



Charles Sturt  
University

Revision 1.0

# Infrastructure Design Standards

## Module S05: Electrical and Lighting

Division of Finance (Facilities Management)  
Charles Sturt University

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# 1. Introduction

## 1.1. Overview

The Charles Sturt University Infrastructure Design Standards (the Standards) outline the University's expectations for its built forms to achieve consistency in the quality of the design and construction of those built forms.

The Standards have been developed to provide guidance to the design team and to assist Facilities Management to drive a consistent approach to the design, construction, commissioning, handover, and operation of new capital projects to ensure the new asset is fully integrated into campus life and conforms to the University's standards and policies.

The successful integration of any new project into the day-to-day operation of campus life cannot be underestimated and is vital to ensuring the new asset provides a fully functional platform for Facilities Management clients and the University. The Standards will ensure Facilities Management is successful in supporting the University's strategic objectives now and into the future. The pitfall of viewing any new project as a standalone entity must be avoided as any new project is an extension of the existing campus.

The Standards are aligned with Charles Sturt's requisites for aesthetic appeal, life cycle maintenance and environmental sustainability, while ensuring that there is sufficient scope for innovation and technological advancements to be explored within each project.

## 1.2. The University

The history of Charles Sturt University dates to 1895, with the establishment of the Bathurst Experiment Farm. Formed progressively through the merge of regional institutions in south-western and western NSW, Charles Sturt was formally incorporated on 19 July 1989 under the Charles Sturt University Act 1989. As one of Australia's newer universities, Charles Sturt has been built on a tradition of excellence in teaching and research spanning more than 100 years.

With over 40,000 current students studying both on-campus and online, Charles Sturt University is the largest tertiary education institution in regional Australia. The University operates six main campuses across New South Wales in Albury-Wodonga, Bathurst, Dubbo, Orange, Port Macquarie, and Wagga Wagga, alongside specialist campuses in Canberra, Parramatta, and Goulburn. Charles Sturt University is structured around three Faculties: Arts and Education; Business, Justice and Behavioural Sciences; and Science and Health.

## 1.3. University Vision and Values

Charles Sturt University is committed to building skills and knowledge in its regions by offering choice and flexibility to students, while collaborating closely with industries and communities in teaching, research, and engagement. As a significant regional export industry, the University brings both strength and learning back to

its regions, positioning itself as a market-oriented institution. Its goals are to remain the dominant provider of higher education in its regions and a sector leader in flexible learning.

Charles Sturt University believes that wisdom has the power to transform communities. With perseverance and dedication, the University contributes to shaping resilient and sustainable regions for the future. Acknowledging the deep culture and insight of First Nations Australians, the University's ethos is encapsulated by the Wiradjuri phrase *yindyamarra winhanganha*, which translates to "the wisdom of respectfully knowing how to live well in a world worth living in." Through its values, Charles Sturt University fosters a welcoming community and learning environment that supports innovation, drives societal advancement, and gives back to the regions it serves.

#### 1.4. Using the Infrastructure Design Standards

The Infrastructure Design Standards are written to advise Charles Sturt University performance requirements and expectations that exist above and beyond existing industry codes and standards.

The Infrastructure Design Standards do not repeat codes and standards.

Performance to Codes and Standards are a non-negotiable regulatory minimum of any design solution, to be determined for each project by the design team.

The Standards are to be used by all parties who are engaged in the planning, design, and construction of Charles Sturt's facilities. This includes external consultants and contractors, Charles Sturt's planners, designers, and project managers as well as faculty and office staff who may be involved in the planning, design, maintenance, or refurbishment of facilities. All projects must comply with all relevant Australian Standards, NCC, EEO as well as Local Government and Crown Land Legislation.

