



**Construction
Clients' Group**
CONSTRUCTING EXCELLENCE



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Sustainability: the Meridian Building

"Best practice in action"

Matthew Bassett

Category Manager – Corporate Real Estate

27 July 2011



About Meridian

- New Zealand's largest electricity generator, supplying one third of the nation's power
- All generated from renewable sources - Hydro (93%) and Wind (7%)
- Our customer load is split between RTANZ Tiwai Point facility (40%), Business & Rural customers (36%) and 185,000 Residential customers (24%)
- Internationally we have generation in Australia, USA (solar), and Antarctica
- We have a strong portfolio of generation options at various stages
- Subsidiaries and other activity
 - Whispertech – CHP units
 - Arc Innovations – smart meters
 - PowerShop – online Electricity retailing portal
 - Damwatch – hydro dam monitoring and design
 - Energy for Industry – industrial on site energy solutions



Project Kumutoto - Overview

- **Tight on Space** - In 2004, current office space was projected to be insufficient by lease renewal dates so a project was initiated to solve this problem
- **‘Walk the Talk’** - Opportunity to align corporate statement using office accommodation as a demonstration of the brand values represented by Meridian
- **Getting Informed** - Process of self education embarked upon before formally approaching the market for a solution – wanted to be an educated client
- **Strategy Conversion & Alignment** – Business Strategy to Property Strategy
- **Performance Specification** – *‘Get what you want’ or ‘Get what you’re given’*





Working Environment Strategy



Meridian Energy

Working Environment Strategy





Strategic Framework

'To achieve the physical embodiment of Meridian Energy's GIC by providing a work space that sets the standard for ESD, cost effectiveness and user experience'

Vision	Cost effectiveness	User experience	ESD
Goals	Demonstrate the value of ESD in a commercial context	Create a healthy safe and exemplar office building as a point of difference	Leverage our building to align with our brand and Renewables Strategies
Objectives	Total occupation cost neutral or better compared to a conventional (non ESD) commercial office development over a 20 year period	Office environment that improves user satisfaction to at least +5% A "wowness" factor	Energy usage of 80kwh/m ² /pa – 31kgCO ₂ /m ² /pa Water usage of 0.16m ³ /m ² /pa 4 ½ + Green Star
Defining Aspects	Cost Programme Commercial terms	Working Environment Indoor Environment Quality Aesthetics Amenities	Energy Efficiency Water Conservation Materials Management & Operations Star Rating



Performance Specification

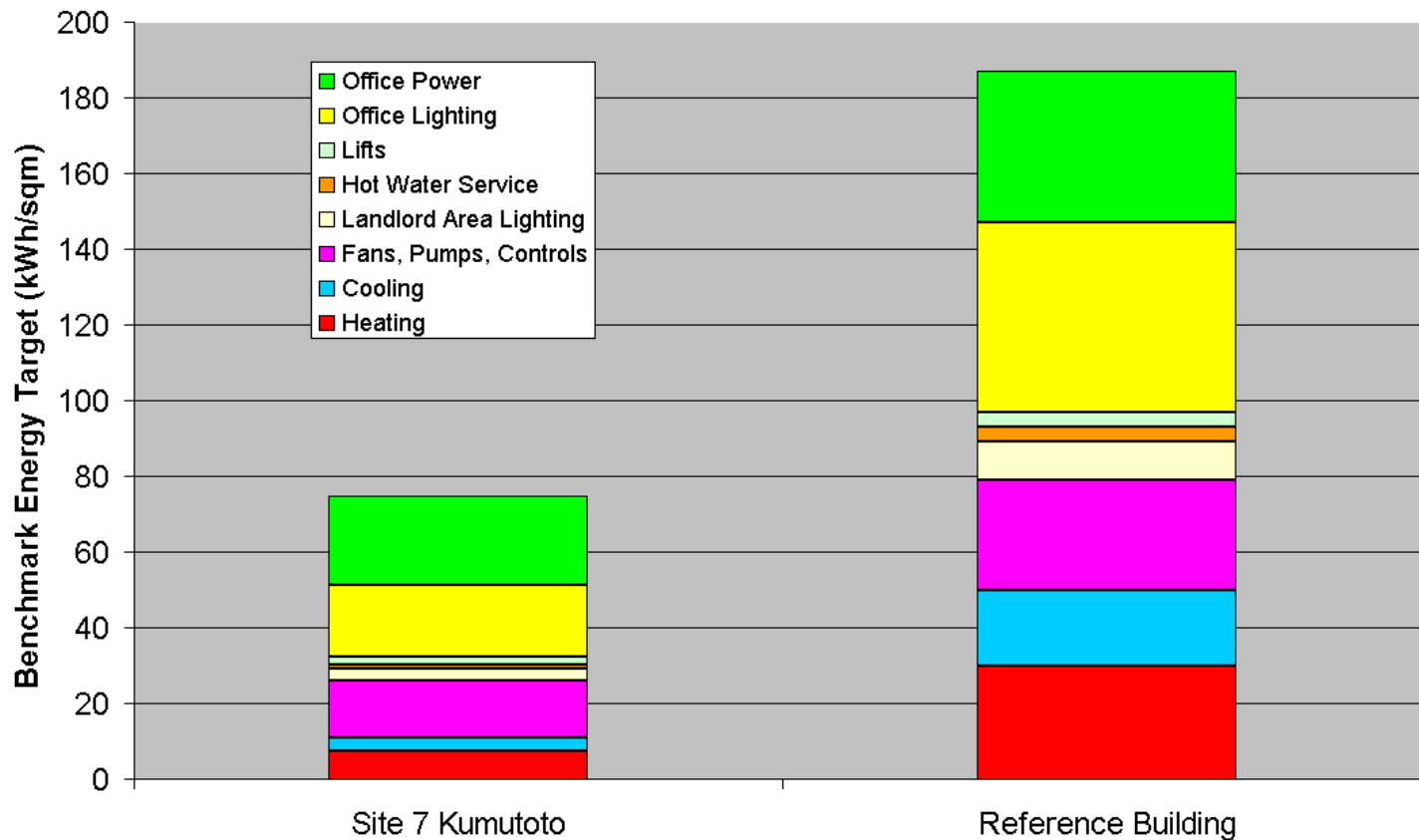
- **Defining Aspects** - 21 Defining Aspects supported by 104 Performance Objectives with supporting Performance Requirements

- ✓Cost
- ✓Commercial Terms
- ✓Programme
- ✓Working Environment
- ✓Indoor Environment Quality
- ✓Architectural/Aesthetics
- ✓Amenities
- ✓Energy Efficiency
- ✓Water Conservation
- ✓Materials
- ✓Management Operations
- ✓Building Common Areas
- ✓Working Floors
- ✓Lifts
- ✓Services
- ✓Green Star
- ✓IT
- ✓Exterior
- ✓Structural
- ✓Security
- ✓Electrical

Defining Aspect	Category	Performance Objective	Green Star	Performance Requirement
Cost	As per Development Agreement and Deed of Lease	Maintain cost equivalency or better with conventional building on a total occupancy cost basis		Total occupation cost no more than \$xxx/m2/pa including naming rights, landlord operating costs and tenant energy consumption over office floor NLA
Energy Efficiency	Mixed (Natural and Mechanical) Mode HVAC System	Minimise energy use with the use of natural ventilation when appropriate climatic conditions allow. Mechanical heating, cooling and ventilation to be used at other times to maintain stated comfort range	IEQ1 IEQ2 IEQ3 IEQ16 Wat 4	Internal air temperature range 21°C to 24°C For natural ventilation mode 19°C to 25°C based on NIWA 2.5% design conditions.. Mechanical ventilation system with heat recovery to offset otherwise increased energy requirements

