

Health Infrastructure

**Westmead Redevelopment**

Town Planning Electrical Utilities  
Statement

E-REP-UTILITIES-1

Issue 2 | 12 July 2016

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 236464

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# Document Verification

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<b>Job title</b>		Westmead Redevelopment		<b>Job number</b>	
				236464	
<b>Document title</b>		Town Planning Electrical Utilities Statement		<b>File reference</b>	
<b>Document ref</b>		E-REP-UTILITIES-1			
<b>Revision</b>	<b>Date</b>	<b>Filename</b>	Town Planning - Utilities Statement.docx		
Draft 1	5 May 2016	<b>Description</b>	First draft		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Issue 1	20 Jun 2016	<b>Filename</b>	Town Planning - Utilities Statement Issue 1.docx		
		<b>Description</b>			
			Prepared by	Checked by	Approved by
		Name	EC	DM	DM
		Signature			
Issue 2	12 Jul 2016	<b>Filename</b>	Town Planning - Utilities Statement Issue 2.docx		
		<b>Description</b>			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		<b>Filename</b>			
		<b>Description</b>			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
<b>Issue Document Verification with Document</b> <input checked="" type="checkbox"/>					

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# 1 Introduction

Arup has been engaged by Health Infrastructure to prepare a Town Planning – Utilities Statement for the proposed construction forming of the new Westmead Redevelopment. Please refer to Figure 1 for an aerial view of the proposed new Westmead Redevelopment site (identified in red).

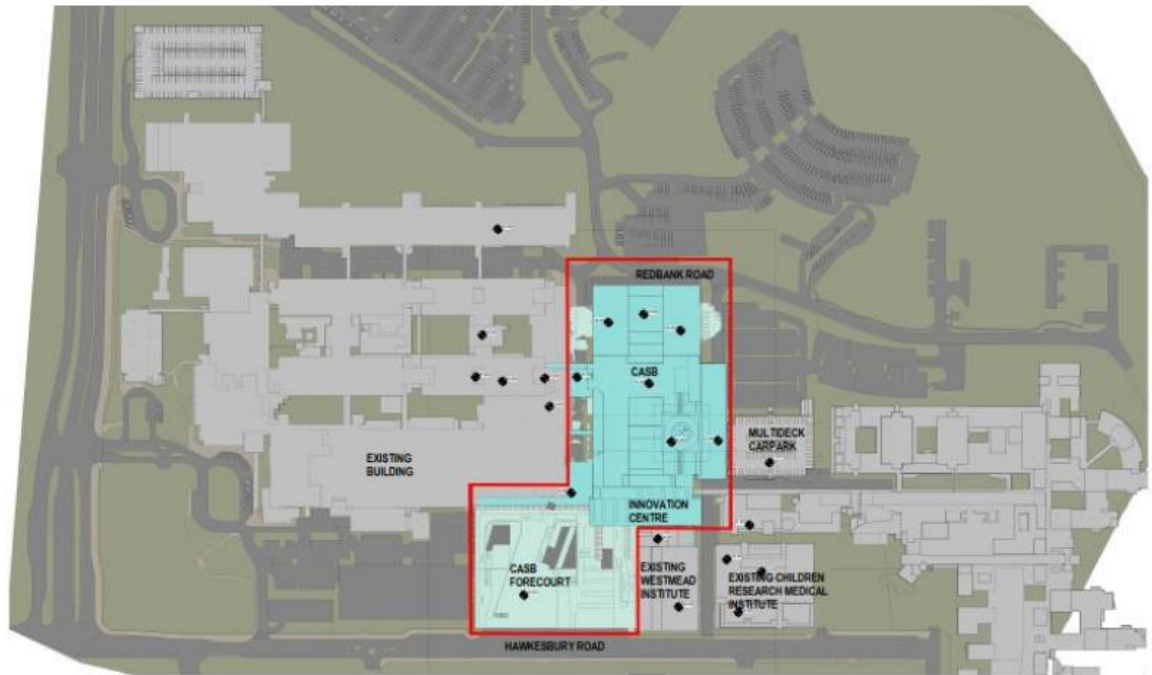


Figure 1 Aerial View of Development Site

The scope of proposed works includes:

## 1. Acute Services and Innovation Centre Building:

- Building heights indicatively ranging from 4 - 13 storeys
- Central Acute Services Building (CASB) comprising the following facilities/services:
  - Acute inpatient;
  - Emergency Department;
  - Paediatric Emergency Department;
  - Operating theatres;
  - Surgical wards;
  - Intensive care / high dependency unit;
  - Acute admissions;
  - Acute Medical Imaging;
  - Cardiac comprehensive care centre;

- Clinical support / pharmacy;
  - Central support areas;
  - Rooftop helipad.
2. **Innovation Centre comprising University of Sydney innovation hub and teaching and learning support incorporating conference suite, multi-function work zone, auditorium, and Westmead biobank repository facility;**
  3. Forecourt:
    - The forecourt will provide main entry to ASB and the Innovation Centre, emergency department drop off, and access to proposed car park;
    - Two separate set-down/pick-up loops with access to the Westmead Hospital main entry to the east and the CHW main entry to the west;
    - Undercroft car park accommodating approximately 200 spaces for use primarily by visitors. This would be accessed via the entry forecourt area from Hawkesbury Road.
  4. **Overhead pedestrian connections to other parts of hospital;**
  5. **Loading dock access via Redbank Road.**

## 2 SEARs Issues Addressed

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- Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.

## 3 Maximum Demand Calculation

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### 3.1 Existing

The existing campus maximum demand has been measured and recorded as 16.5MVA.

### 3.2 New

#### 3.2.1 CASB

The proposed load density has been developed using bench marked data from other hospitals. The table below shows how the proposed VA/m<sup>2</sup> for clinical spaces has be split between services:

Category	Rate (VA/m <sup>2</sup> )			Notes
Power	68			Larger than usual, based on highly clinical building function.
Lighting	12			Assuming high efficiency luminaires
Mechanical AHU	20			
Mechanical chiller	30			
Hydraulics	3			
Total ASB Load Density	133			

At the concept stage a conservative load estimate for the building can be made through the product of the load density, diversity and building area.

- Building wide diversity factor 0.8
- Building power factor 0.9
- Load densities per area:

Space	Power	Lighting	Ventilation	Cooling	Hydraulics
	(VA/m <sup>2</sup> )	(VA/m <sup>2</sup> )	(VA/m <sup>2</sup> )	(VA/m <sup>2</sup> )	(VA/m <sup>2</sup> )
T&E	5	12	20	30	3
Support or Staff Area	68	12	20	30	3
Plant (ss)	5	6	5	0	0
IPU	68	12	20	30	3
Consultation Space	68	12	20	30	3
Imaging	68	12	20	30	3
Operating Theatre	68	12	20	30	3
Education + Research	68	12	20	30	3
Emergency	68	12	20	30	3
Retail	68	12	20	30	3
Pharmacy	68	12	20	30	3
Future Build	68	12	20	30	3
CSSD	68	12	20	30	3
BOH	68	12	20	30	3
Security	68	12	20	30	3
OR Support Space	68	12	20	30	3

When the load densities and diversities are applied across the various areas result is a Maximum Demand of **4.8 MVA**.

### 3.2.2 Innovation Centre

Due to the flexible nature of the innovation centre a generic 100VA/m<sup>2</sup> has been used to determine the maximum demand.

Area 8800m<sup>2</sup>

Diversity 0.8

Maximum demand 700kVA

### 3.2.3 Forecourt

The forecourt will have limited power. The power component will comprise lighting and mechanical ventilation.

Lighting load density 2.5VA/m<sup>2</sup>

Underground area 20,000m<sup>2</sup>

Above ground area 10,000 m<sup>2</sup>

Lighting load 75kVA

Mechanical load 100kVA

Other loads 50kVA

Maximum demand 225kVA

## 4 Electrical Utility Connections

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### 4.1 Existing

The Westmead Hospital campus is fed from a single Endeavour Energy zone substation located in the North East corner of the campus adjacent to Redbank Road. Prior to the re-development, the site maximum demand was recorded as 16.5MVA

Following recent upgrades, the zone substation now comprises 2x35MVA new Endeavour Energy 33/11kV transformers of which 20MVA has been made available to Westmead Hospital.

