MAJOR PROJECT ASSESSMENT
Sydney CityGrid Project

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

August 2009

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EXECUTIVE SUMMARY

EnergyAustralia (the Proponent) proposes to upgrade electricity supply to the Sydney Central Business District to meet future demand, ensure the continuation of a reliable supply to this area, and meets its N-2 Licence obligations imposed by the then Department of Water and Energy. This N-2 obligation is defined as the ability to meet peak electricity demand with two major network elements out of service. The project includes new/upgraded/refurbished substations and the replacement of old high voltage cables. The project is subject to Part 3A of the *Environmental Planning and Assessment Act 1979* (the Act), by virtue of an Order made by the Minister for Planning under section 75B of the Act on 11 February 2008. On 21 April 2008, the then Minister for Planning authorised the submission of a concept plan for the proposal. The Concept Plan includes the following components:

1. Construction and operation of the Belmore Park Zone substation, which is to be integrated with a commercial/retial development located on the corner of Pitt, Campbell and Hay Streets and stub tunnel connection from the existing City South Cable Tunnel to Belmore Park Zone substation. This component is known as Stage 1 of the proposed works.
2. Construction and operation of the City East Zone Substation, to be situated in the vicinity of Phillip, Bent, Bligh and O'Connell Streets, Sydney - The specific site for this zone substation is yet to be confirmed however and it may include an integrated commercial/retail development.
3. Potential refurbishment of the existing Dalley Street Zone Substation or construction of a new building adjacent to the existing site.
4. Construction and operation of a Sub-transmission Switching Station at Riley Street.
5. City East Cable Tunnel, to be constructed between Riley Street Sub-transmission Switching Station and City North Zone Substation, with connections to the proposed City East and existing Dalley Street zone substations, and a potential services control room adjacent to the Riley Street Sub-transmission Switching Station.
6. Extension to the City South Cable Tunnel from Wade Place to Riley Street (Surry Hills).

The Proponent seeks project approval for Stage 1 and concept plan approval for the remaining components. The entire project has a capital cost of $800 million, with Stage 1 of the project having a capital cost of approximately $125 million. The project would employ 290 full-time staff during construction and 18 full-time staff during the operation of the project. The construction of the project is proposed to be within the following timeframes:

- 2009 to 2012 – construct Belmore Park substation and stub tunnel connection (note, the commercial/retail development will either be constructed within one to two years or up to ten years following construction of the zone substation, depending on when a developer is secured for this component);
- 2010 to 2012 – extend the existing City South Cable Tunnel;
- 2010 to 2012 – construct new 132kV cable tunnel (the City East Cable Tunnel), from Riley Street to City North;
- 2010 to 2015 – construct new Sub-transmission Switching Station at Riley Street;
- 2011 to 2015 – construct new City East Zone Substation; and
- 2013 to 2017 – refurbish or replace existing Dalley Street Zone Substation.

The main electricity supply to the Sydney Central Business District is supplied from five zone substations (City North, City East, Dalley Street, City South and New City Central), which range in age from three years to more than 50 years. As such, it is necessary to replace the aged electricity generating assets and cater for the increase in demand for electricity. The scheme of works proposed as part of the Project are therefore required and would be in the best interest of the State, as it would provide for a major upgrade to the electricity supply infrastructure over the next decade and support the ongoing growth and economic importance of Australia's major city, by the continued provision of a reliable electricity supply.

During the exhibition period of the Environmental Assessment, the Department received a total of nine submissions. These comprised of eight responses from government agencies and one public submission, which included a petition from local residents and business owners/operators opposing the commercial/retail component of the proposed Stage 1 works. This submission stated that scale of the Stage 1 development will be increased due to the commercial/retail component and this will result in adverse impacts to the visual amenity of the local area. The design for Stage 1 (proposed Belmore Park zone substation integrated with a commercial/retail development) was assessed under a design review process, consistent with the Director-General's Requirements for the Project. The Department finds that the architectural design and material proposed for the development is

appropriate to the proposed use of the building and the location in which it would reside. The Department is satisfied that the form and the external appearance of the proposed development will also improve the quality and visual amenity of the locality, as it would offer a visual interest to a site that is currently used as an open-air car park only. Also the design of the building is consistent with the existing planning controls contained in the Sydney Local Environmental Plan 2005, particularly clause 50 Height of Buildings. The proposed development envelope has been designed to comply with the Belmore Park Sun Access Plan A1 (25 metres on northern alignment of Hay Street with a vertical angle 32 degrees 30' providing a maximum height on Campbell Street of 60 metres to the ridge). The Department notes that the proposed building has a maximum height of 58.4 metres to the ridge, thus allowing the sun's rays to reach the adjacent Belmore Park. The proposed development would not cause adverse glare for the public, including pedestrians and drivers at surrounding locations, due to the proposed glazing to be incorporated into the external finish for the development. The glazing elements of the development would have a reflectivity coefficient of less than 20 per cent and the other external façade materials would have a low specular reflectivity, meaning low reflection of visible light.

A very late submission was received from the owners of the adjacent Central Square building. This submission did not object to the proposal but raised concerns about architectural/urban design matters and potential electric and magnetic field (EMF) impacts. The Department is satisfied that urban design matters have been satisfactorily addressed, and the recommended conditions will require further review. This will enable the issues raised in this submission to be further addressed. The Department is also satisfied with the Proponent's approach to the management of EMF levels. A condition is also recommended that will require the Proponent to identify further measures to reduce magnetic field levels.

The eight submissions received from government agencies provided the Department with recommendations for the management of potential noise, vibration, heritage, surface and groundwater and traffic and road impacts. The Sydney Water Corporation and RailCorp also outlined that existing and planned major sewer and associated assets, and existing rail infrastructure respectively will need to be considered by the Proponent during construction works, so as to ensure no adverse impact occurs to this infrastructure. The Department is satisfied that the environmental impacts associated with Stage 1 of the Project are considered to be acceptable, subject to the Department's recommended conditions. The Department has recommended specific conditions that the Proponent must adhere to, to address those issues raised in the assessment process for Stage 1 (contained in the Project Approval):

- noise impacts – specific conditions to limit hours of construction to acceptable times and to limit noise generated during operations to mitigate amenity noise impacts;
- vibration impacts – specific conditions to ensure vibration resulting from construction and operation of Stage 1 does not exceed the acceptable values for vibration and does not result in adverse impact to sensitive facilities and rail infrastructure;
- heritage impacts – specific conditions which require monitoring of the site during bulk excavation to identify any non-indigenous items that may be present within the area and recording of items found. Also specific conditions to cease relevant construction works, should any indigenous objects and/or material be detected and procedures for notifying the Department of Environment, Climate Change and Water and the Metropolitan Aboriginal Land Council;
- surface and groundwater impacts – specific conditions to ensure the protection of water sources from potential pollution as a result of construction and operation; and
- traffic and road impacts – specific conditions to manage road impacts and site access and conditions requiring the Proponent to provide car parking and bicycle parking facilities and end trip facilities (such as showers and changing rooms) to encourage bicycle use for travelling to and from the commercial/retail component of the development.

The Department finds that further assessment is required for the remaining components of the project, which the Proponent at this stage is only seeking concept approval for. This is because the Proponent is yet to determine the final location for all of the components, including the extent of works and the potential impacts that may result from the construction and operation of these components. As such, the Department has recommended conditions to be contained in the Concept Approval, which require the Proponent to complete project level noise and vibration, heritage (non-indigenous and indigenous), air quality, water quality and traffic and access assessments. Any future project applications for these concept plan components must be accompanied by these assessments, where relevant.

CONTENTS

1. BACKGROUND

1.1 Location

The Proponent (EnergyAustralia) proposes to upgrade electricity supply to the Sydney Central Business District, to meet future demand, ensure the continuation of a reliable supply to this area (by the replacement of ageing assets such as old cables), and meet its N-2 Licence obligations imposed by the then Department of Water and Energy. The location of the Project is illustrated in Figure 1. There are two key components to the proposed electricity supply works, of which the details are presented below. Chapter 2 of this report also provides further information on these proposed works.

1. New/upgraded/refurbished substations

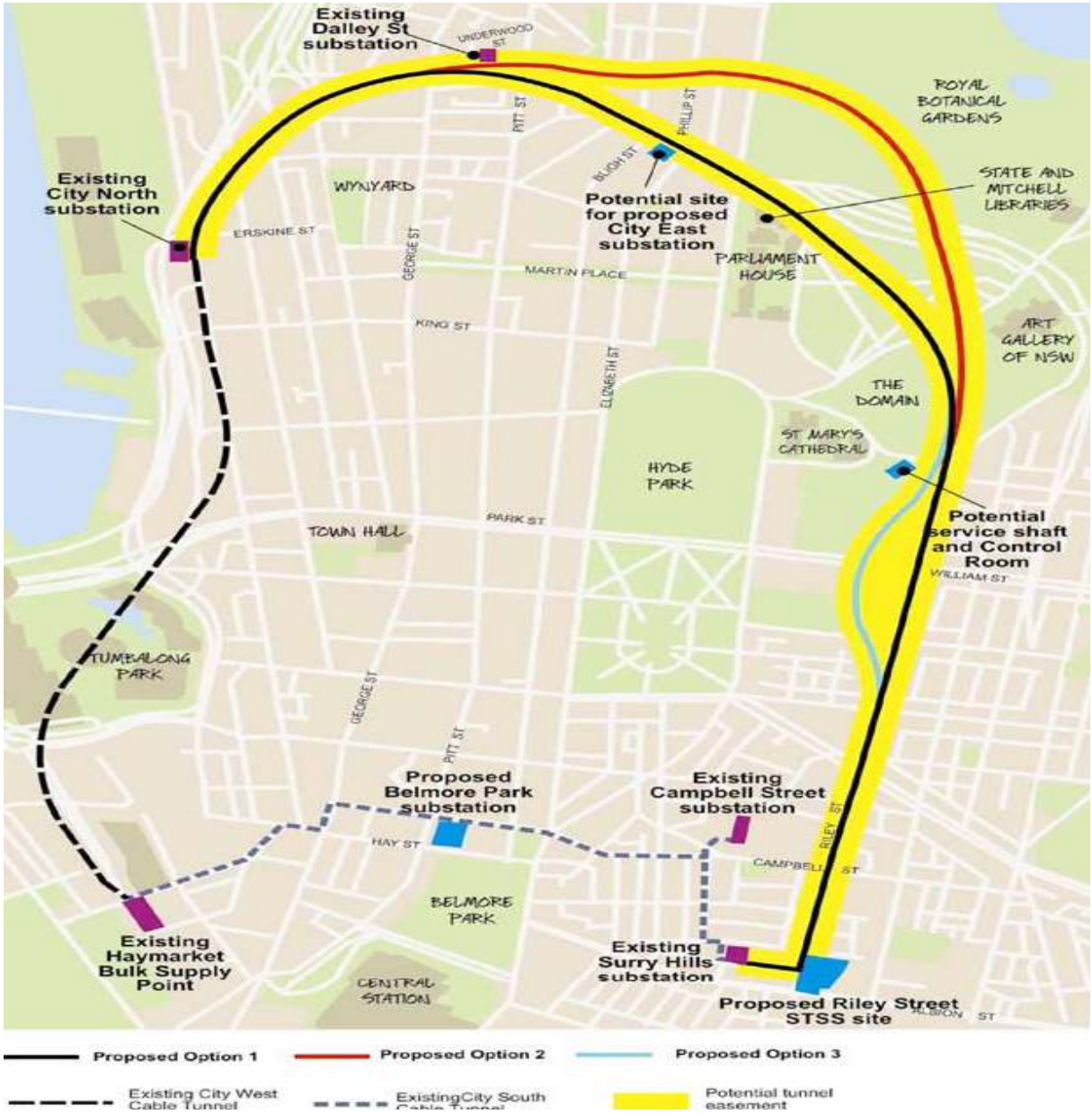
- Belmore Park Zone Substation - A new zone substation, integrated with a commercial/retail development on the corner of Pitt, Campbell and Hay Streets in Sydney. The substation is to be designed in a manner that will allow for continuous operation and maintenance of the zone substation unimpeded by other activities that may be occurring within the remainder of the development, i.e. the construction and operation of the zone substation will not be hindered by the commercial development. This component is part of the Proponent's Project Application.
- New City East Zone Substation - The specific site for this zone substation is yet to be confirmed however it may include an integrated commercial/retail development, similar to Belmore Park Zone substation. The proposed City East Cable Tunnel would be designed to allow for connection of five 132kV feeders at the City East Zone substation, emanating from the proposed Sub-transmission Switching Station. Similarly, the City East connection must also allow for the installation of the four 132kV feeders that would run between the new City East Zone Substation and Dalley Street Zone Substation.
- Potential Refurbishment of the existing Dalley Street Zone Substation or build at an adjacent site - The Dalley Street Substation was commissioned in 1969 and presently supply is fed via four oil-filled cables (feeders) running from Lane Cove. The Proponent explains that when these feeders were installed in the 1960s, they were the major supply route to the CBD and Eastern Suburbs. Two of the four feeders between Lane Cove and Dalley Street require replacement or retirement by the year 2012. The remaining feeders have been prioritised for retirement by the year 2017. Thus, refurbishment or replacement of the existing zone substation must occur to support the new feeders originating from the new City East Zone substation.
- Sub-transmission Switching Station at Riley Street – this would be established to provide a connection of the Eastern Central Business District load and the 132kV supply to the eastern suburbs but also provide 123kV connections for a future bulk supply point.

2. Replacement of old high voltage cables – this will involve the construction of new tunnels on the eastern and northern sides of the Central Business District, and minor extensions/connections to existing tunnels.

- City East Cable Tunnel - this cable tunnel will enable the installation and connection of 132kV feeders between the various substation components. It would be constructed between Riley Street Sub-transmission Switching Station and City North Zone Substation, with connections to the proposed City East and existing Dalley Street zone substations, and a services control room adjacent to the Riley Street Sub-transmission switching Station.
- Extension to the City South Cable Tunnel from Wade Place to Riley Street (Surry Hills).
- Stub tunnel connection from City South Cable Tunnel to Belmore Park Zone Substation. This component is part of the Proponent's Project Application.

Works are to be staged over the next decade. It must be noted that the commercial/retail component of the Belmore Park Zone substation development may not be realised up until ten years from the construction of the zone substation. This is because the Proponent may not be able to secure a developer for this component immediately after the construction of the zone substation. For this reason, the Proponent has proposed temporary façade treatments to be included as part of the construction of the zone substation, so as to manage the visual amenity of the area. The Proponent's indicative programme for the project is shown in Figure 2.

Figure 1: Sydney CityGrid Project Location Plan (reproduced from the Proponent's Environmental Assessment)



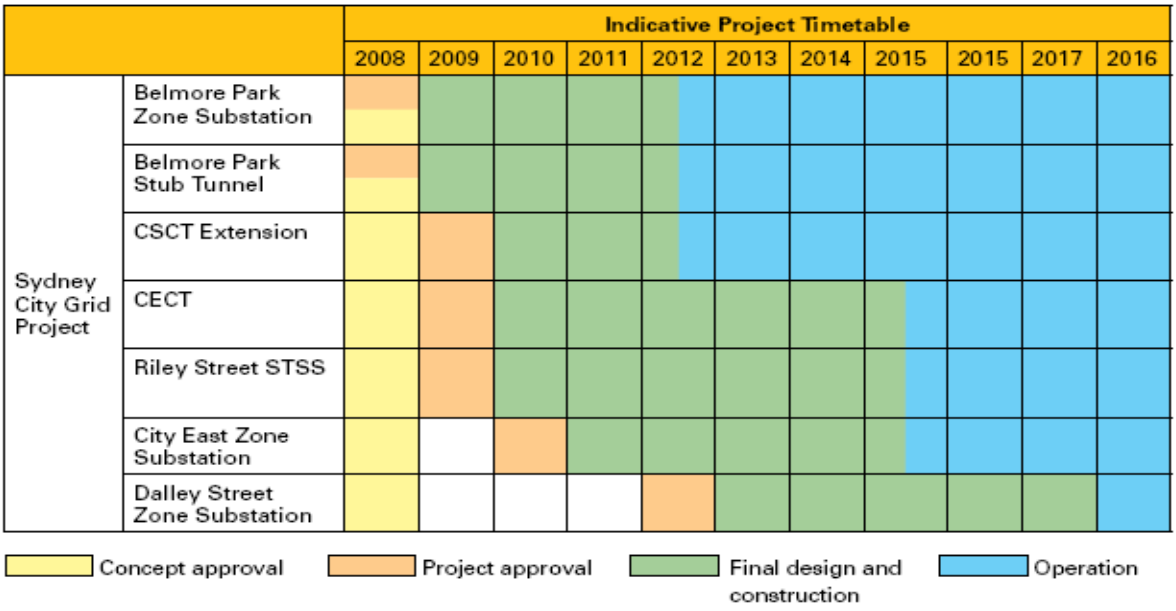
1.2 Existing Site

Belmore Park Substation and Commercial/Retail development Site

The Belmore Park Zone Substation site has an area of 3,429m^2 and is located between Campbell and Hay Streets, east of Pitt Street. The site is located at the southern end of the Sydney Central Business District and is adjacent to Belmore Park and Central Railway Station. The site comprises the western half of the street block bounded by Hay Street to south, Campbell Street to the north, Castlereagh Street to the east and Pitt Street to the west. The eastern half of the street block fronting Castlereagh Street contains a 23 storey commercial tower, known as Central Square. The site where the proposed substation is to be located is used as a privately operated open-air commercial car park and has the capacity to accommodate approximately 100 vehicles. The car park is open 24 hours, seven days a week and entry and exiting of vehicles is via the site's single two-way driveway off Hay Street. Figure 3 below illustrates the view of the proposed substation site from the north, south and west.

The Proponent states that Council restrictions on building height for the subject site in the 1990s, in relation to shadows on the neighbouring Belmore Park, may have contributed to its long term car park use.

Figure 2: Nominal timeframes for CityGrid Project (reproduced from the Proponent's Environmental Assessment)



Proposed City East Zone Substation

A new substation, integrated with a commercial/retail development is proposed in the eastern Central Business District area of Sydney. The site is proposed to be situated in the vicinity of Phillip, Bent, Bligh and O'Connell Streets in Sydney. The final location within this area is yet to be confirmed by the Proponent. The potential site will align with the proposed City East Cable Tunnel. The area in which this substation is proposed to be situated is a mixture of retail and commercial land uses. Figure 4 below depicts the locality in which the substation is proposed.

Potential refurbishment of, or replacement of Dalley Street Zone Substation

The Dalley Street Zone Substation is located in Dalley Street, a small laneway scale street, with mainly utilitarian uses. The substation was commissioned in 1969 and currently supply is fed via four-oil-filled cables (feeders), running from Lane Cove. When these feeders were installed, they were the major supply route to the Central Business District and eastern suburbs. Two of the four cables between Lane Cove and Dalley Street require replacement or retirement by 2012. The Proponent anticipates the remaining circuits are to be retired by 2017. As a consequence, refurbishment or replacement of the existing Dalley Street zone substation must occur to support new feeders emanating from the proposed City East Zone Substation. The Proponent is yet to determine the extent of works and the level of modification. Figure 5 shows a current view of the substation.

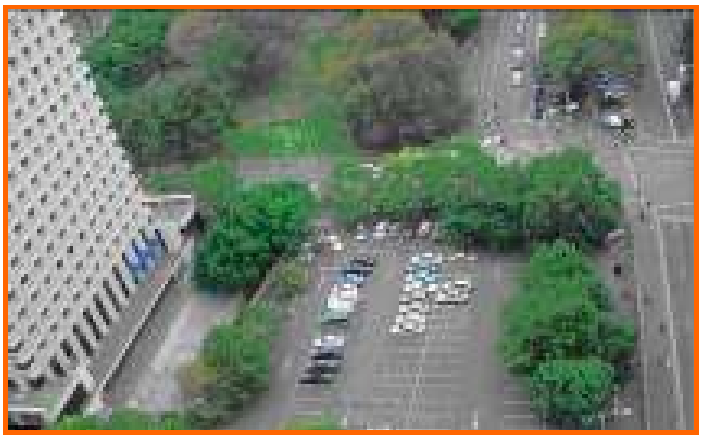
Riley Street Sub-transmission Switching Station

A sub-transmission switching station is required at Riley Street, Surry Hills by the year 2016. It would be established to provide a connection of the Eastern Central Business District load and the 132 kV supply to the Eastern Suburbs and provide 132 kV connections for a future bulk supply point, post the year 2020.

The sub-transmission switching station is proposed on part of the site located on Riley Street, between Ann and Albion Streets. The Riley Street site is not in active use and is excavated into the sandstone bedrock. The Proponent notes that the excavated area allows for the bulk of the proposed facilities as part of the substation to be located underground, minimising the bulk of the building aboveground.

The proposed sub-transmission switching station development will utilise approximately 25 per cent of the site area and is to be located along the Ann Street frontage, with a narrow frontage on Riley Street. The sub-transmission switching station development is to be approximately two storeys on the Riley Street frontage (with two storeys underground) down to one storey along Ann Street (with three storeys underground) due to the slope of the land. Potential exists to integrate the proposed services shaft and control room within the proposed sub-transmission switching station. The Proponent is yet to determine the final extent and details of the development. Figure 6 shows the view of the site from Riley Street.

Figure 3: Views of the proposed Belmore Park Zone Substation Site (reproduced from the Proponent's Environmental Assessment)



View from the north

View from the south (Campbell Street)

View from the west (Pitt Street)

Figure 4: Locality of proposed City East Zone Substation (reproduced from the Proponent's Environmental Assessment)

Aerial view of proposed substation area

View of Phillip Street, Sydney

View of Bligh Street, Sydney

View of Hunter Street, Sydney

Figure 5: Dalley Street Zone Substation, view from Pitt Street, Sydney (reproduced from the Proponent's Environmental Assessment)

Figure 6: Riley Street Site, View of Sub-transmission Switching Station (and tunnel construction) (reproduced from the Proponent's Environmental Assessment)

City East Cable Tunnel

The option for installing and connecting 132kV feeders between the various substation components of the Project is via the construction of a new cable tunnel, known as the City East Cable Tunnel. This tunnel would form the supporting infrastructure for installing the 132kV feeders between the substations proposed. This cable tunnel would be constructed between the proposed Riley Street Sub-transmission Switching Station and City North Zone Substation, with connections to the proposed new City East and existing Dalley Street Zone Substations, and a services control room adjacent to the Riley Street Sub-transmission Switching Station. There are currently three alignment options for this cable tunnel, being the Riley Street alignment, Bridge Street alignment and Yurong Street alignment. Further feasibility analysis is currently being undertaken by the Proponent to determine likely constraints, and to assess risks and operational requirements associated with each alignment. The final alignment will be presented as part of the future Project Application for this component of the Project.

A services shaft and control room is required to house the major tunnel control services including the tunnel ventilation system and is being considered at two possible locations. The preferred location is to integrate the services shaft and control room within or adjacent to the Riley Street sub-transmission switching station building or alternatively to locate the shaft and room in the vicinity of Cook and Phillip Park, adjacent to St Marys Road and Yurong Parkway. The final location would be determined during the detail design stage of the project.

1.3 Surrounding Land Use

Belmore Park Zone Substation

The surrounding area of the proposed substation is characterised by a mixture of entertainment (Capitol Theatre), offices (Central Square and Sydney Central), retail (ground level shops in Sydney Central, Manning Building and along Pitt Street), accommodation (Chamberlain Hotel and Royal Garden Hotel) and residential (Regis Tower). Belmore Park to the south of the site is a public park and an important thoroughfare from the Eddy Avenue entry to the Central Station into the Central Business District.