Energy Use Target

Design Annual Energy Benchmark for Site 7 Kumutoto Base Build

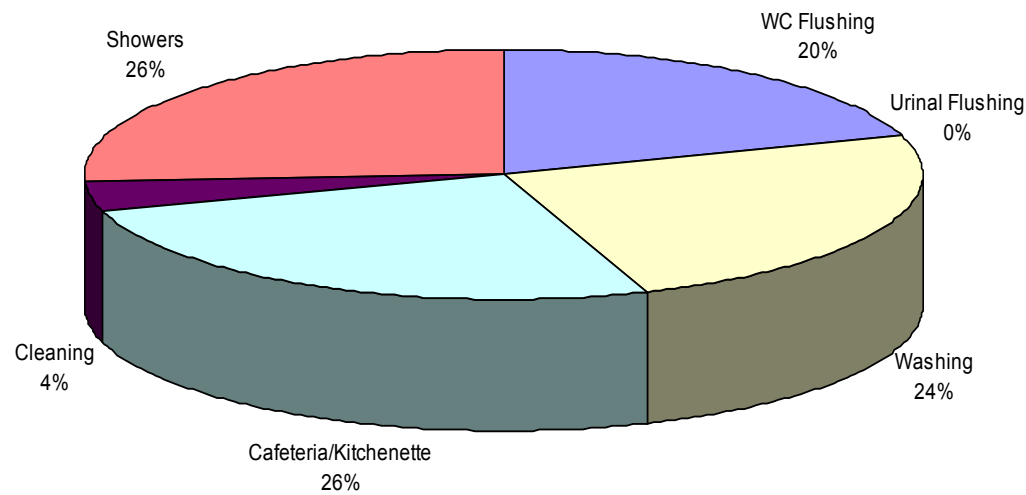


Water Use Target

34 litres per person per day

vs

