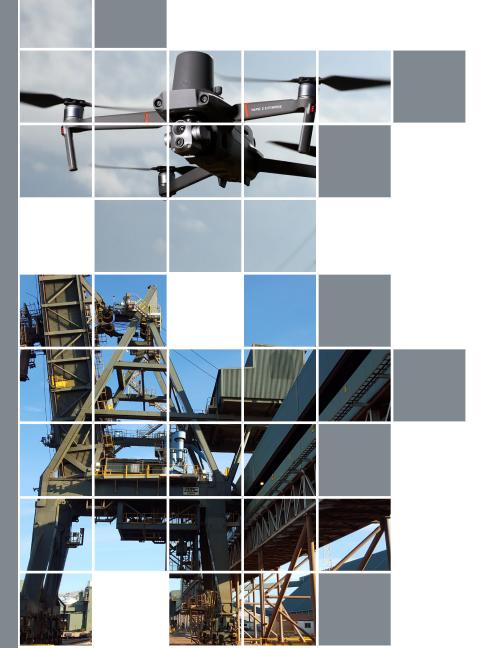




ASSET MANAGEMENT | 2022



CREATING THE FUTURE

Our **vision** is to be Australia's most forward thinking, agile and influential engineers and asset advisors.

Founded in 2000, Lucid is the largest employee-owned and Australian-owned engineering consultancy to operate in all mainland regions of Australia.

Our team consists of over 300 professionals with offices based in Adelaide, Darwin, Melbourne, Perth, Canberra, Sydney, Brisbane, and Alice Springs.

SECTORS

Lucid has a strong track record and impressive project portfolio spanning a wide range of industries and sectors,

- Aged Care and Retirement Living
- Arts and Culture
- Correctional and Justice
- Critical Facilities
- Defence
- Education
- Food and Agribusiness
- Health
- Hotels and Entertainment
- Infrastructure
- Local Government
- Manufacturing and Logistics
- Mining, Oil and Gas
- Multi-Residential
- Office
- Sports and Recreation
- **Transport**



SERVICES



Asset Management



Communications and Audio Visual



Digital Engineering



Electrical Services



Energy and Sustainability



Fire Engineering



Fire Services



Hydraulic Services



Industrial Power



Infrastructure



Mechanical Services



Project Management



Security Services



Specialist Lighting



Vertical Transportation

WHAT SETS US APART?











As an Australian business with national reach, our agile design brings together the expertise you need, where you need it.

- Founded in Adelaide with company ownership all held in Australia.
- 300+ professionals in seven offices around the country.
- Operational dynamism and focus on service agility.

Employee ownership means we are personally invested in your future. Your success, is our success.

- 65+ shareholders in Lucid representing approximately 20% of our workforce.
- Direct access to people who influence our business and can respond rapidly to your needs.
- Annual shareholder succession incentivises our leaders to perform on your projects.

As a relationships driven business, you can trust us to know what really matters to you and to deliver on your needs.

- Lucid maintains relationships with clients that have been with us since our inception.
- 950+ clients who trust us with their projects.
- 92%+ of feedback respondents would advocate for the Lucid brand.

WITH A STRONG BELIEF THAT STRATEGIC THINKING AND ENGINEERING BELONG TOGETHER, OUR SOLUTIONS PLAN FOR THE UNCERTAINTY OF YOUR TOMORROW.

- Our vision is to be Australia's most forward thinking, agile and influential engineers and asset advisors.
- Lucid formalised it's Asset Management discipline in 2019.
- Our Asset Management team is represented nationally with 17+ professionals.

With a passion for a better world, we stay ahead of change to provide you with the advantage you need to lead.

- Lucid has a federated Energy and Sustainability team.
- Lucid has a Bluesky team dedicated to technological creativity and innovation.
- Building a better world is one of eight key goals in our Strategic Plan.

OUR TEAM



PHIL KOWALCZYK

NATIONAL LEAD - ASSET

MANAGEMENT



MITCHELL GARCIA SA REGIONAL LEAD - ASSET MANAGEMENT



NICK KENNEDY
WA REGIONAL LEAD - ASSET
MANAGEMENT



CIARAN FARRELL NT REGIONAL LEAD - ASSET MANAGEMENT



MARK SEFTON NSW REGIONAL LEAD - ASSET MANAGEMENT



PORTFOLIO LEADER - ENERGY AND ASSET MANAGEMENT



ASSET MANAGEMENT CONSULTANT



MICHAEL SEAL ASSET MANAGEMENT & HYDRAULIC SERVICES



EMILE KOBAYASHI DIGITAL TECHNOLOGY CONSULTANT



MATTEO GODI
PROJECT ENGINEER / ASSET
MANAGEMENT CONSULTANT



RIKKI SMITH
ASSET MANAGEMENT
COORDINATOR



HARRY GRIGG ASSET MANAGEMENT ENGINEER



ASHLEY BIDDULPH ASSET MANAGEMENT ENGINEER



CASEY VOSS
ASSET MANAGEMENT
ENGINEER



JACINTA TALLARIDA ASSET MANAGEMENT COORDINATOR



AMY GILL ASSET MANAGEMENT CONSULTANT



SCOTT TILLER
UNDERGRADUATE ENGINEER

APPROACH & CAPABILITY

Our Asset Advisory Consultancy provides services that enable our clients to develop strategies to mitigate operational risks, maximise asset utilisation and minimise disruption to business operations to enable maximum value from their assets.

The built and digital environment experiences continual cycles of rapid change and technological advancements. Our clients require access to information to enable data driven decision making.

At Lucid we recognise this, and by delivering our Company's vision we continue to invest in building our capability and capacity to service our client's asset portfolios. Backed by Lucid's Vision and Mission our Asset Advisory Consultancy aspires to become.

'Australia's trusted Asset Advisory Consultancy for technically complex assets'

As an Australian employee-owned business with National reach, we are personally invested in your future, and our agile approach brings together the expertise you need, when you need it.