Proposed City East Zone Substation

The surrounding land uses are mainly commercial office towers with active street frontages, retail activities, hotels and eateries, including Sheraton Wentworth Hotel, Chifley Tower/Square, Macquarie Apartments, Noble House and Governor Macquarie Tower.

Potential refurbishment of, or replacement of Dalley Street Zone Substation

The surrounding land uses are mainly commercial office buildings, hotels and parking stations with the major activities being the Australian Stock Exchange, Telstra Telephone Exchange, AIG building, Exchange Square, Grosvenor Place, National Australia Bank, Macquarie Graduate School of Management, Underwood House, Sydney Harbour Marriott, and Gerling and Endeavour House.

Riley Street Sub-transmission Switching Station

The surrounding land use is mainly characterised by residential land use, comprising terrace housing and multi-storey apartment buildings with a number of hotels, cafes, and commercial and recreational activities. These include Frog Hollow Reserve, the Albion Street Centre, Salvo-care Crisis Centre, Chelsea Apartments, Gertrude Abbott Nursing home, Sister Anne Court, Chinese Presbyterian Church, and the Womens and Girls Emergency Centre.

Services Shaft and Control Room

A services shaft and control room is needed to house the major tunnel control services, particularly the tunnel ventilation system. The Proponent has considered at least two possible locations, of which one will be selected upon completion of detailed investigation work. The Proponent's preferred location is to integrate the City East Cable Tunnel services shaft and control room within or adjacent to the Riley Street Sub-transmission Switching Station building. Alternatively, the services shaft and control room may be located at an intermediate location along the tunnel alignment. This option would most likely require the construction of a shaft connection between the control room and the tunnel. The Proponent has identified a potential alternative location for this facility in the vicinity of Cook and Phillip Park, adjacent to St Mary's Road and Yurong Parkway. The final location will be determined by the Proponent during the detailed design phase of the Project and prior to the Proponent lodging a project application for this component of the Project.

2. PROPOSED DEVELOPMENT

2.1 Project Description

The Proponent seeks concept approval for the upgrade of the electricity supply network in the Sydney Central Business District, which involves:

1. the construction and operation of up to three new zone substations (including, as necessary, the demolition and/or refurbishment of existing zone substations, and the construction and use of commercial and/or retail developments on, adjacent to, or integrated with, the new zone substations);
2. replacement of, and upgrades to, the Proponent's existing high voltage cable network;
3. the construction and use of tunnels for the installation and operation of high voltage cables and associated cables and other infrastructure; and
4. the construction, operation and use of associated works, including ventilation shafts and access structures.

The construction and operation of the proposed Belmore Park Zone Substation, which involves the integration of a commercial development and stub tunnel connection from the existing City South Cable Tunnel to the proposed substation, are components of the Proponent's Concept Plan Application. However the Proponent has also lodged a Project Application for these two components and as such, has provided more certain information regarding potential environmental impacts and acceptability of these impacts in its Environmental Assessment, compared to the 'concept' only components. The Belmore Park Zone Substation Project Application involves a new substation and 132kV cables via a tunnel connection. Table 1 describes the key features of the works proposed as part of the Proponent's Concept Plan Application and Project Application.

Table 1: Key Project Components

Application Type	Key Features of the Proposed Components
Concept	Extension to the existing City South Cable Tunnel from Wade Place to Riley Street, Surry Hills.
Concept	Construction and operation of the proposed City East Cable Tunnel (approximately 3.2km) from Riley Street, Surry Hills to Erskine Street, City North, inclusive of potential ventilation shaft and services at a midway along the alignment.
Concept	Construction and operation of the proposed City East Zone Substation, potentially encompassing commercial/retail development (at a site yet to be determined).
Concept	Construction and operation of a new Sub-Transmission Switching Station at Riley Street, Surry Hills, and potentially a tunnel services control room and access to the proposed City East Cable Tunnel (in the alternative the control and access would be located at a midway point along the tunnel alignment).
Concept	Potential refurbishment or replacement of the existing Dalley Street Zone Substation or building at a nearby site.
Project	Construction and operation of the proposed Belmore Park Zone Substation, encompassing commercial/retail development (at the corner of Pitt, Hay and Campbell Streets, Sydney).
Project	Stub tunnel connection from the existing City South Cable Tunnel (nominally 20m below Campbell Street) to the proposed Belmore Park Zone Substation.

2.2 Project Need

The main electricity supply to the Sydney Central Business District is derived from five zone substations (City North, City East, Dalley Street, City South and New City Central), which range in age from three years to more than 50 years old. The Proponent states that the reliability performance of its equipment and infrastructure is managed through maintenance and replacement of that infrastructure. For the Proponent, the decision to replace infrastructure is based on an assessment of equipment condition and consideration of the strategic replacement needs of the electricity supply network. This Project encompasses the Proponent's long term strategy to replace and/or refurbish its infrastructure. It takes into account the need to ensure that security of supply is maintained to the Sydney Central Business District, while equipment is removed from service for refurbishment or replacement.

In addition to replacing the aged electricity generating assets, the Proponent has stated that it is necessary to cater for the increase in demand for electricity. Prior to 2005, an N-1 security standard was applied to the distribution system assets supply the Sydney Central Business District. The existing 132 kV Central Business District zone substations can supply full load during the outage of a single transformer (a N-1 level security). The Minister for Energy added a new draft condition to the Proponent's operating licence in August 2005 to adopt N-2 reliability criteria for all zone substation transformers and sub-transmission feeders in the Sydney Central Business District. This draft condition was then made final in December 2007. This means the substation transformers and sub-transmission feeders must be able to deliver the full load requirement with two transformers or feeders offline. The Proponent has found that this increased level of security cannot be applied to existing 132/11 kV zone substations without reducing their ratings. As such, it is necessary to change the design and operating arrangements of the Sydney Central Business District supply network in order to provide additional capacity to meet the newly imposed N-2 security criteria.

Under the N-2 standard, all new zone substations and sub-transmission feeders commissioned after 1 July 2007 must comply with the N-2 security criteria. For existing infrastructure, the N-2 licence conditions apply from 1 December 2007 for all newly constructed assets, from 1 July 2014 as reasonably practical to existing assets, and from 1 July 2019 all existing and future assets must be compliant with the standard. Customer interruptions are required to be less than one minute for the first interruption and less than one hour for the second outage.

The Proponent's analysis has found that if loading of existing Sydney Central Business District zone substations and sub-transmission feeders is kept within their present rating, then the existing Sydney Central Business District network would comply with the service interruption risk criteria until June 2014. The existing system would, however, be non-compliant with the Proponent's licence conditions beyond 30 June 2014, when the load 'at risk factor' can no longer be considered, as the N-2 licence conditions will apply.

The current total capacity of the zone substations in the Sydney Central Business District is 664MVA, however the Proponent's city load forecast has shown that the demand will reach existing capacity by the year 2012. The forecast indicates an expected average annual growth rate of 1.6 per cent (11 MVA) up to the year 2020, with upper limit of 2.2 per cent (15MVA) per annum. The Proponent finds that the modification of the electricity supply and operating arrangements of existing zone substations and sub-transmission feeders is required to provide additional capacity, to meet its obligations under the N-2 licence criteria. As such, to provide a reliable supply for the Sydney Central Business District in the future and to maintain capacity as its current levels, it is necessary to:

- carry out the replacement or refurbishment of aged zone substations over the next decade;
- carry out replacement of aged high-voltage cables supplying Central Business District Zone substations; and
- provide additional supply system capacity to meet projected load growth under N-2 security standard.

Upgrade works for the City North Zone Substation have commenced and were subject to a separate Project Application, which was approved on 21 February 2007 ('City West Cable Tunnel Project'). No required work has been identified for the New City Central Zone Substation, as it is only approximately four years old and it is a 132/11kV type substation.

However for the City East Zone Substation, a site is required for a new zone substation, as the existing substation is approximately 42 years old and is supplied at 33kV from Surry Hills Sub-transmission Substation. The proposed City East Cable Tunnel would be designed to allow for the connection of five 132kV feeders at a new City East site, emanating from the Riley Street Sub-Transmission Switching Station. Similarly, the City East connection must also allow for the installation of the four 132kV feeders that would run between the new City East and Dalley Street zone substations.

The Dalley Street Zone Substation is currently connected to four 132kV oil filled cable circuits that run between Lane Cove and Surry Hills, which were installed in the 1960's and 1970's. The Proponent states that its current condition assessment indicates that two of the four cables are now in a condition requiring replacement or retirement by the year 2012. The remaining circuits have been prioritised for retirement by the year 2017. Therefore, the Proponent states that the refurbishment or replacement of the existing Dalley Street Zone Substation must be achieved to support new feeders emanating from the new City East Zone substation.

The new sub-transmission switching station is required at Riley Street, Surry Hills by the year 2015 to 2016. It would be established to provide a connection of the Eastern Central Business District load and the 132kV supply

to the Eastern Suburbs, but more importantly provide 132kV connections for a future bulk supply point, post the year 2020. The Proponent has purchased land opposite Belmore Park, on the corner of Pitt, Campbell and Hay Streets, to construct a new 132kV to 11kV substation, which is the proposed Belmore Park Zone Substation and is required by the year 2012.

The Department considers that the proposed scheme of works is necessary and would be in the best interest of the State, as it would provide for a major upgrade to the electricity supply infrastructure over the next decade and it will support the ongoing growth and economic importance of Australia's major city, by the continued provision of a reliable electricity supply.

The Department also finds that the Project is consistent with the Priority E2(a) in the State Plan ('reliable electricity supply with increased use of renewable energy'), and particularly the target of 'achiev[ing] electricity reliability for NSW of 99.98% by 2016'. The Project is also consistent with the Priority P2 in the State Plan ('maintain and invest in infrastructure').

2.3 Demand Management

Demand Management refers to the use of financial incentives, education or other programmes to shift the peak load of electricity to another time of day, cut the peak load or reduce the total load by increasing end user efficiency.

The then Minister approved in 2003 an electrical upgrade into the Sydney CBD (TransGrid's Metrogrid Project and Energy Australia's Electricity Cable Project). During the consideration of these projects, a matter raised was the practical effect of demand management measures on the overall scale and need for such augmentations. In light of this, the then Minister imposed conditions whereby both Energy Australia and TransGrid were required to investigate how much demand management opportunities and constraints there were in the Sydney region. In light of this, the Department established the Demand Management and Planning Project to investigate demand management, as an independent body.

The main conclusion of the Demand Management and Planning Project is that it is technically feasible to reduce peak electricity demand. For example calling up the use of standby generators at customer sites and working with customers to shift electricity loads to off-peak times. However, there are a number of constraints to the successful implementation of Demand Management measures.

The current growth in office and hotel space is expected to continue for the next few years, resulting in a growth peak in CBD demand. An econometric forecast has also been carried out for the CBD, which provides an indication of long term growth. It has indicated an expected average growth rate of 1.6% (11MVA) up to the year 2020, with an upper limit of 2.2% (15MVA) per annum.

Matters such as tunnelling provision, avoidance of electricity supply interruptions and alternative substations is considered by the economic regulator in regulating network monopolies, such as the Proponent. It is the most appropriate body for determining justification of network augmentation. In this regard, the Proponent is required to meet its "N-2" licence obligation.

3. STATUTORY CONTEXT

3.1 Major Project

The proposal is a project to which Part 3A of *the Environmental Planning and Assessment Act 1979* (the Act) applies by virtue of a specific Order made by the then Minister for Planning under section 75B of the Act on 11 February 2008.

3.2 Concept Plan Authorisation

On 21 April 2008, the then Minister for Planning authorised the submission of a concept plan for the proposal.

3.3 Permissibility

The proposed development is located wholly within the City of Sydney Local Government Area, within the Sydney Central Business District. The proposed project is permissible without development consent as clause 41 of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) provides that development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without development consent on any land. The Proponent is a statutory state-owned corporation owned by the NSW Government and is an electricity distributor.

3.4 Environmental Planning Instruments

There are no environmental planning instruments that substantially govern the carrying out of the Project.

3.5 Director-General's Requirements and Adequacy of Environmental Assessment

The Director-General Requirements for the preparation of an Environmental Assessment for this Project were issued on 10 June 2008. These requirements were formed based on the Proponent's Concept Plan Application for the entire proposed works and Project Application for the Belmore Park Zone Substation component of the proposal.

The Proponent submitted an Environmental Assessment for the Concept Plan Application, which also included a Environmental Assessment for the Project Application. The draft Sydney CityGrid Concept Plan Environmental Assessment submitted to the Department on 8 September 2008 was found to be inadequate by the Department on 10 October 2008. The reasons for the inadequacy were in relation to a concept level assessment of the potential visual impacts associated with the project and a legible Hazards and Risks study. The Sydney CityGrid Concept Plan Environmental Assessment, with the inclusion of the revised sections, dated November 2008 was found to be adequate pursuant to section 75H of the Act on 21 November 2008. The draft Belmore Park Zone Substation Environmental Assessment submitted to the Department on 10 November 2008 was found to be adequate pursuant to section 75H of the Act on 5 December 2008.

3.6 Exhibition of the Environmental Assessments

The Sydney CityGrid Concept Plan Environmental Assessment was exhibited concurrently with the Belmore Park Zone Substation Environmental Assessment. The Environmental Assessments were placed on public exhibition from 17 December 2008 to 16 February 2009. The Department invited submissions in accordance with Section 75H of the Act. The exhibition locations were:

- Department of Planning's head office in Sydney;
- City of Sydney Council; and the
- Nature Conservation Council.

The Environmental Assessments were also provided for download on the Department's internet site. Notification of the exhibition period was made through three separate advertisements in the *Sydney Central Courier* (17 December 2008 and 21 January 2009), the *Daily Telegraph* (17 December 2008 and 21 January 2009) and the *Sydney Morning Herald* (17 December 2008 and 21 January 2009). The Department has met all its legal obligations so that the Minister can make a determination on the Project.

3.7 Nature of Application and Approval

The Proponent has lodged a Concept Plan Application for a majority of the proposed works in order to have:

- flexibility for the consideration of various options for tunnel corridors;
- a transparent community consultation process, enabling upfront notice of the total intended works; and
- to obtain sufficient certainty that the proposal can proceed, such that detailed planning work can commence, funding be secured and detailed construction timetables be developed.

The then Minister concurred with this approach, as it was accepted that it is impractical for the Proponent to provide complete details of this proposal upfront, given the long-term nature of the proposal and the complex issues associated with the later stages of the proposal that require more detailed consideration of environmental impacts and evaluation. The Concept Plan Application has enabled the proposal to be considered in its totality while providing a flexible staged approvals scheme to reflect the intended staged delivery of the proposal. It is also noted that this concept plan approach has enabled the Proponent to provide detailed information regarding the Belmore Park Zone Substation and associated works, while forming an understanding of the potential constraints with regards to the entire proposed scheme of works. The Department finds that there are specific requirements that the Proponent will need to address in the future, when it seeks Project Approval for the concept components of the proposal, however at the same time it finds there is sufficient information contained in the Environmental Assessment for the Project Application, to recommend requiring no further assessment for the works associated with the Project Application.

The Department therefore recommends that the Minister concurrent with the granting of Concept Approval for the Project, also grant Project Approval under a separate instrument of approval, for the Belmore Park Zone Substation and stub tunnel connection. This will mean that the majority of the works proposed under the Sydney CityGrid Project will still require further assessment in the future by the Department, upon the Proponent lodging the relevant Project Applications.

4. CONSULTATION AND ISSUES RAISED

The Department received a total number of nine submissions, of which eight were from Government agencies and one was from the general public which consisted of four signatures from the local residents and business owners/operators. One very late submission was also received from a property owner.

4.1 Public Submission

Objects to the proposal due to the proposed integration of a commercial component with the substation, as the scale of the development will be increased by the commercial component and this will result in impacts to the visual amenity of the area. The specific reasons for the objection are summarised below:

- the proposed commercial development is not necessary for the development of the substation;
- the architecture of the proposed construction does not match or complement the surrounding buildings, and the aesthetic value of the area will not be enhanced by the proposal;
- a strong glare would potentially result from the reflective glass proposed to be used for the development;
- the proposal will block views of Belmore Park for current and future residents and businesses and visitors to the locality; and
- the feeling of having breathing space in the precinct around the Belmore Park and Capitol Theatre will be severely diminished.

4.2 Government Agency Submissions

Heritage Council of New South Wales – commented on the Concept Plan Application

- Notes that while the archaeological aspects of the proposal have been adequately assessed, there are several elements of the Proponent's Environmental Assessment that do not address the assessment requirements regarding other types of heritage items, nor does it assess the specific issues raised previously by the Heritage Branch in its May 2008 correspondence.
- States that the Environmental Assessment addresses only the non-aboriginal archaeological aspects of four sites along the proposed Sydney CityGrid Infrastructure route (Belmore Park Site; alternative services control room site, located within Cook and Phillip Park; City East Zone Substation potential sites; and Dalley Street Zone Substation site). It further states that there is no identification or assessment of the impact the Project may have on any other type of heritage along the proposed project route(s), such as buildings, gardens or works. It considers that the potential affect of the proposed works on all heritage items should be assessed to identify any adverse impacts that may occur.
- States that it is not clear whether a search of the State Heritage Inventory or State Heritage Register was undertaken by the Proponent, to identify specific sites or structures of heritage significance.
- Notes that the Director-General's requirements required non-aboriginal heritage items 'under or adjacent' to the area affected by the proposal to be identified by field survey and an assessment of the impact of the proposal on the item's heritage significance be undertaken. This specifically includes all heritage items along the proposed infrastructure route(s), not just the locations identified as having archaeological potential. States that it is not clear from the Environmental Assessment, whether this has been undertaken.
- States the structural vibration impacts of proposed tunnelling work on the built heritage along the tunnel route have not been addressed.

Sydney Metro

- States that the proposed City East Cable Tunnel will have a direct interface with the proposed CBD Metro Tunnel, in the vicinity of George and Grosvenor Streets, Sydney. Therefore further coordination is required between the two projects and recommends that the Department request the Proponent to continue to work with Sydney Metro to resolve this issue.
- States that due to similar program timeframes, there is potential for cumulative truck movements associated with the CBD Metro and Sydney CityGrid Project in the vicinity of Central Station in Pitt Street and Belmore Park.

Department of Water and Energy (now part of the Department of Environment, Climate Change and Water)

- Notes that as the proposed construction involves excavations, any groundwater works, including bores and excavations for the purpose of investigation, extraction, dewatering, testing or monitoring, must be approved under Part 5 of the *Water Act 1912* and a licence a licence be obtained from its department prior to such works/installation.

Sydney Regional Development Advisory Committee

- States it does not object the proposal, however provided comments to be considered by the Department with regards to the Belmore Park Zone Substation Component (Project Application). These comments related to traffic management and detailed design issues, such as the need for appropriate signage and markings on the site to ensure the safety of the public, consideration of bicycle parking facilities and the entry/exit of vehicles.

Department of Environment and Climate Change (now the Department of Environment, Climate Change and Water)

General Comments

- States that although the project will not require an environmental protection licence, the Proponent would need to comply with the provisions of the environment protection legislation. This includes the *Protection of the Environment Operations Act 1997*, *the National Parks and Wildlife Act 1974* and the *Threatened Species Conservation Act 1995* during the construction and operation of the project.
- Notes that there is potential for impact on European and Indigenous heritage surrounding the Domain in the Sydney Central Business District. Therefore requests a condition of approval which states if during construction, the Proponent becomes aware of any heritage items or archaeological material, works that are likely to affect the site(s) must cease and relevant authorities be notified, prior to works commencing again.
- Recognises that noise and vibration issues related to the project are of significant concern. It determines that there is potential for significant impact to occur to surrounding receivers and therefore has recommended conditions of approval to manage this.

Concept Plan Application

- States that there are no noise or vibration issues that would be considered as 'show stoppers' however detailed project level studies are required to be undertaken.
- Lists recommended conditions of approval that would in effect become assessment requirements for the concept plan components. The recommended conditions presented in its submission included requirements for detailed descriptions of the project activities likely to generate noise and vibration and assessment of the potential impacts by providing a comparison with the predicted noise and vibration levels to the relevant assessment criteria. The submission further stated that for tunnelling activities, the detailed assessment should include a diagram clearing showing the locations where the tunnel depth is less than the minimum offset distances required to satisfy the vibration and ground borne noise objectives at sensitive receivers. Mitigation measures for potential impacts should be detailed in the assessment.

Project Application

- States that the Proponent must prepare and implement a detailed Construction Noise and Vibration Management Plan and all audible construction works must be conducted between 7 am and 6 pm Monday to Fridays and between 7 am to 1 pm Saturdays and at no time on Sundays or public holidays;
- Recommends the imposition of construction and operational noise objectives as conditions of approval;
- States that any approval granted for the project should include conditions that address issues relating to greenhouse gas potential and air quality impacts resulting from the project;
- Requests a condition be included that requires the Proponent to comply with section 120 of the *Protection of the Environment Operations Act 1997* and apply appropriate treatment techniques and actions to infiltrated groundwater prior to discharge.
- States that any approval for the project should include conditions that address issues relating to the appropriate management and disposal of spoil resulting from the project.

City of Sydney Council

Project Application

- States that the Belmore Park Zone Substation project, if realised correctly, demonstrates a most effective way of incorporating a substation within the urban fabric that is integrated and well hidden within the overall built form. However it notes the key issue is how to ensure the substation is integrated with the intended commercial development of the whole site and how the design of the substation and the rest of the site are to be treated in the event that the substation is constructed first as a stand alone structure.
- States that the proposed 'visual' through site link does not seem to offer any real benefit and therefore further information in relation to this matter is requested. Further states that a Landscape Plan should be submitted with this detailed documentation.
- Raised concerns regarding the Pedestrian Link:
  - notes that the intention of the pedestrian through site link is not made clear on any of the plans submitted with the Project Application. Requires further clarification on exactly how this link is intended to function;
  - requests clarification on ownership/arrangements for public access to the pedestrian link and whether the link will be gated and/or locked at certain times;
  - requests further clarification on whether there will be an easement or positive covenant associated with the pedestrian link, and how the link will be activated;
  - requests further clarification on the extent of public art in the pedestrian link and notes that public art should be considered for the substation façade as well; and
  - requests further information and resolution of the pedestrian link in the context of the commercial development, including proposed finishes and clear widths for the intended pedestrian circulation.
- Raised concerns regarding Public Domain Treatments:
  - notes that the public domain 'activation' in the location of the substation building, fronting Campbell and Hay Streets, is virtually non-existent. States that further consideration of the proposed treatment should be considered during the detailed design development phase and that the integration of public art should be explored.
  - states that the plans contained in the Environmental Assessment contain a number of public domain treatments that may not be supported, such as inclusion of a flagstone trim on the footway;
  - states that the Public Domain Plan and landscape plans must be lodged with Council for approval, prior to a Construction Certificate being issued for any new building work;
  - notes that the public domain works must be staged in accordance with the proposed construction staging and commercial buildings. A staging plan must be prepared and submitted in conjunction with the Public Domain Plan, and must approved by Council prior to any Construction Certificate being issued; and
  - states that prior to the issue of any Construction Certificate, footpath alignment levels for the building, including the public domain and through-site link, must be submitted to, and approved by Council.
- Raised issues concerning landscaping:
  - States that a detailed Landscape Plan, drawn to scale, by a landscape architect or approved landscape consultant, must be submitted to and approved by the Certifying Authority, prior to a Construction Certificate being issued.
- Raised issues regarding Public Art:
  - states that high quality art work must be provided within the development in publicly accessible locations, in accordance with the *Central Sydney DCP 1996* and the Public Art Policy. Further states that details of the art work must be submitted to and approved by Council, prior to a Construction Certificate being issued.
- Raised issues regarding stormwater and drainage, mainly relating to on-site detention, treatment and re-use of stormwater and issues relating to the proposed construction and fit-out with food premises;
- Recommends a condition of approval be imposed requiring further consultation with Council and a further design review workshop to discuss relevant design issues.
- Raised issues regarding traffic concerns, such as provision of a designated loading area must be identified and must not interfere with vehicle circulation and construction programs are to take into account the general ban of construction activities in the City due to special events in the month of December.
- States that a site specific community consultation plan should be prepared and be approved by the relevant authority prior to any works commencing.

