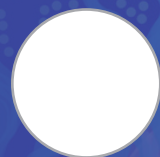


STEENSEN VARMING

Business Critical and Resilient Infrastructure

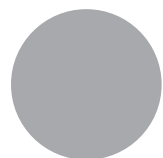


Acknowledgment of Country

Steensen Varming acknowledges that we create, learn and walk on unceded Aboriginal land.

We pay our deep respects and enduring gratitude to the Gadigal, Dharug, Tharawal, Wiradjuri, Ngunnawal and Ngambri peoples, on whose Country we learn and work, acknowledging Elders past and present, as knowledge holders and enduring carers of Country.

Steensen Varming extends this respect to all Traditional Custodians throughout Australia and the world acknowledging the vital importance of their culture, language and lore in keeping the land, waters, seas and community strong. We walk together humbly, acknowledging care and respect should always be present.



About Us

Firm Foundations

We strive for technical perfection. We are driven to enable the best building design where functionality and wellbeing are paramount. We demand at least as much from ourselves as our clients and collaborators have come to expect.

We grew up with the Danish design approach to refinement and longevity in our formative years. Since our foundation, in 1933, we have attracted and employed gifted people with a shared ethos and commitment to optimal design solutions.

We focus on offering a portfolio of specialist services and high levels of expertise, deliberately maintaining a scale of operation that does not outgrow our talent pool. We continue to innovate to meet and exceed the needs of the most challenging projects, to consistently deliver positive outcomes.

Enabling Architecture

Working in close cooperation with architects, engineers, scientists and designers, we have developed the knowledge to seamlessly assimilate form and function, art and technology. We are practitioners in mechanical and electrical engineering, lighting and sustainable design that enhance spatial design.

In addition to the Vitruvian principles of solidity, utility and beauty, we have put in place our own guiding triad to produce intelligent, valuable and elegant solutions. Our integrated design innovations are often examples of quiet achievement with a profound effect on the success of a project, creating exceptional environments from combinations of active and passive measures - the efficient, seamless operation merges elegantly into the whole, we achieve total architecture.

Thinking Without Borders

Steensen Varming was founded by Niels Steensen and Jørgen Varming in Copenhagen - but the seeds of a global outlook were already sown when Jørgen and his architect father before him, studied in the U.K.

Not long after the war ended, the Dublin office opened followed by London was preceded by prestigious commissions with competition-winning architects. The Sydney Opera House commission with Jørn Utzon continued this pattern and the Sydney practice opened in 1973. Hong Kong and New York followed in our eightieth year.

We remain inspired by our Danish heritage while working with visionary architects and clients, wherever their location. Being global means more than expansion or having a physical presence in different countries - it is a way of thinking.





Mechanical Engineering

Mechanical engineering design is more than componentry, it is the knowledge of the fundamental principles of physics and the ability to apply these imaginatively. It is essential to the success of the internal environment of a building and its people.

Through active and passive means, we put as much into the design of our invisible plant rooms as we do the visible components of our integrated systems.

Technological advancement and statutory development make it critical to stay ahead, to use the best, or the next, available means. Sound engineering involves buildability, space, operation, aesthetics, acoustics, capital and recurring cost, energy efficiency and environmental quality. We consider the holistic requirements and priorities, applying mechanical engineering solutions that create comfortable buildings.

Sustainable Design

Sustainable design focuses on creating comfortable environments without increasing environmental deficit. It is a way of thinking that embraces simple, appropriate solutions to complex problems. It is about efficient design, specifying systems that complement one another, using less material in the right place, and utilising the waste of one process to fuel another.

Our expertise spans design and engineering with our integrated solutions supported by a long tradition of in-house collaboration across all building services.

We participate in creative dialogue in concept stages and have the technical acuity to support our work with prudent analysis throughout design development. Continuous exchange within the design team yields integrated solutions, both active and passive, that are fit for purpose, low maintenance and low energy.

Lighting Design

Light is a fundamental part of life and a powerful means of communication. We intuitively perceive and experience our world through light. It influences our wellbeing, it reaches our emotions, it inspires us. Our passion for light comes from the understanding of its deep connection to being. To realise and share a vision in any context, whether in landscape, in the built environment or in art, the role of light is essential.

