required to support the built form in accordance with the approved Concept Plan (as modified).

A large loading dock is proposed to service Barangaroo South with multiple points of vertical connection to both the ground level and to each of the future buildings above the basement. The proposed design / layout of the loading dock provides efficiency in terms of the layout, manoeuvring space and the ability for different sized truck spaces to be managed for appropriate uses. Additional loading docks will be associated with residential lift cores in other locations, and will be subject to future Project Applications.

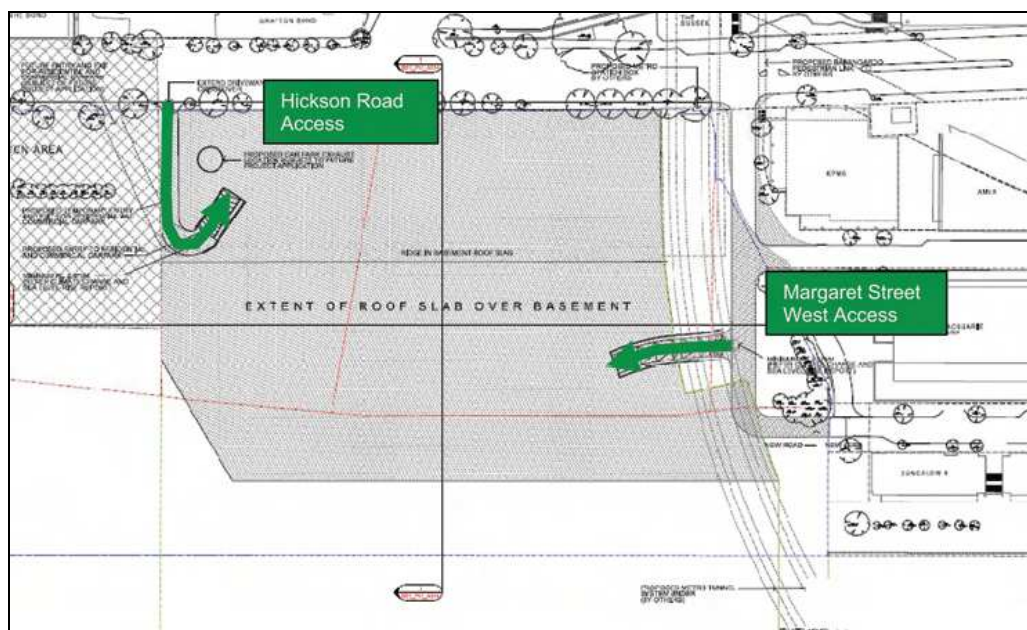
The loading dock will be a fully shared facility with managed time of arrival. The loading dock makes provision for 5 garbage compactors, 26 truck and van docks and 10 courier spaces. Additional spill-over courier spaces, 10 motorbike spaces and up to 46 bicycle courier spaces are also available. The loading dock will be accessed via the Margaret Street West entry and controlled by a dock controller. There will be on-site personnel who would manage the loading dock area, monitoring and managing delivery vehicles on entry to the site.

The proposed quantum of parking and loading arrangements are considered satisfactory by the Department.

5.6.2 Vehicular Access

Ultimately, two vehicle entrances are proposed to provide access to the basement carpark. The first is on Hickson Road and will provide ramp access to Level B1. This access will serve as the final vehicular access point to the basement car park (see **Figure 7**). However, this road is located within the DECCW declared area to the north of the subject site (within Concept Plan Block 4) which is required to be remediated prior to any development proceeding. The design and construction of this access road will therefore be subject to a separate future Project Application.

Figure 7: Vehicle Access Arrangements



This Project Application includes a temporary road to be constructed to connect the spiral ramp in the north east corner of the basement to Hickson Road. The ramp will provide access to the residential, retail and commercial car parking levels which are located along the Hickson Road alignment. Roller shutters or other barriers will secure this ramp until the operation of the car park is determined under

future Project Applications. Details relating to all aspects of the operation of the car park will be submitted with the future Project Applications (and updated sequentially as necessary).

The other vehicle entrance is located at the western edge of the proposed Margaret Street West extension. This entrance leads directly to the loading dock.

The construction of a combined basement car park beneath the future development provides for a significantly enhanced level of efficiency in car park design, and allows for vehicular circulation within Barangaroo South to be rationalised to a high degree. Rather than a series of separate basements, with separate vehicular and pedestrian access arrangements, the proposed combined basement allows for the number of vehicular access points and crossings within the public domain to be minimised. This supports the creation of a pedestrian oriented public domain.

Council has raised the concern in their response to the PPR that, without assessing the traffic generation of the development and the impact on the wider network, an assessment of whether the driveway locations are acceptable or not cannot be made. The prospect of future project applications (for individual buildings and uses above the basement) dealing with this issue is not suitable in Council opinion, as once the basement is excavated and entry ramps/driveway locations set (and possibly built) there may be no chance to relocate them. Council has highlighted that it may be appropriate for traffic generation and modelling for future land uses at Barangaroo South to be done at this stage to ensure what is being proposed is suitable.