- We have a consultancy style that blends strategic and engineering thinking, we develop plans that help you realise your asset strategy.
- We priortise initial stakeholder engagement and advisory services to understand your business and asset objectives.
- We have experience in delivering services over the Whole of Life of an asset:
 - We provide our clients with assurance that their assets are aligned with their business requirements.
 - We design and document asset solutions suitable for competitive tendering.
 - We specialise in project management services during construction and commissioning.
 - We develop maintenance strategies aligned with the legislative requirements and end user requirements.
 - Our services identify opportunities to develop strategies to renew or dispose of assets.
- Lucid utilises technology to enhance our consultancy services providing clients with access to accurate asset information.

Lucid's Asset Advisory consultancy has vast experience across multi-discipline asset systems and strongly believe that strategic thinking and engineering belong together.

Delivering Strategic Asset Management involves working closely with the decision-making groups of client organisations to develop a long-term strategy designed to enable their asset portfolio to deliver against their corporate policies, goals and objectives. This area of asset management requires extensive and collaborative consultation with senior business stakeholders and executive leadership to define tangible outcomes that consider internal and external requirements and constraints.

Tactical Asset Management service delivery provides our clients with medium term asset solutions to enable strategic alignment with asset specific information. Lucid leverages its vast engineering experience to provide tactical Asset Management services to assist our clients in translating their strategic goals and objectives into specific plans and performance targets for individual assets. A key enabler to successful Asset Management planning is the combining accurate asset information with a well-developed Asset Strategy.

Operational Asset Advisory services provided by our consultants, engineers and project managers, develops and implements detailed work plans and processes to enable asset owners to understand the current condition, capacity and compliance of their assets and develop opportunities to improve them. We maintain a strong focus on advising our clients to select the right delivery techniques, value engineering their key asset upgrade projects and ensuing that the works are executed efficiently.

We believe that successful Asset Management service delivery is underpinned by the development of collaborative client relationships. The collaborative relationships allow Lucid to develop asset strategies that clearly align without client's short- and long-term strategic asset management objectives. Lucid offer tailored asset management outcomes that align to our client's asset portfolio strategy and assist with the delivery of their organisational goals.

Though the successful delivery of strategic advisory services, asset condition assessments, lifecycle and asset management plans across our diverse client base, Lucid has developed a deep and highly specialised asset intelligence knowledge base which we seek to leverage at the commencement of any new engagement.



PROJECT EXPERIENCE



THE SALVATION ARMY – AGED CARE FACILITIES

Salvation Army was engaged Lucid to conduct a detailed electrical audit across its aged care portfolio. The project was completed over two stages, with the second stage being intrusive testing with the incumbent electrical contractor the scope included asset capture of all electrical assets on site

- Equipment installs date (based on available documentation or equipment nameplates).
- Current condition (based on non-invasive visual inspection).
- Anticipated remaining economic life (based on manufacturers and industry recommendations) and maintenance information if available.
- Estimated year the item may need to be replaced and budget cost associated with the replacement.
- High level scope of works and budget costs for identified remediation work(s).
- Compliance related items that are readily visible to the inspection team that pose a risk to The Salvation Army Operations. e.g. Emergency Lighting and Evacuation Systems.
- Stage 1 included a detailed contractor test plan and recommended upgrades to rectify the defects and compliance issues identified.
- Stage 2 worked in collaboration with the incumbent electrical contractors to test the electrical systems. The tests included thermographic scans of switchboards and phase and earthing testing.
- A site-specific scope was developed for each site.

THE SALVATION ARMY - COMPLIANCE AND CONDITION AUDITS

Salvation Army was engaged Lucid to conduct an asset compliance and condition audits and asset capture across its SA/NT portfolio.

- Equipment installs date (based on available documentation or equipment nameplates).
- Current condition (based on non-invasive visual inspection).
- Anticipated remaining economic life (based on manufacturers and industry recommendations) and maintenance information if available.
- Estimated year the item may need to be replaced and budget cost associated with the replacement.
- High level scope of works and budget costs for identified remediation work(s).
- Compliance related items that are readily visible to the inspection team that pose a risk to The Salvation Army Operations. e.g. Emergency Lighting and Evacuation Systems.
- Asset Plans that depict the layout of each of the buildings. These are to take the form of a scaled floor plan of each facility.

SA WATER BUSHFIRE AND SAFETY AUDIT - TRANCHE 1

SA Water assessed 74 sites which had been identified as critical to the business in sustaining supply to customers or presents a safety risk due to vulnerability from bushfire attack.

- Identification of the level of threat from bushfire attack (this may be represented by a BAL category as per AS3959).
- Assessment against the auditing elements and identification of gaps.
- Provided high level recommendations to address identified gaps.
- An assessment on the existing fire systems providing a description of each system identified and comment on the condition of the existing equipment. This included a compliance and condition rating for the equipment. Where items are non-compliant or in poor condition a simple recommendation was provided.
- Categorise identified gaps into high, medium and low priority based on likelihood of damage sustained from bushfire attack.
- Summary of the outcomes of the above assessment.
- Auditing completed during COVID-19 restriction period Independent assessment and audit of state critical infrastructure across 74 metropolitan and regional sites.
- Condition assessments with a focus on risk and safety.
- Unbiased assessment of construction/installation and subsequent maintenance activities.

SA WATER BUSHFIRE AND SAFETY AUDIT – TRANCHE 2

Further to the successful outcome of Tranche 1, Lucid was engaged to conduct a Bushfire and Safety audit on an additional 237 sites.

Tranche 2 included 3D data capture and development of an SA Water Bushfire Preparedness Technical Standard which represents industry best practices.

- Using a drone, a 3D mesh was created at each site which enabled contractors to price remediation works and provide a visual representation of each site that can have asset information associated with defects.
- Assessment information was provided against 3D spatial information that can easily be imported into SA Water's ESRI system.
- Assessment data was attached to the 3D meshed spatial data to provide the ability to review assessment made and determine the response strategy against the non-compliance. This information provided the SA Water business the ability to visualise the asset/ vegetation relationship like someone would be able to if they were to attend site.
- Conducting a Literature Review to determine industry best practice associated with Bushfire Preparedness, and subsequent development of SA Water Technical Standard



SA WATER – PROJECT RELATED BUSHFIRE ASSESSMENTS

Lucid was engaged by SA Water Constructors and Consultants to provide Bushfire Assessments for new projects to ensure compliance with the SA Water Technical Standard.