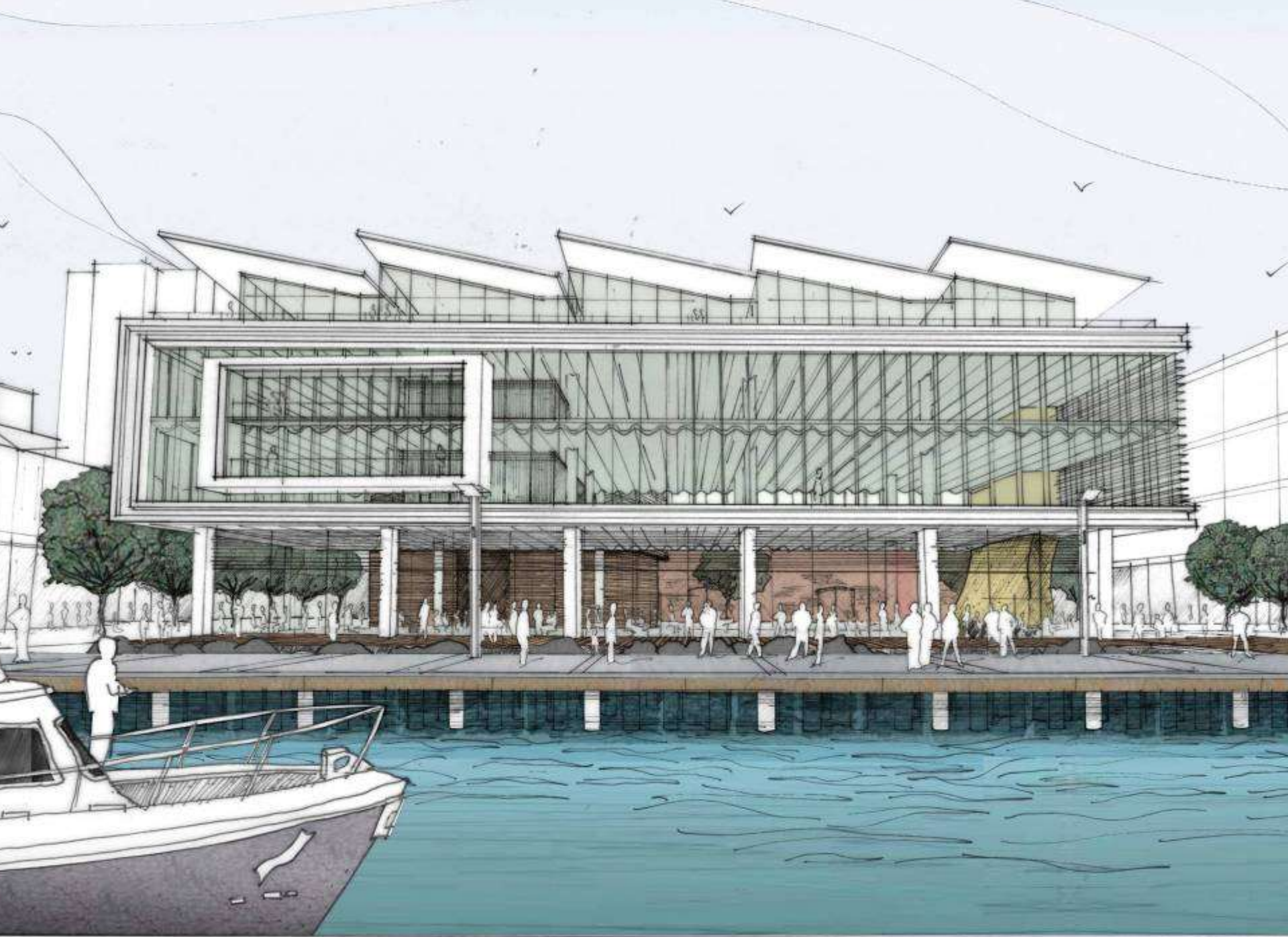
13.5 litres per person per day

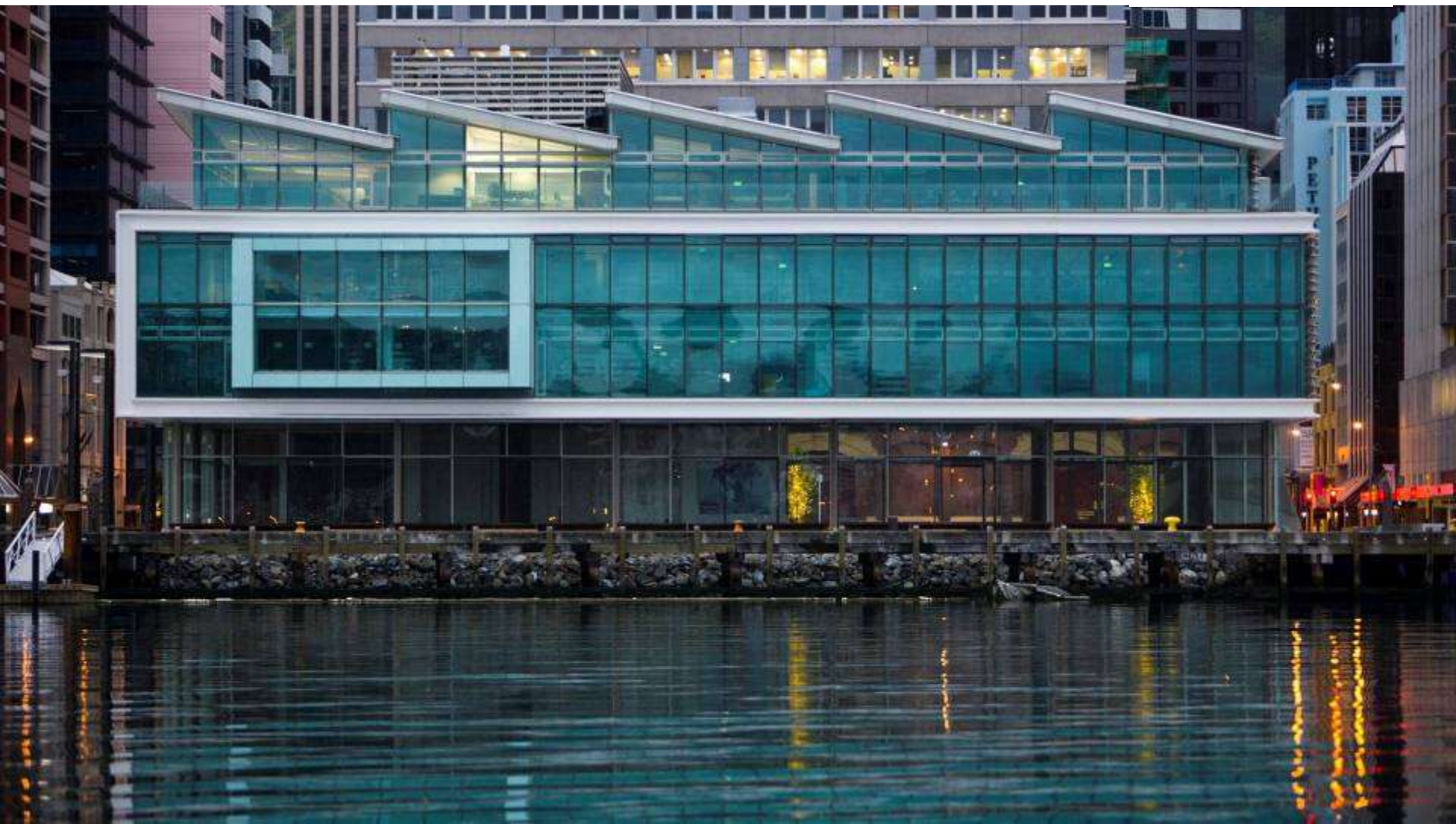


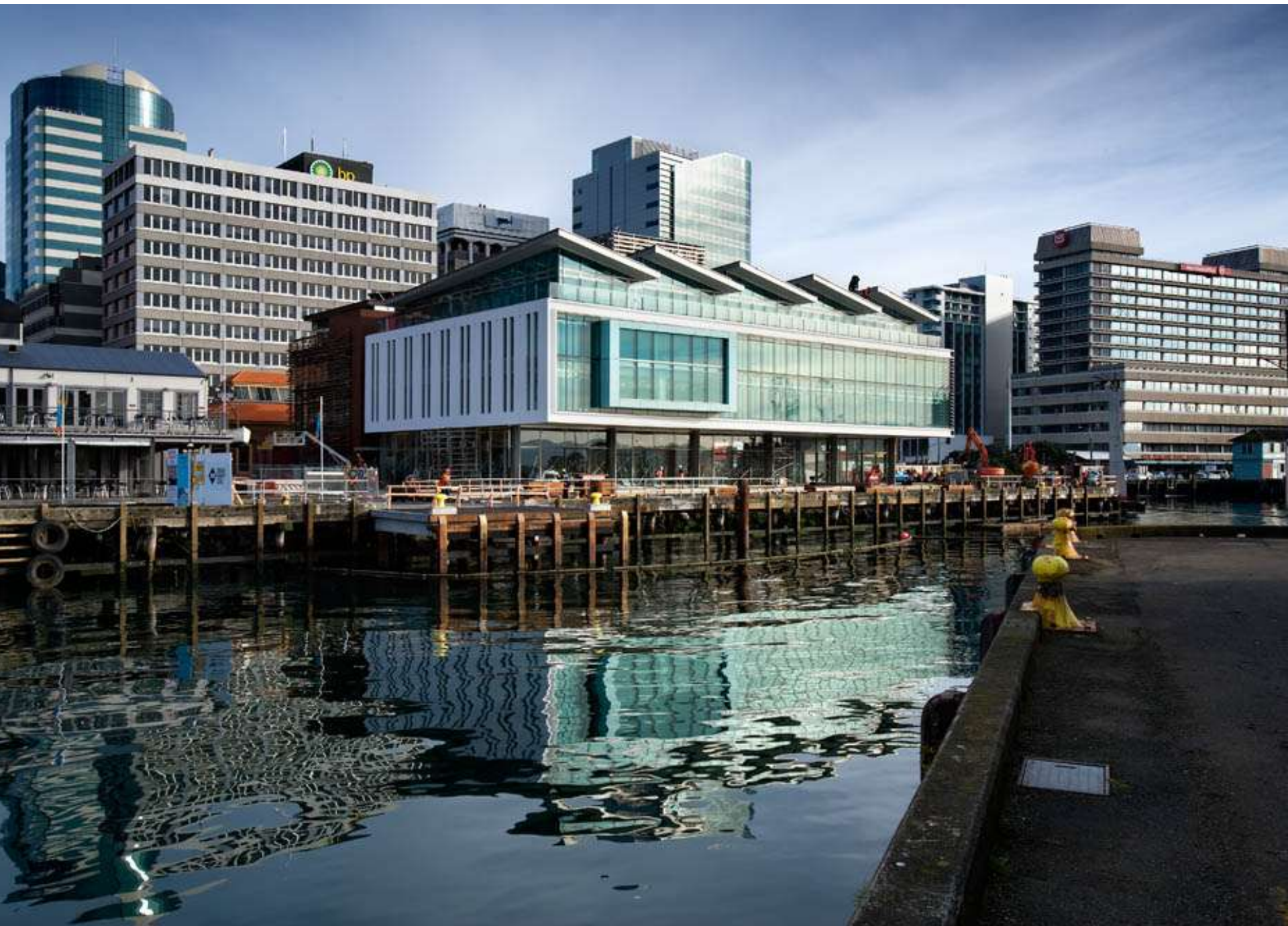
So...how did we go?