In response, the Proponent has submitted a supplementary report from their traffic consultant (Arup) to address Council's concerns regarding access. The supplementary report has detailed that key parameters have been set and traffic analysis and modelling has already been carried out in relation to the approved Concept Plan for Barangaroo. Specifically:

- *Detailed PARAMICS modelling has been undertaken by Masson Wilson Twiney (MWT) in relation to the Barangaroo site and the current approved Concept Plan. A Road System Report was prepared by MWT (dated 21 May 2008) to outline the analysis and summarise the results of the modelling. The following is an excerpt from MWT's Section 4.6.9 of the MWT Transport Report for the Modified Concept Plan dated July 2008.*

"The wider external traffic impacts of the development traffic resulting from the proposed development has been assessed on an area wide basis using a PARAMICS microsimulation traffic model of the Sydney CBD. The traffic model is owned by the RTA and permission has been granted to test the capability of the modelled network to accommodate the traffic demands which would include the forecast traffic generated by the proposed development.

....all the key intersections local to the site would provide an acceptable level of operation with the addition of the development traffic."

- *The approved Concept Plan has restricted on-site parking for commercial development within the Barangaroo precinct to 1 space per 600m². The equivalent parking supply that would result using the Council Code is a parking supply rate of 1 space per 340m². In recognition of the site's traffic access issues a condition was placed on Concept Plan Approval to restrict the quantum of on-site car parking.*
- *The provision of car parking for the Basement PA, including the quantum and the mix, is consistent with the approved Concept Plan and the Transport Management and Accessibility Plan as prepared by the NSW Government dated 2008. Hence, the assumptions, traffic modelling and conclusions that relate to the approved Concept Plan are considered to be applicable for the Basement PA.*
- *The driveway locations established for this Basement PA distribute traffic onto the new proposed roads of Margaret Street (West) and Globe Street that then link into Hickson Road and Sussex Street. Arup confirms its advice that these driveway locations are suitably located and can be configured to support the forecast traffic generation. Site generated traffic will distribute to the key access routes from the driveway locations based on direction of travel which will not differ from that modelled by MWT.*

Based on the above, Arup are of the opinion that sufficient modelling has already been undertaken in relation to the approved Concept Plan. As the Basement Project Application is consistent with the approved Concept Plan, the traffic modelling and analyses undertaken as part of that body of work are relevant in the assessment of this application. These previous traffic studies concluded that all key intersections local to the site provide an acceptable level of operation.

It is therefore considered unnecessary that further traffic modelling be undertaken as part of the Basement Project Application in relation to the location of the driveways.

5.6.3 Traffic Generation

Although seeking approval for up to 880 car parking spaces on the site, the proposed development does not seek consent for the operation of any parking spaces on the site to commence. Based on this, there will be limited vehicle movements until the future commercial, residential and retail buildings (subject to other Project Applications) are constructed and occupied.

In the context of the existing traffic flows on the surrounding street network, the resultant peak hour traffic generation of the site as a whole has been assessed by the Proponent's traffic consultant to be relatively small. The traffic generation of the site is constrained by a low parking provision rate for commercial, residential and retail uses adopted under the approved Concept Plan.

As referenced in the TMAP dated September 2008, a Paramics model of the Sydney CBD was utilised to test traffic options with different trip generations and traffic management measures for the completed Barangaroo development. The modelling demonstrates that traffic operation will continue to be reasonable post development of the Concept Plan; however, average speeds will be lower. As a result of the indicative modelling, it can be concluded that the proposed car parking arrangements (once operational) will operate without overloading the local road network.

5.6.4 Temporary Cruise Passenger Terminal & Construction Traffic Management

With regard to construction traffic impacts, the *Construction Traffic Management Plan* (CTMP) exhibited with the original EA has been updated to address the various authority and public submissions and included with the PPR.

