



## Energy Conscious Design

For over 20 years Energy Conscious Design (ECD) have been providing mechanical building services consultancy services throughout NZ. Based in Auckland, ECD collaborate closely with clients and project teams, building long term relationships to deliver practical and innovative building services solutions.

Building services bring a building to life and the right design and solutions are paramount to providing resilient comfortable working environments whilst being conscious of energy efficiency, sustainability and maintenance over the life of the systems.

ECD was established in 2003 by Ian Sumner. Initially qualified as a Plumber in the UK, Ian returned to University in London, graduating in 1996 with a First Class Honours degree in "Energy Engineering / Mechanical Building Services". Ian worked with the Building Research Energy Conservation Support Unit (BRECSU) in the UK, before emigrating to New Zealand where he has worked for multi disciplined consultancies and established ECD.

### Services we provide

ECD have a wide range of experience providing engineering consultancy services covering; auditing, design, tender and project management of;

**HVAC** – including projects of all sizes, applications and complexities from a single hiwall HVAC unit to critical data centres and server rooms and 1.5MW of HVAC systems throughout commercial buildings.

**Plumbing / hydraulics** – from small hub kitchen retrofits, domestic hot water, solar hot water and space heating plantrooms to an aircraft taxiway wash-rig (bird bath) with a water flow rate of over 130 litres per second.

**Critical facilities** – air conditioning, extraction and backup power systems for server rooms, data centres, aircraft simulators, telecom exchanges and television studios and transmission centres throughout New Zealand. These have ranged in size from small server rooms to infrastructure for TVNZ and the NZDF.

**Industrial extraction** – ECD have completed projects for many applications within different industries including; industrial ventilation, process and health extraction, process engineering and swimming pool heating and services for corporate, educational, industrial, manufacturing and Defence Force clients.

**Building services operational and condition assessments** – from reviewing the operation of simple single systems to operational reviews and condition assessments of mechanical building services throughout buildings.

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## Sample projects

<b>HVAC</b>	
<p>Auckland University of Technology (AUT) building WH – design for the replacement of the central plant serving this five storey educational building including chilled water, heating and DHW systems with heat pump chillers and CO<sub>2</sub> heat pump DHW heating.</p>	
<p>New Zealand Defence Force (NZDF) SY92 decarbonisation project – design for the replacement of the central space heating boiler and chiller serving this waterfront NZDF building with a heat pump chiller.</p>	
<p>AUT building WB (Historic Building) – replacement of the old split type HVAC and fresh air systems throughout this 4 storey educational building, including full refurbishment and fitout to remove asbestos throughout the building.</p>	
<p>AUT multiple projects – design and project management of over 50 HVAC projects since 2013 including full building, multi floor, multi room and single room HVAC fitouts using chilled and heating water systems, VRF, HVRF, natural ventilation and split type HVAC systems.</p>	
<p>NZDF, RNZAF Base Auckland – design and project management for the full replacement of the HVAC systems serving the Sunderland / Base HQ building including new chiller, new chilled water reticulation pipework and new air conditioning systems throughout the building.</p>	
<p>NZDF, RNZAF Base Auckland - C130 and Orion P3 Aircraft simulator buildings – identify the reasons for the existing HVAC system deficiencies, including excess humidity, air flow rates and pressure. Design and project manage the upgrades to resolve the system deficiencies including new packaged HVAC systems and controls providing temperature and humidity control of these large spaces.</p>	
<p>NZDF Dive School – review existing HVAC systems and recommend upgrade and associated costs for this two storey building using split type HVAC units.</p>	
<p>NZDF Gym ventilation upgrades (multiple sites) – review the existing and design the upgrade of the ventilation and conditioning systems to condition and dehumidify the gyms on the Devonport, Narrowneck and Papakura bases.</p>	
<p>NZDF, RNZAF Base Auckland Avionics centre - determine reasons for a chiller system explosive failure, recommend solutions, design and project manage the upgrade works.</p>	
<p>NZDF multiple projects, multiple sites – HVAC, heating, ventilation and plumbing upgrade and new installation projects. Approximately 200 projects completed since 2003 ranging from whole building HVAC replacements through to air and water services for specialist, operational and secure facilities, swimming pools, hospitals, industrial, manufacturing and process facilities. Site services includes site wide water reticulation upgrades and hydrant system upgrades.</p>	