- States that a Noise Management Plan, as part of the Construction Environmental Management Plan, should be submitted to Council.
- States that street trees shall be protected at all times during construction, in accordance with the Council's tree preservation order. Approval for the removal of any tree will also be required.
- States that any damage arising to footpaths as a result of construction is to be made good and reinstated in accordance with Council's public domain standards and specifications and the Proponent is to bear all associated costs.
- States that a detailed air pollution monitoring plan should be prepared by a suitably qualified environmental consultant before any building work is commenced.
- States that Electric and Magnetic Field emissions from the substation should be assessed by a suitably qualified and experienced electrical engineer on completion of the proposal.

Concept Plan Application

- City Planning Controls: States that it reiterates its position that the design of the substations should be subject to a competitive design process and that ecologically sustainable development principles should be incorporated into any new design for the sites.
- New Sub-transmission Switching Station at Riley Street, Surry Hills: states that the proposed site for the substation is not ideal as if constructed, it would be too close to the terraces facing Ann Street and may prevent future commercial/retail activation of the surrounding area. Alternatives such as placing the substation away from Riley Street, or underground should be considered.
- Expresses concern in relation to significant tunnelling activities which are to be launched from the Riley Street site. The issue of regenerated noise near the construction sites close to the tunnel alignment is not considered to have been adequately assessed and thus further information is required on this matter.
- Dalley Street Substation: states that whichever option is considered, the Proponent should liaise with Council, in consultation with the State Government's Public Works and Services Department, which is undertaking a laneways/precinct study looking at the redevelopment potential of key sites and the network of lanes that prevail in the area.
- Traffic: a separate Construction Traffic Management Plan for each component must be submitted for approval of Council prior to construction commencing on site.

Sydney Water Corporation

Concept Application

- States main concern is towards the City East Cable Tunnel, particularly the cable tunnel's potential to impact on the Bondi Ocean Outfall Sewer, the Riley Street Branch Sub-main and other existing and future Sydney Water infrastructure assets.
- States that it would further assess the impact of the project at the section 73 Certificate (*Sydney Water Act 1994*) stage of the development. This will enable it to specify any works required as a result of the development and to assess the impacts of the project in building over and/or adjacent to its sewer infrastructure.

RailCorp (Rail Corridor Management Group)

Concept Application (notes these comments also relate to Belmore Park Zone Substation Component)

- States that the noise and vibration assessment does not appear to address the potential impact of works on rail infrastructure (particularly vibration) or the acoustic impact of rail operations on the future developments, particularly the Belmore Park Site.
- Recommended conditions of approval relating to consultation with RailCorp and ensuring the project is designed, constructed and maintained so as not to interfere with rail infrastructure or the capacity to design, construct and operate planned rail infrastructure.
- Requests that items 1 to 12 in its 12 May 2008 submission and items a) to d) in its 17 September 2008 submission, also be incorporated as conditions of approval by the Department. These items related to further work and management measures to be undertaken by the Proponent to address existing infrastructure constraints and the carrying out of dilapidation surveys prior to works commencing.

Project Application

- States that during excavation and construction activities, the Proponent will need to consult with RailCorp's own geotechnical and structural engineers to ensure no adverse impact to rail infrastructure occurs.

- States that artist's impressions provided for the Belmore Park Zone Substation raises the possibility of sighting interference issues for train drivers on the above ground corridor, as it is shown as being highly reflective.
- States that the Electric and Magnetic Field report will need to be review and endorsed by RailCorp's Electrical, Signal and Telecommunications sections prior to construction commencing.
- In RailCorp's earlier correspondence dated 12 May 2008, concerns were raised that there would be impacts to the existing rail corridor and tunnels at Eastern Suburbs Railway – Tunnels near Belmore Park (which will also impact on the existing Metro Light Rail Corridor in Hay Street).
- RailCorp's earlier correspondence dated 17 September 2008, recommended the following:
  - a new electrolysis report for the Belmore Park Zone and Commercial Development, to extend to earthing and bonding considerations for the project and the potential impact on existing rail electrical services;
  - as part of the acoustic investigations, confirm that the distance from the existing rail tunnel to the proposed excavation would be 11 metres;
  - the 20mm/second peak particle velocity criterion applies where there are no existing vibration sensitive installations in the affected sections of the rail tunnel. RailCorp's City Region Office would need to verify and advise the Proponent of this aspect.

On review of the issues identified in submissions, the Department required the Proponent to prepare a Submissions Report to address each of the issues raised in those submissions. The Submissions Report was submitted to the Department on 18 May 2009.

Additional Representations

A late submission was received by the Department on 19 August, 2009 from the owner of a multi-storey commercial building known as Central Square, on the adjacent site of the proposed Belmore Park Zone Substation site at 323 Castlereagh Street, Sydney. The submission did not object to the proposal, but raised two issues of concern:

- urban design;
- electric and magnetic field impacts.

4.3 Further Departmental Consultation with Council and Heritage Office

The Department, on receiving the Proponent's Submissions Report for the Project, advised the availability of the report to those agencies who lodged a submission for the project. The City of Sydney Council and the Heritage Office of the Department provided further comments, with regards to the additional information presented in this report. A summary of these comments is presented below.

City of Sydney Council Response

With regards to the Concept Plan Application, Council reiterates that all substations should be subject to a design excellence competition process pursuant to the design excellence provisions of *Sydney Local Environmental Plan 2005* and should include consultation with Council.

With regards to the Project Application for the Belmore Park Zone Substation, it states that it now understands that there is to be a time delay between the commissioning of the substation and the future construction of the commercial/retail building. Council advises that a condition be imposed to require further articulation of the building prior to completion of the substation in consultation with the Design Review Workshop Panel.

Heritage Office of the Department Response

Notes that several of its comments submitted during its review of the Environmental Assessment have now been addressed. The Heritage Office however notes its previous comment regarding the uncertainty of all heritage items along the proposed infrastructure route, such as buildings, works, relics, gardens, landscapes, views, trees or places of non-Aboriginal heritage significance, not just locations identified as having archaeological potential, were not assessed by the Proponent. It states that the Proponent's Submissions Report indicates that this concern is addressed in Appendix B of the Submissions Report. However it finds that Appendix B contains only a search of two Heritage Registers to identify affected heritage items.

It states that there is no information regarding a field survey to confirm this information or an assessment of any impacts the project would have on any heritage items identified through the search of the heritage registers. As a result of this standing issue, the Heritage Office states that the Department should advise the Proponent to undertake this field survey and assessment as soon as possible for the Concept Components of the Project. The Heritage Office states it awaits further information generated through this field survey and through the vibration impact study on this heritage, which the Proponent has committed to in the Submissions Report. I.e. once the Proponent conducts the detailed design and investigations, the Proponent can determine the vibration impacts.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

Key issues raised in the submissions in response to the public exhibition of the project and/or identified during the Department's assessment included:

- visual amenity and urban design issues;
- noise and vibration impacts; and
- heritage impacts.

All other issues are considered to be minor and have been addressed as part of the Proponent's Statement of Commitments.

5.1 Visual Amenity and Urban Design Issues

Issues

The Belmore Park Zone Substation is proposed to be located in an area that is characterised by a mixture of retail, commercial, entertainment, recreation and residential land uses. Under the Director-General's Requirements for the Project, the Proponent was required to include an assessment of the visual impacts associated with the project, including the impact on local and regional views by the substations and related infrastructure. The Proponent was also required to conduct a design review process for this new electricity infrastructure. The outcome of this design review process was required to be provided in the Environmental Assessment. This design review process was required to be based on the principles of the design review competition of *Sydney Local Environmental Plan 2005*, and include consultation with Sydney City Council.

Therefore the Proponent undertook a design review process aimed at achieving the requirements for design excellence in regard to the visual amenity and design aspects of the Project. A design review workshop was held on 22 August 2008, and included representatives from the Proponent, City of Sydney Council, the Department and Architectural Peers (Assistant Government Architect and representatives from a multi-disciplinary design practice). The purpose and desired outcomes of this design review workshop were firstly to assess the visual impacts of Stage 1 (i.e. the construction and operation of Belmore Park Substation and associated infrastructure), secondly to assess the design for Stage 1, as an integrated development and thirdly to agree and record that the design exhibits design excellence with regards to the following matters:

- achieves a high standard of architectural design, material and detailing appropriate to the building type and location;
- the form and external appearance of the building would improve the quality of the public domain; and
- the new development does not detrimentally impact on view corridors identified in the relevant development control plan.

The design review workshop commenced with a presentation by the Proponent of the proposed development design to the review panel and an open forum discussion was then held. The key design and construction aspects that were discussed related to architectural treatments, urban setting and orientation, sun access plane, the through-site link and construction sequencing. A number of comments were made regarding the design of the substation, particularly from Sydney City Council, the Department and Architect Peer. As a result of the comments that were made at the workshop, the Proponent developed a revised scheme. It was also agreed that a further meeting should be held to discuss the revised scheme and to confirm whether the development achieves design excellence. A final design review workshop was held on 7 October 2008, to assess the design amendments and finalise the review process. It was concluded at this second design review workshop that with the design amendments incorporated the Project exhibits 'design excellence'.

Figure 7 illustrates the composition of the proposed development. The substation (blue) uses the eastern part of the site with functional areas on multiple levels. Un-utilised space above the substation (red) allows for conventional transformer cooling methods. The western part of the site is retained for 'Stand Alone Commercial Development' (yellow). The substation was then further developed to take into account the location of the site, the surrounding built form and the options for development of the remaining footprint and an integrated substation design with commercial development was chosen as the preferred option as illustrated in Figure 8.

Figure 7: Composition of the Integrated Development

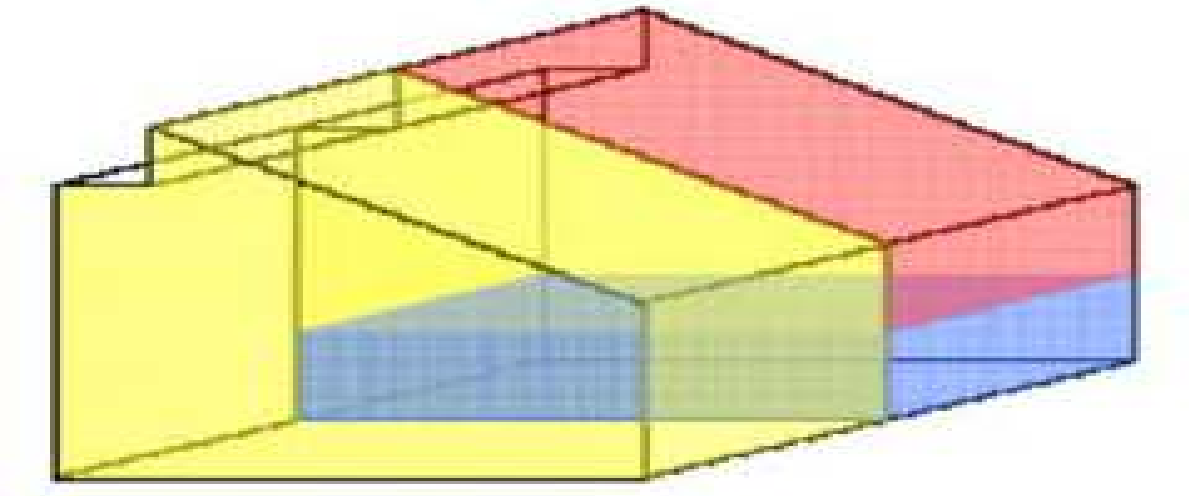
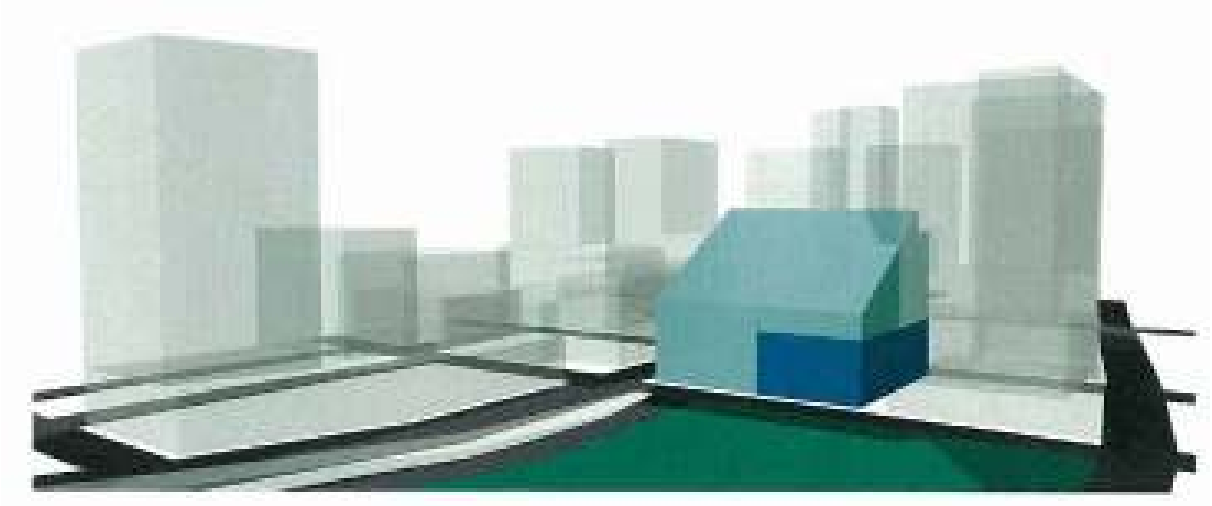


Figure 8: Integrated Substation/Commercial Development



Thus the Project is an integrated substation development, with the substation comprising of seven floors in total including two basement levels, a single row of transformers at ground level and sealed radiator cooling of the transformers.

The Proponent proposes to construct this development in two stages, with the substation to be developed first. The Proponent states due to the recent global credit crisis, including the down-turn in the Sydney property market, a developer has not yet been secured for the entire site development. This issue is compounded by the fact that it needs to construct the zone substation component by the year 2012. The Proponent therefore proposes that there would be a two staged construction process. That being:

1. bulk excavation, building works (including temporary treatments and landscaping), electrical fit out and commissioning for the zone substation component only; and
2. remaining bulk excavation for the site, building works (include final façade details for the commercial component and the zone substation), fit out of the retail and commercial floors.

As a result of the proposed two-staged construction process, the Proponent has presented respective landscape works to ensure the development provides an appropriate urban space solution and creates a unique place within the southern precinct of the City of Sydney local government area, which would allow for passive recreation and provide for pedestrian access around the Project. The principal design elements for the integrated development are:

- a visual link through the site;
- a pedestrian link;

- public footpath landscaping;
- temporary landscape treatment;
- design of the integrated development (substation and retail/ commercial development.

Visual through Site Link
A through site visual link to the eastern side of the proposed development, between Campbell and Hay Streets is proposed and will be constructed as part of the substation works. This approximately six-metre wide strip of land will not be accessible to the public. No access to the public was determined to be appropriate during the design review workshops, as it may pose as a safety hazard. This strip would consist of a paved pathway immediately adjacent to the substation with the remainder consisting of a landscaped area. Figure 9 shows this overall landscape elements and Figure 10 is a magnified image of the landscape area for the through site visual link.

Pedestrian Link
A pedestrian link will be developed as part of the commercial development, to act as a public thoroughfare between the commercial/retail component of the project and the street. However details of this component would be determined during the detailed design phase of the commercial development.

Public Footpath Landscaping
The development site is bounded by Pitt, Hay and Campbell Street and the Proponent states that all landscaping works proposed are in keeping with City of Sydney Council standards as follows. This being, footpaths of asphalt to allow for ease of access to existing services, street trees to be *Flindersias* species and appropriate kerb and guttering.

Temporary Landscaping Treatment
The Proponent states that although the intention of the integrated development is for the commercial/retail component to dovetail the substation works, as outlined above, there may be a delay between the completion of the substation and commencement of the commercial/retail building works. In the event that this occurs, the Proponent proposes that landscaping treatments to the substation would be considered, if the delay between the completion of the zone substation and commencement of the commercial component is more than 12 months.

The Design of the Integrated Development (Substation and Commercial/Retail Development)
Figure 11 illustrates the north, south, east and west elevations of the integrated development. Overlooking Hay Street, the proposed building volume picks up the tree canopy height of the adjacent Belmore Park. The south façade, with its six levels, continues in an angle from the seventh level towards the north where it reaches its highest point at level 14. A continuous band of glass covers the north, south and angled roof façade. An atrium located in the centre of the building defines itself through the outside with a different glass tone. Fixed horizontal sun-shading elements cover vision panels and substation louvres on the north and south façade.

The western façade facing Pitt Street comprises a glazed curtain wall. Protection of intense sunlight is given by vertical sun-shading elements to the west and horizontal elements to the north. The proposed material would be a silver finish to allow for a consistent indirect light spreading deep into the floor spaces inside the building. The Proponent states the ground floor façade, comprising the main entrance for the upper floors on Pitt Street and retail space on the north and south perimeters, opens itself up to the urban hub of the area. Floor to ceiling glazing would provide views inside and materials such as black granite to the entry lobby fronting Pitt Street and anodised aluminium give the façade a classic modernist feel. The Proponent states that overall, the building would add to the quality of the area around Belmore Park and Central Station precinct, understanding it as a gateway site for Sydney's Central Business District.

Figure 9: Landscape design scheme for Integrated Development (reproduced from the Proponent's Environmental Assessment)

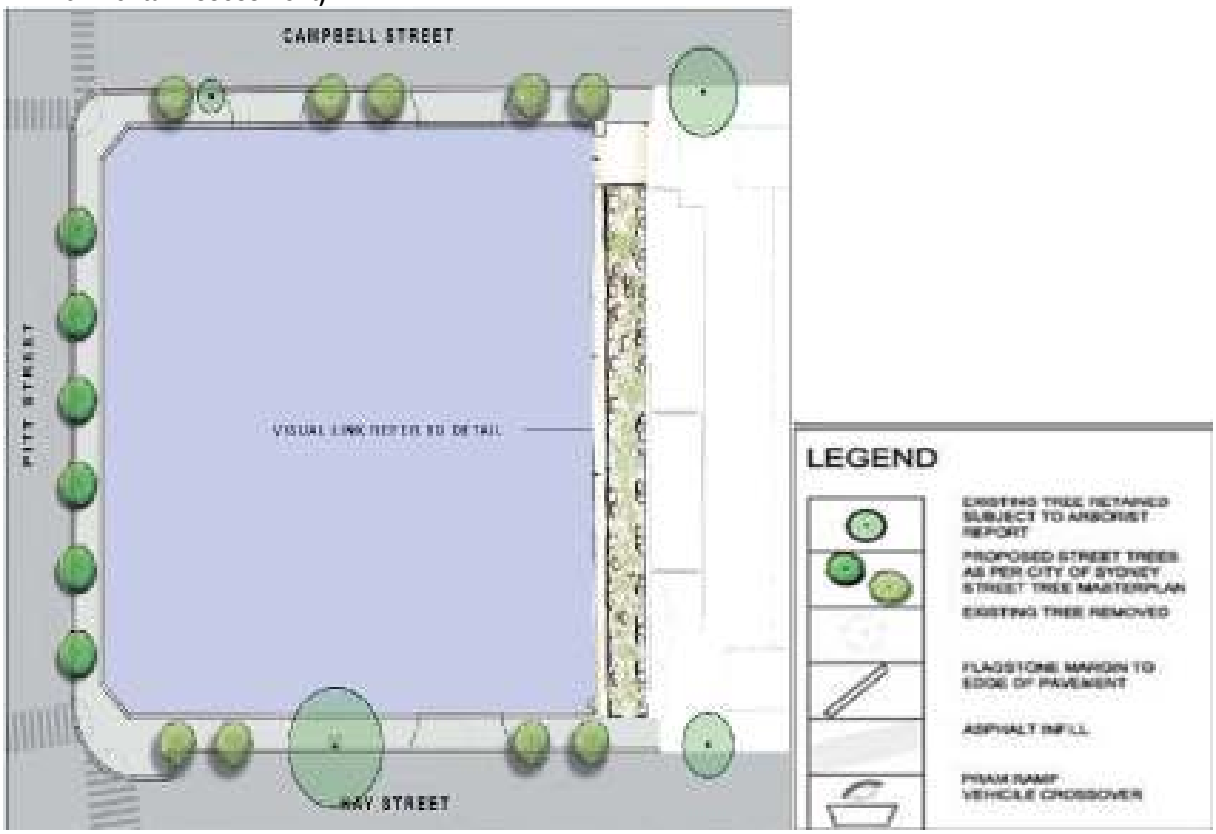


Figure 10: Conceptual sketch of the landscape component of the through-site link (reproduced from the Proponent's Environmental Assessment)

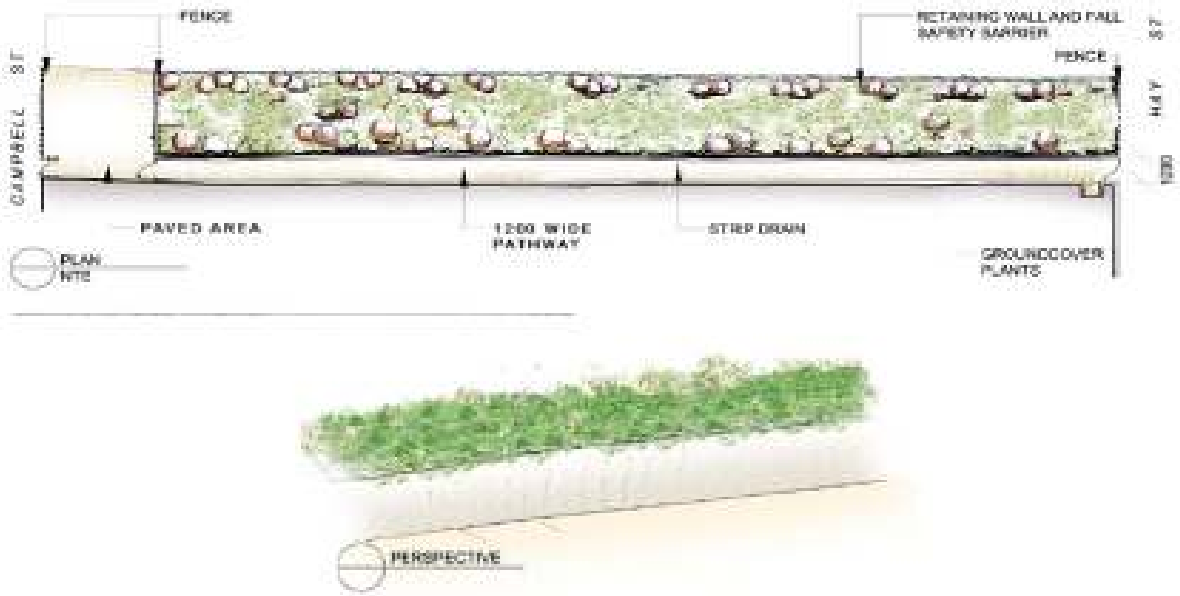


Figure 11: The façade treatments of the Integrated Development

Issues Raised in Submissions

Issues raised in the public submission on the project can be summarised as follows:

- States the Belmore Park Integrated Development would block views of Belmore Park for current and future residents and businesses (and their customers/clients).
- States that an unnecessarily tall three-storey glass ceiling will obscure Belmore Park views.
- States that feeling of having breathing space in this important precinct around Belmore Park and Capitol Theatre will be severely diminished.
- The late submission from the owners of the adjacent Central Square building stated that pedestrian access in the visual link area would be appropriate. It also raised concerns about the architectural design of the standalone substation.