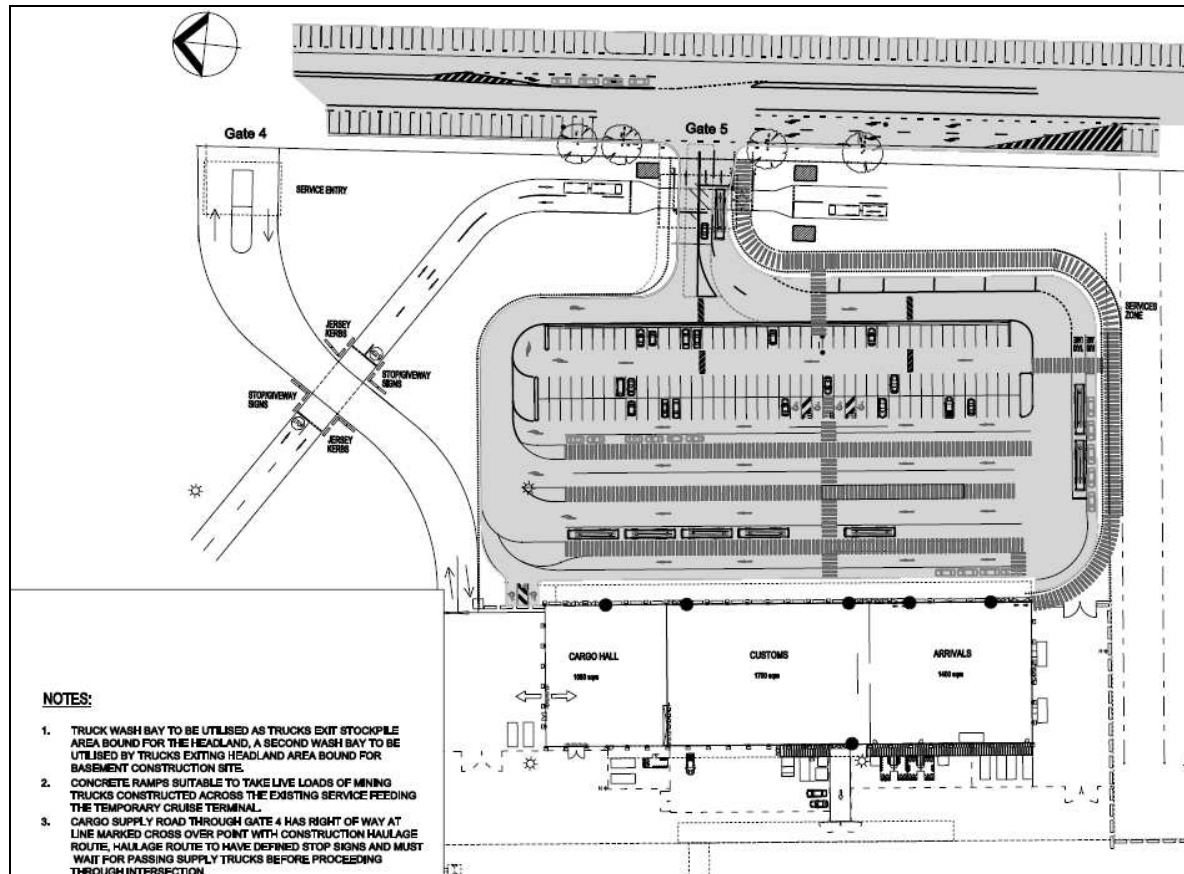
Following discussions between the Proponent and the Sydney Ports Corporation, the CTMP has been updated to specifically address the key impacts of the proposal on the temporary Cruise Passenger Terminal (CPT) and Harbour Control Tower (HCT).

The updated CTMP details the proposed temporary traffic management arrangements to be implemented to address traffic impacts during Sydney Ports operation of the temporary CPT.

To effectively manage the potential conflicts between construction vehicles and vehicle and pedestrian traffic on ship berthing days, the amended CTMP recommends:

- the installation of signage to redirect passengers along Hickson Road to the new temporary CPT access point;
- maintaining of an existing access via Gate 4 to service the passenger terminal cargo hall and the Sydney Ports HCT; and
- installation of traffic signal controls that manage the conflict between construction vehicles and Cruise Passenger vehicular and pedestrian traffic on berthing days. A manual override function will be available to control personnel to manage any unusual peaks in activity.

The proposed construction traffic arrangements with the CPT and haulage route crossings can be seen in **Figure 8** below.

Figure 8: Proposed Construction Traffic Arrangements with CPT

In addition to the above, the Proponent has committed to further consultation with Sydney Ports in relation to the preparation of an "Operational Protocol" regarding the traffic management arrangements where the haul route between the Stage 1 excavation site and the site of the Headland Park interfaces with the pedestrian and vehicular traffic servicing the temporary Cruise Passenger Terminal at Gates 4 and 5. The Operational Protocol will be prepared prior to operation of haulage route and will establish an agreed framework for their management on ship days during:

- unforeseen events that lead to significant congestion of traffic either exiting or entering the terminal;
- a major breach of security within the passenger terminal requiring the closure of the terminal;
- a major health and safety incident; and
- a major environmental incident.

Sydney Ports has advised that the Corporation is willing to consider entering into an Operational Protocol to facilitate access through the temporary CPT site on ship days. The Operational Protocol would obviously need to consider heightened levels of security and any other instances required to allow for the safe operation of the CPT facility.

Since exhibition of the EA for the Project Application, the Proponent's traffic consultant has undertaken further analysis of the proposed access and manoeuvring arrangements associated with the on-site haulage route and the Wharf 5 access road to determine traffic flows and any potential impacts on Sydney Ports operations, particularly during berthing days.