#### 1.5. Modules

The Standards are divided into the following modules for ease of use, but must be considered in its entirety, regardless of specific discipline or responsibilities:

- S01 Overview and Universal Requirements
- S02 Active Transport
- S03 Acoustics
- S04 Building Management System
- **S05 Electrical and Lighting**
- S06 Energy Management
- S07 Ergonomics
- S08 Fire and Safety Systems
- S09 Floor and Window Coverings
- S10 Furniture
- S11 Heritage and Culture
- S12 Hydraulic

- S13 Information Technology
- S14 Irrigation
- S15 Mechanical Services
- S16 Roof Access
- S17 Termite Protection, Vermin Proofing and Pest Management
- S18 Security Systems
- S19 Signage
- S20 Sustainable Building Guidelines
- S21 Waste Management
- S22 Project Digital Asset and Data Requirements
- S23 Commissioning, Handover and Training

## 1.6. Related Documents

### 1.6.1. University Documents

The Standards are to be read in conjunction with the following relevant University documents, including but not limited to:

- Facilities and Premises Policy along with supporting procedures and guidelines
- Charles Sturt University Accessibility Action Plan 2020 - 2023
- Relevant operational and maintenance manuals
- Charles Sturt University Asbestos Management Plan
- Charles Sturt University Signage Guidelines
- Charles Sturt University Modern Slavery Statement
- Charles Sturt University Sustainability Statement
- Charles Sturt University Work Health and Safety Policy
- Charles Sturt University Risk Management Policy
- Charles Sturt University Resilience Policy
- Charles Sturt University Health, Safety and Wellbeing Policy

### 1.6.2. Federal Legislation

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- National Construction Code (NCC)
- Disability Discrimination Act 1992 (DDA)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC)
- Work Health and Safety Act 2011

### **1.6.3. NSW State Legislation**

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- Work Health and Safety Act 2011
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Building and Development Certifiers Act 2018
- Heritage Act 1977
- Protection of the Environment Operations Act 1997 (POEO Act)
- Design and Building Practitioners Act 2020
- State Environmental Planning Policies (SEPPs)
- Local Government Act 1993

### **1.6.4. Federal Regulations and Standards**

- Relevant Australian or Australian/New Zealand Standards (AS/NZS)
- Safe Work Australia Model Codes of Practice
- Work Health and Safety Regulations 2011
- Disability (Access to Premises – Buildings) Standards 2010
- National Environment Protection Measures (NEPMs)

### **1.6.5. NSW State Regulations and Standards**

- SafeWork NSW Codes of Practice
- Disability (Access to Premises – Buildings) Standards 2010
- Building and Development Certifiers Regulation 2020
- NSW Work Health and Safety Regulation 2017
- Protection of the Environment Operations (General) Regulation 2022
- NSW State Environmental Planning Policies (SEPPs)
- Fire and Rescue NSW Fire Safety Guidelines
- NSW Local Council Development Control Plans (DCPs)

### **1.6.6. Manufacturer Specifications and Data Sheets**

All installation must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as not to invalidate any warranties.

### **1.6.7. Project-Specific Documents**

Requirements specific to a particular project, campus, or other variable, will be covered by project specific documentation, such as client briefs, specifications, and drawings. These Standards will supplement any such

project specific documentation. The Standards do not take precedence over any contract document, although they will typically be cross-referenced in such documentation.

Extracts from the Standards may be incorporated in specifications; however, it must remain the consultant's and contractor's responsibility to fully investigate the needs of the University and produce designs and documents that are entirely 'fit for purpose' and which meet the 'intent' of the project brief.

### 1.7. Discrepancies

The Standards outline the University's generic requirements above and beyond the above-mentioned legislation. Where the Standards outline a higher standard than within the relevant legislation, the Standards will take precedence. If any discrepancies are found between any relevant legislation, the Standards and project specific documentation, these discrepancies should be highlighted in writing to the Manager, Capital Works.

### 1.8. Departures

The intent of the Standards is to achieve consistency in the quality of the design and construction of the University's built forms. However, consultants and contractors are expected to propose 'best practice / state of the art' construction techniques, and introduce technological changes that support pragmatic, innovative design. In recognition of this, any departures from relevant legislation, or the Standards, if allowed, must be confirmed in writing by the Manager, Capital Works. Any departures made without such written confirmation shall be rectified at no cost to the University.