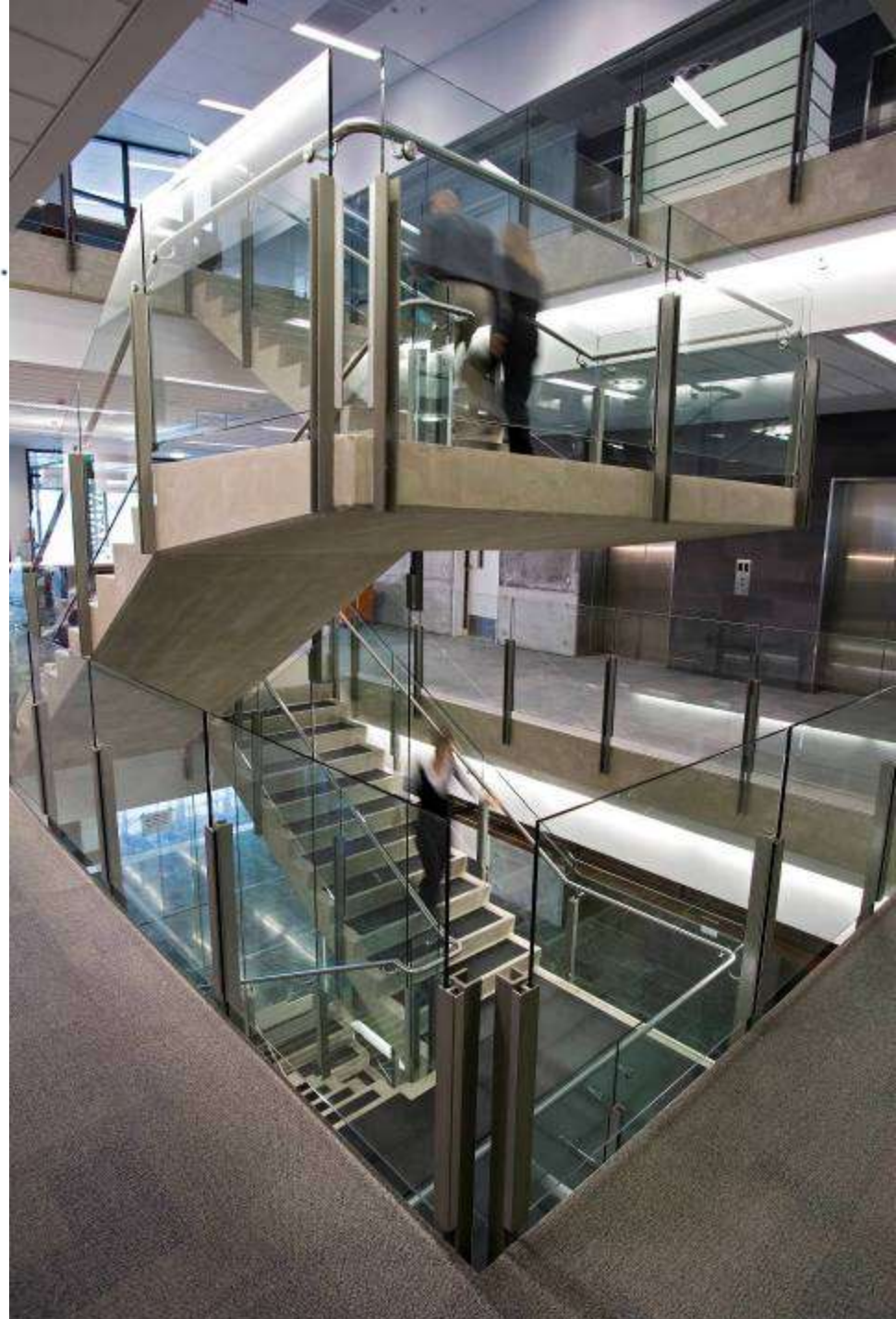
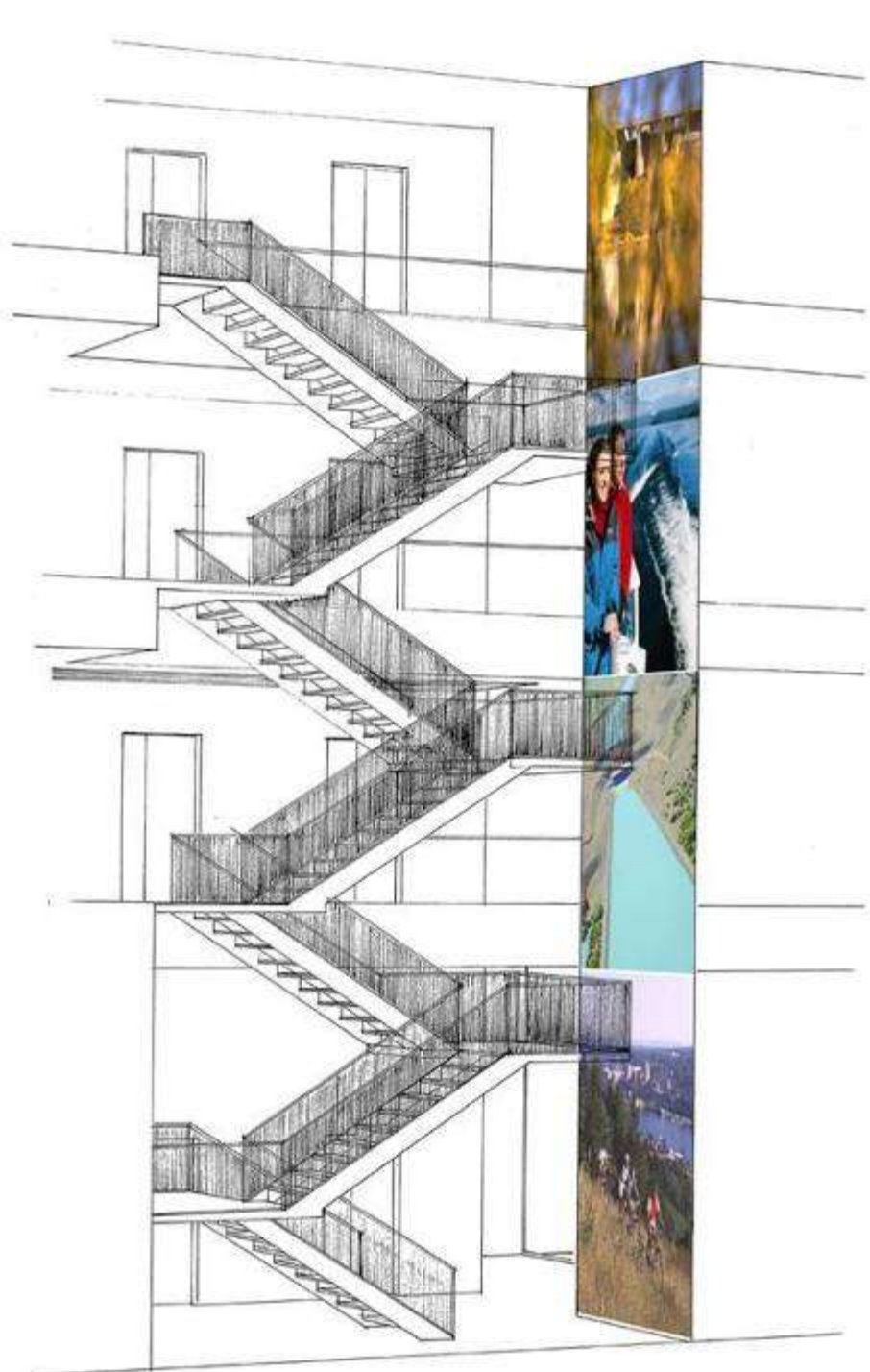
Plan vs Reality













USE OTHER EXIT
PLEASE DO NOT ENTER

EXIT

WAITAKI









'Green' Features

- Integrated design of building and services
- Climate responsive facades – adapt to suit the ambient conditions
- Exposed structure assists passive temperature control
- Daylight harvesting and automated dimming of lighting
- 'Mixed mode' natural ventilation and mechanical ventilation
- 100% outdoor air supply with energy recovery (75% efficiency)
- Heat pump heating and cooling
- Solar hot water heating
- Rainwater collection and recycling, waterless urinals
- Environmentally preferable materials selection
- Reduced embodied energy
- Photovoltaics