The submission from the City of Sydney Council raises the following matters:

- Finds that the visual-site link may not serve any real benefit and a detailed landscape plan should be developed to enable a better understanding of its purpose.
- Notes the pedestrian through site link is not made clear on any of the Proponent's plans and requires clarification on how this link would function. Also requests further information and resolution of the pedestrian link in the context of the retail development, including proposed finishes and clear widths for the intended pedestrian circulation.
- Notes that public domain 'activation' in the location of the substation building, fronting Campbell and Hay Streets, is virtually non-existent. Further consideration of the proposed treatment should be considered during the detailed design phase and that the integration of public art should be explored.
- Notes that the public domain works must be staged in accordance with the proposed construction staging of the substation and commercial buildings. Thus states a staging plan must be prepared and submitted in conjunction with a Public Domain Plan. The staging plan must clearly show the proposed extent of public domain works for the substation and the commercial building.

- States high quality public art must be provided within the development in publicly accessible locations, including near main entrances, in lobbies and on street frontages.

The submission from RailCorp stated that the artist's impressions provided in the Environmental Assessment raise the possibility of sight interference issues for train drivers on the above ground corridor, as it is shown as being highly reflective.

Modifications to the Development Design

External Finishes

Upon reviewing the issues raised in the submissions, the Proponent presented additional information in its Preferred Project and Submissions Report. It acknowledged that it may not find a developer to construct the proposed commercial/retail development in the originally anticipated time frame of one to two years following construction of the zone substation and that it may be five to ten years before the integrated development is realised. It therefore revised the temporary façade treatments and landscaping, to account for the stand alone substation only and the integrated commercial development.

For the stand alone substation, it is proposed to provide temporary façades for the building, which is to be removed in the future, when the commercial/retail (thus integrated) development is constructed. The temporary facades would extend down to within approximately 3.5 metres of the footpath level. The lower 35 metres would have a permanent honed granite cladded finish (refer to Figure 12 and 13).

The Proponent proposes to use a cladding material that has a nominal design life of 10 to 15 years, although it is not anticipated that it would be required for that length of time. The west façade has been designed to provide a visual interest to an otherwise blank wall. The Proponent states this responds to the colour of the surrounding built landscape with an accent on the sandstone and red brick tones. The otherwise flat relief is broken by a rectangular area of recessed cladding which is further emphasised by creative illumination within this recess feature at night time. The cladding terminates approximately 3.5 metres above ground level. A "green" landscape wall would be provided along this lower apron to provide further interest and to provide continuity with the adjacent Belmore Park.

The north, south and east faces of the substation would feature pre-finished metallic light silver cladding to serve as an appropriate neutral background to the natural landscape of the adjacent Belmore Park. The coloured cladding will provide continuity around the building and to create a bold contrast with the light silver cladding. The wall cladding up to about 3.5 metres height to the north and south-street frontages and returning partly into the east façade would be of honed black granite material.

It should be noted that the visual design of the integrated development (substation and commercial/retail building) has not been changed and remains as per the exhibited Environmental Assessment. The intention is that the future owner of the commercial/retail component and the Proponent would remove the temporary cladding and replace with the finish described in the exhibited Environmental Assessment (i.e. as described in sub section titled 'the design of the integrated development' of this report).

The Proponent states that in recognition of the semi-permanent nature of the temporary façade (as it may take up to ten years for the commercial/retail development to be realised) and as suggested by the City of Sydney Council at a meeting on April 2009, the Proponent intends to continue the consultation process and obtain advice from Council's design advisory panel in lieu of a design review panel workshop, as was used for the design of the integrated development.

Landscape Staging and Public Domain Plan

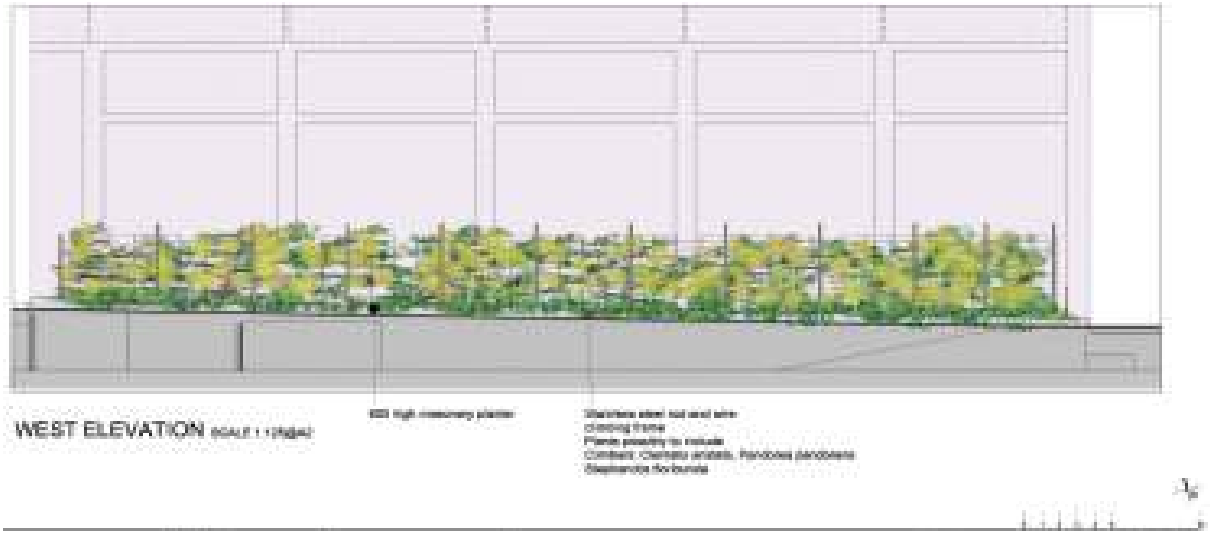
The visual through-site link, as proposed for the integrated development, would be constructed as part of the construction of the substation component of the development. Apart from the paved strip with an elevated area to accommodate for small shrub and grass plants already proposed, the Proponent will now also provide an approximately 3.5 metre high "green" mesh fence, to act as a screen for the lower substation louvres and to provide interest when viewed by the eastern neighbour. The Proponent would use lighting to provide further interest at night time and the mesh fence would be sinusoidal in plan, supporting climber plants. This means the fence would be installed in a manner that allows it to consist of curves, which will thus incorporate a series of 'peaks' and 'troughs' (refer to Figure 14).

Figure 12: Temporary Façade treatments for Substation Only Construction

Figure 13: Conceptual Model and Images of the Temporary Façade Treatments for Substation Development

Figure 14: Visual through site Link (reproduced from the Proponent's Environmental Assessment).

Figure 15: 'Green Wall' to be situated on the western side of the substation building (reproduced from the Proponent's Environmental Assessment).

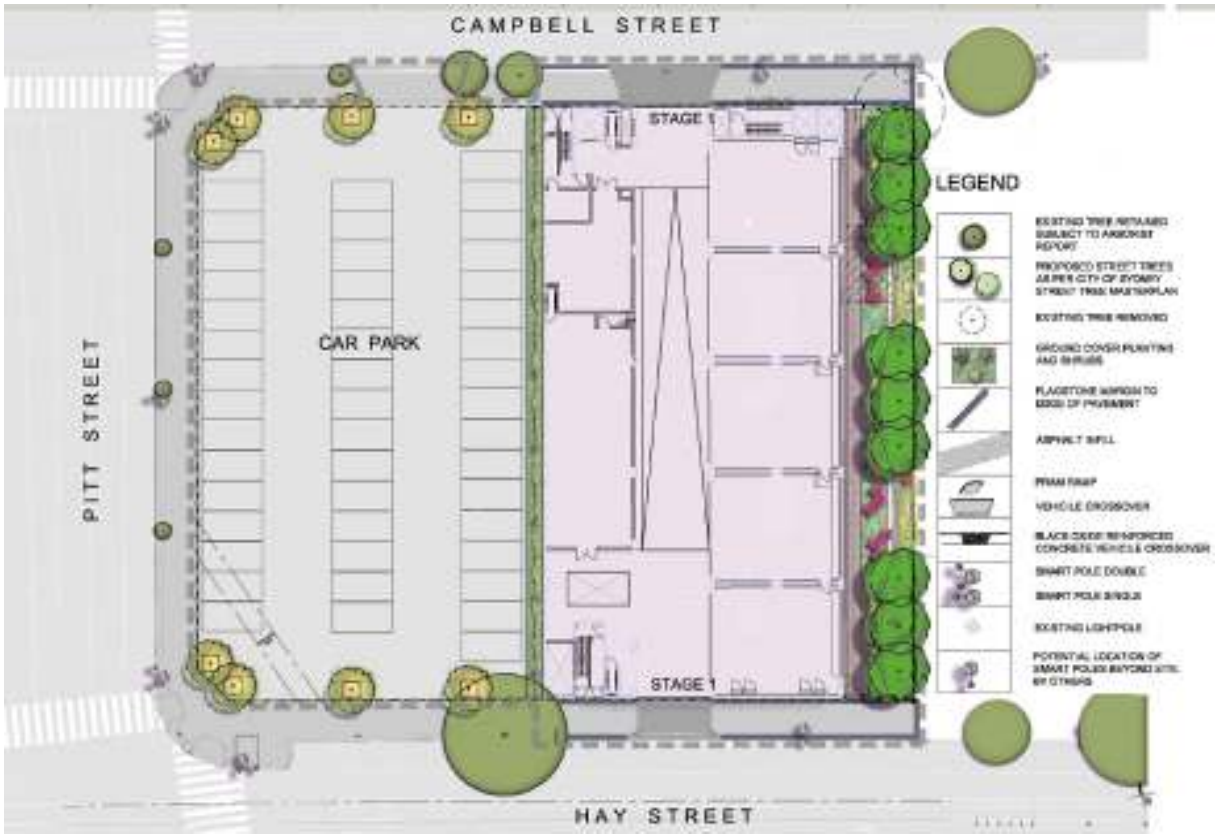


Trees would be planted in the 'peaks' and 'troughs' to add further screening and to soften the boundary between the properties. Consistent with the plans exhibited in the Environmental Assessment, this strip would be permanent to provide a visual through site link between Hay and Campbell Streets and would not be accessible to the public for security reasons. At either end of the strip, a toughened, etched glass wall will be present at either end of the strip to prevent public access.

A "green wall" along the bottom of the west façade is also proposed by the Proponent, this can be seen in Figures 12 and 15. This would comprise a mesh fence with climber plants up to about three metres in height. The Proponent states the purpose of this 'green wall' is to provide a soft edge to the public car park and further contrast to the substation façade. The Proponent further states that the use of plants on this fence would minimise the potential for graffiti and vandalism. This 'green wall' is only temporary as it would be removed upon the commencement of the commercial/retial development construction. Also a number of temporary trees would be located within and around the car park perimeter in planter boxes. Permanent trees would also be planted along Hay and Campbell Streets, adjacent to the substation building. Figure 16 shows the total landscape works proposed for the substation building.

Figure 16: Landscape works for the substation component (note the existing car park is the area on which the commercial/retail development would be constructed)

Consideration



In assessing the suitability of both the design of the integrated and stand alone substation developments, it is necessary to evaluate the visual form of the buildings surrounding the proposed development site. It is important for the development to be able to either complement or blend into the locality, in order for it to be accepted as aesthetically pleasing. In some situations, however, something dramatically different can also work if it is designed well. The section below provides a brief evaluation of the surrounding built environment.

Surrounding Buildings

The Chamberlain Hotel, located at 420-428 Pitt Street, is immediately to the north of the subject site. It was built in 1904 and altered in 1936 and is one of the City's few surviving Federation Anglo-Dutch style hotels. The hotel occupies a prominent position on the corner of Pitt and Hay Streets (refer to Figures 17 and 18).

Directly opposite the site, the west side of Pitt Street, running horizontally between Hay and Campbell Streets, is the Manning Building. The Manning Building was erected in 1916, re-using a large proportion of material from the pre-existing New Belmore Market Building, constructed on part of the subject site in 1893. The Manning Building presents a red-brown face brick façade to the street. It incorporates typical early Federation city building design elements, such as arched fenestrations, strong pilasters, rendered and carved decorative elements (such as capitals, shields and balusters). The Manning Building has undergone redevelopment, which involved the addition of five floors, raising the building height to about eight floors. The upper levels are finished in face brick, similar to the original section of the building, with a traditional pattern of fenestration. The top level is setback with a floating flat roof element (refer to figure 19).

To the north of the site, high rise office and residential towers form a backdrop, dwarfing those streetscape elements reflecting the 19th and early 20th Century phases in the locality (refer to Figure 20). To the south-west of the car park on the site, on the corner of Pitt and Hay Streets, is a two-storey sandstone cottage, which was constructed in 1820 as a Presbyterian Manse. The scale of the building shows a strong contrast with the surrounding developments and is an important element in the Haymarket streetscape (refer to Figure 21).

Figure 17: Views from the Site to the Chamberlain Hotel

Consideration

It can be seen that the design of the proposed integrated development is a distinct contrast to the majority of the existing buildings. That said, it can also be seen that the area in which the development is proposed contains a mixture of services that are housed in buildings of varying form and style. The proposal site is surrounded by buildings that were erected in the years 1820 to 1936 (commercial development – Chamberlain Hotel, retail - Manning Building and the two storey cottage that was previously the Presbyterian Manse) and also by modern high rise office (Central Square and Sydney Central) and residential towers (Regis Tower). The Belmore Park, situated to the south of the proposal site is the only urban green park within the locality, which provides for passive recreation. For these reasons, it can be understood that the design reflects the urban setting in which it is proposed and provides integration with the high rise backdrop of the office and residential buildings (refer to Figure 20).

The proposed integrated development was assessed in terms of its design through a design review process. The outcomes of this process are presented in the first part of this section. The Department finds that the architectural design and material proposed for the development is appropriate to the proposed use of the building and the location in which it would reside. The form and the external appearance of the proposed development will also improve the quality and visual amenity of the locality, as it would offer visual interest, to a site that would be otherwise undeveloped. Also the design of the building is consistent with the existing planning controls contained in the *Sydney Local Environmental Plan 2005*, particularly clause 50 Height of Buildings. This being, the proposed development envelope has been designed to comply with the Belmore Park Sun Access Plan A1 (25 metres on northern alignment of Hay Street with a vertical angle 32 degrees 30' providing a maximum height on Campbell Street of 60 metres to the ridge). The Department notes that the proposed building has a maximum height of 58.4 metres to the ridge, thus allowing the sun's rays to reach Belmore Park.

Figure 18: Views from the Site to the Chamberlain Hotel

Figure 19: Manning Building, viewed to the south-west from the Hay Street across the subject site (reproduced from the Proponent's Environmental Assessment).

Figure 20: High Rise Backdrop to the Subject Site (reproduced from the Proponent's Environmental Assessment)

Figure 21: View of the heritage item, the two storey sandstone Georgian building, viewed west from the subject site (reproduced from the Proponent's Environmental Assessment)

The Department understands that the proposed development would not cause adverse glare for the public, including pedestrians and drivers at surrounding locations, due to the proposed glazing to be incorporated into the external finish for the building. As stated by the Proponent, the glazing elements would have a reflectivity coefficient of less than 20 per cent and the other external façade materials would have a low reflectivity.

The integrated design is an innovative approach for operating a substation within an urban façade that is integrated and well disguised within the overall development. However it is noted that the landscape elements for the development (both for the stand alone substation and the integrated development) will be further articulated by the Proponent during the detailed design phase of the project. Also the City of Sydney Council provided comments to the Department, regarding the updated design information contained in the Proponent's Preferred Project and Submissions Report. The Council's Design Advisory Panel reviewed the information and recommended the following:

- All public frontages include articulation and activation and this could be layered on the perimeter to the substation. The activation does not have to be permanent or 'fixed'.
- The north and south façade have large roller shutters that have negative impacts to pedestrian amenity. A corten steel screen could be designed to conceal the roller door when not in use.
- The use of corten steel panels are cladding for the structure should be extended to the street frontages of the building (north and south) facades.
- Supports a condition to require further articulation of the building prior to completion of the substation, in consultation with the 'Design Review Workshop'.

Due to the above identified issues, the Department has recommended a project design condition, which requires the Proponent to submit for the approval of the Director-General, detailed plans, including landscape design treatments and temporary façade treatments for both the substation and the commercial/retail building. The Department has also recommended a condition that requires the Proponent to consult with Council's Design Advisory Panel, during the detailed design phase of the project. This recommended condition also states that the articulation of the substation building, if required by the Design Advisory Panel, shall be further refined as part of this required consultation process, including the potential uses of the public frontages of the building. The aim of this further consultation process is to ensure that the final design of the integrated development is consistent with the Proponent's Project Application, the outcomes of the Design Review Process and meets the reasonable requirements of the Design Advisory Panel.

The Department has consulted with the City of Sydney Council regarding this recommended requirement for the Proponent to further liaise with Council's Design Advisory Panel, rather than those representatives who attended the design review process for the proposal. The Council provided verbal support for utilising its Design Advisory Panel. The Department notes that the members of this Design Advisory Panel hold knowledge and experience in the field of architecture and urban design and also two representatives of this panel were part of the design review workshop (NSW Government Architect and the multi-disciplinary design practice representatives).

The Department notes that as the Proponent has stated it may not find a developer for the commercial/retail component within two years of the substation being built and that it could take up to ten years for a developer to be secured, the Proponent has proposed a 'semi-permanent' façade treatment to encompass the stand-alone substation, until the commercial/retail component is built. This means that the design of the integrated development, which was developed as part of the design review process, will be realised once both the substation and commercial components of the development are constructed. Thus the above recommended condition addresses the issue of the 'semi-permanent' façade treatment proposed for the stand alone substation. The Department considers that while the 'semi-permanent' façade treatment would enable the proposed building to blend into the existing environment, due to the use of cladding and a colour scheme that reflects the existing buildings, it is still essential for the 'semi-permanent' design to be accepted by the Design Advisory Panel.

Due to the potential for the substation to be built as a stand-alone component, the Department has provided flexibility for the Proponent when submitting the required detailed plans. The Department has recommended a condition that allows for the Proponent to submit the relevant detailed plans to the Director-General, for the substation and the commercial/retail development separately, prior to the construction of that relevant component. This ensures that the design of both the complete integrated development and the two building components will meet the reasonable requirements of the Design Advisory Panel and be submitted to the Director-General for approval. It should be noted however this condition allows for bulk excavation of the site to occur prior to these plans being approved. This is because the Department recognises that the bulk earth works have no design consequences in relation to the development to be built. While these earthworks are occurring, the Proponent will be able to develop and submit the detailed plans required to the Director-General. All other construction works, apart from bulk excavation, cannot commence until approval has been received.

As indicated above, the reason for restricting pedestrian access to the visual link area is because of safety and security concerns. The Department's recommended conditions requiring further detailed design review will provide the opportunity for this issue to be further considered.

The Department is satisfied that the provisions contained in the recommended conditions will ensure the proposed Belmore Park Zone Substation and Commercial/Retail Development is appropriately realised, in terms of the development's functionality, environmental design and aesthetic quality.

5.2 Noise and Vibration Impacts (Stage 1)

Issues

The Proponent conducted a noise and vibration assessment in accordance with DECC's *Industrial Noise Policy* and its *Environmental Noise Control Manual* for operational and construction noise respectively. The Proponent identified seven sensitive receivers surrounding the proposed Belmore Park Zone Substation Site, however it also noted that nearby receivers in Campbell Street, Pitt Street and other nearby streets should also be considered as being 'potentially affected' by airborne noise, regenerated noise and vibration due to the proposed works. The seven sensitive-noise receivers are listed in Table 2 below.

Table 2: Noise and Vibration-Sensitive Receivers

Receiver Type	Receiver Location
Residential	420 Pitt Street/36 Campbell Street – Strata Units
	414 Pitt Street – Strata Units
	317-321 Castlereagh Street – Strata Units
Hotel/Tavern	428 Pitt Street – Chamberlain Hotel
	431 Pitt Street
Commercial	323 Castlereagh Street
	441 Pitt Street

Construction Noise

The Proponent established a benchmark Sound Power Level (L_{A10} and L_{Amax}) for each plant item likely to be used on site. It determined the Sound Power Levels by measuring existing plant machinery in good working order in use in the State, and as such considers them to be readily achievable on future projects, such as this proposal.

The Proponent has identified the nearest residential receiver to be the Meriton Mosaic apartments, overlooking Belmore Park and located approximately 40 metres from the nearest (northern) boundary of the proposed site. These apartments are identified as the strata units, located on 36 Campbell Street (refer to Table 2). The Proponent therefore conducted a construction noise assessment for the residential receivers in the Meriton Mosaic apartment building, based on the determined Sound Power Levels. Table 3 below illustrates the results of this assessment. The Proponent states that the results are indicative of the operation of some of the noisier plant items working in isolation at the northern boundary of the site, representative of early ground level works when establishing the site. The Proponent determined representative limiting sound power levels for typically-used plant items, based on measurements undertaken on projects of similar scale to the proposed works. The results depicted in Table 3 demonstrate that the operation of approximately half of the typical plant machines would generate a noise level that exceeds either the night-time sleep disturbance or the daytime noise criteria (shaded light orange). The Proponent has stated that this situation is not atypical for construction activity in populated urban areas but due to the potential for such exceedances, it will be necessary to implement feasible and reasonable construction noise mitigation measures. These include erecting hoardings along the site boundaries and selecting the smallest and quietest practicable plant items for each construction task, whilst maintaining efficiency of machine operation. The Proponent further states that these measures will apply to the substation and commercial building components of the Stage 1 development, which will be constructed separately in a staged approach potentially up to five to ten years apart (with the substation to be constructed first).

Construction Vibration

The Proponent analysed vibration assessment criteria outlined in DECC's *Assessing Vibration: A Technical Guideline* document (August 2006). The DECC guideline provides preferred and maximum vibration dose criteria, and states there should be a low probability of adverse comment or disturbance to building occupants at vibration values below the preferred criteria. Adverse comment or complaints may be expected if vibration values approach the maximum criteria. The Proponent determined safe working distances for the project, which correspond to the distance at which the maximum vibration level generated by the operation of the plant item is predicted not to exceed 2mm/s, to ensure no risk of cosmetic damage to buildings occurs. The Proponent does not determine the vibration levels that could occur based on the criteria, rather focuses on the safe working distances for the project.