Our lighting design philosophy is driven by creativity and collaboration, and backed by experience and learning. We are actively involved in the industry and research, expanding our knowledge, teaching, speaking and participating. Our progressive and dynamic methodology is constantly evolving, enabling progressive design solutions across a wide spectrum of lighting services.



Electrical Engineering

Modern society could not exist without the control and distribution of electrical power and communications. Electrical services are its arteries and veins - critical to the smooth operation of a contemporary building and its business. They are taken for granted, as long as they function properly, but their complexity is increasing at the same startling rate as technology is developing.

Electrical lifelines range from power generation, supply and infrastructure reticulation to communication networks, security systems, fire safety and vertical transportation. Their design and delivery requires patience and perseverance; liaison with supply authorities, strategic advice on cost and space planning, clear and concise briefings and precise documentation detailing every system powering the building, running the air conditioning, controlling the lighting.

Day-to-day operational provision converges with our long-term outlook where life-cycle cost, energy saving initiatives, efficiency, security and sustainability are key, including planning for interaction with embedded generation and smart grids. We are experienced in complex and challenging projects with a portfolio covering the health, education, defence, residential, commercial, cultural, public, civic and urban design sectors.

Expertise

Services Masterplanning
Specialist Environments
Natural, Hybrid & Mixed Mode Ventilation
Air Conditioning, Heating & Cooling
Medical & Specialist Gases
Industrial Ventilation
Smoke Control & Life Safety Systems
Dynamic Thermal Modelling
Building Load Analysis
Interior & Exterior Lighting
Lighting Masterplanning
Daylight Analysis & Design
Exhibition Lighting
Solar Shading & Access
ESD & Energy Masterplanning
Passive & Low Energy Design
Building Envelope Design
Climate Control & Thermal Comfort
Indoor Air Quality
Thermal Storage
Renewable Energy
Energy Recovery
Material Reuse and Recycling
Vertical Transportation
Information & Communications Technology
Building Management & Controls
Security & Surveillance
Audio Visual Services
Power Generation & Standby
High & Low Voltage Power
Co-generation & District Energy
Lightning Protection



Sustainable and Social Values

It is in our DNA to create positive environments.

Steensen Varming has an innovative and collaborative approach to design that considers the broader social and environmental aspects of our work.

We are committed to creating 'positive environments', and continuously improving our practices to the benefit of the local and global environment and communities.

We are proud to lead by example and consider environmental and social issues to be essential to a responsible business. We exclusively support projects that provide benefit to, and advance society rather than those that irresponsibly exploit others or the environment.

B Corp

Certified B Corporations, or BCorp, envision a better economic system where businesses can benefit people, communities, and the planet.

Steensen Varming is proudly B Corp certified. Meaning, we are eco-centric, not ego-centric. We hold ourselves accountable in meeting B Corp's high standards of social and environmental performance, accountability, and transparency.

We are proud to play our part in B Corp's global movement for an inclusive, equitable, and regenerative economy: "We over Me".

UN Global Compact

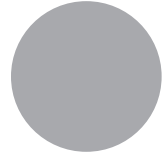
Our partnership with the UNGC (United Nations Global Compact), demonstrates our dedication towards expanding our industry reach and seeking opportunities to further participate and collaborate on projects that advance the UN Sustainable Goals (SDGs).

We embed core UN Sustainable Goals principles of human rights, labour, climate action and anti-corruption into everything we do, from our company strategy to our culture and operations.

Certified



Corporation



Design Resiliency

Modern society relies on critical infrastructure that incorporates high levels of design resiliency to minimise single points of failure and improve both functionality and maintainability.

Electrical services serve as the arteries and veins of this infrastructure - critical to the smooth operation of data centres and the businesses they support. When functioning properly, they are often overlooked, but their complexity is increasing at the same starting rates as technology is developing.

Steensen Varming applies careful consideration to resilience, redundancy, safety, efficiency, and scalability when designing high voltage (HV) and low voltage (LV) systems, inclusive of on-site power generation and UPS systems for critical infrastructure buildings such as Data Centres, Hospitals, and Laboratories.