The scope of services included:

- Including the use of drones to capture relevant data to undertake the assessment.
- Identification of Bushfire Risk depending on the proposed siting of assets on the development based on the SA Water Technical Standard TS0601.
- Provision of ongoing feedback to Constructors and Consultants regarding recommended changes to improve bushfire preparedness.
- Development of concept plans which indicate proposed siting options and changes to the built form of the asset in accordance with SA Water Technical Standard TS0601.

Lucid is currently developing the following sites:

- Taplan Tank Upgrade
- Ceduna Water Storage and Pump Station
- Eyre Peninsula Desalination Plant (project on hold)







PROPERTY SERVICES ASSET MANAGEMENT PLAN - ADELAIDE CENTRAL MARKETS

The Adelaide Central Markets is a heritage listed building located in the Adelaide CBD. The building containing the market was originally constructed in 1920, and has approximately 8 million visitors a year. Lucid were engaged to undertake an assessment of electrical, mechanical, hydraulic and fire and life safety services within the markets

The intent of the masterplan was to develop a timeline for upgrading infrastructure based on the risk to market operations, realise strategic business opportunities and to future-proof the market. This reporting was also used to develop budget estimates for approval by the local Council who owns the site.

Upon completion of the masterplan Lucid have been engaged to project manage the design and implementation of the asset management plans associated with the electrical and fire and life safety assets. The scope of services provided include:

- Auditing of electrical (low voltage and high voltage), HVAC infrastructure, hydraulic infrastructure and fire and life safety services. The audit identified the following:
 - Current condition.
 - Spare capacity.
 - Assessment of future demand.
 - Compliance and safety (for visitors and maintenance staff).
 - Improved amenity for visitors.
- Liaison with utilities / authorities, key council and market stakeholders.
- Risk assessment of assets based on clients risk profile for all assets based on ISO31000 framework.
- Preparation of asset management plans and associated scope of works.
- Preparation of high level budget estimates associated with the asset management plans.







NT GOVERNMENT – CONDITION ASSESSMENTS APPLYING ISO55001 CERTIFIED PROCESS – PILOT STUDY

The Strategic Asset Management division of the department of infrastructure and planning at the NT Government engaged Lucid to conduct a pilot study condition assessment applying ISO 55001 Certified Process.

- Desktop review of other site-specific information e.g. asbestos registers;
- Gather information from maintenance records and communicating with maintenance personnel/ contractors and building users to understand the complexity of the facilities to be assessed and any maintenance issues;
- Undertake the condition assessment as detailed in "DIPL Asset Condition Assessment Procedure and Guidelines" including:
 - physical inspection of an asset to identify defects and assess the actual condition of the building and its individual elements (e.g. roof, façade, internal walls and floors) and services (e.g. air conditioning, fire protection), against the asset owner's required standard for asset condition;
 - capturing of visual images on electronic or other media:
 - identification of remedial maintenance works required to bring the condition of the building and its services up to, or maintain it at, the specified condition standard (refer to Table 1);
 - ranking of maintenance works in order of priority;
 - preparation of cost estimates for remedial works; and
 - determination of actions to mitigate any immediate risk until remedial works (or other actions) can be taken to address problems in a more permanent manner.
- Presentation of a condition assessment report
- Compiling a list of recommendations/lessons learned from the process to enhance the DIPL Asset Condition Assessment Procedure and Guidelines.
- Attend a debrief to discuss proposed enhancements and compliance with the ISO certified process.

NT GOVERNMENT POLICE FORENSICS BUILDING

The Strategic Asset Management division of the department of infrastructure and planning at the NT Government engaged Lucid to conduct a pilot study condition assessment applying ISO 55001 Certified Process. The assessment was of a visual nature and required Lucid to assess the following assets; Alice Springs Correctional Facility, Adelaide River Primary School, Police Station, Fire Station & Health Clinic and Peter McAulay Police Complex in Berrimah.

The project mentioned above included the Forensics Building at the Peter McAulay Police Centre in Berrimah. The Forensics building is approximately 4000sqm and contains 8 independent wings all connected by a central corridor. Each wing is dedicated to a specific element of the forensic department. Spaces included, firearm storage, chemistry labs, biology labs, finger-prints lab and a crime scene lab.

Within this building Lucid conducted audits of the biology and chemistry laboratories and aligned defect remediation strategies with operational compliance requirements of the building. Lucid was required to coordinate access to these areas with relevant stakeholders and abide by laboratory access requirements in order to conduct the assessment.

Lucid developed a report highlighting the overall condition of the building inc. a photographic record of defects, developed an asset register of the site and a program of rectification of works.







295 SOUTH TERRACE - ASSET MANAGEMENT PLAN

Lucid were engaged to develop a site-specific Asset Management Plan for 295 South Terrace.

Our approach in developing the Asset Management Plan was to support Women's and Children's Health Network to develop their Asset Management knowledge and realise the following benefits:

- Identify issues that are driving the need for change and ensure assets are used in such a way as to support the existing and future requirements of the service and the change required.
- Manage assets within portfolios, by making decisions to maintain, enhance, replace or dispose based on an informed asset prioritisation matrix that guides future asset investment decisions.
- Provide / maintain an appropriate number of quality affordable assets complementing and supporting the services to meet population needs, which are financially sustainable over the long-term.
- Address backlog maintenance and essential equipment replacement where there is a high, significant, or moderate risk likely to impact on an Local Health Network's Board's ability to meet and deliver current and future services.
- Support an integrated planning approach through informing Strategic Planning processes across functions and levels.





Lucid developed an Asset Management Plan that prioritised asset-related issues to be addressed in the short-term, while assessing scenarios and options for the medium- and long-term to ensure continued provision of residential parenting support services while minimising risks and considered the following content:

- An introduction that provides background, an overview of the document purpose and the scope of assets covered within the plan.
- Strategic context in which the plan has being developed, the asset management objectives to be achieved, and a set of scenarios to be considered will be established.
- A current building performance assessment will be conducted based on existing asset information and eight main performance criteria;
 - Condition of building
 - Compliance
 - Capacity of infrastructure
 - Suitability of infrastructure location for service
 - Suitability of infrastructure for service
 - Level of utilisation
 - Criticality of buildings to services
 - Essentiality of service on acute site
- A high-level gap analysis and risk assessment utilising the SA Health Risk Assessment Framework
- Scenario analysis will be undertaken to explore options for minimising risks and ensuring continued service provision over the short-, medium- and long-term.
- A Service Sustainment Plan will detail the financial investments and associated timings to maintain service provision based on the findings of the risk assessment and scenario analysis.



