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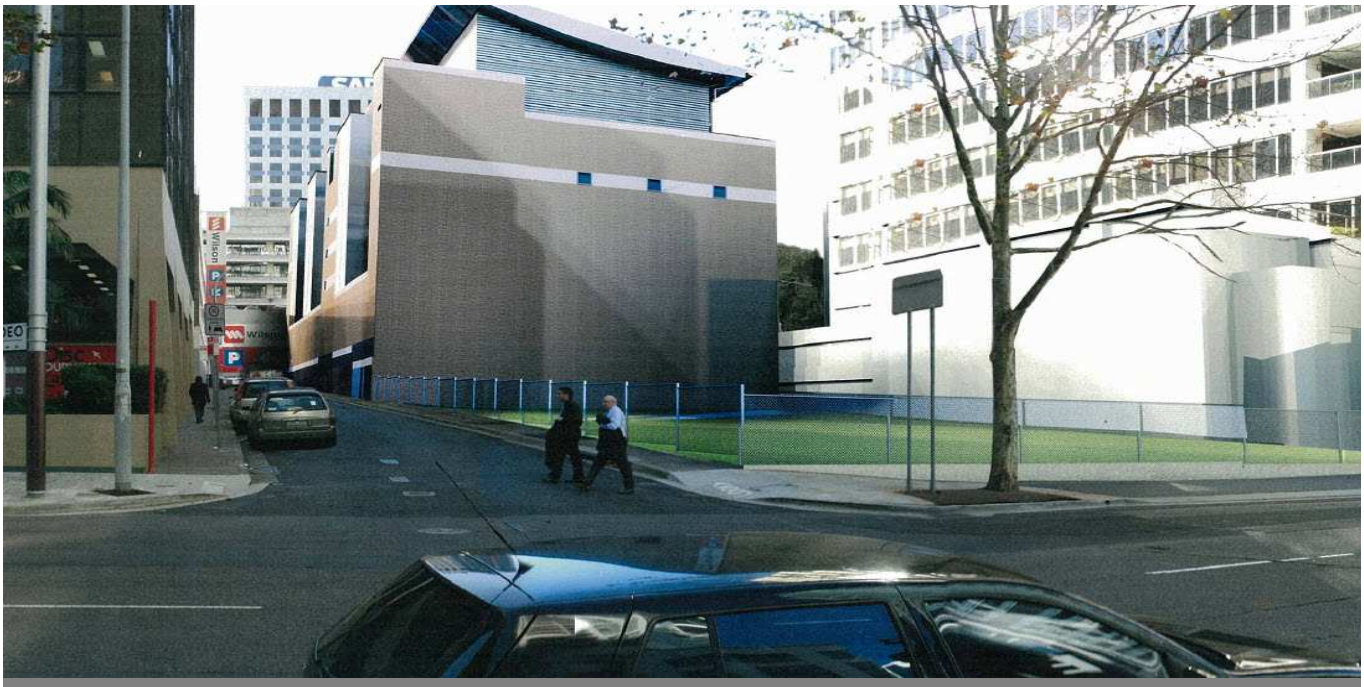

North Sydney Zone Substation Redevelopment
Preferred Project Report

QUALITY INFORMATION

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REVISION HISTORY

			Authorised	
Revision	**Revision date**	**Details**	**Name/position**	**Signature**
A	16 November 2010	For internal review	Catherine Brady	
B	5 December	For internal authorisation	Tony Boakes	

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The Energy2U Alliance brings partners EnergyAustralia, Leighton Contractors Pty Ltd, AECOM Australia Pty Ltd and PowerServe Pty Ltd together to undertake works for EnergyAustralia's Overflow Infrastructure Project.

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ACRONYMS AND ABBREVIATIONS

ACRONYM or ABBREVIATION	DEFINITION
ACM	Asbestos containing material
ARPANSA	Australian Radiation Protection and Nuclear Safety Association
BCA	Building Code of Australia
CEMP	Construction Environmental Management Plan
CIP	Community Information Plan
DECCW	Department of Environment, Climate Change and Water
DA	Development application
DGRs	Director Generals Requirements
DoP	Department of Planning
EA	Environmental Assessment
EMF	Electric and magnetic fields
ENA	Energy Network Association
EP&A Act	Environmental Planning and Assessment Act 1979
ESCP	Erosion and sediment control plan
GIS	Gas insulated switchgear
HV	High voltage
mG	Milligauss
MSDS	Material safety data sheet
NML	Noise management levels
NOHSC	National Occupational Health and Safety Commission
OEMP	Operational Environmental Management Plan
OH&S	Occupational Health and Safety
PCB	Polychlorinated biphenyls
PEA	Preliminary Environmental Assessment
PPE	Personal protective equipment

PPR	Preferred Project Report
RTA	Roads and Traffic Authority
SoC	Statement of Commitments
SMF	Synthetic mineral fibre
SWA	Safe Work Australia
TBS	Temporary builders supply
TMP	Traffic Management Plan
TWA	Time weighted average
WHO	World Health Organisation
WRAPP	Waste Reduction and Purchasing Policy

1 INTRODUCTION AND BACKGROUND

1.1 Introduction

EnergyAustralia proposes to undertake a redevelopment of the zone substation in North Sydney. To complete the redevelopment, EnergyAustralia intends to construct, operate and maintain a new North Sydney zone substation and decommission and demolish the existing North Sydney zone substation.

The project is being delivered by the Energy2U Alliance on behalf of EnergyAustralia.

The purpose of this Preferred Project Report (PPR) is to outline the preferred project for the North Sydney zone substation redevelopment, which has been modified since preparation of the Environmental Assessment (EA), in response to issues raised in submissions received during the EA exhibition period. This report also contains the final Statement of Commitments (SoC) for the preferred project.

1.2 Part 3A Approval Process

In accordance with Section 75B of the *Environmental Planning and Assessment Act 1979* (EP&A Act 1979), the Minister declared by Ministerial Order published in the NSW Government Gazette on 25th June 2010, that the construction and operation of the North Sydney zone substation is of State and regional significance and consequently, to be a project to which Part 3A of the EP&A Act applies.

A Preliminary Environmental Assessment (PEA) was issued to DoP on 22nd June 2010 and the Director-General issued the Director General's Requirements (DGRs) dated 14th July 2010 for the preparation of the EA for Project Approval under Part 3A. The EA presented an assessment relating to the nature of the proposal against all relevant planning and environmental issues, including the DGRs. The EA included a number of technical investigations to assist in evaluating the benefits of the project while simultaneously managing its impacts.

Section 75H of the EP&A Act requires that the EA be placed on public exhibition for a minimum of 30 days. The EA was placed on public exhibition from 22nd September 2010 to 22nd October 2010 (a total of 31 days). The submissions received during this period, and the proponent's response to issues raised within each of the submissions, form the basis of this report.

1.2.1 Consultation Activities

Consultation with the community and other key stakeholders regarding the North Sydney zone substation redevelopment has been underway since October 2009 and is ongoing.

One of the key objectives for consultation during the planning approval process has been to offer a range of opportunities for stakeholders and the community to be informed about the project.

A communications plan for the North Sydney zone substation project has been prepared which facilitates two-way communication between communities and stakeholders and the proponent. All relevant stakeholders have been informed of the progress of the project and issues raised by stakeholders have been addressed in the EA.

During the public exhibition members of the community and stakeholders had an opportunity to be informed about the project's scope and impacts and impact mitigation strategies in the EA and make a formal submission. Local community, government agencies and stakeholders, such as utility providers, have been consulted as part of this Part 3A assessment process.

1.3 Structure of this Report

This PPR is structured as follows:

Chapter 2 outlines the modifications of the design and the preferred project.

Chapter 3 presents a revised environmental assessment for the preferred project.

Chapter 4 presents a summary of the submissions received regarding the proposal.

Chapter 5 provides a tabulated list of the key issues raised in submissions and responses to issues. Where relevant, responses to individual submissions refer to sections of the EA.

Chapter 6 presents the final statement of commitments for the project.

2 PREFERRED PROJECT

2.1 Overview of Project as Presented in the EA

The project involves the construction, operation and maintenance of a new 132/11kV North Sydney zone substation at 3-11 Ward Street and the decommissioning and demolition of the existing North Sydney zone substation at 70-74 Berry Street. The proposed substation would be constructed on a site immediately adjacent to the existing substation. Collectively, both sites are referred to as the project site.

The key activities associated with the project include:

- Construction of a brick-clad substation building.
- Installation of an 11kV switchboard.
- Installation of three 50 MVA 132/11kV low noise transformers.
- Installation of 1600 Amp 132kV gas insulated switchgear (GIS).
- Installation of control and protection panels.
- Installation of auxiliary equipment for the transformers and substation.
- Installation of a cable vault and conduits at the intersection of Ward and Berry Streets and conduits in Harnett Street.
- Commissioning of the new substation.
- Temporary interconnection works between the existing and the new substations.
- Decommissioning and demolition of the existing North Sydney zone substation.

The North Sydney zone substation redevelopment project would be supported by three associated projects that interface with the redevelopment. These projects comprise the transfer of all existing 11kV feeder cables to the new substation, the installation of three new 132kV feeder cables from Willoughby sub transmission substation (STS) and Mosman zone substation and the upgrade of the 132kV feeder cables from East Lindfield to Willoughby STS.

2.2 Overview of the Preferred Project

The proposed substation design presented in the EA has been modified to respond to concerns raised in submissions received during the public exhibition phase, particularly related to visual amenity, EMF and noise. The preferred project would be essentially the same as that presented in the EA with the following amendments:

- Structural changes to the building envelope Level 3 and above.
- Changes to the facade design.
- Rearranged internal 11kV cable configuration.
- Inclusion of a temporary kiosk style substation adjacent to the construction compound on Harnett Street.

A description of the preferred project is outlined below.

2.2.1 Design Modifications

The modifications are clearly illustrated in marked up plan view and cross section drawings presented in Appendix A. Mark ups showing the preferred project have been provided on drawings

of the proposed substation that were presented in the EA to illustrate the difference between the two.

Compared with the design presented in the EA, the preferred project comprises structural façade setbacks on the eastern, northern and southern boundaries and revised internal cable configuration. The modifications are listed below and provided in detail in the following sections:

1. Locally setback walls between Level 3 and 3A by approximately 230mm along the eastern boundary.
2. Setback roof and louvred facade by approximately 1200mm to eastern boundary.
3. Lower parapet and box gutter by approximately 2000mm to eastern boundary and part of northern and southern boundaries. Lower south western fire stairs capping slab to allow for lowered box gutter. Reconfigure stairs to maintain minimum head height clearance requirements.
4. Relocate loading platform area from Harnett Street to Ward Street. Install pivot doors to brickwork and louvred facades.
5. Reconfigure capacitor locations to allow access from loading area.
6. Continue brickwork to complement proposed development adjacent eastern boundary.
7. Relocate fixed glazing to be consistent with louvered parapet.
8. Reduce the number of 11kV cables on the eastern boundary to the minimum and enlarge the internal cable riser to accommodate the additional feeders.

2.3 Preferred Project Description

A description of the preferred project with particular emphasis on the requisite layout and configuration of equipment and electrical clearances is presented below. Egress and operational separation distances are illustrated on drawings in Appendix B. Photomontages, elevations and viewpoints illustrating the preferred project are presented as Appendix C.

The architectural and structural changes have been made in response to issues raised within submissions lodged during the public exhibition and consultation with stakeholders, in particular with the developers of 136-140 Walker Street, subsequent to the public exhibition. The modifications are reflective of the operational needs within the building for an operational substation that complies with the current standards and regulations.

The preferred project would comprise a brick-clad substation building, with aluminium finished louvres and a sloped lightweight Colorbond roof in Woodland Grey colour. The internal layout of the building is shown in the architectural design drawings (refer to Appendices A and B) and would consist of:

- Level 1 – cable basement, oil containment tank and fire pump room.
- Level 2 – main transformer bays, transformer roadway from Harnett Street and auxiliary transformer bays.
- Level 2A – Ward Street access to cable riser and oil separator.
- Level 3 – 11 kV cable floor, 132kV GIS switchroom, utility rooms 1 and 2, LV switchroom and amenities.
- Level 3A – Mezzanine, including 11kV switchroom, control room and lunch room.
- Level 4 – Roof, with provision for potential future installation of capacitor banks in enclosed roof space.

The proposed substation would be positioned immediately to the north of the existing substation which fronts Berry Street, and would accommodate all the associated electrical equipment, such as the transformers and switchrooms, within the building. The proposed substation building would occupy the entire site (from boundary to boundary) and would be approximately 55 m long, 22 m wide and 25 m high above Ward Street (29 m above Harnett Street) at its highest point.

Level 1

Cable Basement

The cable basement forms the majority of Level 1. It is where the 132kV and 11kV cables enter and leave the substation to connect to the surrounding network. The cable basement is required to be a large area that provides space to maneuver the cables and prepare cable terminations and allows for their large bending radius. It also allows for the required physical separation of the cables to achieve the necessary current ratings.

