



*Innerscape Ltd*

Building Services Consultants and ESD Specialists



## Curriculum Vitae



**Ken McKenzie**- Director / Mechanical Engineering Consultant  
BE (Hons), MIPENZ, CPEng, NZCE (Mech)

### Qualifications:

- Chartered Professional Engineer – IPENZ
- GSNZAP – Green Star Accredited Professional
- Bachelor of Engineering - Mechanical (with Honours). University of Canterbury, Christchurch NZ.
- NZ Certificate of Engineering - Mechanical. C.I.T. Wellington NZ
- Journeyman Fitter/Turner Machinist. Wanganui NZ

**Specialization:** Mechanical Building Services: Commercial, retail, civic, education, institutional, healthcare, industrial, and residential applications. Environmentally sustainable design (ESD).

### Professional Affiliations:

IPENZ, ASHRAE, APEGGA, NZ Green Building Council

### Summary of Selected Projects:

Ken is a senior Mechanical Engineer with over 20 years consulting experience in the design, contract administration, project management, construction, and commissioning of a large variety of projects in New Zealand and overseas. Ken has an in-depth knowledge of building services and has provided mechanical services design and/or supervision on the following selected projects:

- Kathleen Kilgour Center, Tauranga. Advanced new 3,000m<sup>2</sup> radiotherapy clinic with state-of-the-art medical equipment and holistic ESD design approach. The multi story facility houses 3 linear accelerator bunkers, brachytherapy suite, CT scanner suite, recovery rooms, consulting offices, meeting rooms, administration offices, and technical support spaces. Building Information Modelling (BIM) utilizing Revit software was used by all design consultants with models combined and analysed for coordination and clash detection. Provided ESD technical advice, and mechanical and hydraulic services design and construction observation. Services included high efficiency air cooled chiller and condensing boiler systems, linac chiller systems, power fresh air and mixed mode natural ventilation, fancoil air conditioning systems, medical gases, plumbing and drainage systems, natural gas reticulation, rainwater harvesting, and BMS controls.
- Wintec Trades and Engineering Development, Rotokauri Campus, Hamilton. Mechanical and hydraulic consultancy services. This \$25M project involved establishment of a new multidiscipline training facility designed to accommodate the latest learning pedagogies and maximize flexibility for future revisions. The facility includes administration areas, learning studios, labs, breakout spaces, and automotive, heavy auto, fabrication, carpentry, joinery, plumbing, welding, and general workshop and equipment/materials storage areas. Systems include high efficiency air cooled chiller and condensing boiler systems, heat recovery ventilation, mixed mode natural ventilation, air conditioning, radiant ceiling panel heaters, compressed air, natural gas, welding gases, specialty dust extract, welding extract, plasma extract, grinding extract, and hazardous space extract systems, and BMS controls.
- Mystery Creek Headquarters, Hamilton. Modern new iconic 1,050m<sup>2</sup> headquarters building for Mystery Creek, blended into the riverbank with panoramic views overlooking the event grounds. This

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building required extensive and detailed services coordination, with a high level of finish required on exposed services. Building services were designed to be “eco-friendly” and included high efficiency VRF heat recovery heat pump systems, heat recovery fresh air and exhaust ventilation system, programmable central HVAC controller, solar hot water, rainwater harvesting and storage for fire-fighting water supply, sanitary fixture flushing, and landscape irrigation.