NEW ROYAL ADEALIDE HOSPITAL - SA HEALTH

The New Royal Adelaide Hospital was constructed between 2011 and 2016, valued at \$2.3B and opened in September 2017 with 800 new rooms.

Lucid was engaged by Spotless, the nRAH incumbent maintenance contractor in thefinal months prior to Hospital opening for Public operations.

The basis for engagement was to assess the electrical infrastructure across the entire site and assist with final stages of Hospital commissioning.

Major obstacles were identified, however Lucid worked collaboratively with SA Health, Celsus, Spotless, the Builder and multiple Services Contractors to assess and remediate the outstanding issues.

Lucid developed and managed the execution of multiple test plans to assess the site infrastructure.

Test results were analysed by Lucid, and a strategy developed to achieve the objective of the root-cause analysis.

A resolution strategy was developed for the Hospital to execute and enable the Hospital to function on Day 1.

CONDITION AUDIT PROGRAM -WOMEN'S AND CHILDREN'S HEALTH NETWORK

Lucid undertook a Building Services & Building Fabric Asset Management Consultancy associated with the Code Compliance and Condition for the Women's and Children's Health following sites:

- Mount Gambier CaFHS 11a West Terrace, Mount Gambier
- 82 Ormerod Street, Naracoorte
- 44 Young Street, Penola
- Community Health Centre Cnr Ayr & Dunure Street, Jamestown.
- 31 West Terrace, Kimba
- 11 Avenue Road, Stirling
- CWA 15 Sunter Street, Strathalbyn
- CAFHS 1 Stirling Road, Port Augusta
- Metro Youth Health, Christies Beach, SA

The various activities and tasks to be carried out were:

- A review of existing plant and equipment Asset Register and 'As Installed' information, to determine existing configuration of plant and equipment.
- A site survey to inspect the condition, performance and life expectancy of existing systems and equipment to confirm accuracy of the presented 'As Installed' information.
- A review of maintenance log sheets and historical information to ascertain the extent of maintenance works.
- Liaision with current maintenance contractors and relevant vendors with inherent knowledge of the plant, equipment and various systems installed.
- An assessment of the installed systems for compliance with current codes and legislation including the Building Code of Australia, Australian Standards and regulations associated with various Authorities.
- Preparation of a Condition Assessment including consideration of Code Compliance and Condition, which would incorporate the following:
 - Short description of the systems
 - Condition rating
 - Compliance issues
 - Timeframe for upgrade or replacement
 - Order of cost for financial planning
- Development of a short report and native excel format for use by the Women's and Children's Health Network.



FIONA STANLEY HOSPITAL INDEPENDENT REVIEWER CONDITION ASSESSMENT - SOUTH METROPOLITAN HEALTH SERVICE

Lucid was engaged by South Metropolitan Health Service to conduct an Independent Condition Assessment of the Fiona Stanley Hospital.

This engagement is part of the Facilities Management Contract to verify that the condition of assets on-site align with their forecast condition.

The scope of services included:

- Development of an appropriate methodology in conjunction with key project stakeholders.
- Undertaking a Pilot Project to verify that the methodology aligned with stakeholders expectations and the systems were fit-for-purpose.
- Conducting on-site condition assessments ensuring alignment with COVID management policies on-site.
 Data captured included current condition, photos of assets, identification of remediation works (where required) and risk to the site.
- Review of preventative maintenance logs to verify maintenance has been conducted in accordance with the Facilities Management Contract requirements.
- Review of reactive maintenance logs to identify any equipment operational trends which could indicate opportunity for improvement to service delivery.
- Review of current Facilities Management maintenance service tasks against manufacturers and other industry guidelines.
- Provision of reporting summarising the findings of all the assessments including a high level cost estimate for the remediation works.



ASHFORD HOSPITAL AND THE MEMORIAL HOSPITAL INFRASTRUCTURE ASSET MANAGEMENT PLANS - HEALTHSCOPE

Lucid was engaged by Healthscope to audit the existing mechanical and electrical services infrastructure within two of their hospitals in Adelaide.

The audit included an assessment of the asset condition including reliability, compliance, maintainability and remaining serviceable life. A further engineering assessment was then conducted to identify the risk of asset failure to the continuity of hospital services during an unplanned outage.

The final masterplan included a preliminary asset management plan and budget estimates to enable allocation of funds for upgrade works.

The scope of services provided included:

- Auditing of existing mechanical and electrical infrastructure assets.
- Assessment of capacity, redundancy and availability forecasting.
- Risk Reporting including preparation of risk treatment strategies.
- Preparation of high level cost estimates.
- Development of changeover plans to ensure continuity of services during upgrade works.

BAPTISTCARE AGED CARE

During 2015, the Lucid team discretely and expertly audited all assets for compliance and condition of Baptistcare facilities.

The portfolio comprises building assets of various aged care facilities from 1970s through to 2006 construction.

This broad range of facilities presented the challenge of consistent resident experience and risk management of building services assets in terms of compliance and condition.

Following the preparation of detailed asset registers for use by maintenance contractors including economic life of equipment and replacement cost estimates, the Lucid team prepared a Class 9C gap analysis for all aged care facilities relative to NCC BCA 2015 requirements in 2016.

The analysis led to comprehensive fire and life safety upgrades across all facilities.

- Conducting engineering inspections in a live operating facility where people work and live.
- Development of work, health and safety plan for the inspection of facilities which contain personnel which have limited mental and physical capabilities.
- Condition assessment of existing building services assets and identification of required upgrades.

FIREFIGHTING INFRASTRUCTURE AUDIT – DEPARTMENT OF DEFENCE

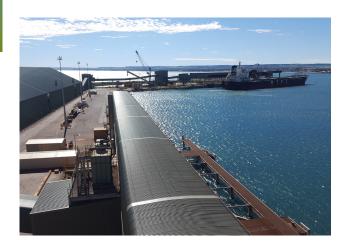
Lucid was engaged by the Department of Defence to undertake an audit of firefighting infrastructure throughout the Defence Estate. Firefighting asset data was captured on secure software and enabled rapid generation of proformas for each asset. These proformas were included within a final engineering report assessing the risks associated with each asset in accordance with Defence risk assessment policies.