North Facade



Opening Windows



Motorised Louvres

Annex Facades



North - Fixed Louvres
West - Fixed and Motorised Louvres

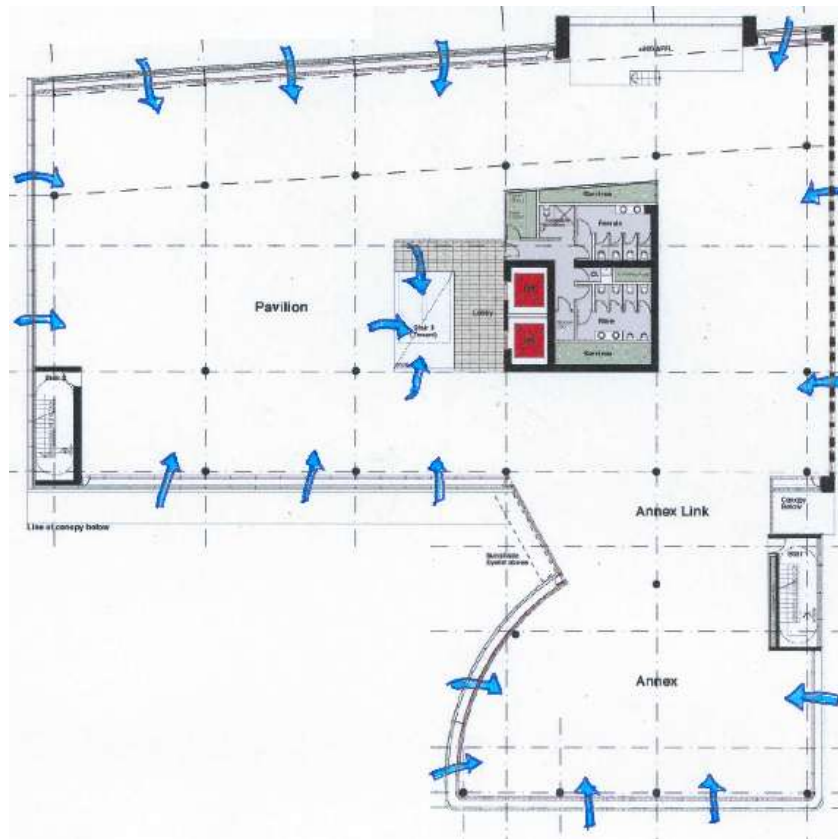




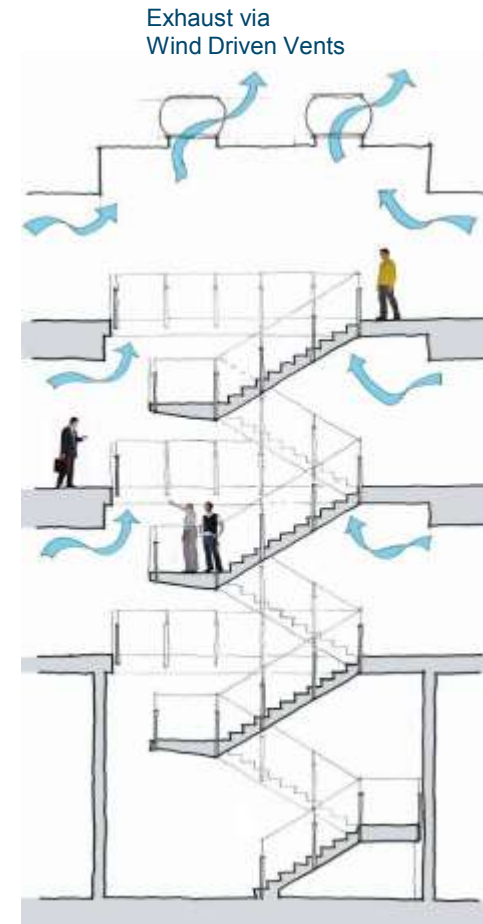
Ventilated Double Skin Facade



Natural Ventilation Mode



Natural Ventilation Plan

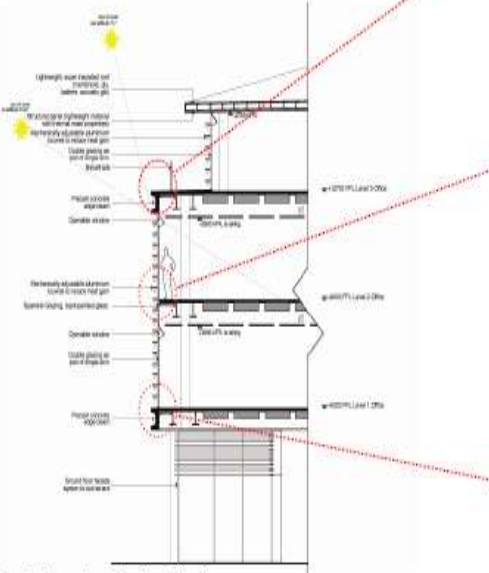


Circulation Stair

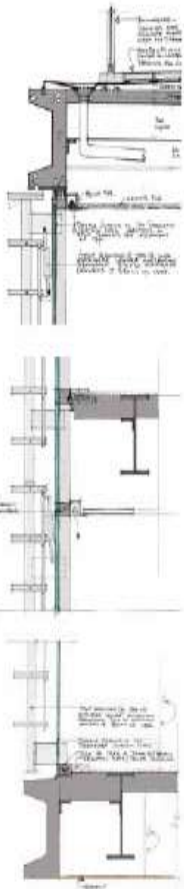
... but really?



North Façade



Pavilion North Façade – Typical Section



Keeping a Track

- Quarterly Reporting since occupation
- Energy
- Water
- Base Building
- Tenant
- Compared against targets

Report

Site 7 Kumutoto ESD Outcomes Quarterly Reporting April 2009

Prepared for Mallard Cooke Ltd (Client)

By Beca Carter Hollings & Ferner Ltd (Beca)