The analysis indicates that, subject to the following measures and controls being implemented, the proposed construction traffic management works will have minimal impact on Sydney Ports facilities and operations providing:

- relocation of the security fence line arrangements are implemented (to Sydney Ports' satisfaction);
- provision of alternate temporary accommodation arrangements and facilities for Sydney Ports staff upon the demolition of the Gate 5 gatehouse structure are provided;
- reconfiguration of the internal vehicle crossing at Gate 4 as a priority control intersection with stop signs on the haul route and priority given to vehicles servicing ships;

- a double left turn lane within Hickson Road has been proposed for times when taxis are queuing to enter the site; and
- a right turn bay to accommodate up to 4 vehicles is proposed to allow southbound through traffic to continue.

The only other major construction project within the vicinity of Barangaroo South is the Barangaroo Headland Park. Accordingly, the cumulative impacts of both the subject Project Application and the Barangaroo Delivery Authority's Headland Park Early Works have also been assessed by the Proponent's traffic consultant. Modelling and intersection analysis indicates that traffic flow and intersection operation will experience minimal disturbance, compared to existing conditions.

The Statement of Commitments has been revised to reiterate the Proponent's commitment to undertaking the development in accordance with the recommendations of the updated CTMP. A condition is also recommended by the Department requiring compliance with the CTMP and the development of an Operational Protocol with Sydney Ports.

5.6.5 Interim Metro Corridor

Transport NSW expressed concern following exhibition of the original EA that the scope of bulk excavation activities and construction of the basement car park did not adequately address structural and engineering issues associated with the Interim Metro Corridor.

A supplementary geotechnical report was submitted with the PPR that considers the implications of the proposed works on the Interim Metro Corridor. The report also addresses Transport NSW's Sydney Metro Network Line 1 Guidelines which aim to protect the structural integrity of potential Metro related infrastructure by providing guidance for future development along the approved corridor.

The retention system required to support the proposed basement car park coincides with, and crosses over, the Interim Metro Corridor's "protection zone" – an area that must not be encroached upon by development unless it can be demonstrated that any proposed encroachment would not have unacceptable structural impacts to the Interim Metro Corridor. In addition, the retention system is located immediately west of Hickson Road and is expected to coincide with the Interim Metro Corridor station box. The Margaret Street West entry and exit ramp also passes over the Interim Metro Corridor.

The supplementary PPR geotechnical report concluded that bulk excavation and construction of retention systems for the basement car park will not compromise the structural integrity of the Interim Metro Corridor and station box subject to appropriate structural options, such as temporary ground anchors and tie backs, being implemented during construction. In addition, the report found that:

- vertical structural elements can be designed above and/or within the protection zone without encroaching on the actual tunnels, and accordingly significant stress distribution within the protection zone or adjoining areas is not expected;
- groundwater levels are not predicted to change as a result of the Project Application works;
- no additional loads on the Interim Metro Corridor are expected;
- no deformation of the Interim Metro Corridor support structures are expected; and
- the construction methodology proposed for the vertical elements is not anticipated to affect the Interim Metro Corridor.

The Margaret Street West entry and exit ramp is proposed to be supported by piled foundations or other suitable footings on either side of the Interim Metro Corridor. It has been determined that vertical structural elements associated with the ramp will pose a low structural risk to the Interim Metro Corridor.

Transport NSW has reviewed the supplementary report and recommended that, as with recent Part 3A approvals (e.g. Carlton United Brewery) within or adjacent to the Interim Metro Corridor, the approval be conditioned to require the Proponents to enter into appropriate arrangements with Transport NSW to ensure that potential impacts of any approved development on the corridor are satisfactorily addressed. This has been incorporated into the recommended conditions of approval.

The Proponent has also drafted a new Statement of Commitment to reiterate their commitment to working with Transport NSW to resolve any Barangaroo South related matter. The Statement of Commitments has also been revised to reiterate the Proponents commitment to undertaking the Project Application in accordance with the recommendations of the supplementary geotechnical report.

5.6.6 Margaret Street West and Barangaroo Pedestrian Link

The application includes road works for the construction of Margaret Street West in its final alignment. The proposed alignment of Margaret Street West is slightly further south than the indicative location in the approved Concept Plan, however, the alignment shown in this application is preferred by both Council and the Department as it retains a view corridor to the water along Margaret Street, south of the Sussex Hotel. Therefore, the departure from the Concept Plan approval is considered to be minor and the project is still deemed to be generally consistent with the terms of approval of the Concept Plan.

Whilst preferred overall, Council has raised concerns with this alignment of Margaret Street West in terms of potential pedestrian movement issues associated with the landing of the Barangaroo Pedestrian Link (BPL) as a result of the proposed road works to realign Margaret Street West.

Although Transport NSW is responsible for the design and delivery of the BPL, the Proponent has considered two design options in their PPR that could potentially be further developed in consultation with the NSW Government. **Figures 9 and 10** demonstrate these suggested design options.