The scope of services provided included:

- Site inspections across 150+ buildings throughout 20+ operating defence bases nationally.
- Development of auditing proforma and systems to enable multiple audits to be conducted concurrently whilst maintaining a consistent output.
- Preparation of reporting identifying the expected risk associated with findings to enable prioritisation of upgrade works. Risk prioritisation conducted in accordance with Defence risk management systems.
- Development of budget estimates associated with remedial works or additional work required to completely understand the associated risks.







HIGH VOLTAGE ASSET MANAGEMENT PLAN - MID WEST PORTS AUTHORITY (MWPA)

Lucid Consulting Australia was engaged by the Mid West Ports Authority to develop a High Voltage (HV) Asset Management Plan for their Geraldton Port.

The project scope included:

- Conducting a visual site inspection of the HV infrastructure on-site to determine visual condition and compliance with the relevant guidelines and standards.
- Review of available asset data to identify the expected remaining useful life of the assets.
- Review of load data from key infrastructure to identify available spare capacity.
- Review of Strategic Asset Management Plan (SAMP) and discussion with stakeholders.
- Workshop with maintenance staff to identify relevant items which could affect decision making like frequency of faults and deferred maintenance.
- Development of an Asset Management Plan identifying the forecast budget associated with ongoing maintenance, asset renewal and provisions for strategic growth in alignment the SAMP

SOUTH AUSTRALIAN HOUSING TRUST, FIRE SAFETY MANAGEMENT WORKS - GOVERNMENT OF SOUTH AUSTRALIA

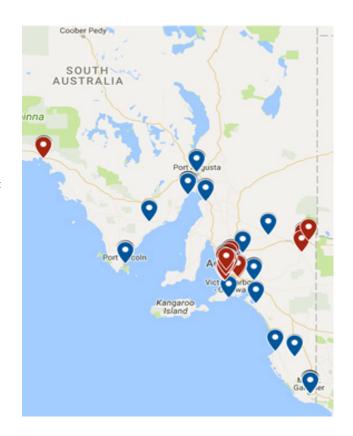
The role of fire safety manager for the South Australian Housing Trust (SAHT) is to provide technical advice to the government regarding their fire and life safety assets.

One of the key deliverables is to conduct audits of the fire and life safety assets across the SAHT portfolio of 240+ properties through metropolitan and regional South Australia to ensure ongoing safety of the residents.

As part of the engagement, Lucid worked with the SAHT to modernise their asset management framework in accordance with ISO55000. This included development of templates and processes to streamline the auditing, reporting and actioning of all audits.

The scope of asset services provided is as follows:

- Audits across 240+ SAHT properties through the state.
- Preparation of custom audit reports detailing all defects and compliance issues identified during the audit.
- Completion of risk assessment based on ISO31000 risk assessment framework.
- Development of design documentation to remediate defects and compliance issues.



CONDITION AND COMPLIANCE ASSESSMENT - COUNCIL ASSETS -BARUNGA WEST COUNCIL

Lucid undertook a Building Services & Building Fabric Asset Management Consultancy associated with the Code Compliance and Condition for the Women's and Children's Health following sites:

- Kulpara Town Hall
- Bute Golf Club
- Port Broughton Town Hall
- Alford Town Hall

The activities and tasks carried out were:

- A review of existing plant and equipment Asset Register and 'As Installed' information, to determine existing configuration of plant and equipment.
- Drone technology to assess roof defects.
- A site survey to inspect the condition, performance and life expectancy of existing systems and equipment to confirm accuracy of the presented 'As Installed' information.
- A review of maintenance log sheets and historical information to ascertain the extent of maintenance works.
- An assessment of the installed systems for compliance with current codes and legislation including the Building Code of Australia, Australian Standards and regulations associated with various Authorities.
- Preparation of a Condition Assessment including consideration of Code Compliance and Condition, which would incorporate the following:
 - Short description of the systems
 - Condition rating
 - Compliance issues
 - Timeframe for upgrade or replacement
 - Order of cost for financial planning
- Development of a short report and native excel format.

77 WAKEFIELD STREET, ADELAIDE -ASSET MANAGEMENT CONSULTANCY SERVICES - BABCOCK INTERNATIONAL

Lucid were engaged by Babcock to undertake a due diligence inspection of 77 Wakefield Street, Adelaide as part of the lease negotiations.

The various activities and tasks that were carried out were:

- A review of existing plant and equipment Asset Register and 'As Installed' information, to determine existing configuration of plant and equipment.
- A site survey to inspect the condition, compliance, capacity, performance and life expectancy of existing systems and equipment to confirm accuracy of the presented 'As Installed' information.
- A review of maintenance log sheets and historical information to ascertain the extent of maintenance works.
- An assessment of the installed systems for compliance with current codes and legislation including the Building Code of Australia, Australian Standards and regulations associated with various Authorities (Adelaide City Council, SA Water, SAMFS, SAPN, OTR etc).
- Preparation of a due diligence assessment report including consideration of Code Compliance and Condition. which would incorporate the following:
 - Short description of the systems.
 - Condition rating.
 - Compliance issues.
 - Timeframe for upgrade or replacement. Order of cost for financial planning.
- The above to be provided in a consolidated short report and native excel format for use by Babcock.
 - Recording and verification of Assets and Asset Register
 - Nomination of Asset condition



ASSET MANAGEMENT CONSULTANCY SERVICES - BABCOCK INTERNATIONAL

Lucid was engaged by Babcock International to undertake condition and compliance assessments in support of Babcock's contract negotiations for JP 9101.