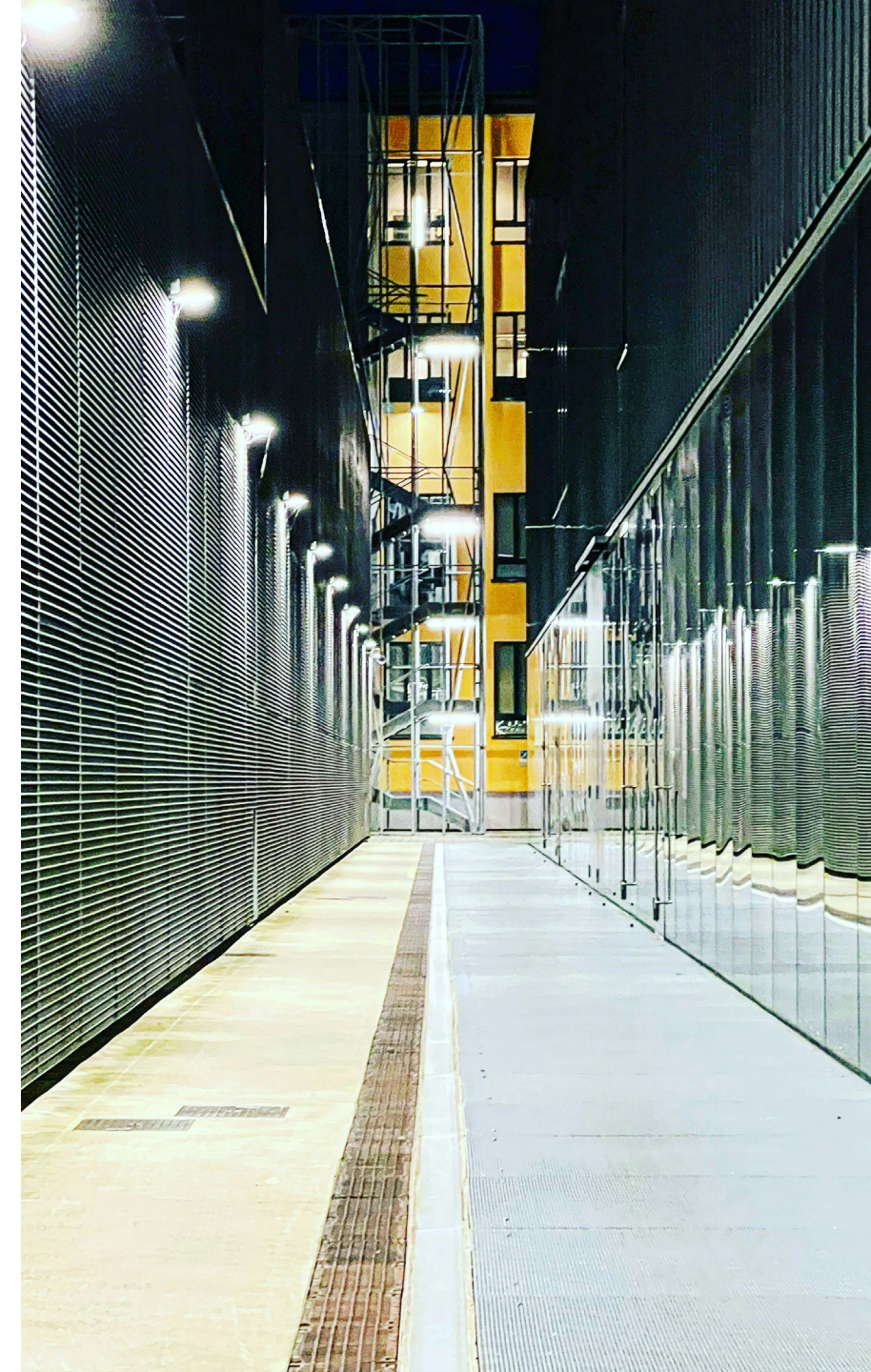
Our approach of maintaining and establishing good working relationships with Distributor Network Service Providers (DNSP) locally in Australia and the UK extends across the globe. This plays a significant part in establishing the desired solution and helps to ensure priority switching and security of the system.