Level 2

Transformers, Transformer Bays and Transformer Roadway

In addition to the information provided in Section 6.2.3 of the EA, the transformer bays must provide horizontal and vertical equipment and electrical clearances (refer drawings in Appendix B). The following horizontal clearances are required:

- From the transformer tank to the transformer bay walls to enable the transformer to be positioned into and removed from the transformer bays
- From the transformer tank to the transformer bay walls to enable maintenance/replacement of equipment such as the transformer tap changer and earthing transformer.
- Adequate clearance between the transformer for the 11 kV and 132 kV electrical cables.
- Adequate ventilation.

The vertical clearances are a combination of mechanical and electrical clearances. The mechanical clearances are to enable installation of the 132kV electrical insulator bushings into position on the top of the transformer tank. The bushings are not delivered with the transformer tank due to their size and weight and a crane is used to sling the bushings into position once the transformer tank is in position. Approximately half of the bushing is inside the transformer tank once it is in its final position. Following installation and commissioning there are required electrical clearances from the top of the bushing connections to the underside of the transformer bay air baffles of 1,100mm. The air baffles hang below the transformer bay ceiling to ensure correct air circulation around the transformers so adequate cooling is achieved.

The current design provides the minimum width, depth and height of 13700mm, 10300mm, and 9705mm respectively for the transformer bays. Due to the size of the available parcel of land, these transformer bays are smaller than the EnergyAustralia standard design. Specially modified pipe work would be used to adapt EnergyAustralia standard equipment to fit in the available space.

The transformer driveway width is determined by the vehicles and associated equipment needed to deliver or remove the transformers. The width allows a special lifting frame to be built around the transformer delivery trailer that enables the transformer to be lifted from the trailer and lowered onto tracks to be skated into the transformer bay

Level 3 and 3A

In addition to the information provided in Section 6.2.5 of the EA, horizontal and vertical clearances are required in the following areas:

132kV Switchroom

Horizontal clearances are required at the front and rear of the 132kV GIS. Clearances at the front are required for the installation and removal of the switchgear sections and a raised operating platform. Clearances at the rear are required during installation of the 132kV cables that would be lifted into position from the floor below.

The area at the northern end of the 132kV switchroom is required to assemble the switchgear.

Vertical clearances are required above the GIS to lift test transformers into position and so the GIS can be lifted out and replaced if there is a failure. The height is determined by the sling and hook heights of the gantry crane and equipment.

11kV Cable Floor

The height of this floor is determined by Building Code of Australia (BCA) requirements, *Occupational Health and Safety Regulation 2001* (OHS Regulation) and EA network standards for working spaces.

11kV Switchroom

The area required for the 11kV switchroom is determined by the number of switchgear panels, and the working clearances at the front and back of the switchgear panels. To comply with EnergyAustralia's electrical safety rules circuit breakers are racked out and removed before people are permitted to work on that particular component of the electricity system. Adequate clearance is required between switchgear sections for safe access to other equipment when the circuit breakers are removed. In addition space is also required at the rear to make the cable connections and maintenance of BCA requirements.

The height of this floor is determined by BCA, OHS Regulation and EA network standards for working spaces.

Control Room

The area required in the control room is determined by the number of cabinets to accommodate the protection and control equipment and the working clearances at the front and back of the cabinets. The amount of control and protection equipment is often determined by conditions in EA's electrical distribution licenses.

Level 4

Roof and Provision for Capacitor Banks

In addition to the information provided in Section 6.2.7 of the EA, horizontal and vertical clearances are required for the mechanical plant associated with the air conditioners. The main clearances are required so that the doors of the capacitor banks can be opened and safe work access maintained. Additional space is required so that the capacitor banks can be removed and replaced in the event of failure.

2.3.1 Temporary kiosk style distribution substation

A kiosk style distribution substation would need to be constructed to provide a temporary builders power supply (TBS) while constructing the proposed substation. The existing EnergyAustralia network is unable to cater for the requested 600A TBS and as such it is necessary for a temporary substation in the form of an L-kiosk to be established near the development site.

The kiosk would be a 600kVA L-type kiosk substation with 800/400/400 low voltage (LV) board. It would be approximately 1.3m wide, 3.1m long and 1.8m high, constructed of either steel or fibreglass and would be dark green in colour.

The temporary kiosk substation would be required for approximately one year, after which time the kiosk would be dismantled and the footpath reinstated.

The kiosk would be located immediately adjacent to the northern boundary of the substation adjacent to the undercroft parking area that has been leased for the duration of the construction works from North Sydney Council and partly on the seldom used footpath located along the western side of Harnett Street. A construction compound, including site offices, was established for the project when the excavation works were being completed (as part of a separate approval). The kiosk would be established within the area that would be used as a construction compound during the North Sydney zone substation redevelopment. Residential properties are located to the east of Harnett Street (across the road from the kiosk).

Establishment of a temporary kiosk is critical prior to the commencement of construction works on the redevelopment of North Sydney zone substation.

Construction methodology

The site for the kiosk would be leveled and piers and earthing rods would be installed. The kiosk would be placed in position with the high voltage (HV) side facing towards the McLaren Street and Harnett Street intersection. Once the kiosk is in position, no part of the kiosk housing would be located beneath the car park cover as kiosks are not permitted in building alcoves or under roofed or partly roofed areas. The temporary kiosk would be identified as S.48302 Harnett St Temp.

The kiosk would connect to two currently out of service HV cables that run along Harnett Street. Two cabling jointing pits approximately 3m long by 2m wide by 1.2m deep would be excavated in Harnett Street to connect the kiosk cabling to the existing HV cables

New cabling would be installed in the footpath via open trenching methods from the temporary kiosk to the temporary construction electrical distribution switchboard. The trenching works would be undertaken within 5m of gutters and drains.

The kiosk would take approximately two weeks to construct and would be enclosed by fencing.

2.4 Alternative Project Options

Two alternative options to the preferred project were considered but deemed to be not feasible as outlined below:

1. Relocate 11kV switchgear so it is configured in a single row.

   This option would comprise relocating the 11kV switchgear so that it was configured in a single row along the length of the building. This would potentially move magnetic fields toward the centre of the building away from the boundaries, although two areas of elevated levels would be created at either end of the row.

   The switchgear would remain on the same level (Level 3) but would be located behind the air intake on the outlet. The option would also comprise the relocation of the control room. This option was deemed to not be feasible as the switchgear configured in a single row would be longer than the length of the building (i.e. 55m) and would not allow the requisite egress for emergency access points.

2. Relocate capacitors to existing substation site.

   It is unknown at this stage whether the capacitors would be installed at the North Sydney substation in the future. However, it is prudent to ensure the substation is designed to accommodate the potential future installation of the capacitors as retrofitting the substation at a later stage would be extremely difficult given the limited space available on the site. As such allowance has been made in the preferred project for the capacitors on the roof of the substation.

This option would comprise installing the capacitors (should they be installed) on the site of the existing substation at 70-74 Berry Street once it is demolished. This option was deemed to not be feasible as it would not result in significant improvement to residual visual amenity impacts associated with the design (as outlined in the EA) and would result in higher magnetic fields on the southern boundary. In turn, locating the capacitors on the site of the former substation would severely and unreasonably restrict the potential future public and private uses of 70-74 Berry Street.

3 REVISED ENVIRONMENTAL ASSESSMENT BASED ON PREFERRED PROJECT

This chapter presents a revised assessment of potential impacts associated with the preferred project. The revised assessment has considered the preferred project in relation to both approved development applications (DAs) for 136-140 Walker Street (Castle Constructions and Winten Property Group) as well as potential impacts on other neighbouring and proximate properties as relevant. A copy of the Castle Constructions approved DA drawings are presented as Appendix D and the Winten Property DA is contained within the Winten Property Group submission in Appendix E. An assessment of the addition of a temporary kiosk is also presented within this chapter.

3.1 Background

At the time when the EA public exhibition commenced there was an existing approved DA for 136-140 Walker Street (Castle Constructions). A few weeks prior to the commencement of the public exhibition period a second DA was lodged for 136-140 Walker Street by Winten Property Group, who is currently in negotiation with Castle Constructions to purchase the two properties 136 and 138-140 Walker Street. The Winten Property Group DA was under determination at the time the EA public exhibition commenced and given a determination was yet to be made, it was not included within the assessment. Subsequent to the closure of the public exhibition period the DA lodged by Winten Property Group for 136-140 Walker Street was approved. As such there are currently two approved DAs for the two residential properties adjacent to the substation that are collectively identified as 136-140 Walker Street.

The Winten Property Group DA is for a development that is similar in height and building footprint to the approved Castle Constructions DA. The material differences relate to the internal layout configuration to create less commercial floor space and more residential units, and the building massing on the lower levels. The setback for Levels 2 to 8 has been reduced so that the tower would be partially built against the eastern boundary of the substation up to and including Level 8.

Based on consultation with Winten Property Group, its proposed development at 136-140 Walker Street was purposely designed to consider potential impacts associated with the substation, particularly amenity impacts of occupants in units on the western side of the building. However it should be noted that despite previous concerns raised by Castle Constructions and Winten Property Group itself pertaining to magnetic field levels on the western boundary of their developments, the Winten Property Group design was not developed to mitigate these concerns (i.e. by retaining the setback of the Castle Constructions building envelope or increasing it).

The focus of the preferred project has been on minimising the residual impacts associated with visual amenity, electric and magnetic fields (EMF) and noise raised by those parties who made submissions during the public exhibition. As such the visual assessment, EMF and noise assessments have been revised to identify how the previously predicted impacts have been minimised. Each of these assessments is presented within this section.

3.2 Visual Impact Assessment

The visual impact assessment presented in the EA has been revised to assess visual amenity impacts associated with the preferred project. The revised assessment has considered the impact on the adjacent proposed developments by Castle Constructions and Winten Property Group as well as other neighbouring existing and proposed developments.

3.2.1 *Approved DA for 136-140 Development (Castle Constructions Pty Ltd)*

The revised substation design has reduced the number of seriously visually affected units to Levels 5 and 6 only (originally Levels 5, 6 and 7). This is due to the proposed 2.0m reduction in the rear wall parapet height of the substation, and the further setting back of the roof and louvered facade by approximately 1.2m (refer drawings in Appendix A). The outlook from Level 7 is now similar to that from Level 8, i.e. views from the Level 7 units now look out onto a setback louvered facade rather than the previous view looking into a brick wall.

The outlook from the Level 8 units would also marginally improve as a result of the amended substation design, with the reduction in the parapet height and setback of the louvered wall and roof by a further 1.2m.

The outlook from Level 9 would also be marginally improved with the further setback of the roof, and louvered wall.

There would be no visual impact to Levels 10 to 22.

With regard to the view of the substation rear wall from the units on Levels 5 and 6:

- The view from the unit in the north-west corner would be similar to the previous design, potentially with some improvement as it now looks into recessed wall panels and a simplified, colour scheme as recommended by North Sydney Council's Design Excellence Panel and through discussion with affected stakeholders
- The view from the unit in the south-west corner has potentially suffered some minor loss of amenity, as it would now look directly into a blank section of the rear wall, while the areas to the north and south of it contain the relief work and additional banding. The view from balconies looking south is of recessed wall panels and simplified, more muted brick banding patterning

In addition to the above, there would be some minor improvement to solar access to units on Levels 5-7 due to setting back of the roof line by approximately 1.2m.

Revised Visual Impact Assessment

In light of the above described changes to the view experienced from the proposed Castle Construction development, the impact ratings would be revised from those provided within the Visual Impact Assessment report as follows:

- **Levels 5-6 / North-western Corner**: Notwithstanding a minor improvement with regard to solar access, visual impact rating remains **unchanged** at Moderate to High
- **Levels 5-6 / South-western Corner**: Notwithstanding a minor improvement with regard to solar access, and minor adverse impact with regard to outlook to the substation wall, the visual impact rating remains **unchanged** at Very High
- **Level 7 / North-western Corner**: Due to minor improvement with regard to solar access, and increased setback to the rear of the substation building / reduced parapet height, the visual impact rating is **decreased** from Moderate to High, to Moderate, in keeping with the rating within the Visual Impact Assessment report for Level 8
- **Level 7 / South-western Corner**: Due to minor improvement with regard to solar access, and increased setback to the rear of the substation building / reduced parapet height, the visual impact rating is **decreased** from Very High, to Moderate to High, in keeping with the rating within the Visual Impact Assessment report for Level 8
- **Levels 8 and 9 / North-western Corner**: Notwithstanding the increased setback of approximately 1.2m to the roofline and louvered facade, the visual impact rating remains **unchanged** at Moderate

- **Levels 8 and 9 / South-western Corner**: Notwithstanding the increased setback of approximately 1.2m to the roofline and louvered facade, the visual impact rating remains **unchanged** at Moderate to High

In summary, the modifications to the proposed substation have resulted in a moderate improvement to the outlook experienced from the Level 7 units, resulting in a reduced visual impact rating over that reported in the Visual Impact Assessment report. The visual impact of the modifications to the remaining levels is marginally improved, but not sufficiently to warrant a reduction in the visual impact assessment rating assigned to these levels within the Visual Impact Assessment report. Overall, the visual impact of the proposed substation on Levels 5-9 is assessed as remaining **unchanged** at High.

