WOOD & GRIEVE ENGINEERS

Campbelltown Hospital
Acute Hospital Services Building
Information for Development Application

Electrical, ICT and Security Services

Prepared for
Health Infrastructure, NSW Health
Revision No. 01

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Revision

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1. Executive Summary

1. Integral Energy (Endeavour Energy) have advised that to supply the additional electrical load of the Acute Health Services (AHS) development a new high voltage underground feeder will be required from Campbelltown Zone Substation, located on the northern side of Narellan Road, to the hospital site main entrance off Therry Road or alternatively off Parkview Crescent. It will enter off Parkview Crescent.

2. Planning for the new building must ensure that suitable access is maintained for servicing and replacement of the Substation No 2 equipment, Main Switchboard No 2 and the generator and underground diesel tank in the West Block. If this access cannot be maintained the equipment will need to be relocated at major expense.

3. For the Acute Hospital Services Building, a new padmount substation near the Parkview Crescent property boundary.

4. A new main switchboard and standby generator will be provided in the Acute Hospital Services Building

5. Relocated underground cable routes have been based on the dedicated service routes indicated on the master plan.

6. Sustainability and energy saving initiatives should be implemented in the design.

7. Preliminary discussions have been held with SWSLHD ICT Department. It is acknowledged that future Hospitals will rely heavily on information technology and suitable IT Infrastructure must be provided to support this.

2. Introduction

2.1. General

Wood and Grieve Engineers have been engaged by Health Infrastructure, NSW Health to report on provide a report on the Electrical, Communications and Security Services for the Campbelltown AHS Development Application.

This report aims to identify the major project decisions which will affect the Electrical, Communications and Security services design for the project.

2.2. Outline of the Development

The development consists of a new 5-storey Building and adaptive reuse of some areas of existing Clinical Services Wing (West Block – Block A), the North Block (Block C) and Central Block (Block B).

2.3. This report has been based on the following:

- Services Drawings viewed on site for the various buildings
- Site visits carried out by Mark Mulholland.
- Architectural Drawings produced by BVN Architecture.
- Project Meetings.
- MCR Engineering Services user group meeting on 1st February 2011.
- SWSLHD ICT meeting on 21 April 2011.

2.4. Limitations of the Report

This report is based site visits carried out by WGE, drawings provided from site and information provided by BVN Architecture and the Hospital Facilities Managers. WGE have based our report on the assumption that the information provided can be taken at face value and in general terms accurately reflects the installation on site. WGE does not accept any liability in regard to the accuracy of the existing documentation.

WGE's site visits involved a walk around the site, and an overall visual inspection. As such, this report should be read with the limitation of such a in mind. Only items visible were considered and where buildings were not being effected as part of the new works the investigation of the building was cursory only.

The investigation did not include a complete examination of all buildings. We did not investigate any non-visible aspects of the installation and we did not physically verify the capacity of any installed systems.

3. Design Criteria

The Electrical Services will comply with but will not be limited to the following relevant codes and standards:

NSW Health Engineering Services and Sustainable Development Guidelines - TS11
Australian Health Facility Guidelines
Building Code of Australia: 2010
Australian Standards

1158	Lighting for roads and public spaces
1680	Interior lighting
1768	Lightning protection
1940	The storage and handling of flammable and combustible liquids
2293.1	Emergency evacuation lighting for buildings
2381.1 + 10	Electrical equipment for explosive gas atmospheres - Selection, installation and maintenance - General requirements
2430	Classification of hazardous areas
2500	Guide to safe use of electricity in patient care
2834	Computer Accommodation
3000	Electrical Installations (Wiring Rules)
3003	Electrical installations - Patient treatment areas of hospitals and medical, dental practices and dialyzing locations
3008.1.1	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV
3009	Electrical installations - Emergency power supplies in hospitals
3010	Electrical installations - Generating sets
3013	Electrical installations - Classification of fire and mechanical performance of wiring system elements
3100	Approval and test specification - General requirements for electrical equipment
3200.2.41	Medical electrical equipment - Particular requirements for safety - Surgical luminaires and luminaires for diagnosis
3439.1 + 2	Low-voltage switchgear and control gear assemblies
5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV

4. Existing Electrical Services Arrangement

4.1. Integral Energy Services to the site

Integral Energy are the local supply authority. The site is supplied from an Integral Energy underground feeder on the Appin Road boundary and a second underground feeder adjacent to the Therry Road entrance. These 11kV feeders are terminated at service protection devices rated at 11kV 630 A. Underground HV cables connect the service protection device adjacent to Appin Road to indoor substation No. 1 located on the Eastern side of North Block.

Another underground HV cable connects Substation No. 1 to Substation No. 2 which is located on the North Side of West Block. Substation No. 2 is connected to the disconnection device adjacent to the Therry Road Entrance. The site is therefore serviced by 2 different Integral Energy feeders which provides a good level of redundancy. The main supply is off the Appin Road feeder and the 'back up' supply is the Therry road feeder.