- Vinegar Lane Apartments, Auckland. New 5 level development with 1,950m<sup>2</sup> total floor area comprised of ground floor retail and café tenancies, and 4 levels of apartments. Provided H1 calculations and compliance report; fresh air ventilation and café, WC and range hood extract system design, and hydraulic plumbing and drainage services design.
- Manuka Health, Te Awamutu. New 5,000 m<sup>2</sup> footprint honey processing and distribution warehouse, and head office facility. The building included 2 levels of reception/visitor centre, office accommodations, laboratory, hot room, tipping room vat room, packaging, and staff facilities, as well as a temperature controlled drum warehouse and a distribution warehouse. The consultant design brief was to develop a world class healthcare facility to meet all environmental and statutory standards for food and pharmaceutical production. Mechanical systems include VRF heat recovery heat pump systems for office and production areas; packaged rooftop heat pump unit with economizer section and high level reticulation ductwork for the drum warehouse; underfloor radiant heating system powered by a specialized high temperature heat pump for the hot room; coolstore refrigeration equipment; process heating and cooling plant including water chiller, LPG fired condensing boiler, and cooling tower; miscellaneous extract ventilation systems and controls. Also designed the rainwater harvesting system, plant and domestic hot water heating systems, and hot water, cold water, and non-potable water reticulation systems.
- Zealong Tea, Hamilton. New 1,200 m<sup>2</sup> visitor/admin building and 1,700m<sup>2</sup> tea production facility. The overall project budget is projected to be \$4.5M. The visitor/admin building includes reception, gallery/museum and conference rooms, function space, commercial kitchen, tea tasting, office, staffroom, and archive areas, and ablution services. The tea production facility incorporates tea processing, packaging and storage areas for efficient production of the company’s products, together with staff facilities. The tea production facility includes industrial canopy hoods and extract systems, chiller and HVAC air handler, dust extract, general extract and WC/shower extract systems, filtered make-up air systems, individual heat pumps, coolstore refrigeration, production plant cooling tower, and associated ductwork, fans, piping, pumps, and controls. The visitor/admin building includes VRF heat pump systems, WC and kitchen canopy extract systems, and fresh air ventilation systems.
- 247 Cameron Building (ANZ Business Centre), Tauranga. New \$30 million landmark business centre building with 8000m<sup>2</sup> of A-grade office space, an auction room and a licensed cafe, as well as parking for 155 vehicles. Advertised as the largest office development in Tauranga for nearly 20 years. Provided HVAC system conceptual layouts, performance tender documentation, design peer review, and construction observation for base-building services. Provided detailed design for Norris Ward McKinnon and Bayley tenancy fit-out works. Provided full hydraulic services design and tender documentation, and construction observation services. Services included a VRF heat recovery heat pump technology driven fresh air system, VRF tenancy fancoils, and central controller.
- Sharpac Building, Tauranga. The BOP’s first NZGBC Green Star 4 star accredited office development. \$9.0M, 2,530 m<sup>2</sup> NLA plus two levels of underground carparking. Designed the mechanical and hydraulic services and provided the building thermal and energy computer simulation models for building system optimization, and for Green Star submission. Key features included in the building system designs were: energy efficient lighting and zone control; enhanced (code +50%) fresh air ventilation rates; heat recovery ventilation; VRF heat recovery heat pump technology using zero ODP refrigerants; CO<sub>2</sub> air quality monitoring, and automatic fresh air controls; meeting room



occupancy sensors to energize lighting and HVAC systems; rainwater harvesting and non-potable reticulation for WC flush; and a computerized building management system. Project was awarded a rare innovation point by NZGBC Green Star for a new concept compact high performance multizone heat recovery ventilation system designed by Ken McKenzie.

- Fast Lane Fitness, Hamilton. New 3,300m<sup>2</sup> recreational facility incorporating a 25m x 25m swimming pool, continuous flow training pool, wet training area, gymnasium, reception, café, and administration areas, and mezzanine level function/viewing area. Mechanical services included packaged rooftop heat pump unit c/w economizer and fabric ductwork for the gym, heat recovery VRF heat pump system with ducted, ceiling cassette, and highwall units for offices, spin, aerobics, and reception areas, heat recovery ventilation system for the WC and shower areas, specialized energy efficient Calorex pool ventilation system with fiberglass and fabric ductwork designed to control pool area humidity and temperature, and transfer waste heat into the pool as required, supplemental natural gas fired pool heating boilers, and plant space ventilation systems.
- Kakariki House Redevelopment, Hamilton NZ. Waikato's first NZGBC Green Star 4 star accredited building. \$4.3M project involved conversion and upgrade of building into 2,750 m<sup>2</sup> open plan ground floor and mezzanine office, meeting, and training rooms. HVAC systems design and building thermal and energy computer simulation modeling and calculations for building system optimisation, and Green Star submission. Key features included: enhanced fresh air ventilation rates; heat recovery ventilation; heat pump technology using zero ODP refrigerants; economiser free air cooling, CO<sub>2</sub> air quality monitoring, and automatic fresh air controls; meeting room occupancy sensors to energise lighting and HVAC systems; and computerised building management system.
- Don Rowlands Event Centre, Karapiro. New event centre, designed for the 2010 World Rowing Championships. Building incorporates large multipurpose sporting/event space, function rooms, cultural space, and back of house commercial kitchen, and ablution areas. Energy efficient and stand-alone heat pump systems with user friendly controls were utilized for the independently operated cultural and function spaces, with radiant heat and power ventilation provided for the multipurpose space. DCW and DHW reticulation included 60°C and tempered supplies for kitchen and ablutions.
- Te Wharekura o Mauao, Bethlehem. Mechanical, Hydraulic, and ESD consultancy services. Project involved establishment of a new school campus with administration block, teaching spaces, multipurpose/gym, and cultural learning centre with library, and performance space. VRF and stand-alone heat pumps, high efficiency condensing boiler and radiant ceiling panel heaters, natural and power ventilation systems, and hydraulic services including rainwater harvesting, low water consumption fittings, and grey water flush.