Figure 9: BPL Option 1 – Diagonal Bridge Crossing

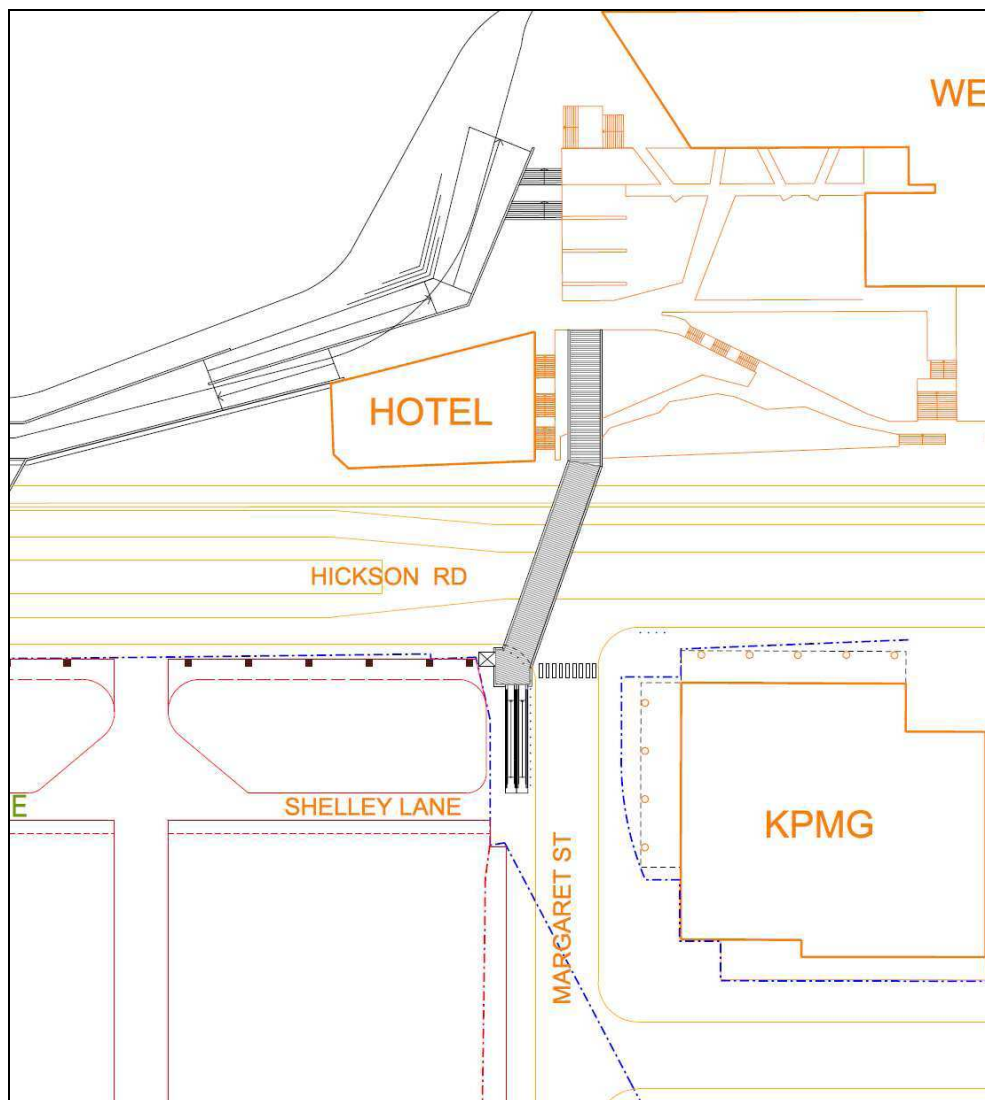
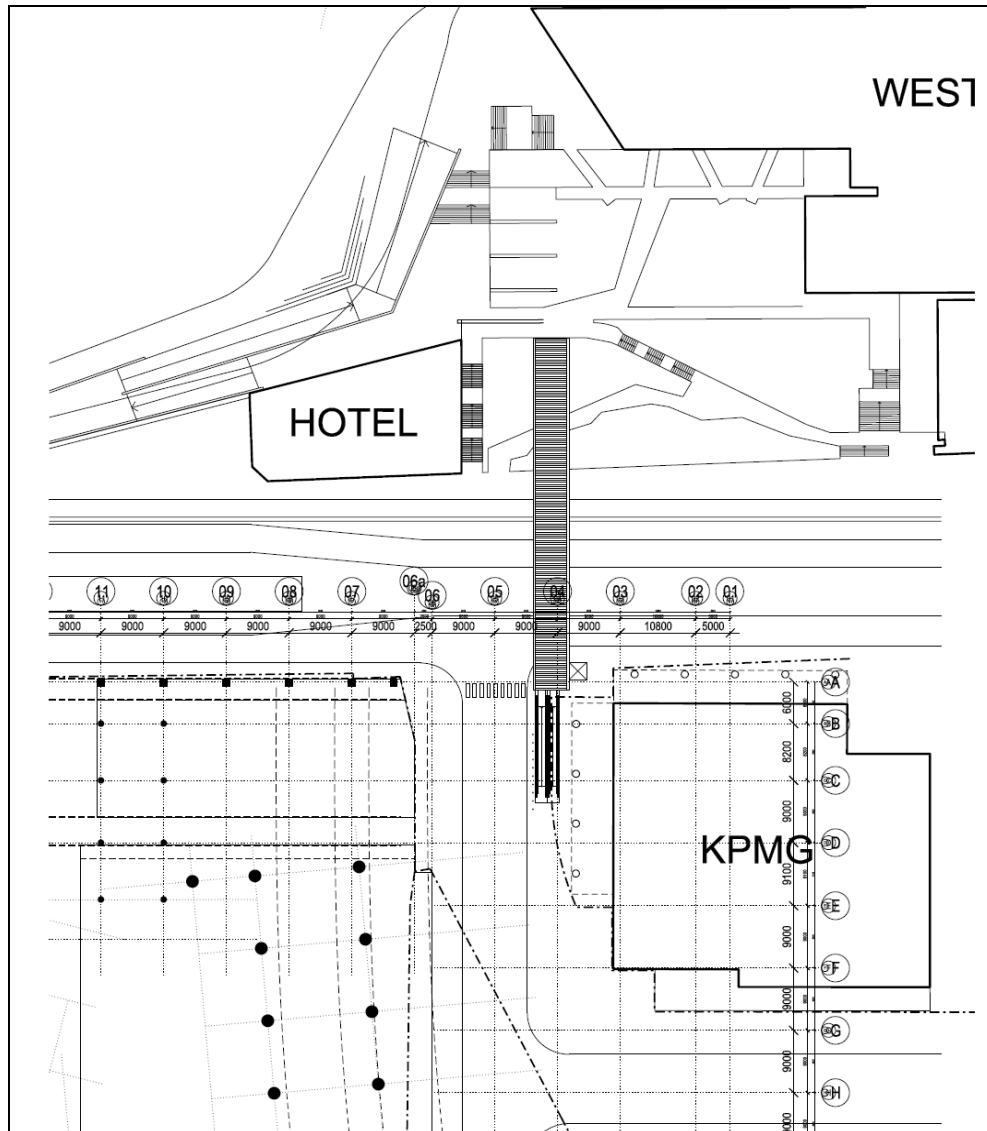