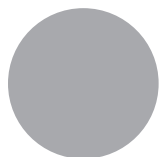
The resilience applied to the HV and Substation infrastructure of N+1, 2N architectures and the number of 9's is typically adjusted to suit specific client needs and power availability within a defined budget.

Transformer sizes, types and placement are carefully designed and coordinated to accommodate the IT loads, cooling, and future growth. Compliance to standards and the functional requirements are a given, with special attention given to harmonic mitigation, earthing, arc fault protection and

fire segregation.

We are passionate about providing our clients with the best advice so we can tailor our design services to to achieve the best results in terms of functionality, performance, efficiency and sustainability for their building. We aim for excellence and this is evident in our 2020/21 'National Excellence and Apprentice Award' received for our successful electrical HV infrastructure works completed at The Canberra Hospital (ACT).





Proposed Approach

Steensen Varming value and promote a collaborative working relationship and approach with our clients and stakeholders. This allows us to understand the project goals and tailor the design solutions to these needs through comprehensible technical reporting from the get-go.

In the first instance, Steensen Varming would undertake a due diligence review of all available information (general industry as well as the specific data centre) and benchmark this to our past experience. This includes:

- Review and asses the existing power system capacity, infrastructure and opportunities in the nearby reginal transmission line and substation infrastructure
- Determination of optimised and resilient supply arrangements and

interconnections to support the client requirements

- Consider spatial allowances of the client and utility infrastructure and the associated interface requirements

Once an appreciation of the site and infrastructure is established, Steensen Varming would look to:

- Undertake load demand assessments, and quality/ efficiency of supply studies for the various phases of the installation
- Develop concept level HV/ electrical single-line diagrams and spatial test fits to support the infrastructure requirements in providing an efficient, tailor-made solution for the data centre
- Undertake system fault tree analysis in ensuring a resilient solution

- Collate the utility design specifications and standards to inform the design. This will be guided by our past project experience and engagement with ASP3 designers, where required
- Review, compare and advise on various switchgear technologies, determine both utility and client electrical characteristics and establish the optimal arrangement to meet the data centre needs
- Advise on the substation build requirements
- Coordinate the HV cable reticulation with other below ground services, advise on services diversions where required
- Advise on costs and procurement strategies

All realised and achieved through continuous reporting and engagement with stakeholders.



Project Capability

John Hunter Health and Innovation Precinct

The John Hunter Health and Innovation Precinct (JHHIP) project is the latest development on the John Hunter Health Campus and includes a new 56,000m² Acute Services Building.

Steensen Varming designed the augmentation to the John Hunter Health Campus' existing HV network to facilitate connectivity to new chamber substations, HV switchgear, earthing, and HV protection. We also designed standby diesel generation and two centralised UPS systems to independently support the ICT and critical clinical requirements of the Acute Services Building.

The LV network comprises dual submain supplies from separate main switchboards to avoid single points of failure to critical clinical areas of the building. The passive elements of the ICT system were also designed with dual supplies

to each floor distributor via alternate communication pathways to avoid single points of failure.

Steensen Varming are completing the Mechanical, Medical Gas, Vertical Transportation, Electrical, Lighting, Communication and Security services.

John Hunter Health and Innovation Precinct
Hunter New England Region, NSW, Australia

Client: Health Infrastructure
Size: 107,000m², including new Acute Services Building, 56,000m², New Car Park, 46,000m², Nexus Mental Health Redevelopment 5,000m²
Completion: 2025
Project Value: \$855M AUD
Services: Mechanical, Medical Gas, Vertical Transportation, Electrical, Lighting, Communication and Security Services



Scott Base Redevelopment Antarctica

Established in Antarctica by Sir Edmund Hillary in 1957, Scott Base is the research station for New Zealand Antarctic, charged with carrying out New Zealand's activities in Antarctica to support world-leading science and environmental protection.

This facility is special, as home to world-leading scientists in one of the most isolated places on Earth with temperatures down to -54°C and wind speeds up to 242 km per hour. Reaching the end of its functional life, the Base needs to be fit for purpose for the next 50 years to support the requirements of these scientists.