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**Local Government - Independent consultant** – engaged to provide independent consultancy services and to liaise with all parties to resolve issues on two multi-million dollar major fitout HVAC projects. By the time of our engagement by the clients on each of these projects, both projects had turned into legal disputes between the clients and the existing project design consultants. ECD managed to successfully resolve the technical and litigation issues on both projects to the satisfaction of all parties.

### Plumbing and hydraulics

**AUT building WC** – Replacement of the DHW systems serving building WC which provides a gym, kitchens and administration spaces. Conversion of the gas boiler heated DHW system to multiple cylinders heated by CO<sub>2</sub> heat pumps.



**AUT building WH** – design for the replacement of the central plant serving this five storey educational building including gas boiler heated DHW systems to CO<sub>2</sub> heat pump DHW heating.

**AUT multiple projects** – design and project management of multiple plumbing projects either for upgrades or full building, multi room or single room fitouts, kitchen hubs and bathroom facilities.

**Ryman Healthcare Grace Joel, Auckland** – review, recommend and project manage the construction and the replacement of the central space and DHW heating systems serving this resthome and hospital.



**NZDF** – replacement of central plantroom, space and DHW heating in multiple NZDF buildings and facilities, design and project management of the plantroom upgrades which included;

- **NZDF Narrowneck Devonport** - new central space heating and hot water services serving barracks including steam boiler replacement.
- **NZDF Philomel Devonport** - new central space heating and hot water services serving barracks including steam boiler replacement.
- **NZDF Linton** - new barrack central space heating, domestic hot water heating and solar water heating central plant replacements.
- **NZDF Papakura** - conversion of three DHW heating plantrooms from being heated by boilers to be heated by heat pumps.
- **NZDF Papakura** - upgrade of the central DHW and space heating systems serving the Mess kitchens and dining areas.

**NZDF, RNZAF Base Auckland** – design and project management of the replacement of the "Birdbath" aircraft taxiway washrig including liaising with Defence staff and aircraft for the design and location of water nozzles.



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<p>NZDF <a href="#">multiple projects on multiple sites</a> – review, recommend, design and project manage multiple plumbing projects to upgrade or for full building, multi room or single room fitouts, kitchen hubs, bathroom and showering facilities in barracks, hangars, offices and workshops.</p>	
<p>NZDF, RNZAF Base Auckland – design and project management for the replacement of the swimming pool heating and water treatment systems.</p>	
<p>NZDF, RNZAF Base Auckland – design and project management for the installation of heat recovery from a refrigeration system to heat the swimming pool.</p>	
<p>BUPA Healthcare NZ – central space heating and DHW plantroom upgrades – design, supply, installation and management of the plantroom upgrades which included, temporary services, replacement boilers, solar water heating systems and DHW cylinder replacements within approximately 30 BUPA resthomes throughout NZ.</p>	
<p>Solar water heating systems – feasibility, design, supply, installation and project management of solar water heating systems for schools, universities, commercial and residential buildings, including the Fonterra head office in Auckland, Copthorne hotel Bay of Islands, multiple Ryman and BUPA resthomes, SkyCity Hotel Auckland, New Plymouth Police Station, Ohakea Airbase, Pipitia Plaza, GCHQ, Victoria University and the BRANZ offices.</p>	
<p>Solar water heating system feasibility studies - for Wellington Regional Council and Wellington City Council multi tenancy buildings.</p>	
<p>EECA / SIA - Generated the report and recommendations for which approach NZ should establish as the basis for a NZ Standard for testing methodologies and accreditation of solar water heating systems for the Solar Industries Association and EECA.</p>	
<p><b>Critical facilities</b></p>	
<p>NZDF <a href="#">multiple sites (existing server rooms)</a> – review of HVAC systems serving existing critical server rooms on multiple NZDF sites and the design, tender and construction project management for the upgrade of the conditioning systems serving these existing server rooms.</p>	
<p>NZDF <a href="#">multiple sites (new server rooms)</a> – design, tender and construction project management for the installation of HVAC systems to condition multiple new server rooms.</p>	
<p>NZDF <a href="#">Communication centre</a> - determine the reasons for corrosion forming within and causing failure of the communication equipment in the NZDF Communications centre. Design and project manage the upgrade works including temporary conditioning and dehumidification control and the construction of a new server room to house the communication equipment.</p>	
<p>TVNZ <a href="#">multiple server rooms</a> - design and project management of conditioning of the TVNZ Project Manawa and CAR broadcast computer facilities. Completed while employed by URS.</p>	