Figure 10: BPL Option 2 – Sussex Street Bridge

Council is of the opinion that both of the above BPL options generate public domain and pedestrian safety issues, and do not demonstrate that a satisfactory solution can be achieved with the proposed configuration of Margaret Street West and car park/building alignments. Specific issues include:

- inadequate footpath areas around bridge landings (options 1 and 2);
- pedestrian–vehicular conflict arising from pedestrians arriving on the south side of Margaret Street West, conflicting with the main vehicular entry/exit point to the car park (option 2); and
- impact on corner sight-lines at the intersection of Margaret Street West and Hickson Road, and impact on pedestrian movement around this corner (option 1).

A condition of approval is therefore recommended that, prior to approval of the relevant road works, additional analysis and design work is required to ensure that the 'Barangaroo Pedestrian Link' bridge can be accommodated whilst maintaining adequate space for pedestrian movement at ground level. Pedestrian safety also needs to be demonstrated in relation to pedestrian access to the site from Margaret Street West and the BPL with regard to footpath widths, potential crossing locations and expected vehicular movements in and out of the car park/loading entry.

5.7 Trees, Landscaping and Public Domain

5.7.1 Hickson Road Street Trees

The City of Sydney has raised concern regarding the proximity of the proposed works and their impacts, including the need for pruning, on the ongoing viability and health of the existing street trees in the Hickson Road reserve.

The Proponent has committed to the preparation of a Tree Management Plan outlining the proposed range of tree protection measures that will be implemented during construction works to minimise any impacts on the trees on the western side of Hickson Road. The Proponent has also committed to the implementation of an Arborist monitoring programme for the duration of the works to monitor the health and stability of the adjacent Hickson Road street trees.

Should the works result in either a significant impact on the health of the trees or compromise their structural integrity to the point where they represent a risk to public safety, they will be replaced with a suitably advanced specimen of the same species in the same location unless otherwise agreed alternative location. The Proponent's Statement of Commitments reflects this undertaking.

Further, it should be noted that Johnson Pilton Walker in association with Peter Walker and Partners Landscape Architecture have been engaged by the Barangaroo Delivery Authority to prepare a detailed Public Domain Plan for the overall Barangaroo Concept Plan site, which will include Hickson Road. Council will be consulted and will have input to the Public Domain Plan as part of that process, as well as through the Barangaroo Design Excellence Review Panel and the Public Domain Technical Working Group, both of which Council is a member.