3.2.2 Approved Development at 144-150 Walker Street

An eight storey mixed use development has been approved for 144-150 Walker Street. These lots are located diagonally adjacent to the proposed substation, separated from each other by one lot width (No. 142 Walker Street). The applicant has recently submitted an amended DA, with the amended building effectively maintaining the outward (approved) appearance, and containing 349sq.m of commercial / retail floor space, 24 residential apartments, four dwelling houses, and vertical car stackers in the basement for 37 off-street parking spaces. A portion of the Ground Floor and Level 1 of the development will contain residential apartments. A portion of the Ground Floor will also comprise a commercial use (a meditation centre). Levels 2-6 would contain residential apartments.

The residential apartment block is located to the rear of the lots, behind the four substantially retained free-standing residences. Views from the proposed development are orientated to the east, north and west. No windows are located on the southern elevation of the apartment building. The eastern elevation of the apartment building is located on the site boundary. From within the apartments therefore, only highly oblique views would be available of the proposed substation. The primary view from the west facing windows will be the Ward Street multi-storey car park and multi-storey commercial building on the opposite side of Harnett Street. The substation would not be able to be viewed from any other windows within the apartment building.

No overshadowing of the proposed development would occur from the proposed substation.

As described within the Visual Impact Assessment, the northern facade of the proposed substation comprises a well considered composition of form, colour and materials. This is the only elevation of the proposed substation that would be viewed by residents of the proposed development entering Harnett Street.

Revised Visual Impact Assessment

Given that the proposed substation would only be viewed briefly by residents of the 144-150 Walker Street development as they enter Harnett Street, and that otherwise only highly oblique views to the substation would be available from within the proposed apartment building, the visual impact of the proposed substation on the 144-150 Walker Street development would be **Very Low**.

Given the close relationship in built form and use for the current approved DA for 144-150 Walker Street, the findings of this assessment would apply equally to both the approved and recently amended DA.

3.2.3 Approved Development at 136-140 Walker Street (Winten Property Group)

Nine levels of the Winten Property Group development are visually impacted by the proposed substation as follows (a copy of the Winten DA is contained in the Winten submission presented in Appendix E):

- **Levels 2-8** - One unit per floor of the proposed Winten Property Group development adjoins the eastern wall of the proposed substation, with windows facing north and south only, i.e. no windows look directly onto the rear wall of the proposed substation. The north and south facing walls of these units have balconies with direct views to the rear wall of the substation. Views north and south from within these units would encompass views along the length of the substation wall.

  Units located in the north-west corner of the building look directly out onto the rear of the proposed substation, with the windows set between approximately 7.0 and 7.2 metres off the wall. The rear wall of the substation has recessed panels and incorporates a simple, colour scheme (refer photomontages in Appendix C). The colour and banding was modified following consultation with Winten Property Group subsequent to the public exhibition. These units also have an approximately equal amount of glazing facing north as facing west.

  Level 8 is set the same distance off the line of the rear wall of the proposed substation as Levels 2-7, with the same floor plan as the units immediately below it, but in this instance, the end wall of the unit sits adjacent to the setback louvered facade of the substation, a distance of some 4.0 metres. The north and south views from this unit are therefore not as visually constrained as those for Levels 2-7, although still encompassing the louvered facade.
- **Level 9** – Three units sit adjacent to the rear setback louvered wall of the proposed substation. The view also looks across the top of the sloping substation roof. The colour of the roof sheeting was selected based on consultation with Winten Property Group subsequent to the public exhibition. The orientation of the central unit is west, direct to the substation rear wall. The main orientation of the unit in the north-west corner is to the north, incorporating the living dining area and both bedrooms. The orientation of the unit in the south-west corner is both west and south. All three units have balconies on the western face of the building, with the central and south-western corner units having large balconies with landscape planters adjacent to the substation wall. The planters are of sufficient depth and orientation to provide substantial screening of the louvered wall from within these units. The balcony for the north-western unit is relatively small.
- **Level 10** – The unit in the north-western corner of the building has views orientated both north and west, with a large north-facing balcony, including the living, dining and kitchen areas. The western view, including views from the two bedrooms looks across the sloping substation roof. This unit would receive unrestricted solar access from the north and west.

  The unit in the south-western corner of the building has views orientated both south and west, with two modestly sized south facing balconies, and the western view looking across the sloping substation roof. The western views from both units would encompass the North Sydney skyline beyond. This unit would receive unrestricted solar access from the west.

Visual Impact Assessment

Levels 2-8 / South-western Corner - Units on the south-western corner would all receive some direct north light, and have narrow views to the north, strongly framed by both the proposed substation rear wall and adjoining units. The view to the south from these units would also encompass the rear wall of the proposed substation. Views from the southern balcony are of the courtyard garden area in 76 Berry Street, and into the commercial tower.

Given that these units have been purpose designed to sit adjacent to the rear wall of the proposed substation, the views obtained are architecturally well optimised, and can be anticipated to be perceived as such by the occupants, i.e. the unit design expresses the intention of maximising the views from the units within the context of the substation.

Notwithstanding the architectural design of the units acknowledging and responding to the adjoining substation wall, thereby optimising what little views are available, the visual impact associated with the outlook from these units is **High**.

Levels 2-8 / North-western Corner – The units on the north-western corner of the building are essentially equally orientated to both the north and the west. Therefore, views to the north with solar access are available to all living areas and both bedrooms. The setback from the west facing windows of these units to the wall of the substation of approximately 7.0 to 7.2m constitutes a moderate level of separation between the buildings.

The visual impact associated with the outlook of these units is assessed as being **Moderate**, given that all living and bedrooms have views and solar access to the north.

Level 9 – The visual impact of the substation for the Level 9 units is as follows:

- North-western Corner – Given that the majority of the unit is orientated to the north, and the setback louvered wall of the substation is set at a moderate distance of some 5.1 metres, the visual impact is assessed as **Low** to **Moderate** for this unit,
- Central - Given that the unit will obtain ample western solar access, has access to sun and views from the north when using the large balcony, and has the capacity to partially screen the view of the louvered wall (thereby viewing across the substation rooftop to the North Sydney skyline beyond), the visual impact is assessed to be **Moderate** for this unit,
- South-western corner - Given that the majority of the unit is orientated to the south, and the unit would obtain ample solar access from the west, have solar access from the north when using the large balcony, and has the capacity to partially screen the view of the louvered wall (thereby viewing across the substation rooftop to the North Sydney skyline beyond), the visual impact is assessed to be **Moderate** for this unit.

Level 10 - The visual impact of the substation for the Level 9 units is considered to be as follows:

- North-western Corner – Given that all of the living spaces within this unit are orientated to the north, the view to the west looks onto the sloping roof of the substation to the North Sydney skyline beyond, and the unit would receive unrestricted solar access from the north and west, the visual impact of would be **Low** for this unit.
- South-western corner - Given that the majority of the unit is orientated to the south (including two balconies), and the unit will obtain ample solar access from the west, with views to the North Sydney skyline above the adjacent substation roof, the visual impact is assessed to be of **Low** to **Moderate** for this unit.

There would be no visual impact to Levels 10 to 22 and views from these levels would be unimpeded to the west.

3.3 Electric and Magnetic Fields

Modifications have been made to the proposed design presented in the EA that affect the magnetic field levels associated with the proposed substation. In the preferred project a total of ten 11kV feeder cables have been relocated from Riser 1 to Risers 2 and 3, both of which are located further from the eastern boundary than Riser 1. The switchboard arrangement has also been modified from double bus to single bus. The change to single gear switchgear was brought about by an operational safety requirement and has the affect of increasing the size of the switchboard. Design drawings presented in Appendix C of the EA have been marked up to illustrate the modifications and are presented in Appendix A of this PPR.

A revised EMF assessment has been undertaken by Aurecon to assess the changes to the magnetic field levels at the boundary of the substation and adjacent properties associated with the preferred project. A summary of the revised assessment is presented below and a copy of the full supplementary EMF report is presented as Appendix F.

The methodology for the revised assessment comprised the following tasks:

- Obtain details of the proposed modified cables
- Modify the model of the substation to reflect the modified cable routes, where a material impact on the magnetic fields at and beyond the substation boundary is predicted
- Re-run the model to produce revised field contour maps and profiles
- Calculate magnetic fields at the relevant floor levels of the two alternative developments proposed for 136-140 Walker Street and consider changes to impacts on other adjacent properties
- Compare predicted field levels associated with the revised design with those presented in the EMF report presented as Appendix H of the EA.

The findings of the supplementary EMF assessment of the preferred project and effect on predicted magnetic fields are presented in Appendix F of this PPR. A summary of the results is provided below:

- The highest magnetic fields at the eastern boundary of the proposed substation have been reduced in the preferred project as a result of the design modifications. The design modifications made are consistent with the principles of prudent avoidance.
- There will be a 46% reduction in the magnetic field peaks adjacent to Riser No.1 on the eastern boundary of the substation site for the preferred project compared with the design presented in the EA.
- The predicted peak field level at a commercial floor of the proposed Castle Constructions development would be reduced by approximately 12% to 15 milligauss (mG) for the preferred project (under the ultimate loading condition) at the outer wall nearest the substation. From the peak of 15mG the magnetic field level will decrease to 7mG within 10m of the outer wall. The levels now predicted at the commercial floors are shown in Figures 2.9 to 2.11 of Appendix F.
- The predicted peak field level at a residential floor of the proposed Castle Constructions development (Level 5) would be reduced by approximately 5% to 8.5mG in the preferred project. The levels now predicted at the lowest residential floor are shown in Figure 2.12 of Appendix F.
- The highest magnetic fields at the proposed Winten Property Group development are predicted to occur at the ground floor and would range from 11 to 15mG for the preferred project (under the ultimate loading condition) at the inner wall nearest the substation. From the peak at approximately 15mG, the magnetic field level would decrease to 6mG within 10m of the inner wall. The fields at other levels would be less than those for the ground floor. The predicted field levels at the various levels of the proposed Winten Property Group development are shown in Figures 2.14 to 2.20 of Appendix F.
- In regard to the residential floors at the proposed Winten Property Group development, the highest magnetic field levels are predicted to be 15mG at Level 2 for the preferred project. The magnetic field level would decrease to 7mG within 10m of the wall.
- If a one metre separation were to be provided between the residential floors of the Winten Property Group development and the substation, the peak field level at a residential floor (Level 2) would be reduced by approximately 13%.

3.3.1 EMF Independent Peer Review

Department of Planning (DoP) engaged SMEC to undertake an independent peer review of the EMF assessment that was undertaken as part of the EA and supplementary assessment prepared for this PPR. A copy of the SMEC report is presented as Appendix G of this PPR. Overall, SMEC concluded that the EMF assessment and supplementary assessment constituted a robust and technically sound assessment.

A summary of the recommendations and clarifications outlined by SMEC in its report is presented in Table 3-1. A response is provided for each recommendation and/or clarification.

Table 3-1 – A Summary of Responses to Findings of the SMEC Independent Review

RECOMMENDATION OR CLARIFICATION	RESPONSE	
1) Occupational exposure limits for EMF should be assessed.	The EMF assessment undertaken for the EA and supplementary EMF assessment has been appropriately based on general public limits which are 1/5 of the occupational limit. Within the substation, the contour plots (Figures 3.11 and 3.12 of Appendix H of the EA) show the zones of highest fields and the occupational limits are referred to in Section 3.2.1, 3.3 and 4.1. As noted in the report, in the event of (highly localised) fields approaching the occupational limits, it is expected that EnergyAustralia would manage the situation through its work practices. It should be noted that for most maintenance activities the equipment would normally be de-energised prior to work commencing.	
2) The techniques referred to in AS2067:2008 should be considered for reducing EMF in the design.	AS2067:2008 states that the nominated techniques (which are well known) should be considered where "reasonable and practicable". The principle of prudent avoidance, which the EMF assessment was based on, suggests that measures should be used to reduce EMF where they can be undertaken at modest cost and without undue inconvenience which, in is similar to the terms "reasonable and practicable". References to where each of these techniques is addressed in the EMF report in the EA are provided below.	
	(i) Reduce electrical current by using more energy efficient equipment for large electrical loads such as lift motors, air conditioning equipment, industrial motors and manufacturing equipment.	This technique is more relevant to electricity users than for the proposed substation. EnergyAustralia encourages demand reduction and energy efficiency and has carried out programs in North Sydney.
	(ii) Balance circuits to minimise net magnetic fields.	The significant loads in the substation are balanced three phase loads.
	(iii) Reduce magnetic fields by circuit installation arrangements that reduce distance between, or coordinate the relative placement of, all conductors in the same circuit.	As noted in Section 4.3 of the EMF assessment (Appendix H of the EA), the substation has been designed with compact, indoor GIS. The cheaper alternative would be outdoor air-insulated switchgear. The former option reduces the distance between conductors in the same circuit. Also, where practical, the conductors in the same circuit have been arranged in a close triangular formation to reduce the distance between phases and the outgoing feeder cables are of twisted construction.
	(iv) Maximise distance between EMF sources and sensitive areas where the level, duration, affected persons or other	The eastern boundary of the substation is likely to have more sensitive areas than the other boundaries, due to the adjacent proposed mixed-use development. As