### 1.9. Professional Services

All projects at Charles Sturt University require the involvement of adequately skilled and experienced professionals to interpret and implement the Standards. Consultants or contractors lacking proper qualifications and licenses are not permitted to conduct any work.

### 1.10. Structure of Document

This document is structured into 4 sections:

**Section 1** Introduction (this Section).

**Section 2** General Requirements – outlines the general requirements or design philosophies adopted at Charles Sturt University.

**Section 3** Supporting Documentation – Legislation, Standards, Codes of Practice, University Policies, and other applicable technical references.

**Section 4** Specifications (if applicable) – materials specifications and/or preferred lists for materials, processes or equipment used by Charles Sturt University.



## 2. General Requirements

### 2.1. High Voltage Network (Bathurst and Wagga Wagga Campuses Only)

The University owns and has total responsibility for the High Voltage (HV) networks on the Bathurst and Wagga Wagga Campuses. Essential Energy has instructed the University that is required to manage its network and as such any contractor required to work on or connect to the University HV Network shall do so in accordance with the relevant campus procedures using the authorised HV Switching Contractor.

This is a large and complex system, to assist us we have engaged a power engineer to survey our network and update schematics. All proposed works involving the HV network must directed to the Bathurst and Wagga Wagga Campus Facility Managers who will facilitate referral to appropriate electrical engineer.

### 2.2. Lighting

Each campus has preferred lighting system. Project Officers shall discuss standards with local Campus Facilities Managers as part of specification building for projects.

### 2.3. Residual Current Devices

Residual Current Devices (RCD) are to be fitted to all electrical circuits as required by the relevant Australian Standards and Codes. As part of capacity planning, a review of the electrical circuits is to be performed before any refurbishments commence on a building, or section of a building, and RCDs are to be added where required as part of the refurbishment project.

### 2.4. Metering

The University has preferred metering control logic and associated systems. Please refer to Module S06: Energy Management for details.

### 2.5. Electrical and Data Outlet Positioning

The University requires that all general office fit out includes either integrated data & power outlets incorporated into the desk or tables or wall mounted boxes above desk height for ease of access to power isolation switches. This is an energy savings initiative, so devices are not left on standby mode. Please refer to Module S13: Information Technology for details relating to data and networking. Adequate allowance shall be made in design for general power outlets throughout the building for the easy connection of cleaning equipment, such as vacuum cleaners, polishers, etc.

## 2.6. Occupancy Sensors

The design will require the inclusion of an integrated occupancy sensor. Dali ...please specify only the best quality motion & micro-phonic sensors for the control of any equipment, lighting, exhaust, air conditioning, etc. Adequate instruction on the setting of delay times for room usage types shall also be provided.

## 2.7. Timeclocks

Where required, digital timeclocks shall be from the Hager EG-range which support programming via programming key and associated software.

## 2.8. Certification of Work

A Compliance Certificate or CCEW refers to the Certificate of Compliance Electrical Work. This replaces the previously used Notice of Electrical Work (NOEW).

The Compliance Certificate is a uniquely numbered form that an electrical contractor should complete every time an addition, alteration, disconnection, reconnection, or replacement of an electrical installation. This includes putting in new power points, new electrical fittings, or work on the electrical switchboard.

## 2.9. Electro Magnetic Compatibility (EMC), Electro Magnetic Interference (EMI)

The University relies on various wireless and hard-wired technologies for teaching, learning, management systems, and critical communications, as well as sensitive scientific instruments in its research facilities, all of which are susceptible to interference from uncontrolled electromagnetic signals. To ensure operational integrity, all installed plant, equipment, utilities, and electrical systems must comply with the Australian Communications and Media Authority (ACMA) guidelines for electromagnetic compatibility (EMC).