The zone substation building is split into two parts including a Local Health District (LHD) owned section and an Endeavour Energy owned section. The zone substation has recently undergone an upgrade and now includes a new consumer mains and a new LHD 11kV switchboard that will be used to provide 11kV feeders to the new development.

The zone substation configuration (including recent upgrades) is shown indicatively below

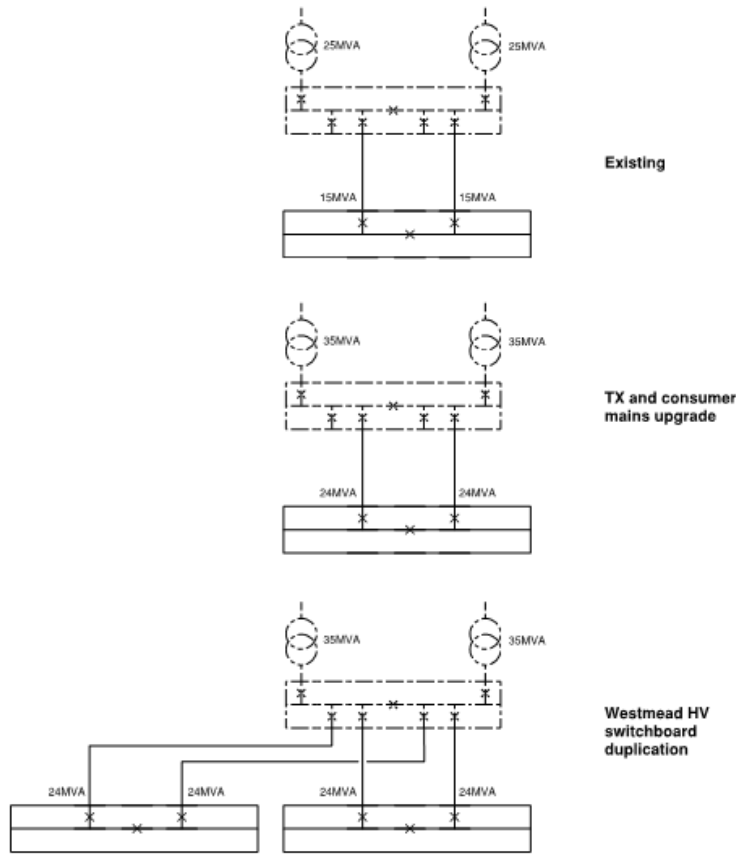


Figure 2 Zone Substation

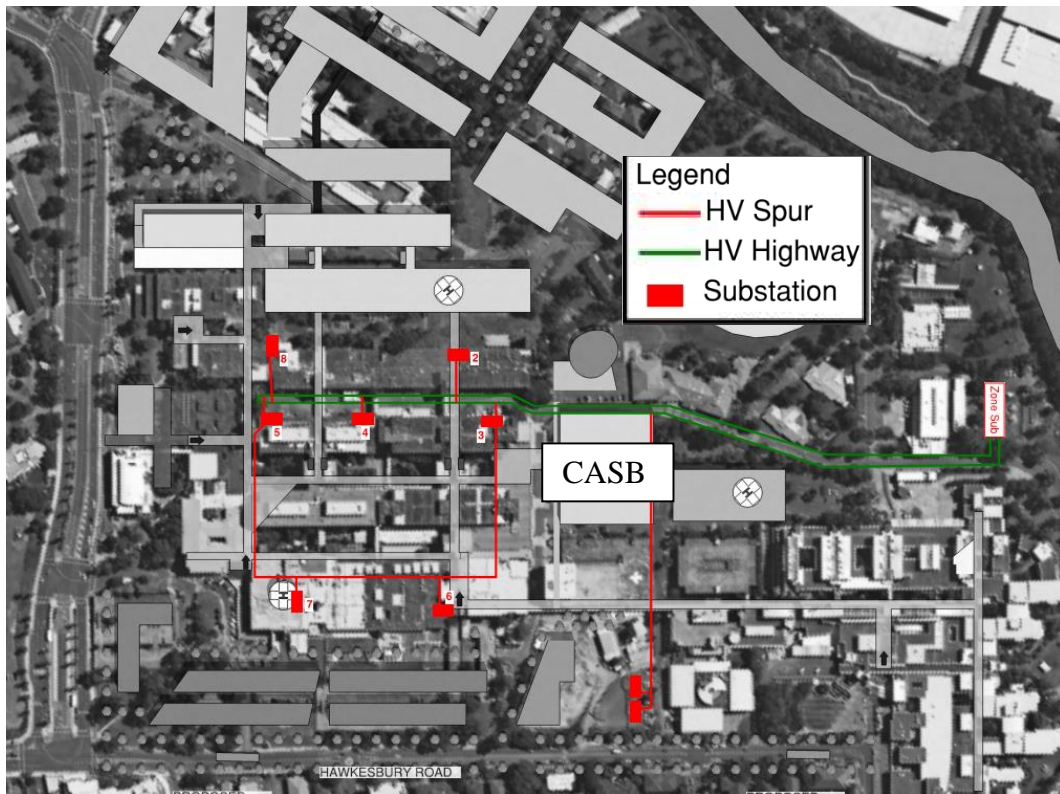


Figure 3 Existing HV Distribution Plan

As part of an early work project a new cross campus services trench is being provided to facilitate the future installation of HV cables without the need to disrupt Redbank Road. The service trench emanates from the zone substation, crosses the oval and then runs north south across the site as showed below.

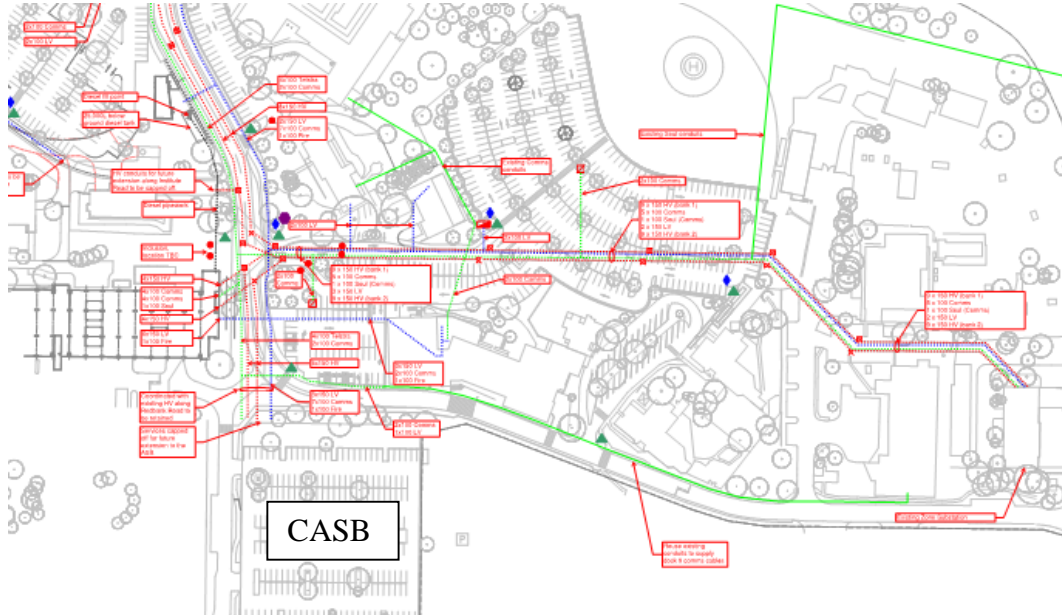


Figure 4 Cross Campus Service Trench

## 4.2 New

The new development will be provided with 11kV feeders from the zone substation via the cross campus services trench. These works were approved as part of the Stage 1 Early Works REF (not part of the SSD application).

### 4.2.1 Innovation Centre

The Innovation centre will include a new private 11kV/400V substation. These details will form part of the SSD application.

### 4.2.2 Forecourt

The Innovation Centre substation will be used to supply the forecourt via an LV supply from the Innovation Centre LV switchboard.

### 4.2.3 CASB

The CASB will include two private substation located on level 4.

## 5 Utility Consolation

As part of the HV switchboard upgrades, Stowe Australia have submitted an application for connection to Endeavour Energy. Endeavour Energy have responded and confirmed that 20MAV is now available to the site.