Lucid deployed teams to the following sites:

- Exmouth, Western Australia
- Humpty Doo, Northern Territory
- Townsville, Queensland
- Riverina, New South Wales

Lucid's delivered the following scope of services

- A Site Investigation and Condition Assessment Reporting
- A visual un-intrusive inspection of the building services, building fabric and structural system installations and review of any available "As installed" information. No physical testing would be undertaken.
- An assessment of the condition and suitability for ongoing use of the building services, building fabric and structural system and identification of any upgrade requirements.
- Development of a testing plan the covers the routine maintenance of pre-engineered fire systems and other building safety measures can also be interpreted as being an "Essential Safety Measures" under the national WHS Act and Regulations.
- Such examples would include:
 - Emergency and exit lighting (AS2293)
 - Electrical residual circuit devices RCD's (AS3760)
 - Electrical equipment within factories, workshops, places of manufacture, maintenance, or fabrication (AS3760)
 - Emergency eyewash and shower equipment (AS4775)
 - Emergency lifts (AS1735)

- Emergency electrical generators
- Water supply backflow prevention devices (AS2845.3)
- Industrial and commercial gas-fired appliances including boilers, overpressure and pressure deregulators etc (AS3814)
- Gas detection systems (AS2290.3)
- Cooling water systems including cooling towers, water treatment systems etc (AS3666.2 and AS3666.3)
- Air handling systems including louvres, air filters, humidifiers, evaporative cooling units (AS3666.2 and AS3666.3)
- Heated water systems including storage tanks, hot water systems, warm water systems (AS3666.2)
- Fume cupboards (AS2243.8)
- Thermostatic mixing valves (AS4032.3)
- Fire indices and resistance levels (National Construction Code)
- Fire egress (National Construction Code)
- Preparation of "range of cost" estimates for recommended capital expenditure items arising from any condition, performance or code compliance issues identified.
- A review of utility service connections and capabilities. (i.e., PWC).
- Identification of items associated with the building services systems that may limit the future use of building in some way.
- Inclusion of costs which aligns to the condition assessment findings to ensure clarity in upgrade cost and scope.
- Preparation of a summary report presenting the information described above for each site,

HIGH VOLTAGE ASSET MANAGEMENT PLAN - UNIVERSITY OF SOUTH AUSTRALIA

The University of South Australia Mawson Lakes campus is located approximately 15km north of the Adelaide CBD and is used predominately for their Science, Technology, Engineering and Math (STEM) courses. The masterplan considered condition, compliance, resilience and capacity of the high voltage infrastructure including the following:

- Utility transformer and connections.
- High to low voltage transformers.
- High voltage switching cubicles and ring main units.
- High voltage wiring systems.
- Associated hardware and devices.

The scope of services provided include:

- Development of an asset register of all high voltage assets owned by the University.
- Condition assessment via non-invasive inspections, review of maintenance logs and recommended economic life.
- Liaison with utility to identify opportunity for the provision of additional electrical feeder.
- Risk assessment of assets based on clients profile for all assets based on ISO31000.
- Preparation of high level budget estimates including options where feedback was sought from the client.

ESSENTIAL SAFETY PROVISIONS CAMPUS WIDE AUDIT AND INFRASTRUCTURE UPGRADE – FLINDERS UNIVERSITY

Flinders University is a premier South Australian University, with the primary campus located at Bedford Park. The University has grown considerably since inception circa 1960's, this has resulted in application of different essential safety provision design standards depending on the age of each building and refurbishments undertaken.

Essential safety provisions audit included assessment of the active and passive fire and life safety systems, such as compartmentation and egress distances within each building.

The scope of services provided included:

- Campus wide audit and review of existing essential safety provisions to enable understanding of existing asset non-compliances, development of as-built drawings and creation of asset registers.
- Non-compliances identified were detailed and assessed against the risk to University students and staff to enable prioritisation of remediation works.
- Liaison with the local fire authority to enable development of remediation work packages.
- Preparation of engineering design documentation suitable for construction.
- Development of preventative maintenance contract for ongoing fire services maintenance based on the asset registers as-built drawings developed.





HIGH VOLTAGE ASSET MANAGEMENT PLAN - FLINDERS UNIVERSITY

The Flinders University Bedford Park campus was constructed circa 1965 with a High Voltage (11kV) ringmain electrical network. Over the past 40-50 years, the campus has grown significantly and a holistic review of the high voltage network was required to develop a plan for the future.

This masterplan included identification of current condition, capacity, future demand, compliance, safety and resilience. These asset management plans detailed in the masterplan were sequenced based on risk, available budget and practical sequencing over seven discrete stages.

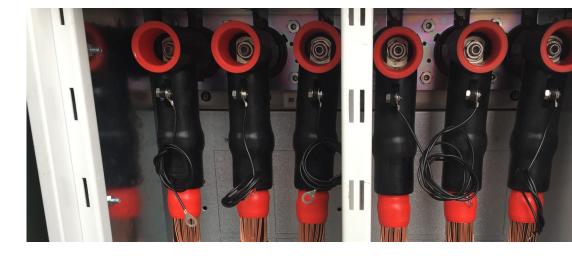
Lucid also completed the design packages including associated network protection studies and critical work plans to manage consequence to University business operations during critical change-over works. Lucid have assisted the University to successfully execute six consecutive years of construction works with final stages scheduled for completion by 2019.

The scope of services provided in the development of the masterplan include:

- Auditing of existing electrical high voltage assets to identify current condition, current capacity, future demand, compliance, safety and resilience.
- Liaison with key stakeholders and utilities.
- Risk assessment of assets based on clients profile for all assets based on ISO31000.
- Preparation of asset management plans and associated scope of works.
- Preparation of high level budget estimates associated with the management plans.
- Development of design documentation to enable delivery of asset management plans in a staged approach.







GLENSIDE HOSTING FACILITY AND FLINDERS TELECOMMUNICATION HUB ASSET REGISTER - SOUTH AUSTRALIAN GOVERNMENT

Lucid was engaged by the South Australian Government to assist in the update of asset registers for two of their Data Centres and Telecommunication Hubs.

This included conduction condition assessments to identify the remaining expected life of the assets, identification of budget estimates to inform the capital expenditure forecast for the sites.

All this information was incorporated into the governments asset framework (based on the requirements of ISO51000).

Asset registers were created for the following disciplines:

- Electrical services.
- Mechanical services.
- Fire and life safety services.
- Hydraulic Services.