Table 3: Belmore Park Construction Noise Assessment Results – dB(A)

Plant Item	Sound Pressure, 40 metres	
	LA_{max}[1]	L_{A10}[2]
Concrete Saw	77	74
Excavator Hammer	81	75
Rock-breaker	83	77
Jackhammer	72	66
Excavator (approximately 3 tonne)	49	46
Excavator (approximately 6 tonne)	54	51
Excavator (approximately 10 tonne)	59	56
Excavator (approximately 20 tonne)	64	61
Excavator (approximately 30 tonne)	69	66
Excavator (approximately 40 tonne)	74	71
Excavator (over 40 tonne)	77	72
Skidsteer Loaders (approximately ½ tonne)	66	63
Skidsteer Loaders (approximately 1 tonne)	69	66
Dozer (equiv. CAT D8)	77	72
Dozer (equiv. CAT D9)	79	74
Dozer (equiv. CAT D10)	80	75
Backhoe/FE Loader	70	66
Scraper	69	64
Tractors, tracked (50 to 100 kW)	76	72
Grader	69	64
Tracked Loader (0 to 50 kW)	75	70
Tracked Loader (200 to 300 kW)	81	76
Dump Truck (approximately 15 tonne)	67	62
Dump Truck (20 tonne)	66	61
Dump Truck (25 tonne, 120kW)	73	68
Concrete Truck	71	66
Concrete mixer truck (24 tonne)	75	70
Concrete Pump	68	66
Concrete Vibrator	64	62
Concrete Vibrator, hand held	62	60
Bored Piling Rig	69	63
Vibratory Roller (approximately 10 tonne)	73	70
Vibratory Pile Driver	80	74
Compressor (approximately 600 CFM)	59	59
Compressor (approximately 1500 CFM)	64	64
Compressor standard	70	70
Compressor Super silenced	54	54
Generator	63	62
Lighting Tower	39	39
Flood Lights	49	49
Cherry Picker	61	58
Mobile Crane	69	64
Crane, truck mounted (20 tonne to 60 tonne)	68	63
Hammer drill	71	68
Grinder	65	62
Chipping hammer/chisel	78	75
Impact wrench (12mm cap)	56	53
Electric Drill	50	47
Rattle Gun, hand held	64	61

Note: The LA_{MAX} noise levels predicted to exceed the Belmore Park Sleep Disturbance criterion of 69dB(A) and the LA_{10} noise levels predicted to exceed the Belmore Park Daytime noise criterion of 66dB(A) are shown in shaded orange.

The Proponent made a distinction between Human Comfort vibration criteria and Structural Damage vibration criteria, noting that DECC's *Assessing Vibration: A Technical Guideline* document only takes into account Human Comfort. The Proponent found that assessing vibration in terms of Peak Particle Velocity would be relevant for the project. With regards to human comfort vibration criteria (peak velocity), it was found that people will be able to feel floor vibration at levels of about 0.15mm/s and that the motion becomes 'noticeable' at a level of approximately 1 mm/s.

The Proponent's assessment indicates that vibration as a result of construction can potentially impact on human comfort and structural integrity of buildings located in close proximity to the site. As the Meriton Mosaic apartment building is located approximately 40 metres from the boundary of the proposed site and there are other buildings in close proximity to the site, the risks of these impacts are high. The Proponent outlines safe working distances, which correspond to the distance at which the maximum vibration level generated by the operation of a subject plant machinery item is predicted not to exceed 2 mm/s (this vibration level is easily noticeable by humans). To mitigate adverse impact to human amenity and structures, the Proponent has proposed to undertake monitoring to confirm the recommended safe working distances for buildings, at locations where buildings are closest to the site and carry out vibration monitoring where vibration intensive activities (for example rock breaking) are required to be carried out within the established buffer zones (safe working distances), or where there is considered to be a risk that vibration levels may exceed the relevant structural damage criteria. The Proponent has also proposed to conduct buffer distance vibration testing at the commencement of construction work with potentially vibration inducing equipment.

Operation Noise

Subsequent from the exhibition of the Environmental Assessment, the Proponent decided to change the transformer technology from sulphur hexafluoride gas insulation to oil. Therefore the Proponent revised its noise and vibration assessment in order to include an assessment of the impacts associated with the use of oil based transformer technologies, which included FR3 or ester type oils and mineral oil for transformer installation. This revised assessment, included in the Submissions Report and Preferred Project Report, has been amended only in regard to the assessment of operational noise impacts associated with the use of alternate oil technology. All other construction and operation noise impacts assessed by the Proponent remain unchanged from the report included in the exhibited Environmental Assessment.

The Proponent's operation noise and vibration assessment was guided by DECC's Industrial Noise Policy guidelines. The Proponent conducted an ambient noise survey at a location indicative of the nearest residences to the proposed development site, being the Meriton Mosaic apartments to the north of the development site. The purpose of this survey was to establish the existing ambient noise levels for the determination of design goals for noise being generated from the proposed substation. It was found that the average sound level was 64 LAeq for the daytime (7am to 6pm), 63 LAeq for the evening (6pm to 10pm) and 60 LAeq for the night period (10pm to 7am). The Rating Background Level for the daytime was 61 LAeq, for the evening it was 59 LAeq and for the night period it was 54 LAeq.

The Department of Environment and Climate Change's recommended daytime, evening and night-time period acceptable noise levels for residents located in urban areas are 60 dB(A), 50 dB(A) and 45 dB(A) respectively. As the ambient noise levels exceed this recommended acceptable noise levels, in accordance with the Industrial Noise Policy, noise levels for new developments are required to be 10 dB(A) below the existing noise levels. Thus, the **amenity noise goals are 50 dBA at night, 53 dBA for the evening and 54 dBA for the day**. This amenity criteria thus determines the site specific operational noise goals. The amenity criteria would apply over the whole daytime, evening and night-time periods, while the intrusive criterion applies over any 15 minute period.

For commercial receivers (commercial premises), the acceptable LAeq noise levels is 65 dB(A) when the commercial premise is in use. Given the existing ambient noise levels are 1 dB(A) , 2 dB(A) and 5 dB(A) below the recommended acceptable noise level for daytime, evening and night-time respectively, in accordance with the Industrial Noise Policy, noise levels from new developments are required to be up to 6 dB(A) below the existing noise levels. Therefore the **amenity noise goal for commercial receivers is 59 dB(A)**.

It must be noted that the Proponent's construction noise assessment focused on the construction of the zone substation only, not the integrated development. This is because the commercial development is proposed to be integrated into the substation building potentially 5 to 10 years after the substation is constructed. However the

Proponent considers that the noisiest activities associated with the bulk excavation and construction of the commercial building will be similar to those for the substation component. The Proponent's operational noise assessment incorporated the integrated building and was based on the significant noise sources from the substation component and the commercial building component.

Predicted Operational Noise Levels – Substation
The calculated L_{Aeq} noise levels at the nearest residential boundaries for the zone substation component are presented in Table 4 below. The Proponent stated that it predicted noise levels at all receiver levels and the floor level outlined in its assessment is the floor where the highest levels of noise were predicted.

Table 4: Predicted Operational Noise Levels - Transformers and Cooling Radiators (reproduced from the Proponent's Environmental Assessment)

Receivers/Address	Floor Level	Criteria (INP Amenity)			Received Noise Level (dBA)		
		Day	Evening	Night	Transformers only	Fans Only	Transformers and Fans
Meriton Mosaic 36 Campbell Street	Floor 3	54	53	50	42	48	49
317-321 Castlereagh Street	Floor 11	54	53	50	41	59	59
428 Pitt Street	Floor 2	59	59	59	43	50	50
431 Pitt Street	Floor 3	59	59	59	36	43	44
441 Pitt Street	Floor 2	59	59	59	31	45	45
323 Castlereagh Street	Floor 4	59	59	59	37	65	65

The predicted noise levels in Table 4 show compliance for the worst case scenario (i.e. operation of transformers and fans) at all receiver locations, apart from 317-321 Castlereagh Street which exceeds the criteria by 5, 6 and 9 dB(A) for day, evening and night respectively and 323 Castlereagh Street, which exceeds the criteria by 6 dB(A). The predicted noise levels do not include any contribution from the basement ventilation, Level 14 Plant Room or carpark ventilation (noisiest aspects of the commercial component). The Proponent states that during the detailed design phase of the project, it would incorporate a specific design goal to ensure the combined transformer plus fan and Level 14 Plant Room does not exceed 50 dB(A) night-time criterion.

Predicted Operational Noise Levels – Basement Ventilation
The Proponent states that in order to comply with the noise criteria, the contribution by the mechanical plant should be set at nominally 6 dB(A) below the design criteria. To achieve noise level of 44 dB(A) (that is 6 dB(A) below the existing night-time criterion) at the 317 Castlereagh Street receiver, the total radiated sound power level is required to be 80 dB(A) for the ground floor basement ventilation louvres. The basement ventilation supply fan and exhaust fan louvres will be located on the Hay and Campbell Street facades respectively. The Proponent states that based on the substation louvre layout locations the centrifugal fans will be used in associated plant rooms with a minimal free field sound pressure level of 65 dB(A) at 3 metres for each fan. This sound pressure level equates to a sound power level of 86 dB(A), which exceeds the nominal 80 dB(A) required. The Proponent states that it would use of quieter fans or consider the inclusion of attenuators and this would be verified during the detailed design phase.

Predicted Operational Noise Levels – Commercial Building Level 14 Plant Component and Basement Ventilation
At the nearest residential receiver to the north, the combined plantroom and substation noise level (from Level 14 Plant Room, carpark fans and the ground level transformer room, transformer radiators and basement ventilation) is required to be less than 54 dB(A) during the daytime, 53 dB(A) during the evening and 50 dB(A) during the night-time in order to comply with the Industrial Noise Policy derived design criteria.

The Proponent states that in order to ensure compliance with the criteria, the contribution by the mechanical plant should be set at nominally 6 dB(A) below the design criteria. This will ensure that the combined noise level from the Level 14 Plant Room, carpark ventilation and the ground level transformer room and basement ventilation will be within the acceptable noise criteria. However the Proponent selection of the mechanical plant items (and hence their associated sound power levels), Plant Room louvres and other details will be determined during the detailed design phase.

Predicted Operational Noise Levels – Commercial Building Emergency Generators
The emergency generator, with an estimated capacity of 1,500 kVA, is proposed to be located on Level 14 of the building. The nearest receiver is the Meriton Mosaic Apartment building, with the design criterion set as 45 dB(A). The Proponent states that given the design details of the diesel generator are yet to be refined, the maximum radiated sound power level has been determined to enable compliance with the criterion, based on the DECC guidelines. The maximum radiated A-weighted sound power level for the generator is specified to be 82 dB(A).

Operational Vibration – from Substation
The five transformers are to be located at the building ground level, on the same elevated (with respect to the building foundation excavation) concrete slab at the adjacent office space in the building. The Proponent proposes the control measures to minimise vibration transmitted into the elevated supporting concrete structure. This will include using double neoprene pad isolators (synthetic rubber) formed by two layers of ribbed or waffled neoprene, separated by a stainless steel or aluminium plate. The layers shall be permanently adhered together and a steel top plate equal to the size of the pad shall be provided in order to transfer the weight of the supported structure to the pads.

Operational Vibration – from Commercial Development
The Proponent finds that the operation of the plant room equipment and emergency generators has the potential to impact on the occupied areas within the building. The Proponent states the detailed design of the building and the mechanical plant will need to be consider the potential vibration impacts and control measures.

Traffic generated from Construction and Operation
The Proponent has found that during construction, a maximum of 20 spoil truck and two delivery truck movements per day are expected and during operation a maximum of 48 vehicle movements per hour. The Proponent states that this is a low volume of traffic when compared to the existing road traffic noise and would not result in traffic noise increases that exceed 2dB(A) at the receivers near the proposal site. The Proponent has predicted that at the most, construction and operation related traffic activity would result in noise increases of less than 1 dB(A). As a noise mitigation measure, the Proponent has proposed to have mufflers and any other noise control equipment in good working order on those trucks that will be regularly used for the project (for example spoil trucks).

Issues Raised in Submissions

The Department of Environment and Climate Change identified construction noise and vibration being the significant issues for Stage 1 (and Concept stages). It found that there is the potential for significant impact on surrounding receivers and therefore recommended the Proponent be required to prepare a Construction Noise and Vibration Management Plan for Belmore Park Zone Substation Stage 1, prior to construction commencing. With regards to operational noise, it recommended noise level limits of LAeq, 15 minutes 54 dBA for the daytime, 53 dBA for the evening and 50 dBA for the night.

The City of Sydney Council stated that all works associated with the proposal (both concept and project application) must be carried out between the hours of 7.00am and 7.00pm on Mondays to Fridays, inclusive, and 7.00am to 5.00pm on Saturdays, and no work must be carried out on Sundays or public holidays. It also stated that all work must comply with the *City of Sydney Code of Practice for Construction Hours/Noise 1992* and Australian Standard 2436-1981 '*Guide to Noise Control on Construction, Maintenance and Demolition Sites*'.

RailCorp stated that the noise and vibration assessment for both the Concept components and Belmore Park Zone Substation does not address potential impact of works on rail infrastructure (particularly vibration) or the acoustic impact of rail operations on the future developments. It made reference to previous geotechnical investigations undertaken by Douglas Partners and requested the Department incorporate the mitigation measures formed from these investigations as conditions of approval, this being dilapidation inspections, saw cutting of rock, excavation support and retaining walls, design criteria and monitoring.

Consideration

Construction Impacts
The Department finds that although the Proponent has committed to undertake the construction of the project within the relevant noise criteria, if no mitigation and management measures are implemented, then this commitment may not be realised. This is because, as shown in Table 3, more than half of the typical, noisier,

plant items modelled would exceed the noise criteria, when in operation. It is noted that these modelled plant items represent the early ground level works, when the site is being established and bulk excavation activities are being undertaken. The activities following this stage would be less noise intensive. For these reasons and from the outcomes of the Department's consultation with the Department of Environment and Climate Change, the Department has recommended conditions that require the Proponent to adhere to construction noise standards. This being the case, the Department requires the Proponent to manage noise from construction activities (as measured by a $L_{A10(15\text{-minute})}$ descriptor) so the noise level contributed by the construction activities does not exceed the background L_{A90} noise level by more than 20 dB(A), 10 dB(A), and 5 dB(A), for a construction period of four weeks and under, greater than four weeks and not exceeding 26 weeks, and greater than 26 weeks respectively.

This condition will ensure that the construction of the project generates noise levels that do not cause adverse impact to human noise amenity. Also the Department has recommended a condition that requires the Proponent to undertake construction activities such that regenerated noise limits of $L_{Aeq\ (15\ -\ minute)}$ of 40 dB(A) between the hours of 6:00pm and 10:00pm and of $L_{Aeq\ (15\ -\ minute)}$ of 35 dB(A) between the hours of 10:00pm and 7:00 am are not exceeded at the nearest residential receiver. This requirement ensures that regenerated noise in buildings (caused by the transmission of ground-borne vibration rather than by the direct transmission of noise through the air), does not cause disturbance to sensitive receptors. The recommended hours do not take into account day time regenerated noise, as ambient noise levels are higher at this time and mask the audibility of such ground-borne noise.

As the noisiest part of the construction is related to the early ground preparation works and bulk excavation, the Department has recommended a condition that requires the Proponent to use only dampened rock hammers and/or "city" rock hammers, to minimise the noise impacts associated with rock-breaking works. The Department has also recommended a general construction noise management condition, which requires the Proponent to minimise noise emission from plant and equipment operated on the site for construction, by installing and maintaining, efficient silences, low-noise mufflers (residential standard), screening of worksites and replacement of reversing alarms on vehicles with alternative silent measures. The Department requires the Proponent to investigate such silent measures for reversing alarms in consultation with the Department of Environment and Climate Change.

Consistent with the Department of Environment and Climate Change's advice, the Department has also recommended a condition which requires a Noise and Vibration Management Sub Plan to be included as part of the required Construction Environmental Management Plan for the project, prior to construction commencing and for the approval of the Director-General. This sub-plan is required to include identification of all potentially affected sensitive receptors (as the Proponent noted other more distant receptors, apart from the closest receptors already identified may be impacted) and activities to be carried out at the project site (as the Proponent focused its assessment on the noisiest activities). As additional receptors may be identified, even though they will be located further away from the project site compared to the already identified seven sensitive receptors, the sub-plan must also include an assessment of potential noise, ground-borne noise and vibration levels from the proposed construction methods (including construction vehicles) anticipated at sensitive receptor premises against the noise and vibration objectives for the project. This assessment will include all sensitive receptor premises, including those already identified. Where the objectives are predicted to be exceeded, the sub-plan must include an analysis of feasible and reasonable mitigation measures that can be implemented to reduce construction noise impacts. Where noise and vibration objectives cannot be met, then the Proponent must develop additional measures including considering reducing the hours of construction, the provision of respite from noisy and/or vibration intensive activities and alternative excavation methods or other negotiated outcomes with the affected community. The Department finds that should the Proponent develop this Noise and Vibration Management Sub Plan, the potential for significant noise levels which cause adverse impact to human amenity would be mitigated and any residual noise impacts could be managed appropriately.

Operational Impacts

As shown in Table 4, the predicted noise levels are well within the nominated amenity noise criteria at most of the identified sensitive receptor locations. However the predicted noise levels do not include any contribution from the Level 14 Plant Room or carpark ventilation, associated with the commercial development as detailed plant selections are yet to be determined. The Proponent states that the plant would be acoustically treated to prevent noise emissions from adversely impacting the surrounding properties. As the detailed design phase of the project is yet to occur, which will enable the Proponent to confirm the predicted noise levels, the Department has

recommended a condition which limits the operational noise generated from the project. This being the case, the Proponent will be required to design, construct, operate and maintain the project to ensure that the noise contribution from the project to the background acoustic environment does not exceed the maximum allowable noise contribution of $L_{Aeq\ (15-minute)}$ 54 dB(A) during the day, 53 dB(A) during the evening and 50 dB(A) at night, at any residential receiver. These allowable noise contributions apply under wind speeds up to $3ms^{-1}$ (measured at 10 metres above ground level), and under temperature inversion conditions of up to 3^oC/100 metres. The Department also requires the Proponent to prepare a Noise Management Plan, as part of the Operation Environmental Management Plan, prior to operation and for the Director-General's approval. This plan will focus on procedures for ensuring the operational noise levels comply with the nominated noise criteria and details for noise monitoring to measure this compliance.

5.3 Noise and Vibration Impacts (Stage 2)

Issues

The Proponent conducted a noise and vibration assessment for the components of the Sydney CityGrid Project. There are seven components, of which the construction and operation of the Belmore Park Substation Integrated Development and stub tunnel connection from City South Cable Tunnel to Belmore Park Zone Substation is subject to a project approval. All seven components are listed below in order of proposed construction, including the main construction works associated with each component.

1. Belmore Park Zone Substation
    - Site establishment
    - Excavation for footings
    - Construction of new substation and commercial building
2. Belmore Park Stub Tunnel
    - Site preparation and establishment of Belmore Park Site
    - Excavation of Belmore Park Site adjacent to Campbell Street
    - Tunnelling by road-header machine
    - Spoil removal for stub tunnel only
3. Extension to the existing City South Cable Tunnel
    - Site preparation
    - Excavation of Little Albion Street
    - Interface to Wade Place Substation
    - Tunnelling by road-header machine
    - Spoil removal
    - Resurfacing of excavated site in Little Albion Street
4. City East Cable Tunnel
    - Site Establishment at Riley Street work site
    - Excavation to allow launch of Tunnel Boring Machine
    - Construction of 'acoustic' shed at Riley Street work site
    - Excavate Tunnel Boring Machine cavern and launch the machine
    - Tunnelling (3,200 metres of tunnelling)
    - Spoil removal
5. Riley Street Sub-transmission Switching Station
    - Site establishment
    - Excavation
6. City East Zone Substation (subject to site selection, to be confirmed)
    - Demolition of existing building, if vacant site is not selected
    - Excavation
    - Interface with City East Cable Tunnel
    - Construction of new substation building
7. Dalley Street Zone Substation
    - Upgrading Dalley Street Substation
    - Interface with City East Cable Tunnel

The activities that would have the highest noise levels have been predicted to be those associated with the construction of the Belmore Park Zone Substation, the City East Cable Tunnel and the Dalley Street Zone

Substation. The Proponent has identified noise and vibration sensitive receivers at each proposed work site. These are listed below.

Proposed Belmore Park Zone Substation.
There are three residential receptors, two hotel/tavern receivers and two commercial receivers near the proposed site.

Proposed Stub Tunnel Connection from the Existing City South Cable Tunnel
The sensitive receptors are the same as those for the Belmore Park Site (see point 1 above). Figure 22 shows these receptors.

Extension to the Existing City South Cable Tunnel
The proposed extension would provide a tunnel connection from the existing Surry Hills (Wade Place) Sub-transmission Substation to the City East Cable Tunnel and Riley Street worksite. In order to construct the City South Cable Tunnel extension, excavation of Little Albion Street in the immediate vicinity of the Surry Hills Sub-transmission Substation will be necessary. Then tunnelling works will occur, using a road-header machine, beneath Little Albion Street, Riley Street and the Riley Street site. As a result of these works, airborne noise, regenerated noise and vibration have the potential to significantly impact residential premises and other nearby receptors. There are **15 nearby noise and vibration-sensitive receivers to the proposed City South Cable Tunnel extension works**, which comprise of ten residential receptors located on Albion Street, one religious receptor (St Frances de Sales Church, Albion Street), two commercial receptors (one on Albion Street and the other a Drop-in Centre on Riley Street), one mixed use receptor (located on Ann Street) and one passive recreation area receptor (Frog Hollow Park). Figure 23 is an aerial photograph showing the area in which the proposed works would occur.

City East Cable Tunnel
The City East Cable tunnel is proposed to be constructed from the Riley Street Site in Surry Hills and will terminate at the City North Zone Substation, at the corner of Erskine and Sussex Streets to the west of the Sydney Central Business District, and, en route, interface with the Dalley Street Zone Substation and the proposed future City East Zone Substation in the Central Business District. The City East Cable Tunnel will be constructed using a Tunnel Boring Machine and be launched from the Riley Street site. The tunnel will follow the north-south alignment of Riley Street, and subject to route options, curve in a north-westerly direction beneath East Sydney, the Domain and the north-eastern fringe of the Central Business District. The tunnel will be aligned beneath existing road easements where practical. The Proponent proposes to maintain a minimum plan radius of 350 metres for possible changes in tunnel alignment. The Proponent **has not identified specific sensitive receptors as the final tunnel alignment is yet to be determined**. The Proponent however states that it can be assumed the tunnel will pass beneath residential, commercial and other land uses. After the determination of the tunnel alignment, the receptors will be identified and an assessment for noise and vibration will be undertaken for the proposed City East Cable Tunnel.

Proposed Riley Street Sub-transmission Switching Station at Riley Street
There are **19 sensitive receptors located in the vicinity of the proposed Sub-transmission Switching Station at Riley Street**, of these eleven are residential, seven are mixed use type and one is a passive recreation area type receptor (Frog Hollow Park). Figure 24 below shows the land uses adjacent to the proposed site, which identifies the type of sensitive receptors.

City East Zone Substation
The Proponent is yet to determine the location for the proposed City East Zone Substation and therefore the **receptors are not known at this stage**, however it has identified a potential locality in which the substation will be situated, as described in section 1.2 of this report. The predominant receptor types are commercial receivers.

Dalley Street Zone Substation
The existing Dalley Street Zone substation will either be refurbished or replaced, using the existing building or a building at an adjacent site. The surrounding land uses are predominantly commercial office buildings, hotels and parking stations.