RECOMMENDATION OR CLARIFICATION	RESPONSE	
	consequences of exposure may warrant attention.	noted in Section 4.3 of the EMF assessment (Appendix H of the EA), the location of 132kV a cable riser was modified to reduce the fields at this boundary. Also, as detailed in the supplementary EMF report (Appendix F of this report) design modifications were undertaken with a view to reducing the peak magnetic fields along the eastern boundary of the substation, at all levels. These modifications included revising the location of ten 11kV feeders that previously entered a cable riser near the eastern boundary. These ten feeders are now more centrally routed. This design review reduced the peak magnetic field along the eastern boundary. The transformers are located on the western boundary, away from the potentially sensitive receivers on the eastern boundary.
	(v) Shield sources by containment or dispersal behind specialised barriers.	This technique was considered but was determined to not be reasonable and practicable given the magnetic field levels predicted at the boundaries of the proposed substation. Notwithstanding, EnergyAustralia will commit to undertake an investigation into the costs and benefits of shielding prior to the completion of construction of the substation.
3) Additional field measurements should be taken during periods of high load.	Although not described in detail in the EMF assessment (Appendix H of the EA), the substation load at the time when the measurements were taken was recorded and compared with the annual maxima and minima. This analysis underpins the statement that fields could range from 50% to 150% of those measured. The curve shown in Figure 2.1 of the EMF assessment shows a summer weekday load profile.	
4) Measured magnetic levels should be related to the known sensitive human receptors.	Although it is somewhat subjective to designate sensitive human receptors, residential premises, childcare facilities and schools are generally considered to be sensitive. For the EMF assessment, magnetic fields were measured along the boundaries of the substation, recognising that they represent the highest predicted magnetic fields that the general public may experience. The assessment predicted the fields at the boundaries of the proposed substation as well as within the identified receptors which might be regarded as sensitive, namely the adjacent existing residences and proposed mixed use development(s). A supplementary assessment has been undertaken to assess the magnetic fields associated with the preferred project and this is presented as Appendix	

RECOMMENDATION OR CLARIFICATION	RESPONSE
	F of this report.
5) Site conditions should be recorded during measurements. Information such as MVA/current loading and bus voltage should be gathered from EnergyAustralia's SCADA systems.	Load data was recorded at the time the measurements were taken. Site conditions were not recorded as magnetic fields are not affected by weather.
6) No indication of upper limit for measured magnetic field levels has been established.	The peak measured magnetic fields were stated in the EMF assessment as well as an estimation that, at times, the actual magnetic fields could be up to 150% of those measured.
7) Clarify modeling description for substation and 11kV cable vault including assumptions.	Modelling assumptions include: i) 85th percentile load upon commissioning (2011) is 263A at 132kV, together with an infeed of 1821 Amps at 11kV from the existing substation, as per Table 1 in Appendix H of the EA. ii) 85th percentile ultimate load (2014) is 452A at 132kV as per Table 1. iii) All other loads were based on the above and were assumed to be divided evenly between the various feeders, transformer connections etc. iv) Magnetic field calculations were performed at 1m above ground level or 1m above the floor level for the adjacent building calculations. v) The configuration of the substation upon commissioning and under the ultimate condition was based on the drawings provided and is reflected in Figure 3.10 in Appendix H of the EA.
8) Field measurements should be undertaken at sensitive human receptor sites after completion of the project to confirm actual magnetic field intensities.	Measurements will be taken along the substation boundaries once the proposed substation is operational to verify predicted measurements.
9) Future air-core reactors should be included in the model.	It is uncertain at this point in time whether the capacitors will be installed in the future at North Sydney and as such they are not included as part of the project description. In turn, as a decision whether to install the capacitors in the future will not be made for some time, details regarding the internal wiring and air-cored reactors is not

RECOMMENDATION OR CLARIFICATION	RESPONSE
	currently available and the capacitors are unable to be modeled without this information. While the reactors are the highest field source at the capacitor banks themselves, their fields decrease more rapidly than those from the cables. This is due to the magnetic fields from reactors decreasing in proportion to the cube of the distance, whereas fields from an array of three phase cables reduce at a lesser rate. The capacitor bank (including the presumed air core reactor) adjacent to the proposed mixed use developments is over 8m from the eastern boundary. In regard to SMECs reference to the rate of decrease in the magnetic fields from an air-core reactor from a peak of around 800mG to 100mG within 6m (SMEC reference [7]), it is expected that the field would decrease more rapidly than this. Based on a review of reference [7] it is noted that from the peak of 840mG shown in Figure 13 of this report, it drops to around 450mG in less than 2m. At this point, the gradient changes suddenly, suggesting the field is influenced by another major source, such as the nearby transformer tails. It is also noted that the reactor is a single neutral earthing reactor. Without knowing the dimensions, number of turns etc it is difficult to comment on the similarities between this type of reactor and a typical three phase reactor that is part of a 6MVar capacitor bank. Given the uncertainty surrounding a) the installation of the capacitors and b) the type of capacitors and c) the relative distance of the capacitors from the eastern boundary of the substation, they were not included in the modeling.
10) The magnetic field levels at the neighbouring properties are invalid because the air-core reactors were not modelled.	Refer response to issue number 9 above.
11) Magnetic field levels and exposure to the fields in the vicinity of the substation, it has been shown from the modelling, may be of concern.	The fields are well below the relevant health guideline and both World Health Organisation (WHO) and Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) caution against the adoption of arbitrary lower limits. Nevertheless, it is appropriate to adopt precautionary (prudent avoidance) measures, subject to cost and convenience constraints.
12) Some building properties can improve magnetic field shielding including metal doors, outer walls containing wire meshes and no windows and closed ventilation	These statements appear to have been drawn from reference [15], which relates to electromagnetic pulses, possibly of the type arising from nuclear explosions. These are fundamentally different in nature to power frequency magnetic fields and have frequencies at least four orders of magnitude higher.

RECOMMENDATION OR CLARIFICATION	RESPONSE
openings. Higher attenuation levels than only wire meshes may be obtained by careful circumferential welding of individual meshes [15]. Levels may be further reduced if external openings in the buildings are treated according to electromagnetic shielding principals.	
13) In general the adoption of magnetic shielding techniques is expensive. The high expense may not be consistent with the principles of prudent avoidance.	Agreed
14) Shielding techniques should be considered and the costs may be justifiable in view of the obligations set under AS 2067.	The provisions of AS 2067 are subject to the caveats of reasonableness and practicality. These terms should be viewed in the context of WHO, ARPANSA and Gibbs' recommendations regarding cost and convenience. The measures already taken in the design of the substation satisfy AS 2067 and material reduction in the magnetic fields could not be achieved conveniently or at modest cost by shielding the eastern boundary of the substation. Further mitigation work would only be warranted if it could be shown that further material improvement in the magnetic fields, particularly at the proposed adjacent development, can be achieved conveniently and at modest cost.
15) Comment on the optimal arrangement of the 11kV feeders in the riser.	SMEC appears to have overlooked the fact that the cables are twisted. As design of the substation was not sufficiently advanced at the time of modelling to provide details of phasing of individual cables, the modelling has been based on conservative phasing arrangements.

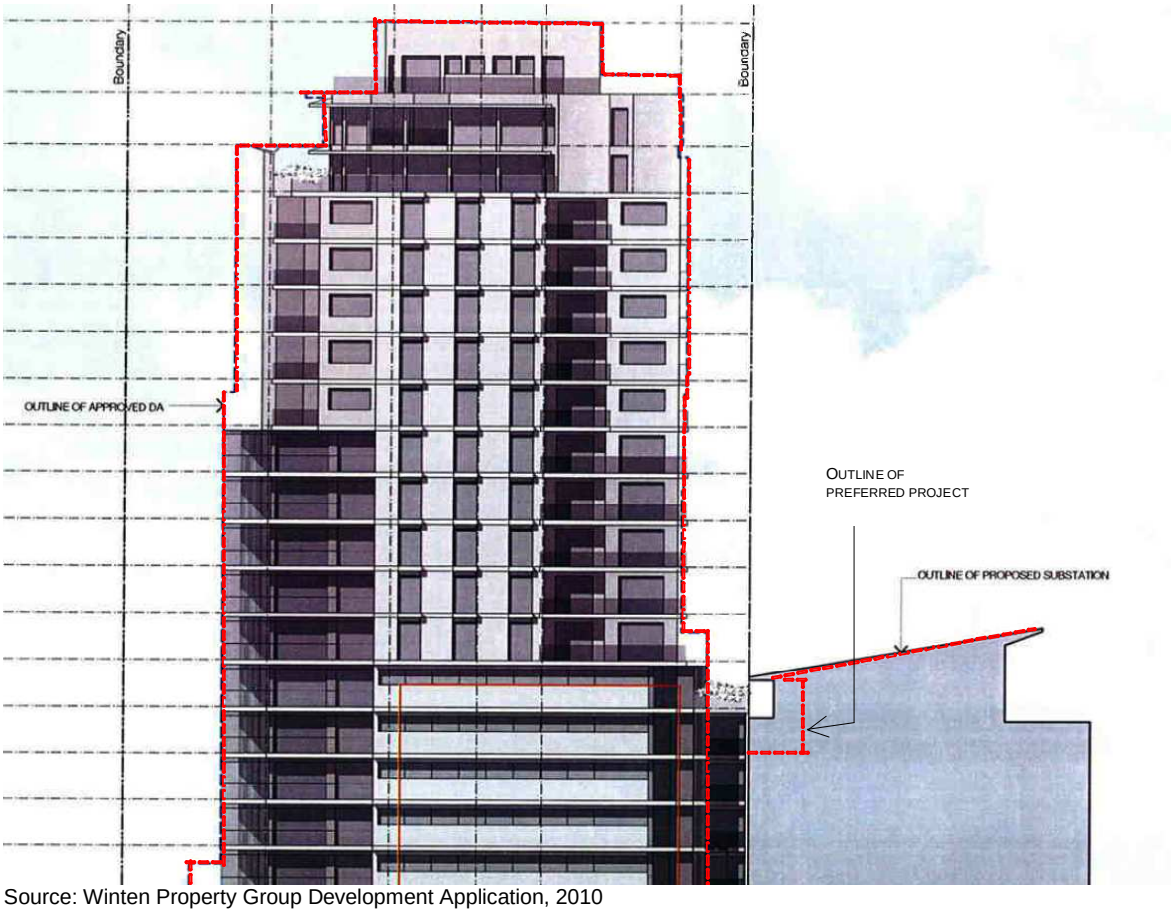
3.4 Noise and Vibration

The modifications to the design would not change the operational acoustic impact to the closest receivers as described in the North Sydney Zone Substation Redevelopment Noise and Vibration Assessment (Appendix F of the EA) as the location of the noise sources in the substation and the distance from the closest affected residences remain the same as that assessed.

The main changes in the substation design are outlined in section 2.2.1 of this PPR and include structural changes to the roof, louvered façade, parapet and eastern walls.

Figure 1 below presents the proposed profile of the Winten Property Group development. The red dotted line around the profile denotes the outline of the Castle Constructions approved development. This profile drawing is an adaptation of a drawing included in the Winten Property Group DA (a copy is included in the submissions presented as Appendix E). The drawing shows the envelope of the proposed substation as presented in the EA and the building envelope of the preferred project is shown by a red dotted line (refer drawings in Appendix A).

Figure 1 – Proposed Winten and Castle Approved DA Building Profiles with Proposed Substation Profile



Source: Winten Property Group Development Application, 2010

The figure illustrates that the profile for the Castle Constructions and Winten Property Group developments are virtually the same with respect to distance from the noise sources associated with the operation of the substation (i.e. on the western side of the substation furthest from the developments).

3.4.1 Castle Constructions Development

The main operational noise emission sources from the proposed substation are the transformers which are located in the basement (and the riser to the east of the substation as shown in Figure 1) and fan exhaust and intake which are located on the roof.

The modifications to the design do not change the predicted noise emissions during operation of the substation. The locations of these noise sources and the way they are enclosed in the preferred project would be as per the original design.

Therefore, the noise and vibration assessment presented as Appendix F of the EA undertaken for the design assessed in the EA would also apply for the preferred project.

3.4.2 Winten Property Group Development

The main difference between the Winten Property Group and Castle Constructions proposed developments is that Levels 2-9 of the former would be closer to the proposed substation by between approximately 1m and 5m.

The essential difference is that approximately 13 m of the void for the Castle Constructions development and proposed substation between Levels 2 and 9 would be closed in and the space taken up with apartments in the Winten Property Group development.

Figure 1 shows that the proposed Castle Constructions and Winten Property Group developments are almost in line with one another. For this reason, the operational noise assessment undertaken for the EA would continue to apply for the Winten Property Group development with no increased acoustic impact.

3.4.3 Revised Construction Noise Impact Assessment for the Cable Vault Works

Establishment of cable vault construction hours

Cables vault works would be required across part of both Ward and Berry Streets. The location of the requisite cable vault works would be constrained by a number of factors including:

- Existing traffic volume along Berry Street
- Sole entry/exit point for car park and loading dock for 66 Berry Street is located in Ward Street.
- Ward Street provides main access to Wilson Parking car park.
- Proximate residences across Berry Street.