DUE DILIGENCE AND PREVENTATIVE MAINTENANCE REPORTING - PRECISION GROUP

Precision Group operate shopping centres and commercial buildings throughout Australia. Lucid has been previously engaged to assist in the due diligence assessment of properties prior to purchase this typically involves:

- Development of asset registers for all building services assets.
- Conducting a condition assessment of the assets.
- Development of asset management plan including budget and capital expenditure forecast.
- Identification of high-risk assets based on the organisation objectives (as per ISO31000).

Lucid has also been engaged on some of their operational sites to undertake routine assessment of maintenance activities conducted.

This includes the following scope:

- Review of asset management plans.
- Inspection of assets and maintenance logs to ensure maintenance activities detailed within the asset management plan have been completed.
- Preparation of report detailing findings and subsequent recommendations.







IMAGERY AND DATA CAPTURE

Reality capture plays a significant role in the asset management industry, enhancing the way we inspect, visualise, plan and design.

Lucid employ a range of digital feature capture technology to generate industry standard outputs, with both ground and drone-based capture capability and outputs in both 2D and 3D space. Lucid's data and imagery capture capabilities include but not limited to:

- Inspection of areas which are generally inaccessible or unsafe to physically inspect. This includes 360 photos and
 walk-throughs /or drone-based photography with thermal capability, allowing for enhanced defect inspection, and
 high-resolution imagery capture of current asset conditions.
- High quality feature survey outputs from visualisation purposes to full design development, such as geospatially
 accurate aerial survey maps, photogrammetry models, LiDAR scans and 360 imagery.
- Data capture and outputs include production of 3D meshes and point clouds, commonly used in CAD packages such as AutoDesk Revit and other 3D software

Lucid is fully certified with the Civil Aviation Safety Authority (CASA,) and operate under a ReOC with all remotely piloted aircraft pilots hold CASA issued licenses, and qualified in data capture and processing methodologies.

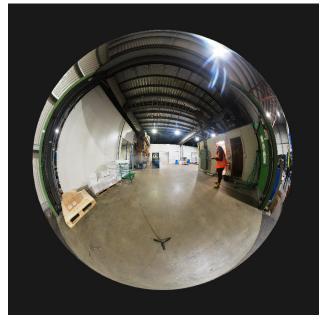
GROUND BASED CAPTURE

360 CAMERA - PANORAMIC PHOTOSPHERES

Lucid's asset inspections are paired with 360 photography, allowing more intuitive methods of data acquisition, visualisation, and analysis. 360 photospheres captured with Lucid's Insta360 X2 cameras are geolocated or can be positioned within supplied floorplan for contextual analysis and represented in visualisation software.

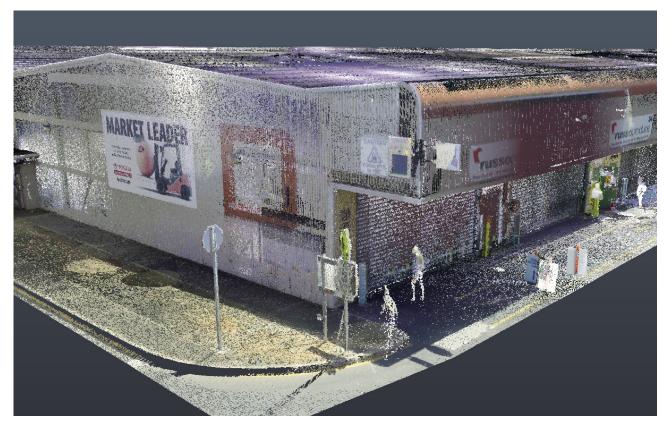
360 CAMERA – WALKTHROUGHS

360 walk-throughs are the 'street-view' of ground-based asset capture, allowing customers to visualise and inspect their site. The added benefit of walk-through captures includes the ability to pick up more details that taking stills may miss. Walk-throughs consist of taking high-resolution videos, which are processed into a streetview post. The 360 camera operation is highly versatile, allowing for tripod, helmet/hardhat or drone mounted capture.





360 Cameras provide full contextual views of capture area.



LIDAR & 3D POINT CLOUDS

Lucid recognises the value of interactive 3D representations of assets, and how spatial data capture methods are revolutionising the industry. Laser scanning and point clouds have made their mark as industry standard formats for asset integrity analysis, inspection, engineering, and design more, with a plethora of methods .

While laser scanners are the default tool for LiDAR capture, photogrammetry allows for 3D point cloud data outputs.





DRONE CAPABILITY

AERIAL MAPPING AND SURVEY

Drones are a safe and efficient way to obtain accurate survey data and maps while also procuring highly detailed, and up to date imagery of a site or asset.

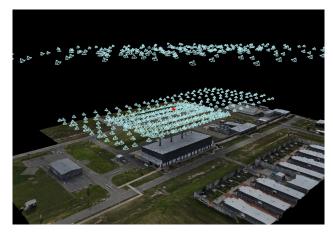
Flying a grid-like pattern over the area, overlapping photographs are captured that are post processed to produce large-scale, high-resolution maps.

Drone based mapping is well suited for:

- Layouts, measurements, and planning for civil, structural, and engineering projects
- Location tracking and positioning purposes
- Industry standard inspections for asset management.
- Imagery for areas that cannot be accessed safely in person.
- GIS applications, such as mapping, and surveying.

Included in Lucid's fleet is the DJI Mavic 2 enterprise drone, equipped with an RTK (Real-Time Kinematic) GPS which provides centimeter level accuracy positioning. This ensures that aerial survey data can be trusted with a maximum tolerance of 50mm.

Embedded GPS positioning from our drone RTK module enables instant integration of aerial mapping imagery into GIS mapping software.



PHOTOGRAMMETRY

Photogrammetry is the process in which 3D models are generated using photos. Multiple images of an asset are captured at various positions and angles and post processed in software to generate the photorealistic 3D model. With drones, photogrammetry capabilities are expanded further, enabling the reproduction of large-scale assets such as buildings, sites, and equipment digitally.

Integration of GPS metadata with high-resolution cameras enables greater geospatial and modelling accuracy and detail of photorealistic models.

Example of Drone based 3D Photogrammetry Capture below.