Figure 22: Land uses adjacent to the City South Cable Tunnel-Stub Tunnel Connection (reproduced from the Proponent's Environmental Assessment)

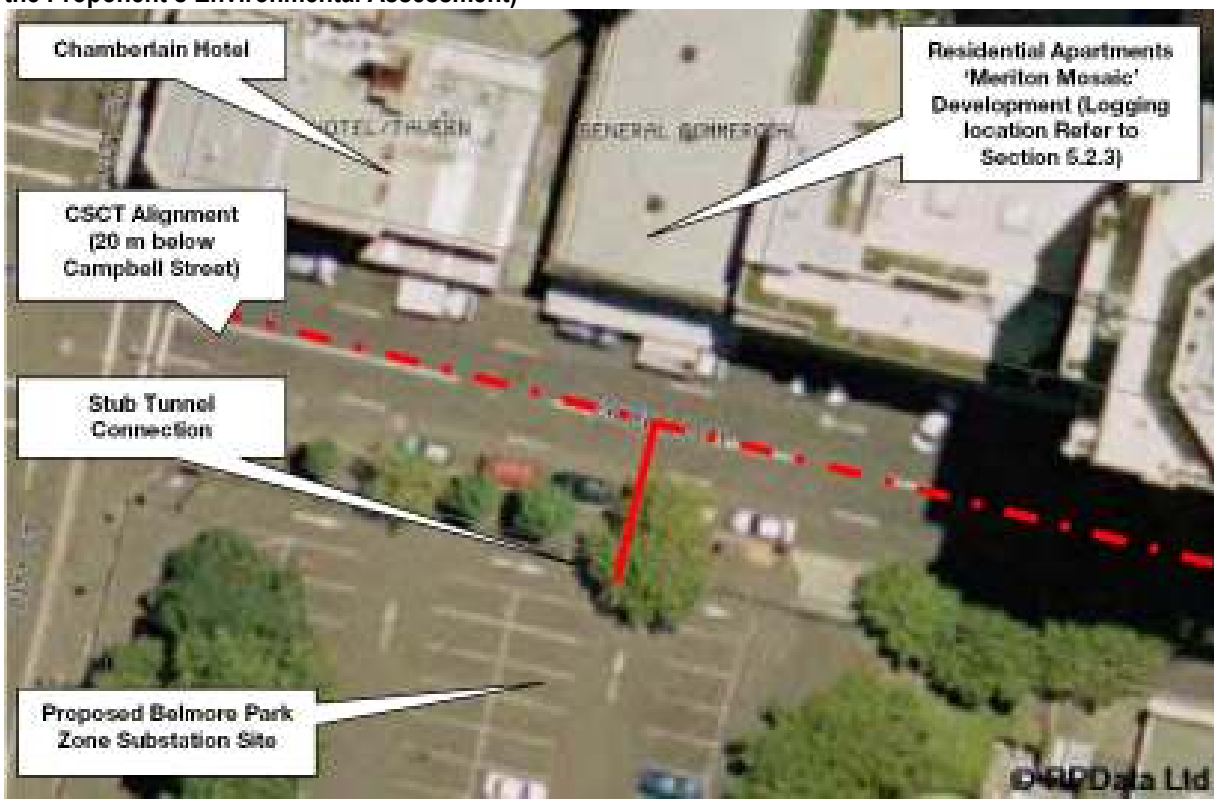


Figure 23: Surrounding land uses adjacent to the proposed City South Cable Tunnel Extension (reproduced from the Proponent's Environmental Assessment)

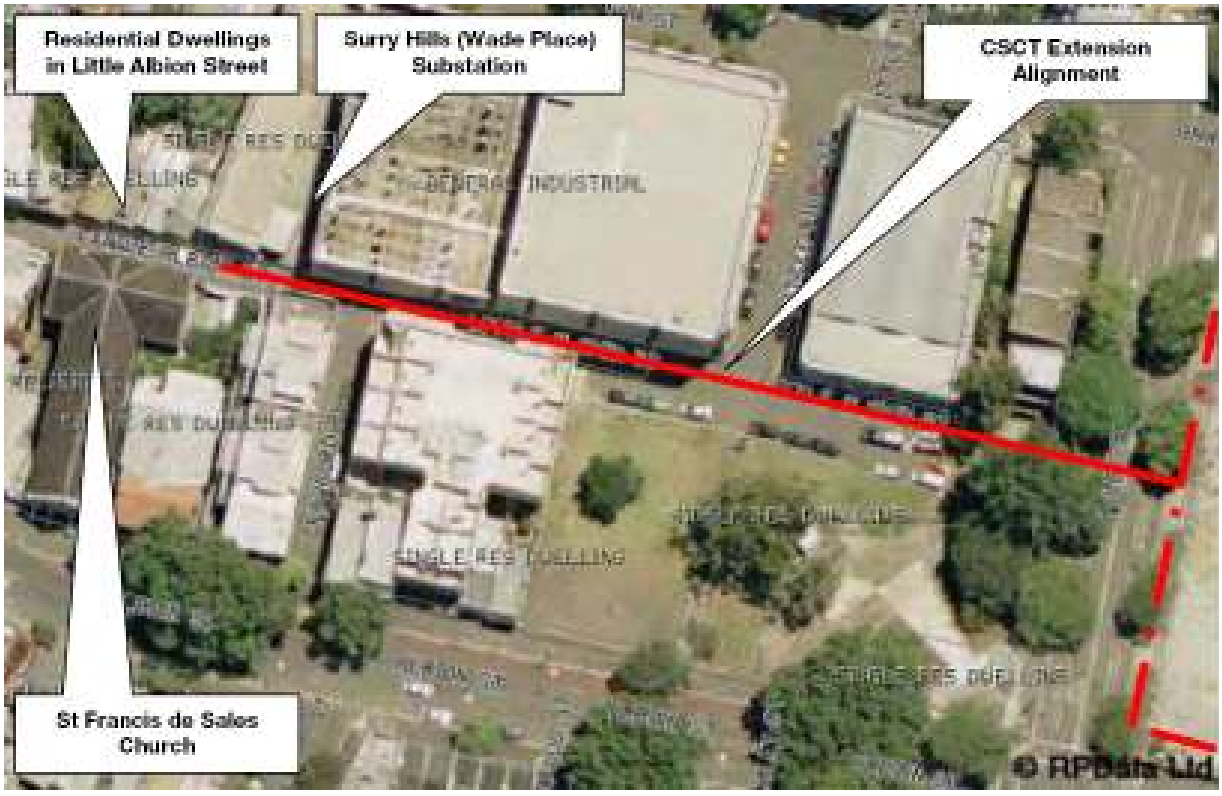
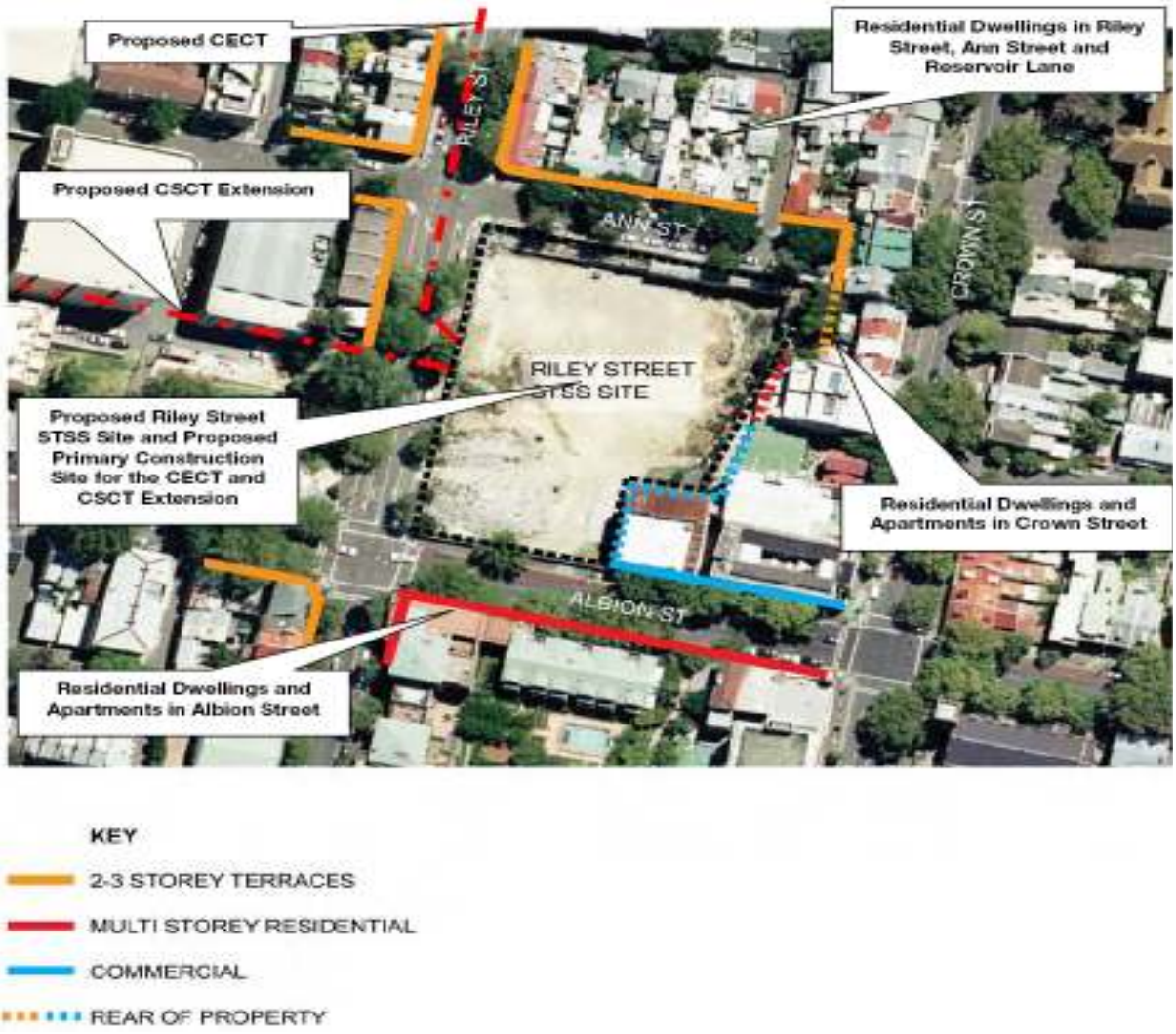


Figure 24: Riley Street Sub-transmission Switching Station, surrounding land uses (reproduced from the Proponent's Environmental Assessment)



The Proponent conducted a preliminary noise assessment using the Department of Environment and Climate Change's *Environmental Noise Control Manual* and the *Industrial Noise Policy*. The Proponent set construction noise goals in accordance with this manual, where the criterion is Background RBL plus 5 dB(A) for residential receivers. The Proponent conducted background noise measurements for Belmore Park Zone Substation (which will also be used for the City South Cable Tunnel-Stub Tunnel) only. The Proponent referenced the Australian Standard AS 1055.2 "Acoustics - Description and measurement of environmental noise Part 2: Application to specific situations", to provide guidance on expected background noise levels for the components of the project that are subject to a concept plan application.

Construction Noise and Vibration

The Proponent's assessment for the components of the project subject to concept plan application did not identify all sensitive receptors, rather it provided an indicative number of receptors likely to be significantly impacted. The concept plan assessment also did not include a detailed noise and vibration for each site, rather it estimated the activities likely to cause significant noise impacts. The Proponent stated that tunnelling activity associated with the City East Cable Tunnel and the City South Cable Tunnel Extension would require a detailed acoustical assessment in terms of regenerated (structure-borne) noise and vibration. The Proponent presented buffer distances for the City East Cable Tunnel based on the findings presented by the Australian Acoustical Society, at a technical meeting in December 2003, where at a 50 metres slant distance, the operation of a tunnel boring machine results in regenerated noise levels of approximately 35 dB(A), and a distance of 30 metres results in a noise level of 40 dB(A). The Proponent therefore found that it is reasonable to consider allowing buffer distances to control regenerated noise:

- of 50 metres between the crown of the City East Cable Tunnel and surface (residential) structures on the basis of regenerated noise control (assuming a project preference to undertake tunnelling on a continuous basis, including during 10:00pm to 7:00am night-time period); and
- of 30 metres between the crown of the City East Cable Tunnel-tunnel and surface (residential) structures on the basis of regenerated noise control (assuming a project preference to undertake tunnelling during 6:00pm and 10:00pm).

The Proponent states that during the preparation of the future Project Applications for the Project elements, it will undertake investigations for the purpose of mitigation and safeguards. The investigations will include:

- undertake a noise survey;
- derive construction noise emission criteria in accordance with the principles it has set out in the Environmental Assessment and further consultation with the Department of Environment and Climate Change;
- conduct a detailed construction noise assessment;
- assess the need for the required noise controls during the construction stage of the project; and
- refine the concept plan noise assessment for the future project applications for each work site and tunnel alignment. Site-specific regenerated noise and vibration results can be established following early works, the results of which may require buffer distances to be changed depending on the results obtained.

Operational Noise

The Proponent stated that operations that have the potential to generate noise and vibration will be from the operation of the proposed zone substations and the sub-transmission switching station. Minimal noise would be generated by the operation of the tunnel (such as from ventilation fans) as these are likely to be located underground. The Proponent conducted an operational noise and vibration assessment for the Belmore Park Zone Substation development only (refer to section 5.1 of this report) and states that further investigations would be conducted for the components subject to concept plan approval, when it will be applying for project approval for these components. The Proponent has stated in the concept plan assessment that it would conduct an operational noise and vibration assessment for the zone substations and the sub-transmission switching station, which will follow the general methodology used to assess the Belmore Park Zone Substation works.

Issues Raised in Submissions

The Department of Environment and Climate Change requested that further Environmental Assessments be prepared to support future Project Applications, which must address noise assessment requirements specified in its submission.

The City of Sydney Council expressed concern in relation to significant tunnelling activities which are to be launched from the Riley Street site. It stated that the issue of regenerated noise near the construction sites close to the tunnel alignment is not considered to have been adequately assessed and thus requires further information on this matter.

RailCorp stated that the noise and vibration assessment does not address the potential impact of works on rail infrastructure (particularly vibration) or the acoustic impact of rail operations on the future developments.

Consideration

The Department finds the Proponent's concept assessment provides some certainty that noise and vibration generated as a result of the construction and operation of the proposal will be within the acceptable environmental standards. However although the Proponent has estimated background noise levels where no unattended noise monitoring was conducted and was able to outline the type of construction activities required for each site, the Proponent did not compare the likely background noise with the potential generated noise from the works. The Department notes that the Proponent has committed to undertake a noise survey and a detailed construction noise assessment for the Riley Street Sub-transmission Switching Station and Services Control Room and the City East Cable Tunnel/City East Zone Substation/City South Cable Tunnel Extension/Dalley Street Zone Substation and the Alternative Services Control Room.

However to ensure the future assessment provides the Department with adequate certainty of the potential impacts associated with noise and vibration, the Department has recommended a specific condition which requires a project level Noise and Vibration Impact Assessment to be submitted as part of the future project

application(s) for the concept components of the project. This assessment must include both construction and operation noise. The Proponent is also required to include, as part of this assessment, consideration of construction vibration and regenerated noise impacts and provide a detailed review of the potential impacts to sensitive receptors from regenerated noise as a result of any proposed night-time construction tunnelling works. The Department also requires this assessment to be prepared in consultation with the Department of Environment and Climate Change.

The Department has also recommended a general requirement for the Proponent to submit a detailed description and location of all project components, particularly the depth of tunnelling works, ancillary facilities and relevant buffer distances, as relevant. Environmental constraints must also be identified relative to the surrounding environment (including sensitive receivers), in which each component is to be situated and include a description of how the project can be carried out without causing an adverse impact to the environment and human amenity. The carrying out of the requirements contained in this condition will allow the Proponent to test its assumption that the City East Cable Tunnel will be situated under residential, commercial and other land uses and allow it to undertake an assessment for the potential for noise and vibration impacts resulting from the construction of the proposed City East Cable Tunnel.

The Department finds that the above two recommended conditions address all concerns raised by the three government agencies, as once the Proponent completes its detailed project level noise and vibration assessment, the Department and key stakeholders will be able to evaluate the predicted impacts and determine whether such impacts would be acceptable and cause no adverse impact to human amenity and surrounding infrastructure.

5.4 Non-Indigenous Cultural Heritage Impacts (Stage 1)

Issues

Background of the Site

The Proponent provided an assessment which measured the impacts of the proposed works on the historic heritage at the Belmore Park Zone Substation Site (the site). A Heritage Impact Statement for the works and two non-Indigenous archaeological assessments, dated 1995 and 2006, were provided. This information included Heritage Register searches, as well as searches of Commonwealth, State and Local level heritage lists.

The site is listed under *the Central Sydney Archaeological Zoning Plan 1992* as an area of archaeological potential and therefore the Proponent prepared a Heritage Impact Statement to assess the likely impact of the proposed development on the cultural heritage values of the locality and the site's archaeological potential.

The north, west and southern boundaries of the site are bounded by Campbell, Pitt and Hay Streets respectively. Although the site has been previously occupied by a succession of buildings, there are no above ground remnants of these earlier phases. The east site of the car park of the site adjoins the high rise office tower of 'Central Square' and its parking ramps. The west side of the car park is bordered by Pitt Street and the approach to Central Station. Landscaping on the site is restricted to mature Plane trees, planted at intervals, some surrounded by raised planter boxes. The topography of the site is relatively flat and sloping slightly, and is currently surrounded by a wire fence. Aside from the Plane Trees, and the open space, the site in its existing state makes no particular contribution to the character of the locality, which is now a busy commercial zone.

The site is faced on the south by Belmore Park and is listed under the *Central Sydney Archaeological Zoning Plan 1992* as an Area of Archaeological Potential. This listing means that the most recent development on this site, whilst affecting archaeological remains, is likely to have not completely removed deeper deposits. The site has views to and from Central Railway Station (although these views are partial due to the considerable tree canopy of Belmore Park), with its associated bridges and ramps. The light-rail system runs along Hay Street, past the site. Hay Street is also the location of an entertainment precinct, including the Capital Theatre, restaurants, hotels and shopping centres continuing on into Chinatown and the Markets.

Historically, the site was part of the Brickfield Village (the 19th Century), where production of bricks and pottery production was concentrated from early 1788. From the year 1829, the site was used for cattle markets, which were then replaced by the Belmore Markets building in 1869, which housed Sydney's main produce markets. The main building on this site was Hotel Sydney, which opened in 1918. The demolition of this hotel left the present ground level carpark.

The site is not listed as a heritage item under any statutory instruments, and is not located in an area of special interest or character, as outlined in the *Sydney Local Environmental Plan 2005*. However, the site is located within the vicinity of a number of heritage items listed in the *Sydney Local Environmental Plan 2005* and within the approaches to Central Railway precinct (the Rail Corridor). These items are listed in Schedule 8 of the *Sydney Local Environmental Plan* 2005. The Schedule lists the Chamberlain Hotel as No. 360, the Manning building as No.361 and the former Presbyterian Manse as No. 362. The Pitt Street facades of Manning Building and the location of the Presbyterian Manse on Pitt Street, are not part of a listed Heritage streetscape.

Potential Impacts
The Statement of Significance of the 2005 Excavation Permit Application and Research Design for the site indicated that the west portion of the site has the potential to retain evidence of the site's use as part of the Brickfields era, if later site uses and services have not removed all evidence. Such items signifying this past use include kilns, brick and clay roofing debris, early pottery and the remains of the huts used by the convict workers. However, there is no likelihood that this evidence exists elsewhere in the locality due to the amount of subsequent development. Therefore any in-situ Brickfield deposits, if found, would have a high level of State heritage significance. The remains of the other phases of the site's use (cattle markets and Hotel Sydney) would have a low to medium level Local heritage significance.

Determining whether the site has the potential to retain archaeologically significant relics is inversely related to judging whether the current building on the site has removed all evidence of previous land use. For example, whether a building's basement occupied the full property area and it was deep enough to remove any evidence of previous use of the site. Council previously considered the site to possess archaeological potential and it was listed in the Archaeological Zoning Plan for Central Sydney. A previous archaeology assessment for the site was conducted in 1995, which included testing in a 20 by 20 metre area in the eastern section of the car park. The testing revealed numerous dry-pressed brick and concrete footings and services, which by their size and placement, suggested that no in-situ pre-1900 remains could have survived in the area. The level of disturbance found in the area tested indicated that the construction of Hotel Sydney caused extensive disturbance of the site. The results of the testing thus found that it is unlikely any extensive area of intact 19th Century remains have survived. However, due to the site's identified archaeological potential, an Excavation Permit Application and Archaeological Research Design was prepared by City Plan Heritage, in conjunction with Casey and Lowe Associates, who conducted the previous study and testing of the eastern area. The 2005 Permit Application noted that there may be evidence of 19th Century land-use in the western portion of the site, fronting Pitt Street and proposed to monitor bulk excavation of the site in order to identify and record any 19th Century features.

Issues Raised in Submissions

The Department of Environment and Climate Change stated that, if during construction, the Proponent becomes aware of any heritage items or archaeological material, all works likely to affect the site(s) shall cease immediately and the relevant authorities, including the Department of Environment and Climate Change, be notified immediately before work progresses further.

The Heritage Office stated that the Proponent should identify any non-aboriginal heritage items 'under or adjacent' to the area affected by the proposal by field survey and assess the impact of the proposal on the item's heritage significance.

Consideration

The Department notes that the information presented by the Proponent indicates that site specific historical research has been undertaken, as well as previous fieldwork, archaeological testing (1996 Permit No.210418) and site survey. The Proponent has included relevant sections of the previous research into its Environmental Assessment. The Department also notes that the proposed site is the subject of a current section 140 Permit (2004/S140/039), held by City Plan Heritage, for test excavation and monitoring which has not been acted upon at the time of the Proponent's assessment. The Proponent's Environmental Assessment includes a significance and impact assessment for the site, which has been completed using the methodology and guidelines established by the Heritage Office of the Department.

The Heritage Branch, on review of the draft Environmental Assessment, highlighted that an approval under the *Heritage Act 1977* is already in force over the site. This approval requires monitoring of any excavation of the site by suitably qualified heritage practitioners, and due to the potential archaeological significance this site holds, this

monitoring will need to be undertaken as part of the heritage mitigation measures and safeguards for the project. The Heritage Branch also noted that while monitoring is already specified as the mitigation measure for the proposal in the Environmental Assessment, it is not specified that the monitoring must be done by an archaeologist and that the archaeologist will be given adequate time to record all relics or features uncovered. It is also not specified that any relics or features uncovered should form part of the interpretation plan for the site.

Therefore the Department has recommended as a condition of approval that the construction of the Belmore Park Zone substation building and associated stub tunnel connection from the existing City South Cable Tunnel to Belmore Park Zone substation (Stage 1A) be monitored by an archaeologist during the initial bulk excavation of the site. This is to identify any non-indigenous items present within the area, including any remains dating to the period of the Brickfield Village. The Department also recommends, as part of this condition, that any such items of significance or interest be recorded by the archaeologist and managed in consultation with the Heritage Branch.