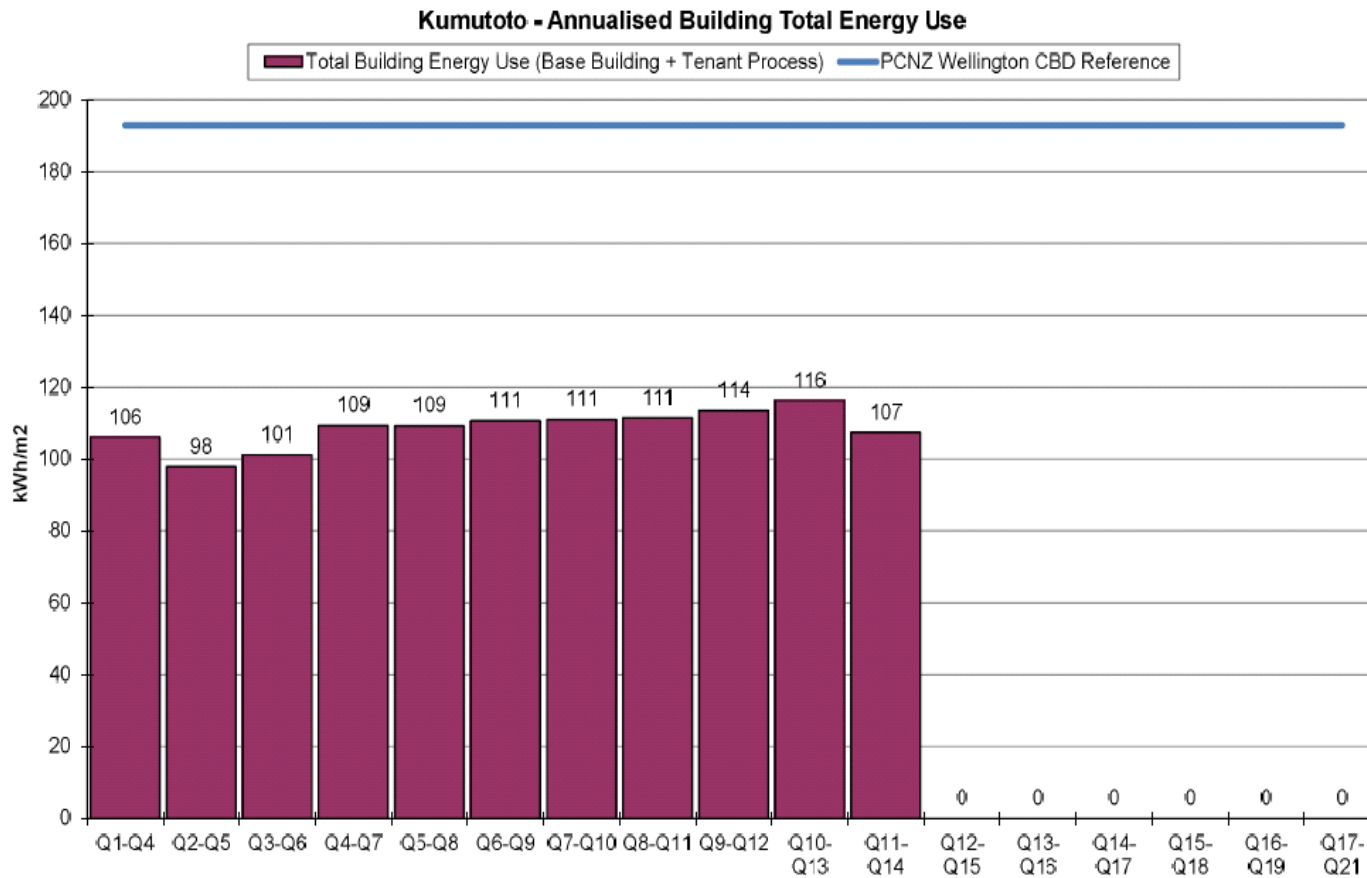
28 April 2009

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Electricity Benchmarked

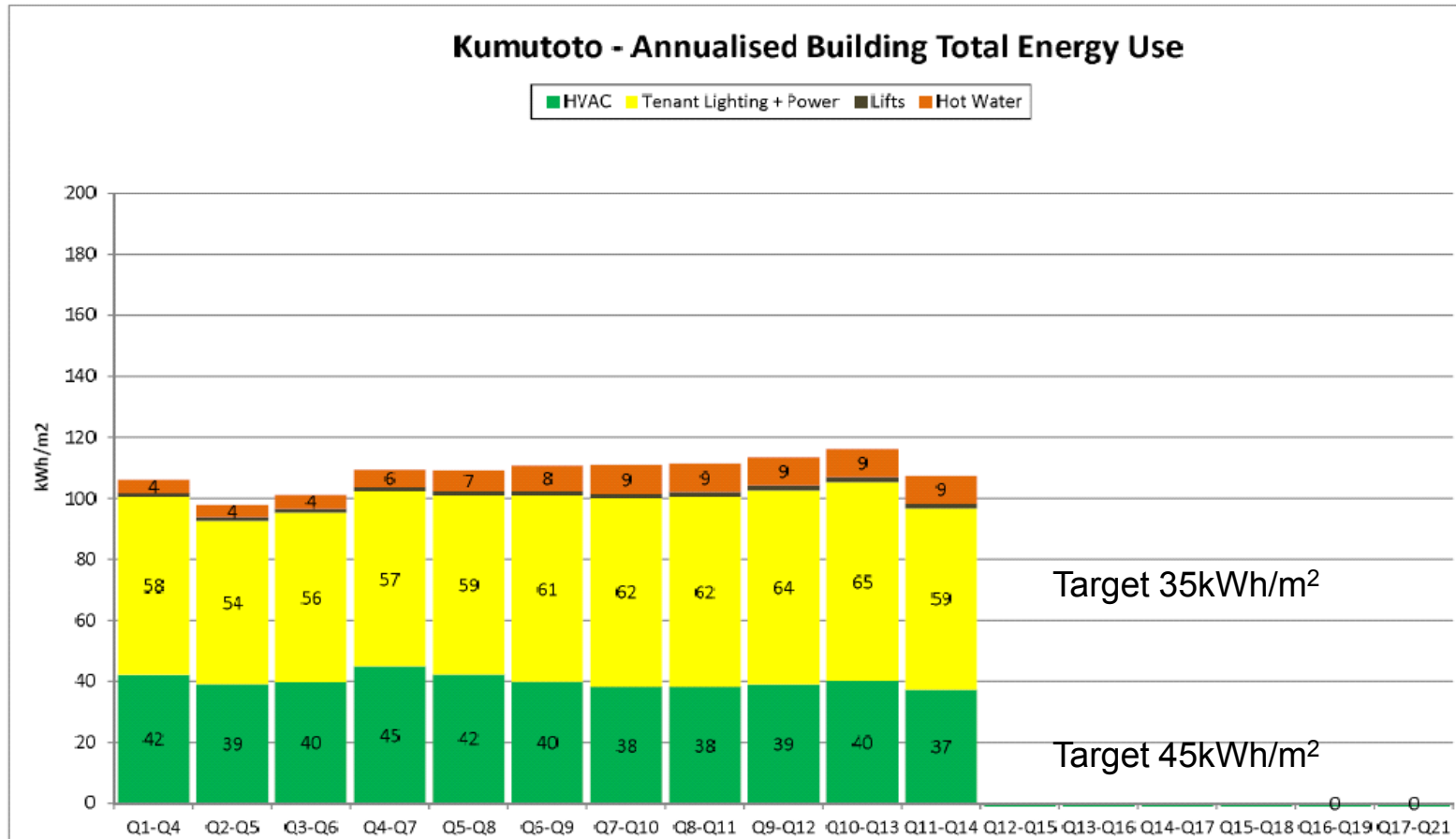


Indicated Electricity Savings

- Typical Wellington Office uses 195 kwh per m².
- The Meridian development uses on average 108 kwh per m².
- Indicates an annual saving of 384mwh per annum.
- Enough to power 50 typical New Zealand houses.
- Base building – excluding Tenant lighting and power averages 48 kwh per m² per annum.



Electrical Energy Use

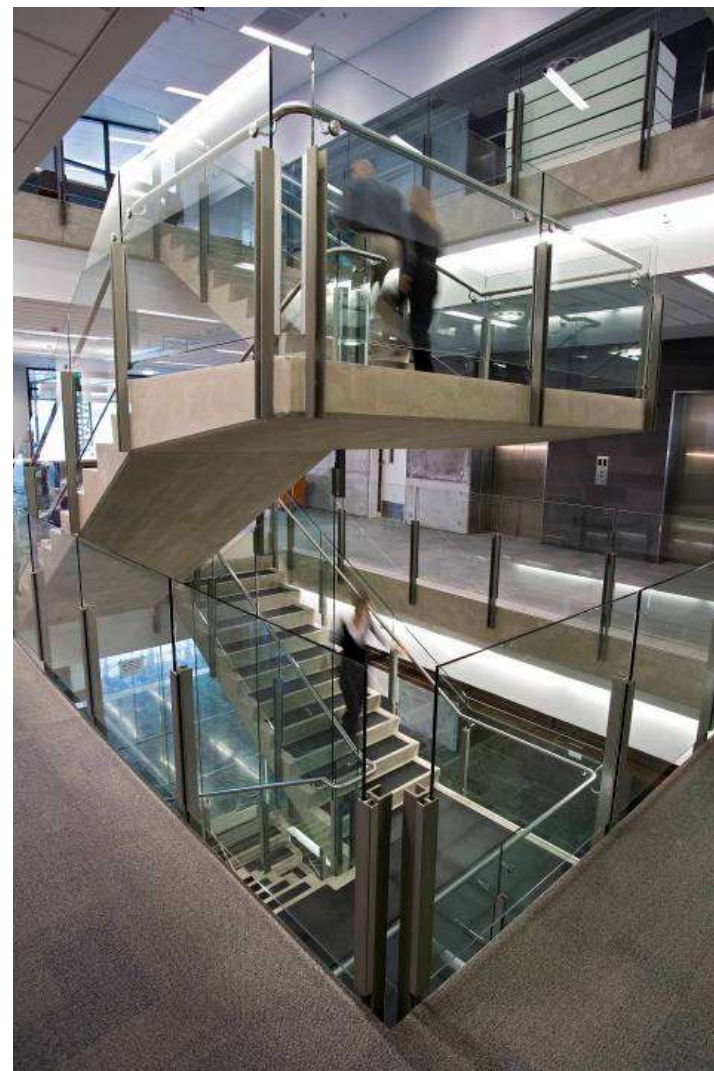




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Energy vs Technology “The Dichotomy”