During the environmental assessment process, consultation was undertaken with RTA, management of 66 Berry Street, North Sydney Council and 77-81 Berry Street (through meeting with body corporate representatives) to establish the most suitable working hours to excavate and undertake the cable vault works. The proposed cable vault construction hours outlined within the EA have been developed as a result of this consultation. Both day-time and night-time works were considered as part of the consultation.

Day-time works were originally considered, however, it was concluded that day time works would not be suitable (even outside peak hours for Wilson Parking car park) due to the need to retain access for staff and deliveries from Ward Street to 66 Berry Street. The management of 66 Berry Street would be amenable to having its car park closed on weekends and at night (provided access is maintained for a garbage truck around 5am on weekdays). Furthermore, if the cable vault works were to be undertaken during the day, one lane of Ward Street would be closed and there would not be sufficient space for a vehicle to turn into the driveway of the car park with only one lane open. Undertaking the cable vault works at night would ensure access for staff parking under 66 Berry Street during weekdays would not be hindered.

It is likely that isolated partial closures of one lane of Ward St during week days would be possible on rare occasions as negotiated with 66 Berry St, however it would be inappropriate to rely on this as a regular occurrence for the reasons outlined above.

In addition, during consultation with RTA it was advised that part of Berry Street would be able to be closed at night or on the weekends only. Works during the day would not be possible as a third lane of traffic would need to be closed for part of the work, when the southern end of the vault is constructed. In addition, if RTA were to allow partial closure of Berry Street during the day, the partial closure would be outside peak hours (i.e. between 10am and 3pm) which, taking into account set-up and pack-up would allow approximately 3.5 hours of productive work. This would result in an extremely inefficient construction process and the excavation and construction works would take approximately 18 months to complete, as opposed to the 5 to 6 months that are predicted with normal 8-10 hour shifts of work.

Revised noise assessment

It was reported in the EA that excavation and construction of the cable vault was predicted to exceed the noise criteria by between 19dB(A) and 29dB(A). The construction methodology for the cable vault has been reviewed to reduce the predicted exceedence of the criteria and two alternative construction options are proposed as outlined below.

1. Option A – Excavation beneath a concrete slab

This option would comprise exposing existing services in soil to identify and confirm existing services. This would be done during the day on Saturday and Sunday only and not at night, and would involve minor excavation in rock with hand jackhammers only. Once this is done, the pit would be filled with sand and asphalt on top whilst the existing services are relocated (i.e. gas, water, sewer and Telstra). In order to excavate the pit itself during the night time the pit lid slab would be poured, then a hole created in the road on the northern side of the pit (i.e. furthest away from residents at approximately 70 m) approximately 2 m by 3 m to enable workers and equipment to fit in the hole. A 2 m high barrier would also be constructed to the south of the hole at its edge. The likely scenario is that there would be two workers in the hole with hand held jackhammers, and it would take approximately one to two months to excavate. The total duration of the cable vault works would be approximately six months.

2. Option B – Open excavation

Option B would comprise the construction of a B class hoarding over the top of the proposed cable vault comprised of plywood plus cool room/sandwich panels and the same material on either side. This hoarding would be removed during the day. There would be an approximate 2m wide by 2m high opening to the north to enable access. The opening would have a 1.5 m duct lined with 50 mm insulation. The open excavation option would take approximately one to two months to complete. The total duration of the cable vault works would be approximately six months.

In both options the noisiest piece of equipment would be the use of a hand held pneumatic rock breaker (jack hammer). A revised assessment based on the abovementioned options to mitigate the noise emissions for constructing the cable vault is presented in Table 3-2. It should be noted that there would be no shielding for the daytime jack hammering.

Table 3-2 - Estimated Cable Vault Construction Noise Levels at Residences along Berry Street

Plant and equipment in operation	L_{Aeq} Noise level, dB(A)			
	Sound power level, dB(A)	Day time	Night time	NML's, dB(A)
Residences along Berry Street				
Option A: Jackhammer	111	67	54	Night (out of hours): 51 Day (standard hours): 64
Option B: Jackhammer	111	67	55	

For both options, it is predicted that minor non-compliance of noise management levels (NMLs) for both day and night periods would occur. The daytime non compliance (3 dB(A)) may be easily controlled with a local barrier around the jack hammering. Night time non-compliance would be between 3 and 4 dB(A) and the main contribution would be from the openings in the cable vault.

3.5 Temporary Kiosk

Potential impacts associated with the construction of a temporary kiosk would be minor and limited to the following during construction:

- Altered traffic and access arrangements.
- Erosion and sedimentation during trenching works and if soil is exposed at the site of the kiosk during the levelling works.
- Excavated spoil and sediment laden stormwater entering adjacent gutters and stormwater drains.
- Oil spills and leaks washed into the stormwater system during transportation of oil filled equipment.
- Emissions and dust generation during operation of machinery and excavation of soil during trenching.
- Noise associated with the trenching works.

Mitigation measures that would be implemented to minimise the potential environmental impacts include the following:

- The kiosk would be positioned with the LV side of the kiosk furthest away from the closest sensitive receiver i.e. commercial building. This is consistent with the approach of prudent avoidance that EA adopts for all electricity installation projects.
- Residents or businesses that are likely to be affected by noise or interruptions to pedestrian or vehicle traffic would be notified prior to the works being undertaken.
- Sedimentation would be controlled by implementing the following measures:
  - Excavations would be staged and undertaken in manageable sections.
  - Excavation works would be avoided in rainy or excessively windy conditions.
  - Tracked sediment from vehicles and machinery would be avoided by cleaning tyres in a bunded area prior to leaving the site.
  - Drains would be guarded with appropriate sediment control devices.
  - The area would be regularly swept to ensure sediment loading on roads is minimised.

- Oil spill response kits would be available during transportation and installation of oil filled equipment.
- Excavated spoil would be stockpiled away from gutters and drains in bunded flat areas where possible. Where stockpiles are located on a slope, controls would be installed upgradient of the stockpile to ensure clean surface water is diverted around stockpiles.
- Sediment controls devices would be established prior to the commencement of the excavation and trenching works and would remain in place until the completion of the works.
- Sediment controls would be checked daily to ensure they are working properly and would be repaired immediately if found to be in disrepair.

- Excavated spoil would be sampled prior to disposal to determine its waste classification.
- Excavated spoil that is suspected of being contaminated would be sampled to determine the appropriate method of disposal. It would be stockpiled separately from other soil and disposed at an appropriately licensed facility.

4 SUBMISSIONS RECEIVED DURING PUBLIC EXHIBITION

4.1 Submissions Process

During the public exhibition period, submissions regarding the proposed project were received by the DoP. Submissions were numbered as received and provided to the proponent for a response. All submissions were reviewed and responses have been prepared to respond to each issues raised (refer Chapter 5 of this report).

4.2 Respondents and Issues Raised

In total, five submissions were received. Of these, four submissions were from State and local government agencies which predominantly focused on particular discipline areas. One submission was received from a member of the local community who is an adjacent landowner. Copies of submissions received are presented as Appendix E.

4.2.1 State and Local Government Agency Submissions

Four submissions were from State and local government agencies including the following:

- Department of Environment, Climate Change and Water (DECCW)
- NSW Health
- North Sydney Council
- NSW Roads and Traffic Authority (RTA)

A summary of issues raised within each of the submissions is presented below. Specific issues raised in each submission are tabulated and addressed in Chapter 5 of this report.

Department of Environment, Climate Change and Water

The DECCW undertook a detailed review of the EA and considered that while it adequately addresses the DGRs, the key environmental impacts associated with the proposal relate to noise and vibration during construction. DECCW supports approval of the project and recommends that the conditions outlined in its submission are included in any consent.

Comments relate to noise and vibration impacts, such as background noise levels, the construction noise management plan, construction hours and vibration.

NSW Health

NSW Health made a submission on two components of the EA:

- EMF generated by the facility
- Operational noise impacts.

North Sydney Council

North Sydney Council resolved to forward a submission based on three key issues including the following:

- A suggested modification to building finishing
- Traffic and engineering issues
- Provision for public benefit of the current substation site (70-74 Berry Street).

Council also resolved that the future potential of the current substation site (70-74 Berry Street) be addressed in the central business district (CBD) character statement as part of any Ward Street redevelopment plans.

Roads and Traffic Authority

The RTA concurred with the EA, specifically the proposed conduits at the intersection of Berry Street and Ward Street, subject to the following requirements:

- A Road Occupancy License should be obtained
- Detailed design drawings and geotechnical reports relating to the excavation of site are required
- The full cost of assessment by the RTA is payable by the proponent
- RTA should receive seven days notice with complete details of work if excavating below the level of the base of the footings of adjoining roadways.

The RTA concurred with determination of the EA, specifically regarding substation redevelopment with the following advisory comments:

- A Construction Traffic Management Plan (TMP) should be submitted to Council prior to the issue of a construction certificate
- The swept path of the longest vehicle shall be in accordance with AUSTROADS
- All vehicles are to enter and leave the site in a forward direction
- All vehicles are to be wholly contained on site before being required to stop
- All works/regulatory signposting associated with the proposed development are to be at no cost to the RTA.

4.2.2 Local Community Submissions

One submission was from the local community, an adjacent landowner, Winten Property Group.

Winten Property Group made a submission that requests consideration of the approved DA for 136 Walker Street, the new DA for 136 Walker Street, consultation conducted, external design of the substation's eastern wall, noise and EMF safeguards.

Winten noted that an essential outcome of the proposal would include a condition to shield the EMF impacts below a maximum specified level of safeguard.

Winten suggested the design address its wider context with less impact of unmitigated bulk in all directions and that no attempt was made to address how the site development could be staged differently, and that fundamentally the design as a concept requires further resolution.

4.3 Summary of Key Issues Raised in Submissions

The key issues raised in the submissions received during the public exhibition are as follows:

- Construction hours
- Construction noise and vibration impacts
- EMF generated by the facility
- Operational noise impacts
- Building finishing / external design of the substation's eastern wall
- Traffic and engineering issues during construction
- Future potential public benefit provided by the existing substation site (70-74 Berry Street).

- Consideration of impacts on adjacent properties and proposed developments (including the approved DAs for 136 Walker Street)
- Consultation undertaken as part of the assessment

5 RESPONSE TO SUBMISSIONS

Each submission was individually reviewed, and issues raised were tabulated and a response provided. Where appropriate, responses refer to relevant sections of the EA.

5.1 Tabulated Response to Issues

This chapter provides a tabulated response to issues raised in submissions. Responses that are specific to either of the approved Castle Constructions or Winten Property Group developments or any other particular stakeholders have been noted where appropriate.

Table 5-1 – Responses to Submissions Made During Public Exhibition

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
Department of Environment, Climate Change and Water			
Background Noise Levels	The construction noise objective for the project is to manage noise from construction activities (as measured by a LAeq (15 minute) descriptor) so it does not exceed the background LA90 noise level by more than 10 dB (A) for works during standard construction house; and by more than 5 dB (A) for works outside standard construction hours.	Noise management levels for the construction of the substation and cable vault were set at 64dB(A) for works occurring during the day and 51dB(A) for works occurring outside standard hours. Predicted noise levels for the construction of the substation and demolition of the existing substation would exceed NMLs for residential receivers by between 1dB(A) for operation of a truck and trailer to 17dB(A) for operation of a jackhammer. Predicted noise levels for the substation would exceed NMLs for commercial receivers by between 6 and 14dB(A) for offices and between 3 and 10dB(A) for receivers in a cafe/restaurant establishment. Two options are proposed for the one to two months that the excavation and construction associated with the cable vault is likely to exceed the criteria. The predicted noise levels for the cable vault in Ward and Berry Street would exceed the NMLs by between 1 and 3dB(A) for works out of standard hours for both options and by 3dB(A) during the day. Refer to Section 9.3.5 of the EA, Section 6.2 of Appendix F of the EA, and Section 3 of this report.	1-a
	Activities that have the potential for noise emissions that exceed the objective must be identified and managed though the implementation of feasible and reasonable noise mitigation and management measures, to be outlined in a CNVMP, with the aim of achieving the construction noise objective.	A construction noise assessment has identified activities including jack hammering during construction of the substation and cable vault that exceed the noise objectives. A Construction Noise and Vibration Management Plan (CNVMP) will be prepared as a subplan to the CEMP for the project and will be issued to DoP for approval prior to the commencement of construction.	1-b