Steensen Varming were engaged for the development of concepts for the heating, ventilation, electricity, and lighting for a research facility redevelopment at Scott Base. We developed comprehensive Fault Trees that

show systems end to end, identifying single points of failure that would result in overall system loss. This is used to discuss the resilience strategy with the client team to ensure that we understand the consequences of component failure in order to develop our backup strategies, recovery plans and ultimately essential spares lists for the stations.

The design incorporates augmentation to an existing HV network shared with USA Antarctic Station Mc Murdo. The HV cable is connected to a wind farm and then to Scott Base. It allows power supply to be transferred between the five diesel generators at Mc Murdo wind farm, and the three diesel generators at Scott Base.

As the HV network operates at 60hz, a frequency converter has been designed together with isolation transformers.

Due to the high soil resistivity of the volcanic rock and permafrost, achieving a compliant earth is challenging. To mitigate this, a quantity of sea earth has been specified to achieve a satisfactory earth for the Base.

Scott Base Redevelopment Antarctica

Client: Antarctica New Zealand
Size: 5,000m²
Project Value: \$498M AUD
Completion: 2030
Services: Mechanical and Electrical Engineering, Communications, Lighting Design, Hydraulic, Fire Protection, Fuel and Dangerous Goods



Westmead Central Acute Services Building (CASB)

The Central Acute Services Building (CASB) is purpose built for services which manage severe injury or illness, urgent medical conditions, recovery from surgery and other critical and complex conditions.

The building was planned with emergency, acute admissions, intensive care, operating theatres, a cardiac comprehensive care centre, surgical wards, medical imaging, pharmacy and sterilising services. The CASB project also includes a new main entry and transit lounge for patients to wait in comfort when they are leaving hospital after treatment.

Steensen Varming prepared the schematic design documents and are reviewing the contractor designs on behalf of Health Infrastructure.

The National Infectious Diseases Unit within the CASB, contained multiple N+1, 2N type infrastructure.

Westmead Hospital Central Acute Services Building (CASB)
Westmead, NSW, Australia

Client: Health Infrastructure
Project Value: \$900M AUD
Completion: 2020





Sydney Water Homebush Data Centre UPS

Steensen Varming was engaged by Sydney Water to review the existing UPS system in 2004 including maintenance reports to recommend maintenance or replacement. Included was fault investigations, a schedule of maintenance records, option reviews and recommendations.

Telstra St Leonards Exchange and Data Centre

This fit-out was carried over several levels of this existing building and included the implementation of an extensive data centre and call centre and comprehensive power system and telecommunications infrastructure designs to provide full redundancy and reliability.



Sydney Water Homebush Data Centre Concept Plan

In 2010, we provided a layout for the data centre, highlighting the equipment, cooling units, clearances, weight distribution and dimensions. We also wrote the Next Generation Data Centre report to outline details on best practices upgrades and future requirements.

Webcom Data Centre

Steensen Varming designed the main computer room comprising 100 data communications racks, complete with raised floor, UPS and backup standby power to provide increased reliability of supply.



Sydney Water Homebush Data Centre

In 2023, we were engaged to provide high level advice based on the existing services to assess the current arrangement, condition, efficiency and code compliance and suggest corrective actions and maintenance.

AGNSW Data Centre

Steensen Varming designed the 10 Cabinet main data centre at the AGNSW which consists of with special in row cooling and backup power for Air Conditioning System. The centre which has dual UPS units and alternative supply is linked via a Dark Fibre arranged by Steensen Varming between their Domain Site and the remote storage facility in the inner west of Sydney to provide remote backup of the business critical data and services.



Storage Facility

(Confidential Project)

Steensen Varming took on the role of Independent Commissioning Agent, providing project delivery and support services during the construction and handover phases of this Storage Facility, including a Data Centre that was designed to Tier IV.

We visited the site at regular intervals to monitor the construction and installation of building services systems as well as witness the commissioning and setting to work of the electrical, lighting, life safety and HVAC systems.



Forensic and Science Facility

(Confidential Project)

Steensen Varming provided ICT passive infrastructure and power distribution design for a state-of-the-art Forensic and Scientific Facility supporting national-level research and law enforcement applications. This facility required the deployment of high-density communications systems to support advanced laboratory instrumentation, scientific computing, and digital forensics.