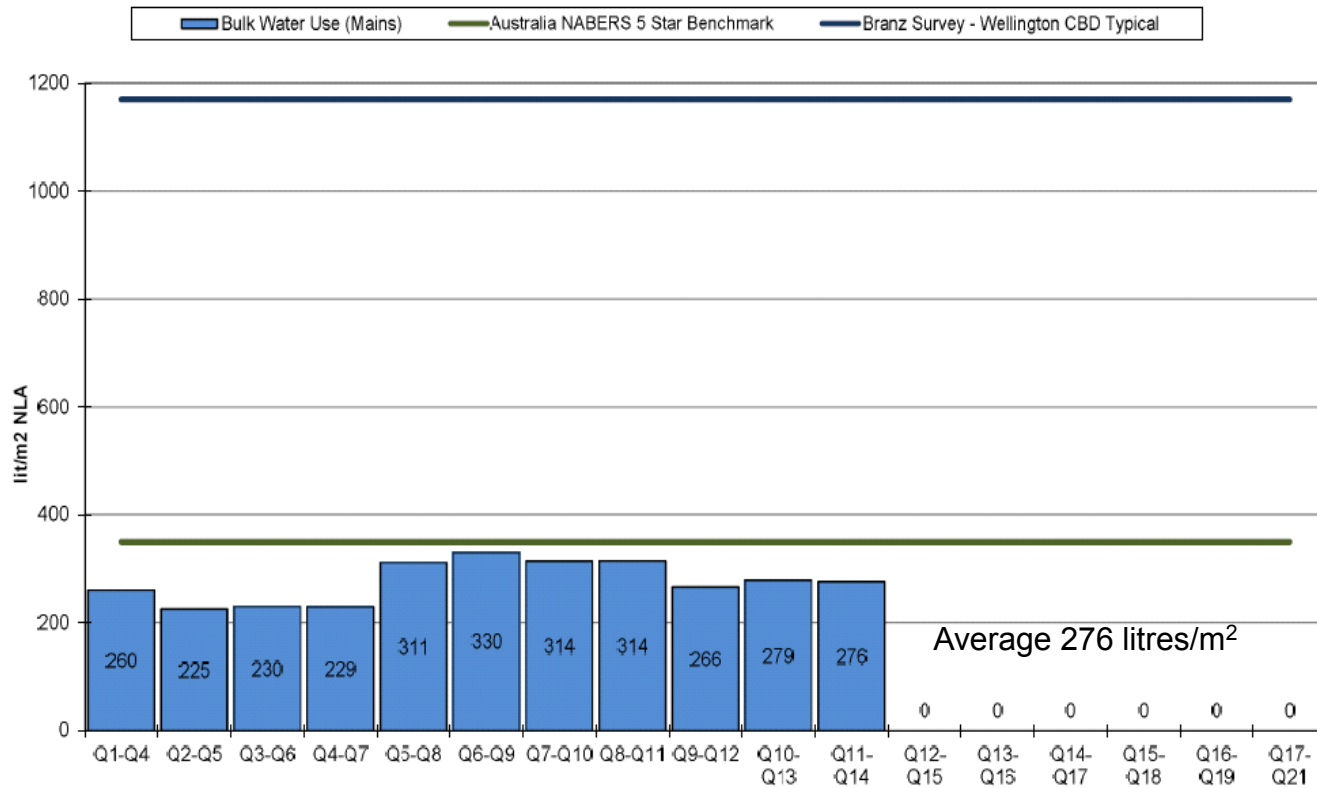
- The **more ‘gadgets’** we put in the **greater the energy** (small power) required to run them!
- However.....use of the technology
 - enables the work style principles
 - delivers a ‘wow factor’
 - potentially reduces air travel
- Equipment selected for low standby and low maximum power usage
- Integrated with BMS for occupancy detection





Benchmarked water use

Kumutoto - Annualised Total Mains Water Consumption



Indicated Water Savings

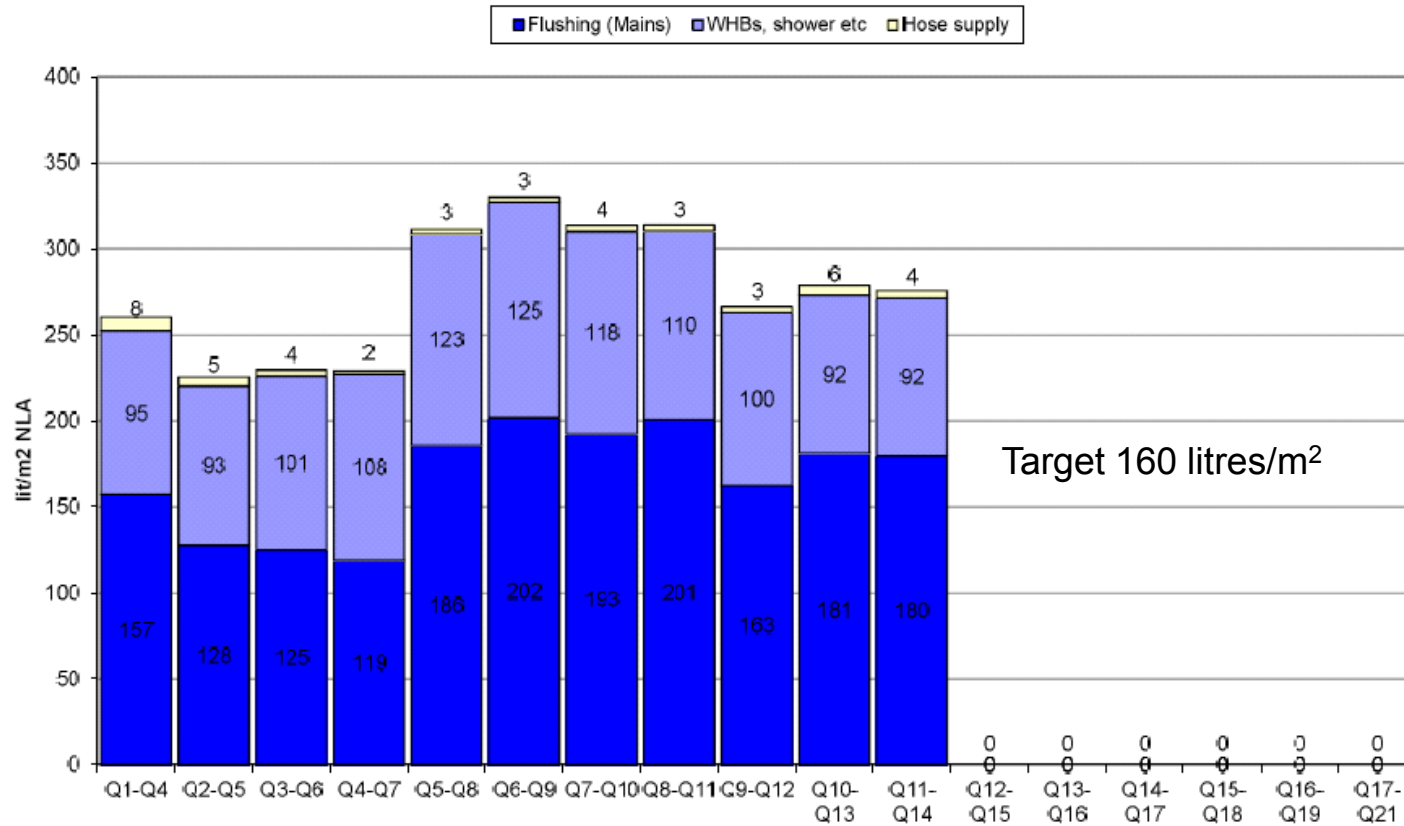
- Typical Wellington Office uses 1,170 litres per m² per annum.
- The Meridian Building on average uses 276 litres per m² per annum.
- Indicates a saving 3.95 million litres of main supply water per annum.
- One and a half olympic size swimming pools of water.
- 5 Star Nabers Rating is 350 litres per m² per annum.



Water Use



Kumutoto - Annualised Total Mains Water Consumption





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Too Much Rain Down The Drain?