Although the Project is subject to Part 3A of the *Environmental Planning and Assessment Act 1979*, clause 74 and 75 of the heritage provisions of the *Sydney Local Environmental Plan 2005* are relevant to this Project. Clause 74, development within the vicinity of a heritage item, states that the consent authority, when considering an application for development within the vicinity of a heritage item, must take into account the impact of the proposed development on the heritage significance of the heritage item. The Department notes that the proposed development is in the vicinity of the Chamberlain Hotel, the Manning Building and the former Presbyterian Manse, all of which are listed Heritage Items under the *Sydney Local Environmental Plan 2005*. The Proponent states that the Chamberlain Hotel was designed to take advantage of its corner location, in an already developed context. The context of the Chamberlain Hotel would be altered by any multi-level construction on the currently undeveloped subject site. However, this Hotel was not designed in relation to a view corridor across the subject site, which at that time was occupied by the Belmore Market buildings. The proposed works will have no impact on the physical fabric or surrounding outside area within the Hotel itself. The Department concurs with the Proponent that the redevelopment of the subject site will reinstate a built form in this location, and recapture the gradual emergence into view of the Chamberlain Hotel in the streetscape, when moving north along Pitt Street.

With regard to the Manning Building, the Proponent states that the proposed integrated development is proportional in the scales of length and height with the size and bulk of the Manning Building. The Proponent has indicated that the simplicity of the façade design and its use of glazed panels provide an openly contemporary building which is complementary in scale and mass to the more textured Manning Building. In relation to the former Presbyterian Manse, the proposal would not have a negative effect on the building and no significant view corridors will be interrupted. It is noted that the Proponent finds that the reinstatement of an appropriate built form on the subject site is considered to be acceptable. Belmore Park is an important open space and landscape element in the locality. The Proponent states that the proposed development has been specifically designed in order to relate to this Park. The graduated tier design for the tower with a minimal pointed top on the northern elevation ensures that shadow patterns do not adversely affect the park and conform to Schedule 2, sun access plane particulars, of the *Sydney Local Environmental Plan 2005*.

Clause 75 of the *Sydney Local Environmental Plan 2005*, states that the consent authority may grant a consent for the carrying out of development on a potential archaeological site, only if it has considered an archaeological assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be located at the site. The Department understands that the proposed works will involve the bulk excavation of the whole site and a previous archaeological assessment for the site was carried out in 1995, for a similar proposal on the site. The management suggestions formed as part of this previous assessment related to further testing of the site due to the uncertainty about the extent to which significant archaeological remains may have survived following the construction and demolition of Hotel Sydney, monitoring of the bulk excavation by an archaeologist and liaison with the Heritage Branch in relation to archaeological works on the site. The Department finds its recommended conditions address these suggestions, apart from the need for further testing. The Department finds that further testing of the site is not required as the assessment by Casey and Lowe was followed up with test trenches excavated in the eastern section of the car park in 1996. This testing concluded that it is likely the entire subject site was extensively disturbed as part of the construction of Hotel Sydney such that it was considered unlikely that any area of intact 19th Century remains have survived. Based on the results of the testing, the site's archaeological potential was described as being low. Furthermore, the Department's recommendation of requiring the Proponent to monitor the site during bulk excavation works will ensure that any unexpected archaeological remains which may be detected are managed appropriately.

The Department considers that the proposed development would not adversely impact upon items of non-indigenous heritage significance. It also considers that the recommendation of a condition of project approval which requires the Proponent to employ an archaeologist to monitor the initial bulk excavation works would ensure that any potential archaeological relics located below the surface of the site would be detected during the monitoring and appropriate measures implemented, in consultation with the Heritage Branch.

5.5 Non-Indigenous Cultural Heritage Impacts (Stage 2)

Issues

The Proponent considered the potential impact on non-indigenous archaeological remains in five of the seven sites of the CityGrid Project. These five sites are as follows:

- Belmore Park Zone Substation (the Department's assessment of this component is provided in section 5.3 of this Report);
- Potential ventilation shaft and services building midway along the alignment;
- City East Zone Substation;
- New Sub-transmission Switching Station at Riley Street, Surry Hills; and
- Potential refurbishment or replacement of the existing Dalley Street Zone Substation or building at a nearby site.

The sites listed above include those components of the Project which entail the major surface level impacts. The characteristics of each site in terms of non-indigenous heritage and the potential impacts of the project are detailed below. The remainder of the route of the project involves tunnelling or refurbishment of existing facilities and would not involve any sub-surface impacts to those heritage sites previously assessed.

Potential Ventilation Shaft and Services Control Building - located at Cook and Phillip Park
The Proponent at this stage is considering locating this component of the Project at Cook and Phillip Park. This site appears on the Archaeological Zoning Plan for Central Sydney (1992) and is listed as an area of Archaeological Potential.

The part of the Cook and Phillip Park area, in which the proposed works are to be developed, appear to have remained undeveloped, apart from clearing until its development as a park area. The initial park area was developed with a relatively low key landscape. The Proponent has explained that some development took place on the perimeter such as the bowling green near College Street. In the late 20th Century, the Cook and Phillip Park area underwent major development which included removal of the bowls club, addition of new recreational facilities and hard landscaping of the area immediately surrounding St Mary's Cathedral. The Proponent states that historical research for this site has not identified any substantial buildings or land-use in this area. The Proponent further states that it appears the area has always been open space, with no structures or buildings that could be considered to have left archaeological features or deposits.

City East Zone Substation
The Casey and Lowe assessment indicates that the site appears to be built upon in the first half of the nineteenth century but by the middle of the century the northern end of the block was occupied by a garden, presumably associated with the adjacent Union Club. When the Wentworth Hotel was built, the Union Club was relocated to the proposed substation site. The building has a lower ground floor and therefore the potential for archaeological remains is considered to be restricted to deeper features, such as wells, or the basements of former buildings. The Proponent states that there is potential for remains, dating to the early 1800s within the site.

New Sub-transmission Switching Station at Riley Street, Surry Hills
This site has previously been excavated down to basement level and the Proponent states that the site is considered to have no archaeological potential.

Potential refurbishment or replacement of the existing Dalley Street Zone Substation or building at a nearby site
The general area of the substation was originally situated on the banks of the Tank Stream and was built upon once the stream was enclosed and no longer flooded the adjacent area. The site is situated towards the mudflats at the mouth of Tank Stream. The Proponent states that it appear to be immediately adjacent to the rock-cut tanks that had been cut out of bedrock to store water and which gave the stream its name. This implies that exposed bedrock was present in the immediate area and that the mudflats were further north. The site of the proposed works should be within Tank Stream valley and thus the soil profiles in the area should reflect the pre-

1788 as well as the early historical environment. The archaeology and history of Tank Stream valley is an important resource. Post 1788, land-use includes being part of the grounds of the Female Orphan School, a group of mall houses off Queen's Court, and a small street running off Queens Place (Dalley Street). Some of these houses are located under the site of the existing sub-station. It can therefore be considered that the surrounding area of the site contains a range of potential archaeological remains associated with the history and development of Sydney.

The Proponent has committed to conduct archaeological investigations as part of the future project applications for the Riley Street Sub-transmission Switching Station and Dalley Street and City East Zone Substations. The archaeological potential and significance of the Dalley Street and City East Zone Substation sites would be re-assessed once the exact study areas and nature of impacts are known. Also the Dalley Street and City East Zone Substation sites are to be archaeologically tested to determine the nature and integrity of the archaeological remains. The Proponent has stated that if substantive remains are identified, these remains would need to be subject to a detailed archaeological recording program. With regards to the Alternative Services Control Room, the nature of possible remains in the Cook and Phillip Park would be re-assessed once the location of the control room is known.

Issues Raised in Submissions

Issues raised by the Heritage Branch of the Department can be summarised as follows:

- States that the Environmental Assessment addresses only the non-aboriginal archaeological aspects of four sites along the proposed Sydney CityGrid Infrastructure route (Belmore Park Site; alternative services control room site, located within Cook and Phillip Park; City East Zone Substation potential sites; and Dalley Street Zone Substation site). It further states that there is no identification or assessment of the impact the Project may have on any other type of heritage along the proposed project route(s), such as buildings, gardens or works. It considers that the potential affect of the proposed works on all heritage items should be assessed to identify any adverse impacts that may occur.
- States that it is not clear whether a search of the State Heritage Inventory or State Heritage Register was undertaken by the Proponent, to identify specific sites or structures of heritage significance.
- Notes that the Director-General's requirements required non-aboriginal heritage items 'under or adjacent' to the area affected by the proposal to be identified by field survey and an assessment of the impact of the proposal on the item's heritage significance be undertaken. This specifically includes all heritage items along the proposed infrastructure route(s), not just the locations identified as having archaeological potential. States that it is not clear from the Environmental Assessment whether this has been undertaken.
- States the structural vibration impacts of proposed tunnelling work on the built heritage along the tunnel route have not been addressed.

The Department of Environment and Climate Change noted that the Environmental Assessment identifies the potential impact on European heritage as low, the one exception being works undertaken around or in areas surrounding the Domain. As such, it requests that if during construction, the Proponent becomes aware of any heritage items or archaeological material, all works likely to affect the site(s) shall cease immediately and the relevant authorities, including itself, be notified immediately before works progress further.

Consideration

The Department notes that the Proponent's assessment was based on historical research, to determine the nature of each proposed site's potential archaeological remains. The Proponent's assessment considered potential impact on non-indigenous archaeological remains of all but two of the areas proposed to be developed (extension to the existing City South Cable Tunnel and Stub Tunnel Connection from the existing City South Cable Tunnel to proposed Belmore Park Zone Substation). This is because these two components of the Project only involve sub-surface tunnelling and refurbishment of existing facilities.

As found by the Heritage Branch of the Department, the Proponent has only considered the archaeological potential of the sites investigated, rather than considering all other items that could be of non-indigenous heritage value, for example gardens, relics, trees or places of non-Aboriginal heritage significance. The Department also notes that the specific area in which the City East Zone Substation and Dalley Street Zone Substation is to be situated is yet to be confirmed. This means further site-specific historical research would be required to ensure a comprehensive understanding of the potential for impacts to non-indigenous heritage.

For the above reasons, the Department recommends a condition as part of the Concept Approval, which requires the Proponent to undertake a project level Non-Indigenous Heritage Assessment. This will include identification of heritage items under or adjacent to the areas affected by the project by appropriate field surveys and an assessment of the impact of the project on the heritage significance of the items. As part of this recommended condition, the Department has included specific items that the surveys must target. Also, as part of this condition, the Proponent is required to prepare the assessment in consultation with the Heritage Council of New South Wales. The Department also requires, as part of a recommended condition, the Proponent to complete a project level vibration assessment for the construction and operation stages of the Project. The Department considers that this recommended condition would address the potential for impact on non-indigenous heritage items as a result of vibration generated by the project's construction.

The Department finds that the above recommended conditions would ensure the Proponent completes a thorough assessment for potential impacts on items or places of non-indigenous heritage significance, prior to it lodging a Project Application for one or all of the Concept Plan components (with the exception of the Belmore Park substation). The project application for the Belmore Park substation included an adequate non-indigenous heritage and noise and vibration assessment.

5.6 Indigenous Cultural Heritage Impacts (Stage 1 and Stage 2)

Issues

The Proponent conducted an assessment for the potential impacts the Project may have on Aboriginal cultural heritage. As part of this assessment, the Proponent reviewed relevant literature and data to determine if known Aboriginal sites were located within the area under investigation (area to be developed as part of the Project), to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The type of information used by the Proponent included heritage registers, local histories and archaeological reports. Aboriginal literature sources included the Aboriginal Heritage Information Management System (AHIMS), which is maintained by the Department of Environment and Climate Change, and associated files and catalogue of archaeological reports, published monographs and other relevant material. Fieldwork was undertaken on 6 May 2008 and involved inspection of the substation and switching station locations and tunnel extension and connection alignments. The assessment and fieldwork was conducted by archaeologists, on behalf of the Proponent.

The Project falls within the Metropolitan Local Aboriginal Land Council area and therefore is the relevant body which represents the Aboriginal community. The Proponent states that the Metropolitan Local Aboriginal Land Council sites officer was unable to attend the one day field survey. As such the Proponent, as agreed to by the Metropolitan Local Aboriginal Land Council, sent a draft copy of its report to it, for the purposes of providing comments on the recommendations drawn from the heritage study and to provide an assessment of the cultural values of sites within the area. The Proponent however has not received any comments from the Metropolitan Local Aboriginal Land Council to date.

Each of the existing and proposed substation and switching station locations at Haymarket (proposed Belmore Park Zone Substation, Surry Hills (proposed new sub-transmission switching station), Cook and Phillip Park (proposed ventilation shaft and services building), Bent Street (proposed City East Zone Substation), and Dalley Street (existing Dalley Street Zone substation), are situated in heavily disturbed areas. These areas now comprise of buildings, car parks, building sites and/or artificially created parks. The proposed tunnel extension and connection alignments essentially stretch from Little Albion Street in Surry Hills east to Riley Street, then north along Riley Street and Boomerang Street to the east of the Domain, before arcing northeast across the northern part of Sydney Central Business District and turning south to end near Erskine Street, adjacent to East Darling Harbour. The Proponent states that although most, if not all, of those locations may have been disturbed through extensive use of fill or through levelling (for the purposes of building and city infrastructure development), this is not entirely certain. Therefore the portions of these areas that are proposed to be developed as part of this Project have been investigated for their Aboriginal heritage value. It should be noted the potential to impact on present and former land surface deposits is the greatest where ground disturbance is proposed to occur (i.e. proposed tunnel extension and connection locations).

The Proponent's assessment found 16 previously reported Aboriginal sites in the vicinity of the Project. No new Aboriginal sites or objects were found during the Proponent's investigation. Table 5 presents a summary of these previously identified Aboriginal sites, including which component of the Project is within the vicinity of the site. If a

site is not located in the immediate proximity of a project component, the Table identifies this site as located in the general vicinity of the project.

Table 5: Summary of Previously Identified Aboriginal Sites within the vicinity of the Project areas

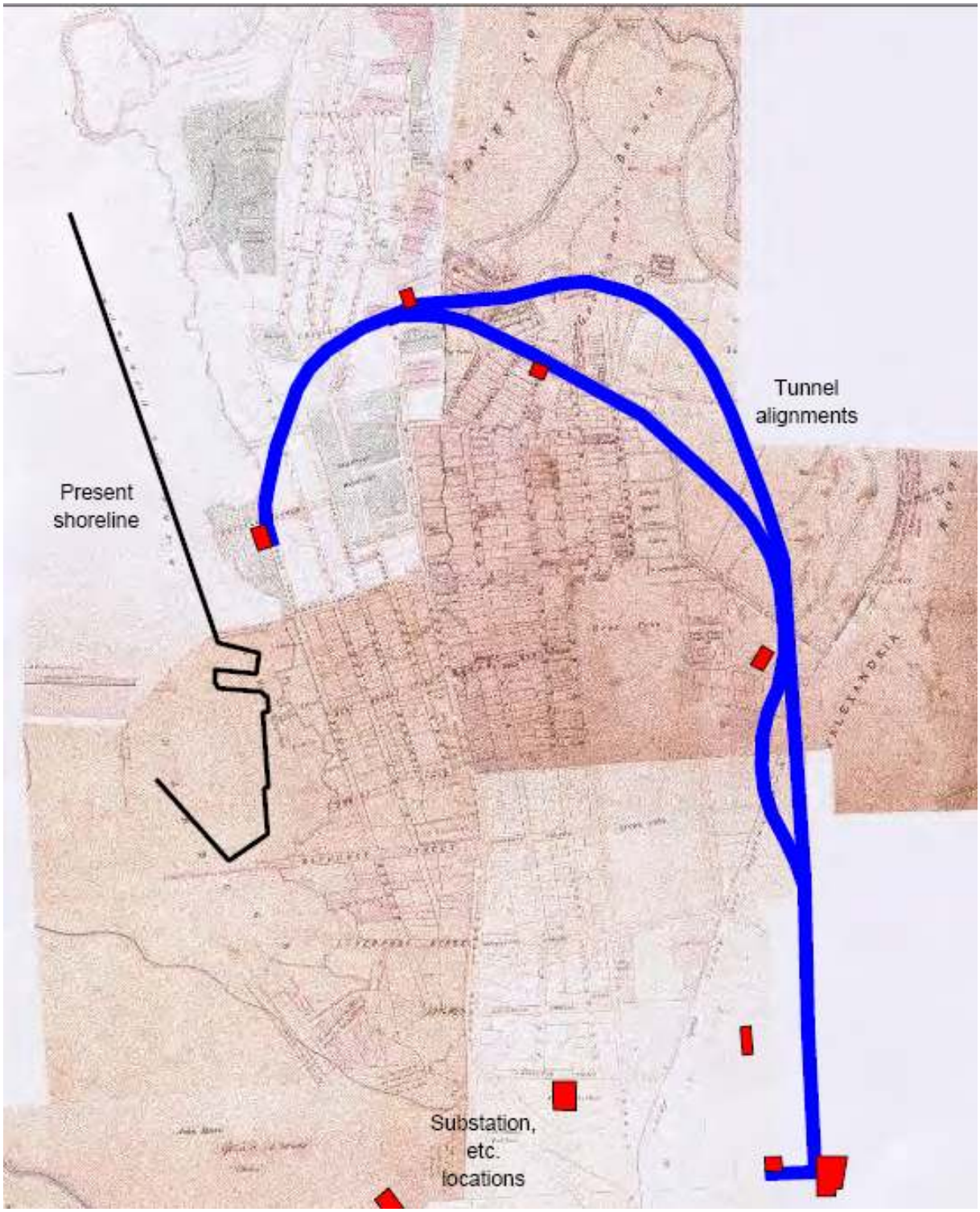
Site ID	Site Name	Site Type	Project Component Located within the Vicinity of Site
1853	Lilyvale	Midden	• City East Cable Tunnel, Bridge and Riley Street Alignment • Dalley Street Substation
2299	First Government House	Burial/s, Historic Place	• City East Cable Tunnel, Bridge Street Alignment • Dalley Street Substation It is noted that this site may be located within the Bridge Street Alignment for the City East Cable Tunnel, as opposed to only within the vicinity of the alignment.
2580	Junction Lane	Open Camp Site	• City East Cable Tunnel, Bridge and Riley Street Alignment • Services and Control Room
2581	Angel Place	Open Camp Site	• City East Substation • City East Cable Tunnel, Riley Street Alignment
2629	Broadway 1	Artefact	Existing Haymarket Bulk Supply Point (this is owned and operated by TransGrid and would be required to decrease the transmission line voltage using transformers).
2647	KENS Site 1	Artefact	• City East Cable Tunnel, Riley Street Alignment • Existing City North Substation
2651	William St PAD	Potential Archaeological Deposit	• City East Cable Tunnel, Yurong Street Alignment • Services and Control Room
2652	Ultimo PAD1	Potential Archaeological Deposit	Located in the general vicinity of the Project components
2663	Mountain St Ultimo	Artefact/ Potential Archaeological Deposit	Existing Haymarket Bulk Supply Point
2666	Wattle St PAD1	Potential Archaeological Deposit	Existing Haymarket Bulk Supply Point
2680	Broadway Picture Theatre PAD1	Potential Archaeological Deposit	Existing Haymarket Bulk Supply Point
2687	Crown St PAD1	Potential Archaeological Deposit	Services and Control Room City East Cable Tunnel, Bridge and Riley Street Alignment
2742	171-193 Gloucester St PAD	Potential Archaeological Deposit	City East Cable Tunnel, Riley Street Alignment
2783	PAD Central Royal Botanic Gardens	Potential Archaeological Deposit	City East Cable Tunnel, Bridge Street Alignment
2796	320-328 George St PAD	Potential Archaeological Deposit	• Dalley Street Substation • City East Cable Tunnel, Bridge and Riley Street Alignment
2838	420 George St PAD	Potential Archaeological Deposit	Located in the general vicinity of the Project components

Note: - Midden is a site where there is an accumulation of shell material, due to use of molluscs by Aboriginal people

Figure 25 illustrates the change in the estuarine and marine shoreline of Cockle Bay/Darling Harbour, resulting from urbanisation and infilling of the Sydney Central Business District.

The detection of 16 Aboriginal sites in the vicinity of the proposed areas of development demonstrates that remnants of Aboriginal archaeological material may survive in limited areas, in the now highly modified environment of the Sydney Central Business District. However, the likelihood that Aboriginal site remnants surviving in an undisturbed context is remote. Similar to the management measures for non-Aboriginal heritage, the Proponent has committed to undertake further investigations for the Riley Street Sub-transmission Switching Station, Dalley Street and City East Zone Substations, when preparing future project applications for these components of the Project. This will involve reassessing the archaeological potential and significance of these areas upon determination of the exact location of these components and nature of impacts. With regards to the potential site for the Services and Control Room, the Proponent has committed to assess the nature of possible remains in the Cook and Phillip Park, once the location of the control room is finalised.

Figure 24: Extracts from various late nineteenth-century parish maps of Sydney, showing original and present shorelines of Cockle Bay/Darling Harbour and overlay of proposed Sydney CityGrid Project components (reproduced from the Proponent's Environmental Assessment)



The Proponent considers the potential for direct impact to surviving archaeological deposits by the Project to be very limited. This is because it notes that above ground works may impact Aboriginal archaeological deposits only where relatively undisturbed original land surface soil profiles are encountered on well-drained elevated landforms within 100 metres of a natural water source. Also below ground works may impact archaeological deposits only where excavations are close to the surface and encounter former or current upper soil profile sediments.

The Proponent states that the proposed connecting tunnel to the City North Substation, situated at the western end of Erskine Street, will be located in an area of former shoreline (refer to Figure 23), and thus it is possible that any associated foreshore deposits containing archaeological material will be impacted during excavation of the tunnel at that section. However, given the highly modified landform, the Proponent does not expect any Aboriginal sites to be present within the proposed locations for the substations and tunnel extension and connection points. Therefore the Proponent considers that all proposed sites have a low to negligible potential for Aboriginal heritage remains. Due to this conclusion, the Proponent's study found that no further Aboriginal archaeological investigation (such as pre-construction subsurface testing or monitoring of construction works) should be required for the Project.

The Proponent's assessment does recommend that an appropriately trained archaeologist should be available (on call) during excavations to identify Aboriginal objects and provide advice where necessary. Also, the Proponent recommends that in an unlikely event that Aboriginal Objects are uncovered by construction or excavation works, the following response strategy be adopted and incorporated into contingency management plans, prior to commencement of works:

- stop all impact works which may disturb the area of the find or exposed Aboriginal Object;
- contact project archaeologist and organise for inspection of site/material;
- consult with the Department of Environment and Climate Change and the Metropolitan Local Aboriginal Land Council regarding an appropriate course of action; and
- carry out any requirements indicated by the Department of Environment and Climate Change and the Metropolitan Local Aboriginal Land Council.

Issues Raised in Submissions

The submission from the Department of Environment and Climate Change noted that potential impact to indigenous heritage is low. However, it requested that if, during construction, the Proponent becomes aware of any heritage items, all works likely to affect the site(s) shall immediately cease and the relevant authorities, including itself, be notified before works progress further.

Consideration

The Department notes that those areas in which the proposed components of the Project are to be situated, including the Belmore Park Zone Substation, have been extensively disturbed as a result of the existing built environment.

The Department considers that it is not likely that Aboriginal archaeological material will be found during construction of the proposed components. The indigenous heritage assessment concluded that the potential for direct impact to surviving archaeological deposits is considered to be limited to above-ground works on undisturbed original land surface soil profiles on well-drained elevated landforms within 100 metres of a natural water source, or below ground works where excavations are close to the ground surface. The proposed connecting tunnel to the City North Substation would be located in an area of former shoreline and it is possible that any associated foreshore deposits containing archaeological material will be impacted during the excavation of the tunnel at that location.