5.7.2 Landscaping and Public Domain

Council has raised concern about the areas of deep soil planting shown on the architectural drawings which accompany the PPR, specifically that the depth of soil shown is inadequate and such areas should not be underlain by structures. Council is of the opinion that basements in Barangaroo South should be generally contained beneath building blocks, and that deep soil areas with no structures beneath be provided under streets and public spaces for the planting of trees within the public domain.

The plans submitted as part of the PPR make provision for deep soil planting within Globe Street and Napoleon Street, both of which are located over the basement. The Proponent has provided supplementary advice from their landscape architect post PPR in relation to the adequacy of soil depths in the context of ensuring the viability of street trees. The advice concludes that a soil depth of 1000-1200mm is "considered to be adequate to facilitate optimal street tree growth". Practical evidence of this is provided in an image of street tree planting in Refinery Drive at Jacksons Landing that is planted in a 1m deep continuous trench over a basement car park (see **Figure 11** below).

Figure 11: Street Tree Planting, Jacksons Landing



Further detail on planting within the public domain of Barangaroo South will be provided in future Project Applications, with due consideration given to the wider Public Domain Strategy being prepared for Barangaroo.

In addition, it should be noted that there is substantial opportunity for deep soil planting (unimpeded by basement structure) elsewhere on the Barangaroo South site, including the waterfront promenade and around the Southern Cove, and throughout the Barangaroo Central Parkland and Headland Park.

Notwithstanding the above, an additional Statement of Commitment has been provided by the Proponent committing to the provision of adequate soil depths over the basement to facilitate deep soil planting within a continuous trench in the order of 1000-1200mm.

5.8 Tri-Generation

Council has raised concern that the current plan of the basement does not allow for the future provision of tri-generation.

In response, the Proponent has detailed to the Department that they have been engaged in discussions during the past 12 months with Council officers in relation to the provision of tri-generation facilities within Barangaroo South. The Proponent has committed to continuing the exploration of feasibility for district-based heating and cooling systems and the manner in which Barangaroo South would integrate with these systems.

Detailed feasibilities for the district-based systems and other solutions cannot be properly commenced until Council has completed its Decentralised Energy Master Plan. This Plan is understood to facilitate the implementation of large scale tri-generation in the City of Sydney and guidance on the implementation of tri-generation projects in the City. The Proponent is of the understanding that briefings on the City's Master Plan will commence in the coming weeks and they will be an active participant in these sessions.

Should the future feasibility study demonstrate the viability and timely delivery of district-based systems, the requisite infrastructure for these systems could be accommodated either in future stages of the basement or in specific buildings. This information will be detailed in a future Project Application.

5.9 Climate Change and Sea Level Rise

A Climate Change and Sea Level Rise Assessment (CCSLRA) was prepared as part of the EA. The Assessment was prepared in accordance with the *NSW Sea Level Rise Policy Statement* and *NSW Draft Coastal Planning Guideline: Adapting to Sea Level Rise*. The NSW Government has adopted a planning benchmark of 0.9m mean sea level rise by 2100.

The CCSLRA details that there is a risk that a 0.9m sea level rise could result in inundation of the Barangaroo site by either direct coastal inundation or by a failure of the stormwater system where the discharge point to the Harbour would become submerged.

As a result the CCSLRA recommends the establishment of a sea wall, or subsequent landward change in the proposed public domain height, at a minimum height of 2.575 AHD. The recommended sea wall height is based on it being:

- greater than the current 1 in 100 year event (1.435 AHD) for Sydney Harbour plus an additional 0.9m to accommodate mean sea level rise (2.335 AHD); and
- equal to the current Sydney Harbour Foreshores DCP (1.675 AHD) plus an additional 0.9m (2.575 AHD).

It is also noted that the height of the wall should be incrementally increased in the future to respond to actual demonstrated sea level changes.

The CCSLRA makes the following recommendations concerning the management of stormwater:

- the stormwater discharge point should be located within the existing caisson structure seawall or basement perimeter retention system wall (in the case of the Southern Cove) at the highest point possible to allow gravity flow of the site run-off to the Harbour;
- the pipeline should be designed to be of sufficient capacity to manage partial backfilling from inundation during storm surge events which may occur towards 2100; and
- overland flow paths should also be identified to manage the stormwater flows should the discharge point become obstructed which may occur towards 2100 during an extreme storm surge event.

The CCSLRA also concludes there is a residual risk of inundation impacts on the basement development if mean sea level rise in Sydney Harbour is greater than 0.9m and an extreme storm surge event occurs greater than the current 1 in 100 year event. To mitigate these residual and co-incident risks, the following measures are recommended:

- selecting materials to prevent accelerated degradation of infrastructure and buildings;
- locating key infrastructure at elevated locations closer to Hickson Road (such as substations);
- providing for safe exit routes above storm flood height levels; and
- adopting principles of adaptive management such as the design of future public domain elements and seawalls is designed so its height may be incrementally increased should future research, change in Government policy or actual events suggest that sea level rise will be greater than current projections.