### 2.9.1. Electromagnetic compatibility, compliance, and labelling

All plant, equipment, utilities, monitoring, metering, control, and electrical/electronic systems installed at Charles Sturt University premises must prevent electromagnetic interference (EMI) that could adversely affect any existing or new systems or equipment. This includes equipment owned by external bodies. All installations must adhere to the Australian Communications and Media Authority (ACMA) guidelines for EMI across the electromagnetic spectrum. Contractors are responsible for ensuring EMI management in line with current ACMA guidelines. If equipment is likely to cause disruptive EMI, such as cross-talk or data losses, it must be installed with appropriate shielding (e.g., EMI-shielded enclosures, conduits, and cables) to meet the ACMA standards, achieving a minimum of 80dB attenuation. Shielded enclosures, conduits, and cables should be selected based on industry-recognised suppliers.

# 3. Supporting Documentation

## 3.1. Supporting Legislation

- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2017 (NSW)
- Work Health and Safety Act 2011(ACT)
- Work Health and Safety Regulation 2011(ACT)
- Electricity Safety Act 1945 (NSW)
- Electricity Safety Act 1971 (ACT)
- Electricity Supply Act 1995 (NSW)
- Gas and Electricity (Consumer Safety) Act 2017
- Electricity (Consumer Safety) Regulation 2015
- Radiocommunications Act 1992
- Telecommunications Act 1997
- Local Government Local Environmental Plans (LEP)

## 3.2. Supporting Standards

Standard Number	Standard Title
AS/NZS 1158	Lighting for roads and public spaces
AS/NZS 1680.4:2017	Interior and workplace lighting, Part 4: Maintenance of electric lighting systems
AS 1768:2021	Lightning protection
AS/NZS 2053	Conduits and fittings for electrical installations
AS/NZS 2293.1:2018	Emergency lighting and exit signs for buildings, Part 1: System design, installation and operation
AS/NZS 2293.2:2019	Emergency lighting and exit signs for buildings, Part 2: Routine service and maintenance
AS/NZS 2293.3:2018	Emergency lighting and exit signs for buildings, Part 3: Emergency luminaires and exit signs
AS 2676.1:2020	Installation, maintenance, testing and replacement of secondary batteries in buildings, Part 1: Vented cells
AS 2676.2:2020	Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings, Part 2: Sealed cells
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.1:2017	Electrical installations - Selection of cables, Part 1.1: Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions
AS/NZS 3012:2010	Electrical installations - Construction and demolition sites
AS/NZS 3013:2005	Electrical installations - Classification of the fire and mechanical performance of wiring system elements
AS/NZS 3010:2017	Electrical Installations - Generating Sets
AS 3011.1:2019	Electrical installations - Secondary batteries installed in buildings, Part 1: Vented cells

Standard Number	Standard Title
AS 3011.2:2019	Electrical installations - Secondary batteries installed in buildings, Part 2: Sealed cells
AS/NZS 3013:2005	Electrical installations - Classification of the fire and mechanical performance of wiring system elements
AS/NZS 3014:2003	Electrical installations - Electric fences
AS/NZS 3017:2022	Electrical installations - Verification by inspection and testing
AS/NZS 3019:2022	Electrical installations - Periodic assessment
AS/NZS 3080:2013	Information technology - Generic cabling for customer premises (ISO/IEC 11801:2011, MOD)
AS/NZS 3084:2017	Telecommunications installations - Telecommunications pathways and spaces for commercial buildings
AS/NZS 3100:2022	Approval and test specification - General requirements for electrical equipment
AS/NZS 3760:2022	In-service safety inspection and testing of electrical equipment and RCDs
AS/NZS 3820:2020	Essential safety requirements for electrical equipment
AS/NZS 3947.3:2001	Low-voltage switchgear and controlgear, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
AS 3996:2019	Access covers and grates
AS/NZS 4777.1:2016	Grid connection of energy systems via inverters, Part 1: Installation requirements
AS/NZS 4777.2:2020	Grid connection of energy systems via inverters, Part 2: Inverter requirements
AS/NZS 4836:2023	Safe working on or near low-voltage and extra-low voltage electrical installations and equipment
AS/NZS 5033:2021	Installation and safety requirements for photovoltaic (PV) arrays
IEC 62052-11:2020	Electricity metering equipment - General requirements, tests and test conditions - Part 11: Metering equipment
IEEE 1789-2015	IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers

### 3.3. Industry Codes of Practice

NSW Government Code of Practice Managing Electrical Risks in the Workplace (2019)

[https://www.safework.nsw.gov.au/\\_data/assets/pdf\\_file/0010/50230/Managing-electrical-risks-in-the-workplace-COP.pdf](https://www.safework.nsw.gov.au/_data/assets/pdf_file/0010/50230/Managing-electrical-risks-in-the-workplace-COP.pdf)

NSW Fair Trading Electrical Compliance Requirements

<https://www.fairtrading.nsw.gov.au/trades-and-businesses/construction-and-trade-essentials/electricians/electrical-compliance-requirements>

Service and Installation Rules of New South Wales (2018)

[https://www.energy.nsw.gov.au/sites/default/files/2022-08/2018\\_07\\_NSW\\_ServiceAndInstallationRulesOfNSW\\_underlined.pdf](https://www.energy.nsw.gov.au/sites/default/files/2022-08/2018_07_NSW_ServiceAndInstallationRulesOfNSW_underlined.pdf)

SafeWork NSW Electrical practices - construction and demolition sites

<https://www.safework.nsw.gov.au/resource-library/construction/electrical-services/electrical-practices-construction-and-demolition-sites-fact-sheet>

Safe Work Australia Model Code of Practice: Managing electrical risks in the workplace

<https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-electrical-risks-workplace>

SafeWork NSW Electrical risks at the workplace

<https://www.safework.nsw.gov.au/resource-library/construction/electrical-services/electrical-risks-at-the-workplace-fact-sheet>

SafeWork NSW Electrical inspection and testing

<https://www.safework.nsw.gov.au/hazards-a-z/electrical-and-power/electrical-inspection-and-testing>

SafeWork NSW Residual current devices

<https://www.safework.nsw.gov.au/hazards-a-z/electrical-and-power/residual-current-devices>

Clean Energy Council of Australia Standards

<https://www.cleanenergycouncil.org.au/industry/installers/compliance-toolkit/standards>

Australian Communications and Media Authority Technical Standards

<https://www.acma.gov.au/technical-standards>

### **3.4. University Documents**

Charles Sturt University Facilities and Premises Policy

<https://policy.csu.edu.au/document/view-current.php?id=465>

### **3.5. Other Resources**

Safe Work Australia Managing Risks

<https://www.safeworkaustralia.gov.au/safety-topic/hazards/electrical-safety/managing-risks>

SafeWork NSW Electrical Safety in Construction Inspection Checklist

[https://www.safework.nsw.gov.au/\\_data/assets/pdf\\_file/0019/1112239/electrical-safety-in-construction-inspection-checklist.pdf](https://www.safework.nsw.gov.au/_data/assets/pdf_file/0019/1112239/electrical-safety-in-construction-inspection-checklist.pdf)

SafeWork NSW Solar Installers Checklist

[https://www.safework.nsw.gov.au/\\_data/assets/pdf\\_file/0008/965888/Solar-installers-safety-checklist.pdf](https://www.safework.nsw.gov.au/_data/assets/pdf_file/0008/965888/Solar-installers-safety-checklist.pdf)

SafeWork NSW De-energised electrical equipment

<https://www.safework.nsw.gov.au/hazards-a-z/electrical-and-power/de-energised-electrical-equipment>

Australian Communications and Media Authority Australian Radiofrequency Spectrum Plan 2021

[https://www.acma.gov.au/sites/default/files/2021-07/Australian%20Radiofrequency%20Spectrum%20Plan%202021\\_Including%20general%20information.pdf](https://www.acma.gov.au/sites/default/files/2021-07/Australian%20Radiofrequency%20Spectrum%20Plan%202021_Including%20general%20information.pdf)

Dial Before You Dig

<https://www.byda.com.au/>

Look Up and Live

<https://www.essentialenergy.com.au/safety/look-up-and-live>