Substation No. 1 has two 1500 kVA transformers and spare space for a third transformer. Substation No. 2 has two 1000 kVA transformers and also has spare space for a third transformer.

Based on information provided by NSW Health the highest combined monthly kVA maximum demand for both substations in 2009/ 2010 was 2337 kVA in December 2009. The separate maximum demand of each Substation was not available.

Campbelltown Hospital is an 11 kV customer and all assets downstream of the service protection devices are owned by NSW Health.

4.2. Voice and Data Incoming Services

The site is serviced by Telstra, Optus and Aarnet lead-in cables from the Appin Road boundary and Therry Road. The MDF/ PABX room is located in the Central Block.

4.3. Site Main Switchboards

Substation No. 1 supplies Site Main Switchboard No. 1 and Substation No. 2 Supplies Site Main Switchboard No. 2. Both switchboards are in good condition.

4.4. Power Factor Correction

Power factor correction is provided for both main switchboards.

4.5. Standby Generators

Main switchboard No. 1 is served by an Onan/Cummins standby generator rated at 1000 kVA (standby) and has a 5,000 litre underground diesel tank. Maintenance staff advised that the maximum demand of this standby supply is in the order of 500 amps per phase.

Main switchboard No. 2 is served by an Onan/Cummins standby generator rated at 576 kVA (standby) and has a 10,000 litre underground diesel tank. Maintenance staff advised that the maximum demand of this standby supply is in the order of 300 amps per phase.

Both generators are in good condition.

4.6. Submain Distribution

Main switchboard No. 2 distributes power to the West Block, Cancer Therapy and the Education Centre. Main switchboard No. 1 supplies the remainder of the site.

4.7. Distribution Boards

Apart from some refurbished areas of the Central and North Blocks generally the distribution boards in these areas are old and nearing their end of service. Distribution boards in the West Block are in good condition.

4.8. General Lighting

Apart from some refurbished areas of the Central and North Blocks generally the Central and North Blocks generally the light fittings in these areas are old and lamps and control gear old technology. Light fittings in the West Block are in good condition.

4.9. General Power

In the Central Block the power provisions at each bed do not comply with current standards. The outlet provision in the North and West Blocks appeared to be compliant.

4.10. Exit and Emergency Lighting

The Stanilite "Nexus" computer monitored system is currently used in the major blocks.

4.11. Nurse Call System

The Adtek nurse call system in the Central and North Blocks is past its use by date. The Questek system in the West Block is in good order.

4.12. Electronic Security, Access Control, CCTV Surveillance, Duress Alarm and Building Management

The electronic security, access control, CCTV surveillance, duress alarm and building management systems utilise a combination of equipment as listed below. The system appears to be operating satisfactorily.

System	Location	Company	Notes
Duress System	Central Block, North Block, West Block	Environmental Automation	This system is a stationary Duress Button System
Environmental controls	Central Block, North Block, West Block Cancer Therapy Burungi Gna ka lun	Environmental Automation	Systems • Air conditioning control & alarms • Lighting Control • Boiler Controls & alarms • AC Chillers • All System Alarms to pager system • Etc
Access control Environmental Automation Sentry system	Central Block, North Block, West Block, Cancer Therapy	Environmental Automation	This Sentry security system monitors logs programs all Electronic locks within the area All access doors, Magnetic locks, Card swipe system, Drop bolt lock, Fire Trip control.
Alarms Pathology / pharmacy & Mortuary Fridge	West Block, Central Block, Cancer Therapy	Environmental Automation	All of these Fridge & cool room are monitored & Logged by the Building Management system. The system Alarms are forwarded to the Paging system
Emergency Dept Personnel Duress System	West Block Emergency Dept	AIC Solutions Pty ltd	This system is a Personal duress alarm used within Emergency Dept confines.
Access control Insight System	Central Block Basement Clinic Burungi Gna ka lun Waratah house	RPA Engineering Insight system	Stand alone Access control system
Duress System Mental Health	Burungi Gna ka lun Waratah house & the PEC Unit	Integrated Wireless	Personal duress system for the Mental health Unit.
Environmental controls	Waratah house	Siemens	Systems • Air conditioning control & alarms

4.13. Structured Cabling System

Generally the structured cabling ranges from UTP CAT 3 to CAT 5 and will not support the latest technology.

4.14. PABX

The existing PABX is a NEC 7400 IMX 260. It is in good condition and has capacity for future expansion.

4.15. Lightning Protection

A conventional lightning protection system is installed on the roofs of the higher buildings.

5. Proposed Electrical Services Arrangement to Accommodate the AHS Redevelopment

The proposed electrical services arrangement to accommodate the Acute Health Services Building is as follows:

5.1. New Substation

A new padmount substation located near the new AHS Building and the Parkside Crescent property boundary, will be provided within the Campbelltown Hospital site. The new substation will be supplied by the new high voltage switch. The substation will provide a new low voltage supply to the AHS Building.

5.2. Main Switchboard

A new main switchboard will be provided in the new building.

The existing main switchboards will service the existing load and the refurbished areas. Suitable access will need to be maintained to the existing Main Switchboard for servicing and replacement of equipment.