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**Telecom NZ multiple server rooms** - design and project management of conditioning of multiple Telecom server rooms. Completed while employed by URS.

**Multiple clients and multiple critical sites** – mechanical design and project management for upgrading generator and fuel systems for multiple clients and multiple sites including Telecom, EDS, Air NZ. Completed while employed by URS.

### Building services operational and condition assessments

**University of Christchurch Ernest Rutherford building** – condition assessment and operational review of services within the Ernest Rutherford Building which was constructed in 2016. Review included HVAC, ventilation, laboratory ventilation and extraction, plumbing, heating and the central site fire fighting water pumping systems.



**University of Christchurch West building** – condition assessment and operational review of services within the SC02 West building, a nine storey educational building originally constructed in 1961 that contains laboratories and educational spaces as well as offices. Review included HVAC, ventilation, laboratory ventilation and extraction, plumbing and heating systems.



**University of Christchurch Rehua building** – condition assessment and operational review of services within the Rehua building, a nine storey educational building originally constructed in 2001 with an extensive refit in 2016 that contains laboratories, workshops and educational spaces as well as offices. Review included HVAC, ventilation, laboratory ventilation and extraction, plumbing and heating systems.



**University of Christchurch (EN buildings)** – condition assessment and operational review of services within the four engineering education buildings, EN02, EN03, EN04 and EN06, two storey buildings originally constructed in the 1950's with an extensive refit in 2019. These buildings contain laboratories, workshops and educational spaces as well as offices. Review included HVAC, ventilation, laboratory ventilation and extraction, plumbing and heating systems.



**AUT Building WF** – condition assessment and reporting on mechanical services in this 10,850m<sup>2</sup> educational building in Auckland. Review included HVAC, ventilation, plumbing and heating systems.



**DB Breweries Auckland site** – condition assessment of services within each of the buildings on this site. The buildings contain offices and administration areas, warehousing, manufacturing, laboratories and workshops. Review included HVAC, ventilation, laboratory ventilation and extraction, plumbing and heating systems.



**NZDF Ardmore BTF facility** – condition assessment of HVAC systems serving the various spaces in this facility. Report the observations and recommended actions.



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### Industrial extraction

NZDF multiple sites – design, tender and construction project management for the installation of multiple industrial ventilation and extraction systems including, Whenuapai Hangar 2 NDT bay, Paint shop, Crud Bay, Narrowneck Soldering Bay and the Papakura Soldering Bay.

NZDF multiple sites – design and construction project management for the installation of multiple ventilation extraction and dehumidification systems serving armouries and night vision storage facilities.

AUT Multiple facilities – design, tender and construction project management for the installation of multiple ventilation extraction and dehumidification systems serving laboratories and storage facilities.

### Fire Services

RNZAF Base Auckland site wide fire detection and alarm system upgrade – design, tender and construction project management for the upgrade and installation of fire detection, alarms and escape upgrades for all buildings on RNZAF Base Auckland including a new central monitoring system for the onsite NZDF Fire Service.

NZDF Kauri Point – design and project management for the replacement of a new hydrant system and water storage tank to serve the NZDF Kauri Point armaments depot, sprinkler systems to serve new commercial buildings and modifications of systems to serve fitouts. Completed while employed by URS.

## Contact Details

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