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
	If the noise from a construction activity is substantially tonal or impulsive in nature then 5dB(A) must be added to the measured construction noise level when comparing the measured noise with the construction objective.	A 5dB(A) tonality penalty has been added to the predicted noise emission from the proposed substation at the nearest affected properties to accommodate the tone generated by the transformers at 200Hz.	1-c
Construction Noise Management Plan	The proponent must prepare a CNVMP that includes, but is not necessarily limited to: Identification of the specific activities that will be carried out and associated noise sources at the premises;	A CNVMP will be prepared as a subplan to the CEMP for the project and will be issued to DoP for approval prior to the commencement of construction. The CNVMP will identify the activities that will be undertaken as part of the North Sydney zone substation project and noise levels at nearby affected premises.	1-d
	Identification of all potentially affected sensitive receiver premises;	Potentially affected sensitive receiver premises proximate to the proposed substation development are outlined in Section 1.3 of Appendix F of the EA and Section 9.3.1 of the EA.	1-e
	Quantification of the background noise level (RBL) for sensitive receivers, as part of the CNVMP or as undertaken in the environmental assessment;	Background noise levels were quantified as part of the environmental assessment (refer Table 2-1 of Appendix F of the EA) and Table 9-2 of the EA. RBLs are 54dB(A), 51dB(A), and 46dB(A) for day, evening and night periods respectively.	1-f
	Identification of the construction noise, ground-borne noise and vibration objectives;	Construction noise, ground-borne noise and vibration objectives are outlined in Chapter 4 of Appendix F of the EA and Sections 9.3.2 and 9.3.3 of the EA.	1-g
	Assessment of potential noise, ground-borne noise and vibration levels from the proposed construction methods expected at sensitive receiver premises against the construction noise objectives;	An assessment of potential noise, ground-borne noise and vibration levels from the proposed construction methods expected at sensitive receiver premises against the construction noise objectives is provided in Chapter 6 of Appendix F of the EA and Section 9.3.5 of the EA. A	1-h

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
		revised assessment for the construction of the cable vault is provided in Section 3 of this report.	
	Where the objectives are predicted to be exceeded, an analysis of feasible and reasonable noise mitigation measure that can be implemented to reduce construction noise impacts;	Methods of noise reduction by using full enclosures for the cable vault have been considered, however, since the barriers would need to be removed for road access during daylight hours, and as contractors would need to work in confined spaces, these methods are neither reasonable nor feasible. Mitigation measures proposed to manage predicted construction noise exceedences, including discussion on measures that have been considered but are not feasible and reasonable, are outlined in Section 6.2.3 of Appendix F of the EA, Section 9.3.6 of the EA and Section 3 of this report.	1-i
	Description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during construction;	Mitigation measures proposed to manage predicted construction noise exceedences, including discussion on measures that have been considered but are not feasible and reasonable, are outlined in Section 6.2.3 of Appendix F of the EA, Section 9.3.6 of the EA and Section 3 of this report.	1-j
	Where the objectives cannot be met, additional measures including, but not necessarily limited to the following should be considered for implementation where practicable: • Reduced hours of construction • Provision of respite for 1-2 nights per week from noisy/vibration intensive activities • An acoustic enclosure over the	Additional measures will be implemented such as: • rock breaking and noisier activities associated with the cable vault construction will be limited to the fringe night time, for example, prior to 10pm where possible, • noisy/vibration intensive night work would only be carried out a maximum of five nights per week, with works carried out during the daytime on Saturday and Sunday. Two nights of respite (Friday, Saturday or Sunday nights) would be implemented each week, • community consultation would be ongoing throughout	1-k

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
	excavation site • Alternative excavation methods • Other negotiated outcomes of respite or compensation with the affected community;	construction.	
	Where it is determined that the work cannot be undertaken in a manner that satisfies the construction noise and vibration objectives, a report justifying that the construction noise and vibration measures (including management measure) consistent with current best practice should be submitted to the Director General for approval prior to commencement of works;	Through a combination of mitigation measures and other management measures including respite periods, and consultation with affected residents, it has been determined that work can be undertaken in a manner that satisfies the construction noise and vibration objectives.	1-l
	Procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity; Publication of a 24 hour contact number for community complaints and measures to monitor noise performance and respond to complaints.	The Community Involvement Plan (CIP) will be appended to the CEMP for the project and will outline a strategy for consultation and for notifying relevant community and stakeholders of construction activities Communication with residents will involve disseminating an 1800/free call phone number and public email for community complaints along with measures to monitor noise performance and respond to complaints.	1-m
Construction hours	All construction work at the premises, other than noise intensive activities such as rock breaking may be conducted between 8am and 6pm Monday to Friday and between 8am and 5pm Saturdays and at no time on Sundays and public holidays.	The majority of noise intensive activities, such as rockbreaking during excavation, have already been completed for the substation (as part of a separate approval). Proposed working hours for construction of the substation and demolition of the existing substation, including noise intensive works, will be 7am to 6pm Monday to Friday and 8am to 4pm Saturday as outlined in the EA. These hours are as recommended within the ICNG	1-n

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
		with the exception of an additional 3 hours on Saturday afternoon and are virtually the same as the construction hours proposed by DECCW. Approval for these working hours is being sought as part of the project application.	
	Works outside these hours are not permitted except as explicitly specified below with strong justification and include: the delivery of material which is required outside these hours as requested by Police or other authorities for safety reasons; Emergency work to avoid the loss of lives , damage to property and/or to prevent environmental harm; Other works expressly approved by the Director General.	Approval is being sought to excavate and construct the cable vault outside of hours as required by RTA to minimise impact on Berry Street traffic flow. Cable vault work would generally be undertaken during the following hours: • Sunday to Wednesday 8:00pm to 5:00am • Thursday 8:30pm to 5:00am • Friday 8:30pm to 7:00am • Saturday to Sunday 8:00am to 5:00pm Approval is being sought for these hours as part of the project application. Night work would only be carried out a maximum of five nights per week, with works carried out during the daytime on Saturday and Sunday. Two nights of respite (Friday, Saturday or Sunday nights) would be implemented each week. The final approved hours for the cable vault work will be those hours that result in the least impacts on the community, with respect to total duration of works, disruption to businesses and sleep disturbance.	1-o
	In considering application for Out of Hours works the Director General should give consideration to the following: the likely effectiveness of any acoustic enclosure or alternative excavation methods in reducing noise levels to	• Rock breaking and noisier activities will be limited to the fringe night time, for example, prior to 10pm where practical and reasonable. • Noisy/vibration intensive night work would only be carried out a maximum of five nights per week, with works carried out during the daytime on Saturday and	1-p

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
	impacted sensitive receivers the need for respite periods for night works extending past five consecutive night the need to limit all rock breaking and noise sensitive activities to before 10pm unless there is clear evidence of community support for an alternative approach as a result of negotiations between the proponent and representatives of potentially affected noise receivers.	Sunday. Two nights of respite (Friday, Saturday or Sunday nights) would be implemented each week. • Community consultation will be ongoing throughout construction and alternative approaches for the construction works will be considered as a result of negotiations with the community.	
Vibration	Vibration caused by construction and received at any sensitive receiver outside the proposal must be assessed against the guidelines contained in the DECC publication 'Environmental Noise Management – Assessing Vibration; a technical guideline'.	Vibration impacts associated with the project have been assessed against the DECCW guideline. Predicted vibration impacts are presented in Section 6.3 of Appendix F of the EA and Section 9.3.5 of the EA. It is considered unlikely that residential receivers at 77-81 Berry Street would be affected by the excavation and construction works undertaken as part of the cable vault works. Mitigation measures and management strategies for vibration impacts will be outlined in a CNVMP that will be prepared as a subplan to the CEMP.	1-q
	Regenerated noise from construction works must not exceed the following criteria as measure at the nearest sensitive receptor: 40dB(A) between the hours of 6.00pm and 10.00pm and 35 dB(A) between the hours of 10.00pm and 7.00am.	Ground-borne noise would be most likely to occur during the excavation of the cable vault and trenches. It is considered unlikely that residential receivers at 77-81 Berry Street would be affected by the excavation and construction works undertaken as part of the cable vault works. Vibration levels will be monitored as per measures outlined in a CNVMP that will be prepared as a subplan to the CEMP.	1-r
NSW Health			
Electric and	The EA predicts that sensitive residential	The EMF assessment undertaken for the EA predicts the	2-a

ISSUE	DESCRIPTION OF ISSUE	RESPONSE	ISSUE ID
Magnetic Fields (EMF) generated by the facility/	receptors (located in the proposed mixed commercial/residential building at 136-140 Walker Street on the eastern boundary of the site) will be exposed to a substantial increase in EMF exposure above currently existing levels, if the substation facility is constructed as currently designed. It is recommended that the design of the project be altered with the objective of reducing this predicted increase over background levels.	magnetic field levels associated with the substation on the boundaries of the facility. The EMF assessment has compared the predicted field levels with the numerical health limit of 1000mG which is the ARPANSA health guideline for exposure in any 24 hour period, per day continuous. The predicted magnetic field levels are well within the 1000mG health guideline. However, as stated in the NSW Health submission, due to a lack of evidence for a causal relationship between magnetic fields and biological function or disease status WHO does not recommend solely relying on exposure limits and recommends precautionary measures. The substation has been designed to incorporate prudent avoidance measures. The preferred project presented in this PPR has reduced magnetic fields further than the design presented in the EA through relocating ten 11kV cables on the eastern boundary. Magnetic field levels for the preferred project are presented in a Supplementary EMF assessment presented as Appendix F of this report and summarised in Section 3.3. By relocating the ten 11kV cables for the preferred project the magnetic field levels have been reduced compared with the predicted increase over background levels reported in the EA, thereby addressing the NSW Health recommendation.	
Operational noise impacts	Noise exposure has been linked with significant non auditory health effects. It is important that project specific noise levels are set and implemented strictly in accordance with relevant DECCW noise policy.	Operational noise emissions will comply with the project specific noise levels.	2-b

North Sydney Council			
Building facade	The banding of the upper section of the building above the podium height is considered to be too dominant. The podium height is defined on the street facade where the building articulation starts which is about the height of the existing substation wall to the south. The upper level above the podium should be less visually assertive, by means of reducing contrast between brickwork bands, and reducing the amount of banding – the bricks should not be too light as they will get dirty. This should also be of assistance in minimising the impact on future residential development to the east.	The substation façade has been modified following consultation with North Sydney Council and Winten Property Group to be more complementary to adjacent existing and proposed development. Photomontages, elevations and viewpoints showing the façade for the preferred project are presented at Appendix C.	3-a
Traffic Management Plan	A Traffic Management Plan should include the following: U-turn required around the Military Road island Preferred site access route Signage in Berry Street Traffic controller at Ward Street Access maintained at Ward Street car park Traffic flow disruption (hours allowed) Consultation requirements Traffic flow Fees for change in traffic conditions Site materials storage Reversing trucks	TMPs will be prepared as part of the CEMP for the project and will include Council requirements for the construction and demolition works and excavation of the cable vault.	3-b

	Plant and equipment storage Pedestrian access Traffic control plans Timing for permits Temporary construction vehicle crossing Traffic route maps for truck drivers		
Engineering and stormwater issues	Building Design and Public Benefits: Council would like to see some public benefit when the current substation is decommissioned which may involve some landscaped public space on the corner of Berry Street and Ward Street.	The site is owned by EnergyAustralia and at the time of writing no decision as to the future use of the site had been made. The project application is seeking approval for the construction of a new substation at 3-11 Ward Street and demolition of an existing substation at 70-74 Berry Street. Once the existing substation is decommissioned and demolished, the site would be remediated, grassed and secured with a wire mesh fence. Refer Section 4.4 of the EA	3-c
	The scale is acceptable; however, further improvement can be made to the materials and external treatments as suggested by council's Design Excellence Panel.	Refer response to 3-a.	3-d
Traffic and engineering issues to be conditioned	Council recommend the following traffic and engineering issues be conditioned as part of the approval for the development (Note: Headings are provided only. Refer to the RTA submission in Appendix E for further detail): • Dilapidation report (Public Infrastructure) • Dilapidation report – Adjacent Private Property • *Driveway Crossing and Associated Works permit* • Required Infrastructure Works – Roads	A meeting has been held with North Sydney Council subsequent to the submission being made by Council during the public exhibition phase. All traffic and engineering issues that Council recommend should be conditioned as part of the approval would be implemented with the exception of issues relating to existing road and shoulder levels that fall under the headings of *Driveway Crossing and Associated Works Permit and Required Infrastructure Work – Roads Act 1993.* The existing road and shoulder levels will change slightly to permit the required vehicular access into the substation. However, all existing vehicular access will remain.	3-e

	Act 1993 • *Road Works* • Stormwater management and Disposal Design Plan – Construction issue detail • Bond for Infrastructure Damage and Completion of Engineering Works • Damage to Public Infrastructure • Temporary Disposal of Stormwater Runoff • Sediment Control • Sediment Control Sign • Asbestos and Hazardous Material Survey • Security Bond Schedule • Bonds • Public liability Insurance – Works on Public Land • Noise • Dust Emission and Air Quality • Vibration from Works • Applicant's Cost of Work on Council Property • Special permits (on-Street mobile plant, hoardings, storage of building materials and building waste containers (skips) on Council's property, kerbside restrictions, construction zones) • Construction and demolition hours • Applicant not to alter existing public parking restrictions	*Driveway Crossing and Associated Works Permit* a) Council will not allow a ramp (gutter bridge) to be constructed. To address this, the entry will be re-designed by lifting the footpath and kerb and gutter to ensure a ramp is not required in the road. d) Footpath levels will be raised in order to remove proposed ramp (see item a) e) The gutter and road levels will be raised in order to remove proposed ramp (see item a) f) The 600mm road shoulder wide strip is not required as the affected pavement in the cul-de-sac will be re-paved *Road Works* a) Footpath along the entire Ward Street frontage will be re-constructed and Council will confirm the requirement to use interlocking pavers or concrete. c) An agreement was made with Council that cross-sections along the centre line of each access point to the building is not required d) 600mm shoulder width not required as frontage footpath and kerb and gutter would be reconstructed properly.	