3D MESH

- Photoreal textures enable life-like representation of assets or environments in a digital environment.
- Measurement of distance, volume, gradients, deterioration, damage, and complex surfaces.
- Consumable in CAD software for engineering and design modelling, as well as simulation modelling software, e.g. load bearing.
- 3D Classification of asset types



POINT CLOUDS

- Photogrammetry also generates industry standard point cloud outputs that laser scanners deliver (LiDAR)
- Used for reference in CAD software in design and engineering.
- Structural integrity analysis
- Al feature recognition use point cloud data for 'smart' modelling.

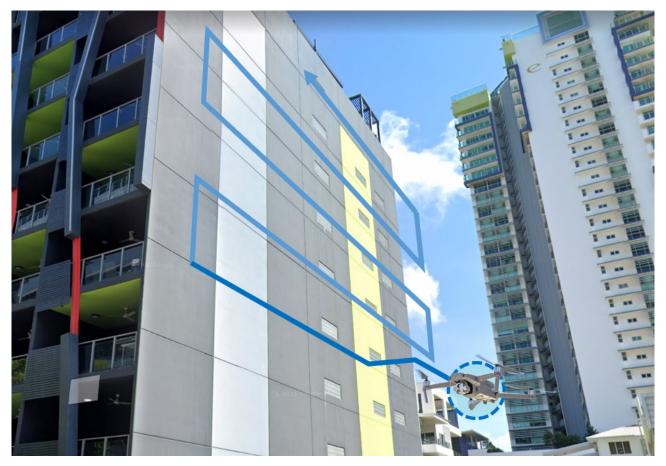
DIGITAL ELEVATION MODELS

- Terrain and elevation models also include contour and relief maps, waterflow and hydrological modelling.
- Beneficial for industries including civil engineering, architecture, infrastructure, and geospatial services.
- Allows for geospatial classification, base mapping, physical geology, and watershed analysis.
- Generated using point clouds.

INSPECTION

Remotely piloted aircraft are an excellent way to obtain access to areas that are difficult or impossible to do safely with personnel.

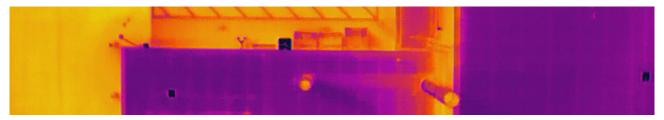
- High altitude inspections.
- Hazardous areas or environments.
- Often faster and more efficient than ground-based capture.



FAÇADE CAPTURE

The rapid advancement inspection technology continues to minimise risks to people and assets in the industrial space. Drones continue to demonstrate their versatility with façade captures, achieving detailed inspections whilst reducing manual involvement and access issues typically involved in assessing the condition of a building face.

Lucid's façade capture capability involves high resolution imagery captured by vertical flight plans, with thermal imagery from the enterprise drones. Aerial façade inspections are either set up as an automated flight plan, or flown manually by Lucid's drone pilots, depending on the complexity of the asset. Façade inspection reports are then generated from the detailed maps and can be viewed in conjunction with 3D drone models.



THERMAL IMAGERY

Lucid offers thermal imagery capture capabilities as part of our drone operations. Thermographic Imaging opens the ability to identify issues in an asset before they aggravate into failures.

Thermal imagery enables:

- Health and functional status of electrical components
- Structural integrity analysis and ability to recognise premature failures
- Ability to assess load bearing operation
- Corrosion, pitting, penetration, and cracks
- Temperature

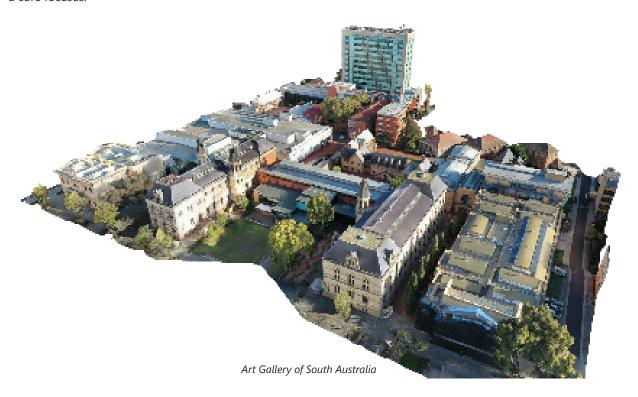
DATA OUTPUT, DELIVERABLES AND VISUALISATION

Lucid values the needs and requirements of our customers, as well as the privacy of their data. 'Drone Deploy' is used as Lucid's software for ground and air-based asset capture visualisation.

The Drone Deploy platform integrates all processed 3D and 2D capture acquired by 360 camera and drone allowing the user visualisation of 360 panorama photos, 360 walkthroughs, photogrammetry meshes, aerial maps, point clouds and floor plans. Analytic tools are also built into the platform such as distance, volume, and area. Being a software as service as a solution, visualisation data can be granted via secure link. Lucid remains closely in contact with Drone Deploy for support and security services.

Raw and processed data outputs can also be delivered directly to the client upon request.

In the rapidly evolving world of data and spatial technology, Lucid remains driven to adapt and lead in this space, with adoption of industry leading data capture methods, processing and visualisation technology remaining as one of Lucid's a core focuses.



QUALITY MANAGEMENT

QUALITY ASSURANCE

Lucid Consulting Australia holds accreditation under ISO 9001. Our Quality Management system was purpose designed for our practice to ensure that it is relevant to all aspects of our operation.

We promote a culture of continuous improvement and embrace the Quality Management System as a framework for the effective delivery of our projects. This, in turn, assures our clients that our project teams remain focussed on the quality of design documentation and delivery by following the system.

The result is an ideal balance between a culture of innovative, robust and efficient design coupled with a system which leaves nothing to chance.

All Lucid personnel are aware of their responsibility to ensure that our Quality Systems are correctly implemented and maintained. Importantly, the scope of the Lucid Quality Management System is not necessarily 'stagnant' but is open to refinement. We constantly strive for improvement.

AIMS OF OUR QUALITY MANAGEMENT SYSTEM

The main aims of the Lucid Consulting Australia Quality Management System include:

- Project initiation including details of all project team members.
- Development of the design brief and 'sign off'.
- Design activities including record of dates for completion of assigned tasks.
- Internal office design reviews at milestone phases in a project.
- Minutes of meetings and distribution to all project team members.
- Document issue, record keeping and filing.
- Enable a consistent output across a National Team.