The project will be undertaken in conformance with the recommendations of the CCSLRA and accordingly the above recommendations are reflected in the Proponent's Statement of Commitments.

5.10 Public Interest

The proposal is deemed to be in the public interest as it will facilitate the future development of Barangaroo in accordance with the approved Barangaroo Concept Plan, which in turn will provide the following key public benefits:

- delivery of a key site in responding to the demand for commercial floorspace in the Sydney CBD to assist in developing Sydney as a Global city;
- increased employment opportunities through the additional 6,600 operational jobs and approximately 1,000 construction jobs generated through the development (total of approximately 7,600 jobs);
- delivery of approximately 11 hectares of new public open space/public domain, including a 1.4km public foreshore promenade; and
- provision of a wide range of new recreational, educational and tourism facilities in the CBD.

Council has recommended a number of conditions in order to mitigate the environmental impacts of the proposed development and these have been incorporated into the approval where appropriate.

On balance, therefore, the Department considers the site to be suitable for the proposed development and that the Project Application is in the public interest. Consequently, the Department recommends that the project be approved, subject to conditions.

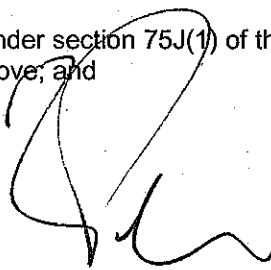
6. RECOMMENDATION

It is recommended that the Minister for Planning:

- a) **Consider** all relevant matters prescribed under section 75J(2) of the EP&A Act, including those relevant matters prescribed by 75I(2) as contained in the findings and recommendations of this report;
- b) **Approve** the project application, subject to conditions, under section 75J(1) of the EP&A Act, having considered all relevant matters in accordance with (a) above; and
- c) **Sign** the attached Instrument of Approval (TAG A).


Executive Director
Major Projects Assessment

1.11.10


Deputy Director-General
Development Assessment & Systems
Performance

1/11/10


Director-General

1/11/2010

NSW Government
Department of Planning

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3803

APPENDIX B SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3803

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3803

APPENDIX D CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Major Development) 2005 (MD SEPP)

The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the Major Development SEPP. The SEPP zones the Project Application site part B4 Mixed Use and part RE1 Public Recreation. The proposed earth works and basement car park are permissible in both zones with development consent.

Schedule 3 of the MP SEPP has recently been amended and now includes the land use zones for the site and also contains a number of specific development standards and provisions for the Barangaroo site, relating to height, GFA and design excellence; however, these are not relevant to the subject demolition application.

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

The remediation works proposed in the Project Application are not considered to be a ‘potentially hazardous industry’ as the works, in conjunction with the mitigation measures prescribed in the Overarching Remediation Action Plan (RAP) and site specific RAP, are unlikely to pose a significant risk to human health, life or property or the biophysical environment.

State Environmental Planning Policy No. 55 – Remediation of Land

SEPP 55 promotes the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. The majority of the site is currently covered by concrete hardstand, however the proposed works will expose potentially contaminated soil.

A Remediation Action Plan (RAP) has been prepared for the Project Application site in accordance with SEPP 55 (refer Appendix G of EA). The RAP satisfies the requirements of SEPP 55 and conditions of approval are recommended to ensure that the provisions of this plan are implemented. Remediation works are discussed in more detail in Section 5 of this Report.

Sydney Regional Environmental Plan (SREP) Sydney Harbour Catchment 2005

Barangaroo is identified in the SREP Sydney Harbour Catchment 2005 as a “Strategic Foreshore Site”. The Sydney Harbour Catchment Planning Principles must be considered and where possible achieved in the preparation of a draft LEP. The key relevant principles are summarised to include:

- Protect and improve hydrological, ecological and geomorphological processes;
- Consider cumulative impacts of development within the catchment;
- Improve water quality of urban runoff and reduce quantity and frequency of urban run-off; and
- Protect and rehabilitate riparian corridors and remnant vegetation.

The site is within the Sydney Harbour catchment and drains directly into the harbour. The proposed works have the potential to impact upon the Harbour primarily through the run-off of stormwater, sedimentation and the spillage of hazardous chemicals. The Proponent has proposed to address these potential impacts through the implementation of the Environment, Construction and Site Management Plan (EC&SMP). The implementation of requirements within the EC&SMP will ensure that the proposed works will not result in any adverse impacts upon the Harbour. Conditions of approval are recommended to ensure that the provisions of this plan are implemented.

The Project Application is also considered to be consistent with the SREP as it will provide the first step in facilitating the delivery of the Barangaroo Concept Plan, which will create a healthy and sustainable waterway environment and promote recreational access to the foreshore and waterways.

APPENDIX E RECOMMENDED CONDITIONS OF APPROVAL