Our scope also included the integration of RFID-based asset tracking systems to enable real-time visibility of critical forensic equipment, evidence materials, and laboratory assets. This allowed for improved chain-of-custody control, streamlined operations, and enhanced security monitoring.



Defence Project – Data Centre with Multi-Tenant Secure Networks

(Confidential Project)

For a confidential Defence-related project, Steensen Varming were engaged to design the ICT and security and power distribution infrastructure for a secure data centre hosting six isolated networks—each dedicated to different government agencies with unique security classifications.

Our team led the design of passive ICT infrastructure and physical security systems to meet stringent Defence and government security frameworks. The solution included high-availability designs (N+1/N+2), robust cable containment, and risk mitigation measures tailored for multi-agency operations. Our focus on cyber resilience included design features that prevent lateral movement between networks and ensure physical isolation.

NSW Parliament House Main Switchboard

Parliament House in Sydney is a complex of buildings housing the Parliament of New South Wales and is of great heritage significance. The facade consists of a two storey Georgian building, the oldest public building in the City of Sydney.

Steensen Varming has undertaken several projects at NSW Parliament House, including the design works for the new entry Guard House, a review and design upgrade of the external lighting and external Security CCTV system and a complete upgrade of the electrical switchboards, exit and emergency lighting and smoke management system.

Steensen Varming also completed an audit of the building's Essential, Emergency and Critical Business loads and Main Building Services (MBS) Infrastructure.

A detailed assessment was undertaken which involved engaging with relevant stakeholders, reviewing and addressing the new code requirements, best judgement and new technology. After detailed evaluation of the risks and costs, a new board in the same space was implemented.

One of the main risks was the water ingress into the MBS room via the substation. Rather than just installing new temporary cabling and removing it after shutdowns, the cables were installed in a permanent position facilitating a provision of new dual supplies or duty standby arrangement to the most critical loads for future planned and unplanned outages.

The staging of the works achieved continuity of critical operations, ensuring that the functional operation of the parliament, library

and hospital would not be affected. The extent of power outages was kept to a minimum.

NSW Parliament House Main Switchboard
Sydney, NSW, Australia

Client: Department of Parliamentary Services
Size: 91,000m²
Project Value: \$6M
Completion: 2016



NSW Parliament House, Sydney

Parliament House

Steensen Varming conducted a detailed study to establish the best configuration of energy systems for Parliament House.

The outcomes enabled Parliament House to be a greenhouse energy neutral building by June 2014.

The study provided a clear direction for the replacement, upgrade and provision of new energy systems for Parliament House for the next 10 years. The plan identified a logical sequence for a staged implementation over time of what was termed the 'Optimum Approach'.

An options study equipped with the data was provided to assist in the decision making process. Information such as the anticipated costs, energy use, CO2 emissions, and pay back periods were provided. Technology such as cogeneration plant, back up heat

rejection, back up power generation, and high voltage feeders were evaluated.

We were also commissioned to undertake the works for the upgrade of the Building Management System (BMS). In addition to providing more control, monitoring and measurement over systems and energy consumption, the design of the new BMS will aim to future proof the facilities' control system to integrate with current, future and emerging technologies.

We have an appreciation for Parliamentary standards and an in depth understanding of the works and challenges associated with complex heritage buildings. This, together with our knowledge from previous involvement in electrical HV infrastructure projects globally and locally, provides us with the necessary skills and expertise to

deliver design excellence for this project at the Houses of Parliament.

Parliament House
Canberra, ACT, Australia

Client: Department of Parliamentary Services
Size: 250,000m²
Project Value: \$5M AUD
Completion: 2009



Parliament House, Canberra

British Museum

Steensen Varming have been engaged as part of a major infrastructure programme to design the electrification strategy for the British Museum in achieving sustainability targets and resilience for the future.

The design included a new high-voltage network servicing 5 no. substations to meet the capacity demands of the Museums wider masterplan aspirations.

A resilience strategy was developed, in collaboration with the Museum, which introduced 3.2MVA of standby generation which was integrated into the network.