5.3. Standby Generator

A new standby diesel generator will be provided for the new building. In accordance with TS 11 the standby generator will be sized to supply a maximum 30% of the total normal mains supply demand requirement and the fuel storage capacity will be based on 12 hour full load capacity. The generator and associated above ground diesel tank will be located in the new building.

The new building planning should take into account the need to maintain access to the existing West Block generator and tank for servicing, maintenance and refuelling.

5.4. Submain Distribution

Numerous Electrical Services will need to be run between the new building and the West Block (Block A). It is proposed that a Services Corridor be provided to link these two buildings. Such a Service Corridor would need to be fully accessible and would accommodate Electrical, Mechanical and Hydraulic services.

5.5. Distribution Boards

Existing distribution boards in the North and Central Blocks will be replaced in refurbished areas. Existing distribution boards in refurbished areas of the West Block will be retained.

5.6. General Lighting

Refurbished and new areas will be provided with new energy efficient light fittings.

5.7. Nurse Call System

The existing nurse call system in the West Block will be retained in the refurbished areas. The new building will be provided with a Questek system to match the existing system in the West Block.

5.8. Electronic Security

The existing Environmental Automation TCT system will be extended to cover the new Acute Health Services Building.
The existing Security Office will be extended.

5.9. Information and Communication Technology

It appears that the existing lead in service provider provisions will have sufficient capacity for this development.

A meeting was held with SWSLHD ICT Department (Nick van Domburg and George Thomas) to discuss the ICT services for the development and the following main points relevant to the AHSB were discussed.

- WGE advised that existing service provider lead in services would need to be relocated clear of the new Mental Health Services Building.
- SWSLHD ICT advised that initiatives are underway to replace legacy PABX systems, such as that presently in operation at Campbelltown Hospital, with VOIP systems. This would be separately funded and the programme for replacement is not yet known.

- SWSLHD ICT will advise on the PABX/VOIP provisions to be made in the new developments.
- SWSLHD ICT requires details of the proposed increase in full time employee numbers.
- WGE advised that the following Communications Room provisions have been made:
  Acute Hospital Services Building:
  Main Communications Room – 4m wide x 5m deep
  Floor distributor on each floor – 3m wide x 4m deep.
  Mental Health Services Building:
  Main Communications Room at Level 02 – 3m wide x 4m deep
  2 off floor distributors at level 03 – 3m wide x 3m deep
  It was agreed in principal that this was in order.
- SWSLHD ICT requested that Comms Rooms be provided with antistatic floor covering and non-dust creating wall and ceiling finishes.
- Open type racks are to be used in the Communications Rooms for housing equipment and patch panels, with good horizontal and vertical cable management provisions.
- SWSLHD ICT to provide WGE with outlet labelling standard arrangement to be used for the development.
- Comms Room layouts to be provided to SWSLHD for approval particularly as they will be shared with Nurse Call, Security, CCTV, MATV etc.
- SWSLHD will provide budget costs for active hardware requirements in the PABX Room, main Communications Rooms and floor distributors including wireless access panels and equipment. (Will require full time employee numbers for this)
- SWSLHD ICT advised the need to have each building connected by redundant fibre links back to the main PABX Room
- Wireless access is to be provided throughout the buildings.
- A central UPS is to be provided for each building with 30 minute minimum backup. UPS in builders scope of work.
- Each rack to be provided with a UPS supply and a non UPS supply. (Both generator backed up).
- Communications Rooms to be provided with 24/7 air conditioning.
- UPS and Communications Room temperature to be monitored by BMS system.
- IT cabling, outlets, patch panels, patch chords etc to provide an end to end solution with minimum 20 year guarantee.

The cabling and outlet provisions will be designed to support the following facilities:

- a networked data systems,
- a single service carrier, integrating all modes of data and voice communications;
- client and customer hub concepts, eliminating local solutions that cannot be shared across the broader organisation;
- systems integrated linking health facilities within Macarthur including hospitals, community health centres, GP and consultant surgeries etc;
- advances in IT including wireless systems, electronic prescribing and electronic medical records; and
- reticulated through a comprehensive, integrated cabling system capable of broad band transmission.

5.10. Lightning Protection

It is proposed that the existing conventional lightning protection system be extended to cover the new building.

6. Sustainability & Energy Saving Initiatives

The key sustainability objectives are:

- Comfortable and healthy indoor environment.
- Minimise non-renewable resource consumption.
- Cost-effectiveness over whole life span.

Minimisation of electrical consumption by ensuring that the design:

- Utilises energy efficient lamps, luminaires and associated control gear.
- Consider lamp life and maintenance requirements when selecting light fittings.
- Optimise use of natural lighting during daylight hours.
- Provide individual light switching for individual spaces and master switches for each functional area.
- Provide automatic lighting control including:
  - Building management system controls
  - Photoelectric controls
  - Time switches
  - Movement detectors
- Use of sub metering for substantive energy uses within the building (Greater than 100kVA.)