	• Road reserve safety • Applicant responsible for all services in, on or over site • Prohibition on use of pavements • Plant and equipment kept within site • Security and safety		
Public benefit provision	Council would like to see some pubic benefit provision be made for the current substation site (70-74 Berry Street) once it is decommissioned. This may involve some landscaped public space. The future potential of 70-74 Berry Street (current substation site) should be addressed in the CBD character statement as part of any Ward Street redevelopment.	The Energy2U Alliance will cooperate with Council to see the future potential of 70-74 Berry Street addressed in the CBD character statement as part of any Ward Street redevelopment. Refer response to 3-c.	3-f
RTA			
Traffic comments in relation to the proposed conduits at the intersection of Berry Street and Ward Street (Cable Vault)	A Road Occupancy License should be obtained.	A Road Occupancy License will be obtained prior to commencement of construction.	4-a
	The developer is to submit detailed design drawings and geotechnical reports relating to the excavation of the site. This report should address the impact of excavation.	A report addressing the impact of the excavation on the stability of Berry Street, including detailed design drawings and geotechnical reports relating to the excavation of the site will be submitted to the RTA in January 2011. Preliminary cable vault drawings are presented in Appendix A.	4-b
	The developer is to meet the full cost of	EnergyAustralia will meet the full cost of assessment	4-c

	assessment by the RTA.	required to be undertaken by the RTA.	
	If excavating below the level of the base of the footings of adjoining roadways, owners of the roadway should have seven days notice with complete details of work.	EnergyAustralia will notify North Sydney Council and the RTA of the intention to commence excavation work in Ward Street and Berry Street at least seven days prior to the work.	4-d
Traffic comments in relation to the substation redevelopment site	A Construction Traffic Management Plan detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to the Council prior to the issue of a Construction Certificate.	A TMP will be included as a subplan of the CEMP for the project. The TMP will outline construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control.	4-e
	The swept path of the longest vehicle entering and exiting the site, as well as manoeuvrability through the site, shall be in accordance with AUSTROADS.	Swept paths for vehicles entering Harnett and Ward Streets are presented in Appendix H.	4-f
	All vehicles are to enter and leave the site in a forward direction.	During construction of the substation vehicles will not enter and exit the site in a forward direction from Harnett Street due to limited space within the site boundary. Vehicles will reverse down Harnett Street in accordance with the approved TMP. During construction of the cable vault and Ward Street trenches, trucks would drive into and out of the site, but would reverse out of Ward Street in accordance with the TMP due to the width of the road. The TMPs will include Traffic Control Plans that will outline specific traffic control measures. • Accredited traffic controllers (one for each direction) will stop traffic in both directions in McLaren Street when a truck is entering or exiting Harnett Street. • When a truck is reversing into Harnett Street, barrier boards will be used to close the footpath on the southern side of McLaren Street and on both sides of Harnett	4-g

		Street to control pedestrian movements. • A spotter will be located at the exit of the driveway to 41 McLaren Street in order to provide guidance to exiting vehicles with regards to when a truck is reversing into Harnett Street. During operation of the substation, trucks would reverse down Harnett Street into the substation to enable maintenance, replacement and testing of equipment.	
	All demolition and construction vehicles are to be wholly contained within the site and vehicles must enter the site before stopping. A construction zone will not be permitted on Berry Street.	During construction, it is not feasible to wholly contain vehicles on site before they will be required to stop. A Work Zone will be located on Harnett Street in accordance with the TMP and North Sydney Council's requirements, and trucks will stop at this point.	4-i
	All works/regulatory signposting associated with the proposed development are to be at no cost to the RTA.	EnergyAustralia will fund all works/regulatory signposting required for the North Sydney zone substation redevelopment.	4-j
Winten Property Group			
Consideration of the approved DA for 136 Walker Street	The application fails to take into account the impact on the approved DA for 136 Walker Street and the current design as outlined in the EA still requires further resolution.	The design outlined in the EA has been modified to reduce residual impacts on the proposed development(s) at 136-140 Walker Street, as outlined in Section 2 of this PPR. A revised assessment is presented in Section 3. Modifications to the façade design have been based on consultation with Winten Property Group subsequent to the public exhibition.	5-a
	The suggestion that landscaping in the approved 136 Walker Street should provide a visual barrier is a transfer of responsibility for proper design. We understand Council has previously requested design improvement when EnergyAustralia self approved the previous	Landscaping to screen impacts associated with the proposed substation have been suggested to minimise impacts to 136, 138-140 if the existing structures were retained. No landscaping has been proposed at 136-140 Walker Street for either of the approved developments. As per Section 2 of this PPR, the facade of the substation has been modified to address concerns raised by Council's	5-b

	approval, but no response to Council's concerns were made.	Design Excellence Panel and in consultation with Winten Property Group. The Design Excellence Panel has reviewed the façade design for the preferred project and agrees with the modifications.	
Consideration of the new DA for 136 Walker Street	Winten Developments has lodged a subsequent Development Application for 136 Walker Street with North Sydney Council on 19 August 2010. The submitted Development Application seeks to address the significant issues created by the overshadowing and lack of a setback created by the proposed Zone Substation. Should the Development Application be approved it will in part mitigate the loss of amenity on 136 Walker Street, it will not mitigate the loss or affection as a result of the transgression of EMFs across the boundary to 136 Walker Street. Should the development application not be approved then we maintain the position as outlined in the Castle Constructions letter dated 12 May 2010.	The Winten Property Group DA was approved on 11 November 2010. The Winten Property Group DA has been developed in full consideration of the substation and it is acknowledged that the development addresses amenity issues associated with the proximity of the substation and proposed development. However the DA did not address EMF and despite raising concerns about EMF, the development was designed to be closer to the proposed substation boundary. A total of ten 11kV cables have been relocated in the preferred project to reduce the magnetic field levels at the eastern boundary of the substation (refer Section 2.2 of this report and drawings in Appendix A).	5-c
Consultation	The applicant asserts that design has been subject to 'a series of discussions' with adjoining owners and North Sydney Council's Design Excellence panel. We would suggest this is overstating the consultation and due regard to any comments of the previous approval.	Database records for consultation undertaken during the Part 3A process show that seven meetings were held and 18 correspondences were sent to Castle Constructions during the period 22 October 2009 and 22 September 2010.	5-d
External design of the eastern wall of the substation	The proposed facade treatment is to be amended or substantially changed to reduce the visual impact of the proposed	Subsequent to the public exhibition period EnergyAustralia has consulted with Winten Property Group regarding the façade and modifications have been made. Refer to photomontages, elevations and viewpoints presented in	5-e

	substation. The level of articulation is at best providing poor visual amenity to 136 Walker street. The proposed banding offer a token relief from a 23 m high blank wall with zero boundary setback. The EnergyAustralia City North Zone Substation in Sussex Street is more unobtrusive and better addresses its context than the proposed design through proper articulation of the facade.	Appendix C and Section 2.2 of this report.	
Noise	The two vertical louvres on the eastern elevation should be relocated from this adjacent elevation. We would expect that the Department can otherwise condition the approval to provide for suitable noise attenuation to address residential uses.	Operational noise emissions from the substation during operation of the substation have been modelled and are predicted to comply with noise criteria.	5-f
Construction impacts/ facade	It is highly likely that we will be constructing 136 Walker Street at the same time as EnergyAustralia and a scaffold over our property will impact on our construction program. An alternative facade solution that assists the conflict should be found, also delivering a more considered external treatment to the building.	EnergyAustralia has consulted with Winten Property Group subsequent to Winten making this submission and both parties have agreed that construction methodologies for both developments would be able to be undertaken concurrently.	5-h
EMF safeguards	The independent conclusion of the report by EMR Surveys Pty Ltd should be upheld and that suitable magnetic shielding be installed to reduce the magnetic fields along the eastern boundary. As a condition of consent the level should be 4 milligauss (90.4 microlesia) as a recommended maximum	The 2006 ARPANSA draft standard states that the numerical health limit for magnetic fields is 1000mG. However, while compliance with the guidelines is important in protecting people from established health effects it does not necessarily address possible health effects, should they exist, from fields at levels normally encountered in the vicinity of electrical equipment. The possibility of such effects has been comprehensively studied over several	5-g

	level.	decades worldwide but there remains no clear understanding of whether or not electric or magnetic fields at low levels can pose a threat to human health. Given the inconclusive nature of the science it is considered that a prudent approach continues to be the most appropriate response in the circumstances. EnergyAustralia, along with other members of the Energy Networks Association (ENA), adopts a policy of prudent avoidance and has applied it in designing the North Sydney 132kV Zone Substation project. The principles of prudent avoidance include designing facilities to reduce the intensity of fields they generate, provided this can be readily achieved subject to modest cost and reasonable convenience and is consistent with good engineering and risk minimisation practice. A material reduction in the magnetic fields on the eastern boundary of the substation would not be achieved conveniently or at modest cost by shielding the eastern wall of the substation. As such, shielding would not be consistent with the principles of prudent avoidance and is not proposed for the North Sydney zone substation redevelopment.	
	There are a number of sub-stations in the Sydney area that have incorporated shielding for magnetic fields. Transgrid shielded a very large transmission cable from Sydney South to Ultimo to ensure that no adjacent house was exposed to magnetic fields greater than 4 milligauss on the nearest external wall. We have checked some of these houses and can confirm the shielding was very effective.	Refer response 5-g	5-i

6 FINAL STATEMENT OF COMMITMENTS

This section provides the final SoCs for the proposed North Sydney zone substation redevelopment project in accordance with section 75(6) of the EP&A Act.

As outlined in Chapter 4, submissions received during the public exhibition of the EA raised a number of issues including construction and operational noise and vibration impacts, substation building façade design, traffic and engineering issues during construction, future use of 70-74 Berry Street, EMF generated by the substation, and impacts on adjacent properties including proposed developments.

Many of the issues raised have been resolved as a result of consultation undertaken with relevant stakeholders subsequent to the public exhibition period. Resolved issues include concerns related to traffic and engineering during construction and the substation building façade. Other issues such as impacts on adjacent properties and proposed developments and EMF concerns have been addressed through development of a preferred project and the availability of more detailed construction information compared with when the EA was prepared. For instance, the mitigation measures proposed to manage noise emissions associated with the excavation and construction of the cable vault have been refined based on more accurate information available pertaining to feasible enclosures and shielding during the evening and night time work periods. The final SoC has been developed following consideration of the submissions and outcomes of consultation undertaken subsequent to the public exhibition.

The final SoC describes the general commitments made as part of this EA and application for project approval. The SoC identifies commitments that will be implemented during construction and operation of the proposed zone substation, construction of the cable vault and kiosk and demolition of the existing substation. The commitments will form the basis of a CEMP that will be prepared for the project and issued to DoP for approval prior to the commencement of construction.

Table 6-1 outlines the commitments identified to avoid or minimise adverse impacts on the environment during the project.

Table 6-1 Final Statement of Commitments

REFERENCE	COMMITMENT	TIMING
EMF		
E1	Once the substation is commissioned, magnetic field levels will be measured around the boundaries of the substation and compared with the predicted levels within the EA and PPR. EnergyAustralia will commit to undertake an investigation into the costs and benefits of shielding prior to the completion of construction of the substation.	Operation

REFERENCE	COMMITMENT	TIMING
Visual		
V1	Should the proposed development at 136-140 Walker Street proceed, EnergyAustralia will ensure the following mitigation measures are undertaken in consultation with the property owners: • Planting of a select suite of tree and shrub species to the rear garden spaces of 76 Berry Street and 142 Walker Street, providing replacement canopy cover within the garden suited to the increased level of overshadowing from the site. If the proposed development at 136-140 Walker Street does not proceed, vegetation would also be planted in the near gardens of 136 and 138-140 Walker Street.	Construction Post-construction
Noise and Vibration		
N1	As part of the CEMP, EnergyAustralia will implement a CNVMP in accordance with DECCW 'Daft Construction Noise Guidelines' to minimise the potential for noise impacts. The CNVMP will include noise and vibration management measures including the strategic location of barriers, enclosures, selection of quieter equipment, community consultation and/or letter drops.	Pre-construction Construction
Traffic and Access		
T1	Energy Australia will ensure traffic management and road works are carried out in accordance with RTA requirements, including limiting road occupancy to specific hours and days, during construction and demolition phases of the development.	Construction Demolition
T2	As part of the traffic management process, EnergyAustralia will ensure the following plans are submitted to the RTA or North Sydney Council for approval prior to construction: • Road Occupancy Licence (for the works in Berry Street) (RTA). • TMP for work in Ward and Harnett Streets (North Sydney Council). • TCPs (as part of the TMPs) for specific traffic control measures (RTA and North Sydney Council). • Condition reports for all public footpaths, curbs and gutters that would be affected by the proposed works (North Sydney Council).	Pre-construction