All works required careful consideration of the importance of the building and the art housed within. New reticulation was seamlessly introduced into the heritage listed building, with an

appreciation of the sensitivity of the building fabric.

All of these works have been phased to ensure minimal impact on the continued operation of the Museum.

British Museum
London, United Kingdom

Client: British Museum
Size: 100,000m2
Completion: Current Projects Underway
Services: Mechanical, Electrical, Lighting Design, ESD, BIM



Albury Campus Redevelopment

The proposed Albury Campus Redevelopment will consolidate the acute services for the Albury Wodonga Health Service onto the Albury Campus, providing increased efficiency in health service delivery for the region. The project is a unique operating model, with funding and operations from both New South Wales and Victoria, with additional stakeholder management requirements and alignment of strategic design objectives between jurisdictions.

The project comprises the construction of new clinical services building with a new helipad, intensive care unit and emergency department, neonatal facilities, operating theatres, a 32-bed mental health facility to replace the Nolan House Mental Health Unit and expanded outpatient and specialist facilities.

Once acute services have been decanted into the new building, large areas of the existing hospital will be refurbished to accommodate expanded pathology and pharmacy services..

Albury Campus Redevelopment Albury, NSW, Australia

Client: Health Infrastructure, Albury Wodonga Health and Victorian Health Building Authority
Size: 32,000m²
Project Value: \$558M AUD
Completion: Current Project
Expertise: Mechanical and Electrical Engineering, Fire, Hydraulics, Vertical Transportation, Communications, Security

Image: Hassell



Canberra Hospital

Steensen Varming have provided mechanical and electrical engineering services to Canberra Hospital on multiple projects.

Our engagement as electrical consultants for Canberra Hospital Building 10 Electrical Infrastructure Upgrade, consisted of electrical and mechanical engineering associated works watching brief services, during the design finalisation, construction, and handover stage. The B10 Electrical Main Switchboard constitutes a risk to provision of health services on the hospital's campus.

The growth in essential load had exceeded the on-floor Distribution Board capacity for essential circuits, and in some cases total supply to the floor. This resulted in two problematic outcomes: of supply to some equipment being taken from other levels; and equipment considered by the

business unit to be essential load which was required to be supplied from non-essential circuits, consequently having Uninterruptable Power Supply systems installed in line with these specific loads.

While the works involved the replacement of the Electrical Main Switchboard for Building 10, with two new intermediate main switchboards and provide sufficient electrical capacity to support increased future demands on the electrical infrastructure within the building to support building occupants. The key purpose of the role was to identify and advise on major risks for ACT Health through the design finalisation and construction of a project.

We are passionate about providing our clients with the best advice, so we can design tailor-made

electrical services to achieve the best results in terms of functionality, performance, efficiency and sustainability for our clients building. We aim for excellence which is evident in our 2020/21 'National Excellence and Apprentice Award' received for our successful electrical HV infrastructure works completed at Canberra Hospital.

Canberra Hospital
Garran, ACT, Australia

Client: ACT Health
Size: Buildings 1, 2, 3, 10, 12, 20
Completion: 2022
Expertise: Mechanical and Electrical Engineering

Image: Commissioning Phase



Wagga Wagga Rural Referral Hospital

The Wagga Wagga Hospital Redevelopment Stage 1&2 delivered enhanced hospital facilities to provide modern and integrated health services for the Riverina community.

Key elements included the new Acute Services Building, a new 50 bed mental health unit, new pathology unit, drug and alcohol services, relocated and improved mortuary, and upgrades to the main entrance and public amenities.

As part of Stage 3, a new six-storey Ambulatory Care Building will be linked to the Wagga Wagga Base Hospital with a range of new facilities including ambulatory clinics, aboriginal health, aged care inpatient unit, allied health and community mental health.

Steensen Varming provided Mechanical, Electrical, Lighting Design, BIM services for this project.

Wagga Wagga Rural Referral Hospital
Wagga Wagga, NSW, Australia

Client: Health Infrastructure
Size: 21,000m²
Project Value: \$282M AUD
Completion: 2017
Expertise: Mechanical and Electrical, Engineering, Lighting Design, BIM





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