The Department understands that most of the other excavations proposed for the Project would occur in sediments previously disturbed to a high level, as a result of road and building construction. However the Department considers the potential for possible impact upon Aboriginal heritage still remains, as significant heritage sites may exist within the areas to be excavated. The Department also notes the absence of comments from the Metropolitan Local Aboriginal Land Council's regarding the findings drawn from the Proponent's assessment and potential impact on Aboriginal cultural values. As such, the Department has recommended specific conditions as part of the Concept Approval and the Project Approval to address this potential for impact.

For the Project Application, the Department considers that there is a need for the Proponent to undertake an adaptive construction methodology to take into account the potential of encountering Aboriginal objects. Therefore the Department recommends a condition which states if, during construction, the Proponent becomes aware of any Aboriginal object(s) and/or material, all work likely to affect these items shall cease immediately, and the relevant authorities, including the Department of Environment and Climate Change and the Metropolitan Local Aboriginal Land Council, shall be contacted in accordance with the *National Parks and Wildlife Act 1974*. This recommended condition also prevents the Proponent recommencing any works, unless a qualified

archaeologist assesses the object(s) and/or material to determine significance and until authorisation from the Department of Environment, Climate Change and Water is received by the Proponent. The Department also recommends a condition that requires the Proponent to report all new (previously unidentified) indigenous sites that are identified during construction or during any stage related to the Project Application, to the Department of Environment, Climate Change and Water, in accordance with section 91 of the *National Parks and Wildlife Act 1974*.

With respect to the Concept Plan Application, the Department considers that further investigation is required to determine the likely impact the concept components may have on Aboriginal heritage. This is mainly due to the pending determination by the Proponent, of the final location of the concept plan components. As such, as part of the Concept Plan Approval, the Department recommends the Proponent be required to provide an updated Indigenous Heritage Assessment, in order to confirm, upon determination of specific locations for the components of the Project, that Aboriginal items of significance will unlikely be present with the Project areas. The Department also requires this recommended updated assessment be informed by the views of the Metropolitan Local Aboriginal Land Council and any other relevant, readily contactable Aboriginal community representative.

The Department considers that its recommended conditions of approval are consistent with the issue raised by the Department of Environment and Climate Change during the exhibition period of the Environmental Assessment and also addresses the shortcomings of the Proponent's indigenous heritage assessment in relation to the concept plan. This includes the limited survey period, the inability to obtain comments from the Metropolitan Local Aboriginal Land Council's and the broad investigation undertaken of the Sydney Central Business District.

The Department is satisfied that the construction of the Belmore Park Zone Substation can be adequately managed to ensure no adverse impact to items of Aboriginal significance occurs. The Department is also satisfied that should the Proponent adhere to its commitments and the Department's recommended conditions for the Concept Plan Application, a detailed understanding of the possible impacts to Aboriginal heritage can be obtained. From this additional information, the Department would conduct a separate assessment to determine whether the impacts, if any, to items of Aboriginal heritage significance, would be acceptable and manageable.

5.7 Other Issues – Surface and Groundwater Impacts (Stage 1 and Stage 2)

Issues

During the construction of the Belmore Park Zone Substation and associated development, the main issues relating to surface and groundwater management would be the prevention of erosion and containment of sediment generated to prevent discharge into the local stormwater systems, and the potential for chemical spills. Another main issue is that stormwater run-off could potentially contain high levels of silt loads from tunnel spoil which could be tracked onto pavement and local roads by trucks.

The Proponent also stated that groundwater would be intercepted during construction, which may contain relatively high levels of manganese and/iron. However, the Proponent has indicated that groundwater intercepted during both the construction and operation phase of the project would be treated and discharged to stormwater in accordance with The Australian and New Zealand Environment and Conservation Council guidelines and in consultation with the Department of Environment and Climate Change, Sydney Water Corporation and/or the City of Sydney Council.

The construction and operation of the proposed substation would require a water treatment facility, to treat groundwater, prior to its discharge into the stormwater system. The groundwater would either be managed on site, in a new water treatment plant installed within the site boundary, or groundwater may be pumped to the existing City South Cable Tunnel water treatment plant (via the City South Cable Tunnel), which is located at the existing Campbell Street Zone Substation. The Proponent states that it prefers to utilise the existing City South Cable Tunnel water treatment facility. However, for the commercial component of the proposed development, a separate water treatment plant would likely be required, subject to final detailed design of the development.

Geotechnical borehole investigations encountered groundwater below the site, at depths in excess of 8 metres. The groundwater table was found to lie within the sandstone bedrock, well below the surface fill and clay material and as such the Proponent finds that further lowering of the groundwater table resulting from the excavation is not expected to have any adverse impact on the surrounding buildings, structures or services. The Proponent states that it does not plan to monitor the groundwater table for the site during excavation and construction of the

development. The Proponent will prepare a Soil and Water Management Plan for the development, which will focus on soil and surface water and groundwater mitigation measures that would be implemented at the various construction stages.

The same issues relating to surface and groundwater management, identified for the construction of works relating to the Project Application, also apply to the concept components of the Project. The other proposed substations would have their own water treatment plant, depending on detailed design. In addition to these already identified issues, higher water pressures may be encountered in the City East Cable Tunnel Alignment. The Proponent states that although the City East Cable Tunnel would be fully lined to exclude or limit the seepage of groundwater, no lining is completely waterproof. As a consequence, it anticipates that small quantities of groundwater would collect in this proposed tunnel, approximately 300 litres/100 metres/per day. It states that during construction, temporary pumping systems would be installed to pump groundwater and other water generated during the works to the surface for discharge to the stormwater system following treatment.

With regards to operation, a sump and pump-out facility would be included at the lowest point/s of the City East Cable Tunnel, with drainage channels throughout the tunnel length to direct seepage water to these allocated points. This water from the sump would then be pumped into the City South Cable Tunnel and treated at the existing water treatment plant, as also proposed for the Belmore Park Zone Substation. The Proponent states that its initial assessment indicates that the existing water treatment plant can accommodate inflows from the two existing City South and City West Cable Tunnels and also the proposed City East Cable Tunnel. However, further detailed investigation would be carried out to confirm this initial assessment.

The Proponent's Environmental Assessment indicates that changes to the water table could potentially result in the settlement of buildings founded on alluvium and/or fill as a result of groundwater drawdown, however, this is unlikely to occur as the City South Cable Tunnel would be progressively lined during construction (within a concrete encased structure underground) and designed to exclude any groundwater seepage.

Issues Raised In Submissions

The Department of Environment and Climate Change requested the inclusion of a condition that the Proponent complies with Section 120 of the *Protection of the Environment Operations Act* in regard to the treatment and discharge of infiltrated groundwater. It also requests that appropriate conditions be applied that relate to the assessment of treatment techniques to the infiltrated groundwater prior to discharge as well as for post discharge monitoring and reporting.

The Department of Water and Energy noted that as the proposed construction involves excavations, any groundwater works for the purpose of investigation, extraction, dewatering, testing or monitoring, must be approved under Part 5 of the *Water Act 1912* and a licence from itself must be obtained, prior to such works occurring.

Consideration

With regard to the Project Application, the Department considers that the proposed construction works have the potential to cause pollution of surface water and groundwater. For this reason, the Department has recommended a condition of approval that requires the Proponent to employ measures to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction activities, in accordance with Landcom's *Managing Urban Stormwater: Soils and Conservation*. In addition, the Department has recommended a condition that requires the Proponent to prepare a contingency plan for events that have the potential to pollute or contaminate these water sources. The Department requires this contingency plan to include threshold levels, remediation actions and communication strategies for the effective management of such an event. This plan is to be included in the required Construction Water Quality Management Plan, required as part of the Construction Environmental Management Plan and therefore would need to be approved by the Director-General.

The Department notes that the Proponent does not intend to monitor the proposed site during excavation for the purposes of preventing adverse impacts to groundwater, the proposed stub tunnel connection will be approximately 20 metres below Campbell Street and the development site would contain four basement levels (meaning the excavation would be of an approximate depth of 14.5 metres below ground level). On this basis, the Department finds that monitoring of the site during construction must occur. As such, the Department has

recommended a condition which requires the Proponent to provide details of the management of groundwater during construction and operation of the Project and include this information in the Construction Environmental Management Plan and Operation Environmental Management Plan (where relevant). The information must detail groundwater control measures to be implemented during both construction and operation, and include details regarding impacts on nearby structures from potential settlement, groundwater inflow control and the methods for monitoring groundwater. The information must also include measures to allow for the reuse of water where practical, in preference to discharge into the stormwater system. The Department also requires this information to include details of the use of existing water treatment plants, including performance and/or proposed new water treatment plant and discharge points, for the purposes of treating seepage water prior to discharging into waterways.

With regard to the Concept Plan Application, the Department has recommended a condition which requires the Proponent to submit, as part of the future project applications, detailed information on water quality impacts (surface water and groundwater). This detailed information must include the potential impacts on groundwater and measures to control or mitigate excessive water inflows and proposed mitigation measures for water quality impacts. Also erosion and sedimentation controls and dewatering of tunnels and associated water quality impacts must be included. Proposed disposal and treatment options must also be outlined, including details of how the seepage water will be treated prior to its discharge.

5.8 Other Issues – Spoil Management (Stage 1)

Issues

The proposed development would require bulk excavation of the entire proposed site, resulting in approximately 70,500m^3 of excavated material. Bulk excavation of the site would occur in two stages. The first stage would entail bulk excavation of the substation component of the development for a period of about nine months, totalling 47,250m^3 and the second stage would entail bulk excavation of the commercial/retial component of the development for a period of about seven months, totalling 23,250m^3 of material. A variety of materials are to be removed during bulk excavation works, ranging from building rubble filling, stiff clays to extremely low and high strength sandstone. The Proponent states that efficient removal of spoil material would require consideration of a number of factors, including precautions necessary to avoid over-break when excavating to boundary lines, or close to footings for the adjacent building and sidewall stability of excavation faces. The Proponent states that during construction, it would employ mitigation measures and safeguards for managing spoil. This will include reusing spoil as part of the project, wherever practical and testing of the fill material prior to it being acceptable for waste disposal purposes. Also spoil that is not Virgin Excavated Natural Material would be transported to approved landfill sites and/or off-site recycling depots and the Proponent would use nominated spoil haulage routes for the transportation of spoil. The Proponent states that all work associated with contaminated spoil, including the preparation of reports, would be carried out in accordance with the relevant guidelines of the Department of Environment and Climate Change and guidelines prepared by the Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council.

Issues Raised in Submissions

The Department of Environment and Climate Change stated that any approval for the Project should include conditions that address issues related to the appropriate management and disposal of spoil resulting from the project.

Consideration

The Department finds the Proponent's proposed measures would ensure the excavated material will be adequately assessed and disposed of appropriately. In order to ensure however, that the trucks transporting the spoil do not pose a hazard to other vehicles and pedestrians, the Department has recommended a condition that requires the identification and designation of heavy vehicle routes, including spoil trucks. This information is required to be included in the Traffic Management Protocol, which the Proponent must prepare in consultation with the Roads and Traffic Authority, City of Sydney Council and the State Transit Authority. This protocol is to be contained within the Construction Environmental Management Plan, which requires the approval of the Director-General, prior to construction works occurring.

5.9 Other Issues – Electrical and Magnetic Fields (Stage 1)

Issues

There remains some uncertainty about the potential health effects of electric and magnetic (EMFs) and, if there is an effect, at what level it would occur. To the extent there is an unresolved concern, it now focuses on magnetic fields rather than electric fields.

There is no current standard for magnetic fields in Australia. The now rescinded National Health and Medical Research Council (NHMRC) Interim Guidelines recommended limit for public exposure is 100 microtesla (μT) (1000 milliGauss (mG)) (24 hour exposure). The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) released the Draft *Radiation Protection Standard for Exposure to Electric and Magnetic Fields 0 Hz – 3 kHz1* in December, 2006. This standard is currently being finalised.

The draft Standard proposed a limit for public exposure similar to the NHMRC guidelines (100 μT). However, the Commonwealth's Radiation Health Committee has subsequently supported an increase in the limit from 100μT to 300μT. The draft Standard encourages a precautionary/prudent avoidance approach by proponents, to reduce the public's exposure to magnetic fields. However, it also states that only modest or low cost measures are likely to be justifiable and that the incorporation of arbitrary additional safety factors beyond the exposure limits in the draft Standard would not be supported.

In relation to this project, the Proponent has indicated that it would undertake a number of measures to minimise EMFs around the proposed project elements and include the following:

- locating the transmission cables within a concrete lined tunnel at a depth of 10 to 70 metres below ground level resulting in the fields being indiscernible from typical background levels occurring in the environment;
- designing the Belmore Park Zone substation to incorporate mitigation measures including:
    - restricting access to the site to limit exposure to the general public;
    - positioning equipment which produces higher fields furthest away from adjoining property boundaries;
    - positioning items of equipment that produce low fields closer to adjoining properties;
    - balancing 11 kV and 132 kV loads to minimum zero sequence current;
    - positioning cables in a trefoil configuration where possible;
    - positioning cable trays away from adjoining properties;
    - installing incoming and outgoing connections underground;
    - utilising 132 kV gas insulated switchgear instead of conventional air-insulated equipment;
    - positioning five transformers in a single line to reflect the optimum location furthest away from neighbouring properties on both sides of the site.

The Proponent has indicated that further investigation of mitigation measures and safeguards would be undertaken for the concept plan components during the preparation of Environmental Assessment reports for these future projects.

Issues Raised in Submissions

The issue of EMFs was not specifically raised in the submissions received during the exhibition period. A late submission received by MKH Properties Pty Ltd, however, raised it as an issue of concern. MKH Properties Pty Ltd owns a multi-storey commercial building known as Central Square, on the adjacent site of the proposed Belmore Park Zone Substation site at 323 Castlereagh Street, Sydney. Its submission states that it is in the process of a major ground level refurbishment of its building to introduce active uses around its perimeter along Campbell, Castlereagh and Hay Streets. Plans have also been prepared for the conversion of ground level office areas to retail use along the building's perimeter. MKH Properties Pty Ltd is concerned with the potential impact from EMFs on tenants within its building and it has requested further detail on this aspect including modelling and analysis from the Proponent in relation to potential field impacts.

Consideration

The Department has reviewed the abovementioned submission and the information provided by the Proponent in its Environmental Assessment and Response to Submissions Report and has recommended as a condition of approval that the Proponent undertake pre-operation magnetic field monitoring to establish existing magnetic field

levels surrounding the project site. In addition, the Department has recommended a condition of project approval which states that the Proponent is required to prepare a Magnetic Field Management Protocol to detail measures to be applied to the project to ensure that the magnetic field levels surrounding the cables, transformers, switchboard and air-core reactors are minimised during operation, including details on the application of Prudent Avoidance Principles. In addition, the results of the monitoring required by the project approval need to be included within the Protocol following which identification of magnetic field reduction strategies can be based. This approach will ensure that magnetic field levels, including those at the Central Square building, are minimised within the Prudent Avoidance framework.

5.10 Other Issues – Traffic Management (Stage 1)

Issues

The construction of the Belmore Park Zone Substation would generate traffic due to the carrying out of activities associated with site establishment, spoil removal, material delivery and staff transport. Of these activities, spoil removal is predicted to generate the bulk of heavy vehicle traffic, which would generate a peak of 20 spoil truck movements per day over the approximate eight month period required to complete this activity. The Proponent has identified designated routes for the heavy vehicles, which would follow the major road network and allow the vehicles to travel to spoil site locations. These routes would be confirmed once spoil sites are determined and a construction contractor is appointed by the Proponent. Other activities would generate approximately one to two deliverers of vehicles per day during the construction of the zone substation. Traffic generation attributable to staff would be limited by the availability of parking in the southern Central Business District of Sydney. This, in combination with existing nearby public transport services, would encourage the use of public transport by construction staff and reduce traffic generation. Based on onsite parking spaces, light vehicle traffic generation would be approximately ten cars (or 20 trips per day) to and from the Belmore Park Zone Substation site. Traffic generated from the operation of the substation would be limited to regular maintenance inspections and associated activities. This generated traffic would not cause adverse impact to the surrounding road network.

The construction of the commercial/retial component of the Belmore Park Zone Substation project, which would be undertaken once the substation works are complete, is expected to take approximately 23 months (which will involve bulk excavation, structural works, façade works, roofing and fitout). Spoil removal activities would generate a peak of approximately 22 truck movements per day (11 arriving and 11 departing), with heavy vehicle routes expected to be similar to those for the substation construction stage. Building structural works will commence once bulk excavation is complete. As the development site occupies the full extent of the site, a work zone may be required along the Campbell Street frontage for deliveries and hoarding would be constructed along all site frontages. The Proponent has selected this location due to the reduced traffic volumes compared to the other frontages. The construction activities, except those related to bulk excavation, would generate up to 15 truck arrivals per day, which results in a total of up to 30 truck movements per day.

The operation of the commercial/retail development of the Belmore Park Site would generate traffic movements from the use of the proposed basement car parking spaces and delivers and maintenance activities. This component is predicted to generate a maximum of 48 vehicles/hour during peak periods, which would result in 38 arriving and ten departing trips in the morning and ten arriving and 38 departing trips in the afternoon. Vehicle trips at all other times would be less than this predicted peak volume.

Issues Raised in Submissions

Sydney Metro stated that due to similar program timeframes, there is potential for cumulative truck movements associated with the CBD Metro Project (the Sydney Metro) in the vicinity of Central Station in Pitt Street and Belmore Park.

Sydney Regional Development Advisory Committee stated that car parking areas and signage for pedestrians and motorists should be developed in consultation with Council to ensure safe traffic flow.

City of Sydney Council stated that a designated loading area for trucks must be identified, which does not interfere with other vehicle circulation. Also states that a Construction Traffic Management Plan must be developed by the Proponent and approved by Council, prior to construction works commencing.

Consideration

The Department supports the Proponent confirming designated heavy vehicle routes and other vehicle access routes, signage and site access arrangements once a contractor for the site is appointed. The Proponent would finalise, from the outcomes of its consultation with the appointed contractor, specific safeguards for the safe movement and parking of vehicles for both the construction and operation phases of the substation and commercial/retail development. The Department however finds that the Proponent's final mitigation and safeguard measures for traffic management must be reviewed and approved by the Director-General, prior to these measures being implemented. Therefore the Department has recommended a condition that requires the Proponent to prepare, in consultation with the Roads and Traffic Authority, City of Sydney Council and the State Transit Authority, a Traffic Management Protocol, which is to be included in the required Construction Environmental Management Plan. This Plan is to be submitted for the approval of the Director-General no later than one month prior to the commencement of any construction works associated with the Project (or within such a period otherwise agreed by the Director-General). This Protocol must include information on all roads nominated for use during construction, the measures taken to allow for heavy vehicle generation to be minimised and how the use of local roads by the heavy vehicles will be monitored to ensure safe vehicle movement. This Traffic Management Protocol must also include information on the scheduling of works to minimise traffic disruption, development of parking spaces and safe pedestrian and cyclist movement.

The Department has also recommended specific conditions which require the Proponent to ensure existing and proposed generated traffic, existing transport and the roads to be used for the construction of the Project are adequately managed. Firstly the Proponent is required, as part of a recommended condition, to both prior to the commencement of construction and after construction is complete, commission road dilapidation reports for all roads nominated in the required Construction Traffic Management Protocol that are likely to be used by construction traffic. The Proponent will need to provide copies of the reports to the City of Sydney Council and the Roads and Traffic Authority. Any road or footpath damage, aside from that resulting from normal wear and tear, must be repaired to a standard at least equivalent to that existing prior damage, at the cost of the Proponent. Secondly, the Proponent is required to ensure the layout of car parking areas associated with the Project (including driveways, grades, turn paths, sight distance requirements, aisle widths and lengths and parking bay dimensions) are in accordance with Australian Standard *AS 2890.1 – 2004*. Certification by a qualified engineer, that the design of the car parking areas complies with the provision of AS *2890.1 – 2004* must be included in the required Construction Environmental Management Plan. The Department also requires the Proponent to include as part of the commercial/retail component, bicycle parking facilities either within the proposal site or in close proximity to the site and provide end trip facilities such as showers and changing rooms, to encourage bicycle use for travelling to and from the development.

With regards to the Project's interactions with Metro Infrastructure and associated works, the Department has recommended a condition which requires the Proponent to liaise with the Sydney Metro Authority. This liaison is required for the Proponent to determine whether construction works associated with the CBD Metro concurrently coincide with works associated with the Project. If such works are to coincide, the Proponent must develop, in consultation with the Sydney Metro Authority, mitigation measures to ensure avoidance or minimisation of adverse impact to public roads, traffic, pedestrians, residents and businesses.

The Department is satisfied that the recommended conditions of approval should provide the necessary measures for managing the impacts of construction traffic to an acceptable level.

6. CONCLUSIONS AND RECOMMENDATIONS

The Department has assessed the Environmental Assessment, Statement of Commitments, submissions received and the Submissions Report and Preferred Project Report, and is satisfied that the impacts associated with the construction and operation of the Belmore Park Zone Substation (including its integration with the proposed commercial/retail development) and the stub tunnel connection from the existing City South Cable Tunnel to Belmore Park Zone substation, can be mitigated and/ or managed to ensure an acceptable level of environmental performance. To ensure significant impacts are mitigated and other impacts are managed to an acceptable standard, the Department has recommended specific conditions as part of the Project Approval. The Department has recommended specific conditions to limit hours of construction to acceptable times and to limit noise generated during operations to mitigate amenity noise impacts. The Department has also recommended specific conditions for potential heritage impacts, which require monitoring of the site during bulk excavation to identify any non-indigenous items that may be present within the area and conditions which require relevant construction works to cease, should any indigenous objects and/or material be detected and include procedures for notifying the Department of Environment, Climate Change and Water and the Metropolitan Aboriginal Land Council. The Department has also recommended specific conditions to ensure the protection of waterways from potential pollution as a result of construction and operation and specific conditions to manage road impacts and site access. Specific conditions have also been recommended which require the Proponent to provide bicycle parking facilities and end trip facilities (such as showers and changing rooms) to encourage bicycle use for travelling to and from the commercial/retail component of the development.

With respect to the design of the Belmore Park Zone substation, the Department has recommended specific conditions of project approval related to design. In this regard, the conditions require that prior to the commencement of construction, the Proponent must submit for the approval of the Director-General, detailed plans including landscape design treatments and temporary façade treatments for the project. As part of this, the Proponent is also required to consult the Design Review Panel and further refine the design of the building during the detail design phase to ensure the final design, purpose and use of the development is consistent with the project approval and meets the reasonable requirements of the Design Review Panel.

The Department finds that further assessment is required for the remaining components of the Project, which the Proponent at this stage is only seeking concept approval for. This is because the Proponent is yet to determine the final location for the identified components, including the evaluation of the potential impacts that may result from the construction and operation of these components. As such, the Department has recommended conditions to be contained in the Concept Approval, which require the Proponent to complete project level noise and vibration, heritage (non-indigenous and indigenous), air quality, water quality and traffic and access assessments. Any future Project Applications for these components must be accompanied by these assessments, where relevant.

The Department recommends that the Minister for Planning consider the findings and recommendations of this report and grant Concept Approval for the entire Project and grant Project Approval for Stage 1 (Belmore Park Zone substation building, including commercial/ retail development to be integrated with the substation and stub tunnel connecting from the existing City South Cable Tunnel to Belmore Park Zone substation), subject to the recommended conditions.

Richard Pearson
Deputy Director-General
Development Assessment & Systems Performance

Sam Haddad
Director-General

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – SUBMISSIONS REPORT

APPENDIX C – STATEMENT OF COMMITMENTS

APPENDIX D – ENVIRONMENTAL ASSESSMENT