REFERENCE	COMMITMENT	TIMING
T3	The TCP for Harnett Street relates to trucks reversing into Harnett Street from McLaren Street. EnergyAustralia will ensure that the TCP includes the following management measures: • Accredited traffic controllers (one for each direction) will stop traffic in both directions in McLaren Street when a truck is entering or exiting Harnett Street. • When a truck is reversing into Harnett Street, barrier boards will be used to close the footpath on the southern side of McLaren Street and on both sides of Harnett Street to control pedestrian movements. • A spotter will be located at the exit of the driveway to 41 McLaren Street in order to provide guidance to exiting vehicles with regards to when a truck is reversing into Harnett Street.	Construction
T4	EnergyAustralia will ensure that the TCP for Berry and Ward Streets includes the following management measures during road closures and for trucks accessing Ward Street: • Accredited traffic controllers will direct traffic into and out of Ward Street. • Accredited traffic controllers will direct traffic adjacent to the closed section of Berry Street when a truck is required to reverse into Ward Street. • Advanced warning signs will be installed in Berry Street and Miller Street (on both the northern and southern approaches to Berry Street) to warn drivers of changed traffic conditions. • Pedestrian warning signs will be installed on the northern footpath at the intersections of Berry Street and both Miller Street and Walker Street to warn pedestrians of the footpath closure. Both of these intersections are signalised and pedestrians will be directed to cross to the footpath on the southern side.	Construction Demolition

REFERENCE	COMMITMENT	TIMING
T5	EnergyAustralia will carry out the following consultation and communications procedures with regard to traffic and access: • Residents and commercial organisations will be notified via a letter box drop of upcoming works, including any road works. • The RTA and key stakeholders will be consulted prior to the implementation of changed traffic conditions, and roadwork information will be disseminated to the community. • A minimum of two days notice will be provided to any affected residents and businesses regarding changes to property access, parking arrangements or traffic arrangements during the construction period. All community and stakeholder enquiries and complaints will be registered in a community and stakeholder database.	Pre-construction Construction Demolition
T6	EnergyAustralia will ensure that all temporary traffic signs will be removed and new permanent signs will be installed, where required.	Post-construction
T7	EnergyAustralia will ensure that temporary roadways or detour arrangements are removed and the area restored to a condition equivalent to that which existed prior to the commencement of construction.	Post-construction
T8	EnergyAustralia will ensure that any damage to curbs, footpaths or gutters during the works (as compared to conditions outlined in condition reports carried out prior to construction) is restored to the satisfaction of the relevant authority at the contractor's expense.	Post-construction
T9	EnergyAustralia will ensure that road pavement excavated during the works is reinstated to the satisfaction of the relevant authority at the contractor's expense.	Post-construction
Air Quality		
AQ1	EnergyAustralia will prepare an Erosion and Sediment Control Plan (ESCP) for inclusion in the CEMP.	Pre-construction Construction
AQ2	Energy Australia will carry out regular maintenance and monitoring as detailed in the Operational Environmental Management Plan. Gas density meters will be installed on gas insulated equipment to detect any drop in pressure which will signify that a leak has occurred.	Operation

REFERENCE	COMMITMENT	TIMING
Sustainability and Climate Change		
SC1	EnergyAustralia will implement the following as part of the design and construction of the proposed substation: • Natural air flow ventilation will be utilised in all areas of the substation with the exception of the control room which would utilise mechanical ventilation for humidity control. • Low loss transformers will be utilised. Materials will be sourced from local suppliers, where feasible. Fluorescent tube lighting and water efficient appliances will be installed. • Recycled materials will be used where possible, such as reinforcing steel, which typically has a recycled content of 50 per cent.	Pre-construction
SC2	EnergyAustralia will implement the following as part of the construction of the proposed substation: • Where possible, all unused construction materials and packaging will be recycled, retained for reuse on other similar projects or returned to the supplier for redistribution. • During construction and demolition phases, waste will be taken off site, with a target of 80 per cent of non-contaminated construction waste recycled. • Materials and equipment removed from the existing substation, including metal components and transformer oil, will be reused or recycled where possible. • Any residual raw materials will be returned to the supplier, resold or reused at another site at the end of the project or recycled.	Construction
SC3	EnergyAustralia will ensure that all electrical equipment is monitored and maintained in accordance with the Operational Environmental Management Plan (OEMP).	Operation
Hazardous Materials – Asbestos Containing Material		
HM1	Energy Australia will manage Asbestos Containing Material in accordance with the OHS Regulation and the guidelines of the National Occupational Health and Safety Commission (NOHSC), including the *Code of Practice for the Safe Removal of Asbestos 2nd Edition* (2005), *Code of Practice for the Management & Control of Asbestos in Workplaces* (2005) and the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* (2005).	Demolition

REFERENCE	COMMITMENT	TIMING
HM2	EnergyAustralia will develop and implement an Asbestos Management Plan as part of the Demolition Management Plan to minimise the risk of human exposure and environmental contamination. The Asbestos Management Plan will include specific measures such as: • Prior to demolition all asbestos containing material (ACM) will be labelled to warn of the presence of asbestos. • ACM will be removed by suitably qualified personnel prior to the demolition works commencing. • A Scope of Works Report or Work Plan will be prepared by a qualified and experienced asbestos consultant, which will outline the requirements for the removal of the ACM. • Airborne asbestos levels will be monitored during the removal of ACM and all samples analysed by a NATA accredited laboratory. • A clearance inspection will be conducted at the completion of asbestos removal work. • Asbestos waste will be sealed in construction grade plastic prior to removal from site. • Asbestos waste will be disposed at a suitably licensed waste collection facility. All waste disposal records will be retained.	Demolition
Hazardous Materials – Polychlorinated Biphenyls		
HM3	EnergyAustralia will handle and dispose of polychlorinated biphenyls (PCBs) in accordance with the *Chemical Control Order In Relation to Materials and Wastes Containing Polychlorinated Biphenyl* (1997) and the *PCB Management Plan* (2003).	Demolition
Hazardous Materials – Lead Based Paint		
HM4	EnergyAustralia will manage the handling and disposal of lead based paint in the existing substation in accordance with the following standards and guidelines: • The Safe Work Australia (SWA) 8 hour Time Weighted Average (TWA) exposure standard for inorganic lead (dusts and fumes) in air is 0.15 mg/m^3. • Australian Standard AS4361.1 – 1995, *Guide to Lead Paint Management, Part 1: Industrial* • Australian Standard AS4361.2 – 1998, *Guide to Lead Paint Management, Part 2: Residential and Commercial Buildings* • DECCW *Waste Classification Guidelines* (2008).	Demolition

REFERENCE	COMMITMENT	TIMING
Hazardous Materials – Synthetic Mineral Fibre		
HM5	EnergyAustralia will ensure all synthetic mineral fibre (SMF) work is undertaken in accordance with the requirements outlined in OHS Regulation and the NOHSC documents, including the *National Standard for Synthetic Mineral Fibres* (1990), *National Code of Practice for the Safe Use of Synthetic Mineral Fibres* (1990) and *Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres* (1989).	Demolition
HM6	EnergyAustralia will ensure the demolition contractor will remove and dispose all synthetic mineral fibre accordance with the Demolition Management Plan. Workers will use Personal Protection Equipment (PPE) during removal of SMF and SMF waste will be disposed at an approved waste collection facility.	Demolition
Geology and Soils		
G1	EnergyAustralia will implement the ESCP in the CEMP. Soil exposed during demolition of the existing substation that is suspected of being contaminated will be managed in accordance with the mitigation measures discussed in the 'Contamination' section of this SoC.	Construction

REFERENCE	COMMITMENT	TIMING
Contamination		
C1	EnergyAustralia will ensure the following is implemented during the construction phase: • All plant and equipment used in the handling and transport of oil, fuels or chemicals will be regularly checked for serviceability, all hoses checked for deterioration, and hose ends and fittings checked for distortion. • Drums will be covered on bunded pallets if stored outside. • Oil hoses and pumps will not be left unattended whilst in use. • Spills and leaks will be promptly and appropriately cleaned up, relevant personnel will be notified and contaminated materials disposed of appropriately. • Emergency spill kits will be maintained and will be readily available whenever oils, fuels or chemicals are handled, transported, stored, processed or tested. • Oil and other chemicals will be stored in a secured and contained area. • Liquid and dry chemicals (including fuels) will be stored and handled in accordance with the material safety data sheet information and directives. • Major spills that will have an impact on the surrounding environment will be promptly reported to the appropriate Emergency Authorities in accordance with emergency response procedures outlined in an Incident Management Plan (a subplan to the CEMP). The spill will be contained, collected and disposed of in accordance with directives from authorities and applicable regulatory requirements. • All personnel involved will be inducted in procedures for the management of fuel and chemical spills and the location of spill kits. • Spoil excavated during the cable vault works, trenching in Harnett and Ward Streets, and installation of the kiosk in Harnett Street will be tested at a NATA accredited laboratory to classify the waste type prior to disposal.	Construction

REFERENCE	COMMITMENT	TIMING
C2	EnergyAustralia will ensure the following is implemented during and following the demolition phase: • A contamination investigation will be conducted at the site of the former substation to ascertain the extent of contamination, if present, and determine level of remediation that is required. • Contaminated material will be classified, stored, transported and disposed of in accordance with the DECCW *Waste Classification Guidelines* (2008). Any removal of material off-site will be disposed to an appropriately licensed waste facility. • All appropriate OH&S requirements will be in place prior to handling potentially contaminated waste and/ or materials. • If any unexpected contaminated soils or materials (e.g. leachate, waste oil, drums of chemicals or asbestos) are discovered during the demolition, all work will cease at the site until the nature and extent of the contamination has been established and an appropriate disposal strategy has been developed.	Demolition
C3	EnergyAustralia will prepare and implement an OEMP during operation of the substation that will outline procedures for managing leaks and spills.	Operation
Water Quality and Hydrology		
WQ1	EnergyAustralia will implement the ESCP prior to construction.	Construction
WQ2	EnergyAustralia will provide a secure, bunded area for the storage of fuel, oil and other chemicals and maintenance and refuelling of plant and equipment will be provided within the site compound, located in the Harnett Street Council car park area. This area will be bunded with an impervious material and will be inspected and maintained regularly and after rain events.	Construction Demolition

REFERENCE	COMMITMENT	TIMING
WQ3	EnergyAustralia will ensure the following are implemented during the construction and demolition phase: • Materials will be stored in accordance with *Storing and Handling Liquids: Environment Protection Participant's Manual* (DECC, 2007). • A spill kit will be provided onsite for emergency spills of fuel, oil or other chemicals. • An emergency spill procedure will be displayed in a prominent position adjacent to the fuel/chemical storage area. • The discharge of site stormwater into the local drainage system will be avoided where practical. Stormwater will be captured on-site in a sediment tank, treated and pumped back into the reticulated stormwater system. • Runoff from exposed areas will be controlled through the installation of temporary erosion and sediment controls. These will be regularly inspected and maintained. • Energy dissipaters will be installed at drainage outlets to minimise water velocity and erosion potential. • A register of all toxic chemicals stored on the site will be maintained, together with a file containing the relevant material safety data sheet (MSDS) of each product. • Any potential pollutant, such as fuels, oils, paints, epoxy and waterproofing, will not be put in a position where it is likely to enter a drain, gutter or other stormwater outlet. • Trays will be placed under the concrete pump whilst in use and will be collected and disposed at an appropriately licensed facility after each pour. Concrete trucks will be washed out upon return to the concrete plant. The chute of the concrete truck will be washed on site in a bunded area. • All temporary pollution control structures will be implemented prior to the commencement of construction and removed from the worksite when it is adequately stabilised.	Construction Demolition
Socio-economic		
SE1	EnergyAustralia will implement a Safety Management Plan in order to ensure the safety of construction personnel and community members during construction and demolition and altered access arrangements.	Construction Demolition
SE2	EnergyAustralia will prepare and implement a Community Involvement Plan during construction of the proposed substation and demolition of the existing building.	Construction Demolition

REFERENCE	COMMITMENT	TIMING
Waste Management		
WM1	EnergyAustralia will ensure the Waste Management Plan (subplan of the CEMP) will contain measures to ensure the segregation, classification, collection, reuse and recycling of construction waste products in accordance with the *Protection of the Environment Operations Act* 1997, DECCWs Waste Reduction and Purchasing Policy guidelines (WRAPP) (2009), DECCW's *Waste Classification Guidelines* (2008) and the resource management hierarchy principles embodied in the *Waste and Resource Recovery Act* 2007.	Pre-construction
WM2	Upon completion of the project, EnergyAustralia will ensure all waste is removed from the worksite and a WRAPP report is prepared.	Post-construction
Heritage		
H1	If a suspected Cultural heritage item, Aboriginal artifact or evidence of Aboriginal occupation is discovered during demolition of the existing substation or excavation of the cable vault, EnergyAustralia will ensure all work stops immediately within that location, access will be restricted and the Supervisor and EnergyAustralia's Environmental Services Unit will be contacted. DECCW and the Heritage Branch of DoP will then be contacted for advice and their requirements will be adhered to.	Construction Demolition
Flora and Fauna		
FF1	EnergyAustralia will ensure vegetation removed from neighbouring properties is replaced with local native species, following consultation with the respective landowner(s). Any remaining vegetation will be avoided where possible.	Construction
Cumulative Impacts		
CI1	Should construction periods for surrounding proposed works coincide with the proposed substation, EnergyAustralia will liaise with North Sydney Council, surrounding landowners and project proponents regarding specific construction hours and periods of work.	Construction Demolition