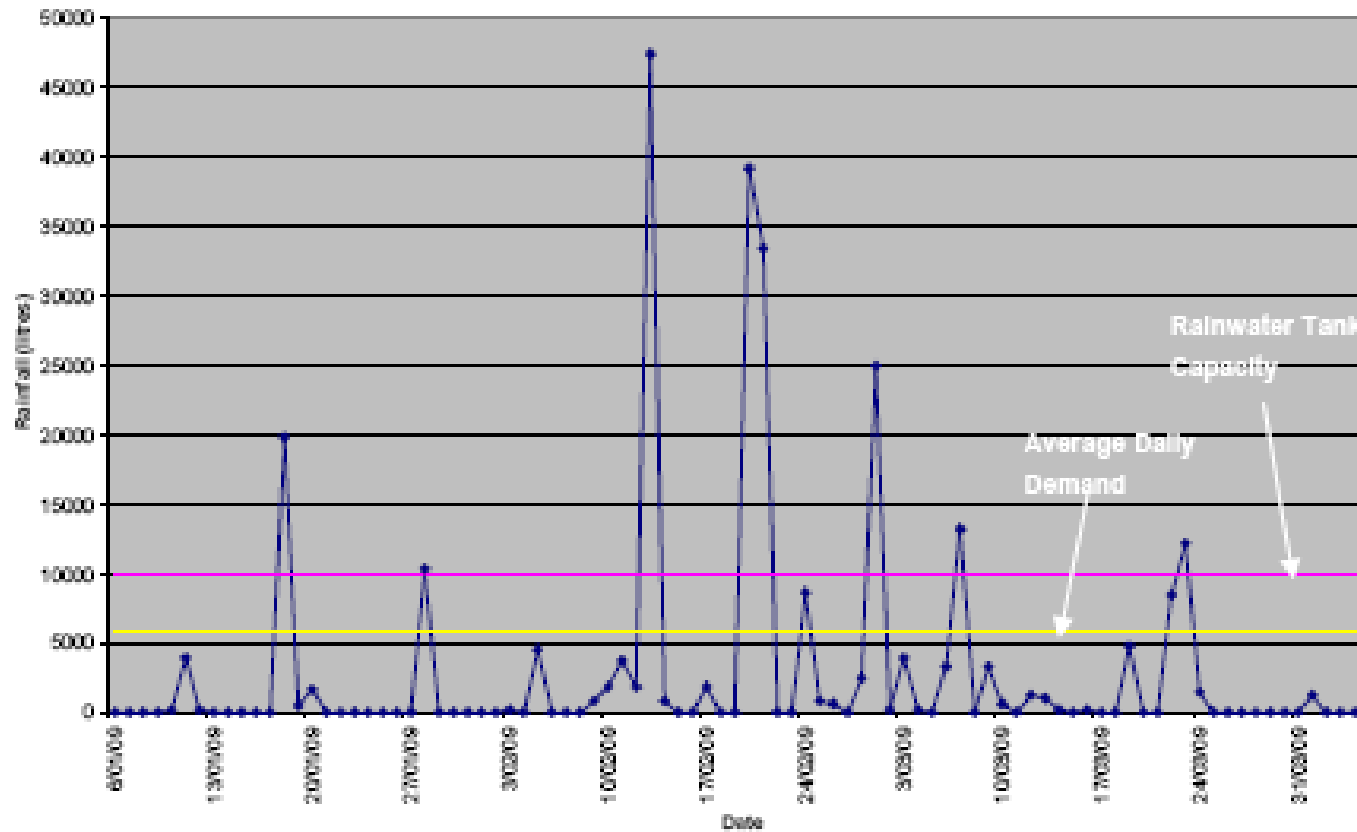



Figure 3 - Wellington Rainfall January - April 2009

...still doing our bit to improve!



eCubed Building Workshop Ltd

energy
environment
engineering

Review of Overnight Energy Use and First
Year Energy Use by Meridian Wellington
Office Building

welland office:

address
unit 01
75 carnation st
atkins 0602
north shore city

postal
90 box 300 021
atkins 0752
north shore city

phone
64 9 442 2331

fax
64 9 442 2338

14 January 2008

wellington office:

address
level 3
35 grayses st
wellington

postal
po box 9585
wellington

phone
64 4 384 0585

website
www.ecubed.co.nz

email
enquiries@ecubed.co.nz

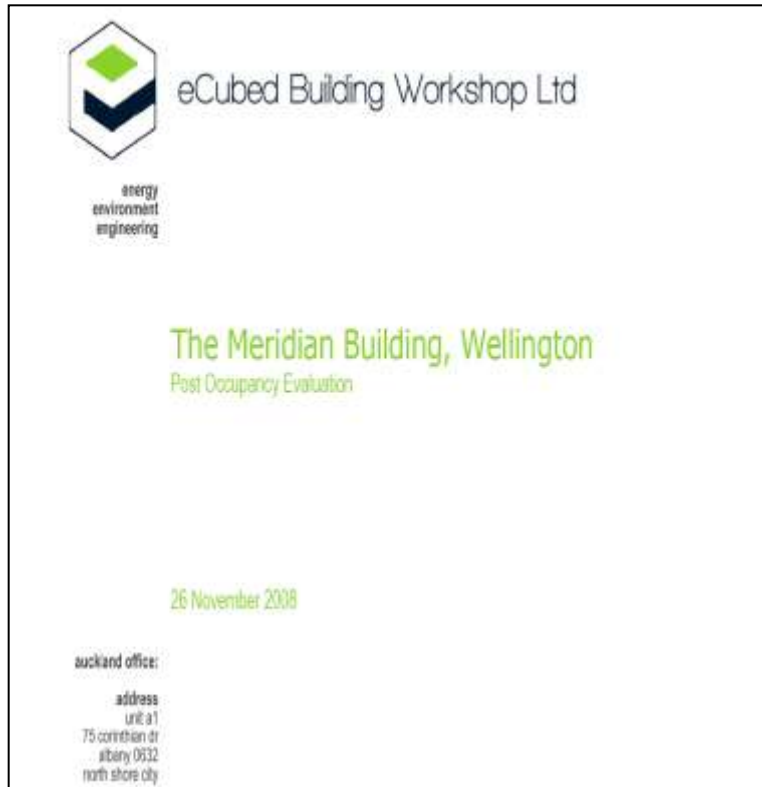
User Experience – Pre Occupation Evaluation



- Pre Occupancy Survey to benchmark (Probe Survey)
- Internationally recognized
- Working Environment
- Staff Satisfaction
- Productivity
- 12 areas
- 63 questions



User Experience – Post Occupation Evaluation



- Post Occupation Survey
- Perceived Productivity
- Main Variables
- Winter
- Summer
- Air Quality
- Control
- Noise
- Lighting
- Perceived Control
- Demographic & Background Information
- Comparison -
Pre Occupancy Evaluation (POE)



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Main Variables

Main Study Variables Unless otherwise stated, higher value on 7pt scale is better	NZ "Traffic Light" Rating	International "Traffic Light" Rating	Meridian Building Mean Score	Comment (compared New Zealand benchmarks)	More details in Appendix ...
Overall Comfort	●	●	5.87	Good score. In the top 10% of New Zealand dataset.	A16
Temperature in Winter	●	●	5.00	Higher than benchmark. Winter temperature is comfortable.	A11
Temperature in Summer	●	●	4.82	Good score in top 10% of New Zealand dataset.	A13
Lighting	●	●	5.10	Satisfactory score.	A17
Noise	●	●	5.11	Noise too is satisfactory.	A15
Space at Desk	●	●	4.55	Higher than the benchmark, survey suggests there is slightly too much space at desk.	A18
Furniture	●	●	5.95	Another excellent score, in top 6% of New Zealand dataset.	A18
Availability of Meeting Rooms	●	●	4.00	Room for improvement.	A9
Suitability of Storage	●	●	4.91	Very good score, storage is highly rated.	A9
Cleaning	●	●	4.58	Satisfactory score.	A8
Design	●	●	6.12	Higher than benchmark and scale midpoint, a very good score.	A8
Needs	●	●	5.94	Needs are well met in this building.	A9
Image	●	●	6.63	Another very good score.	A8
Health	●	●	5.03	Above average, in top 1% of New Zealand dataset.	A16
Productivity (Prod %)	●	●	8.96	An excellent score. It means that the building can be said to raise perceived productivity by nearly 9%.	A16
Noise from Colleagues <i>Value close to 4 is better</i>	●	●	4.38	Room for improvement.	A15
Hours per Day in Building (Mean Score)	-	-	8.6 hrs	Benchmark for New Zealand buildings is 7.7 hours.	A7
Window Seat	-	-	55%	55% of staff sits next to a window.	A8
Journey to Work Time (Mean Score)	-	-	31 mins	Almost half of building occupants take public transport.	A20



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Comparison - Pre & Post Occupation

<i>Variable Name</i>	Old Buildings	New Building	New Zealand Benchmarks (Copyright Building Use Studies 2007)	International Benchmarks (Copyright Building Use Studies 2008)
Temperature in Winter Overall	4.54	5.00	4.21	4.72
Temperature in Summer Overall	3.84	4.92	4.03	4.29
Noise Overall	3.72	5.11	4.24	4.62
Lighting Overall	4.70	5.10	5.10	5.02
Comfort Overall	4.32	5.67	5.67	5.67
Health	3.69	5.03	3.55	3.97
Forgiveness (-1 to +1 Scale)	1.04	1.12	-	-
Overall Rating (Selected Variable Method)	66/100	100/100	-	-
Perceived Productivity (-40% to +40% Scale)	-6.37	8.96	-2.69	3.45

Target +5%

Comfort vs Productivity - NZ Benchmark

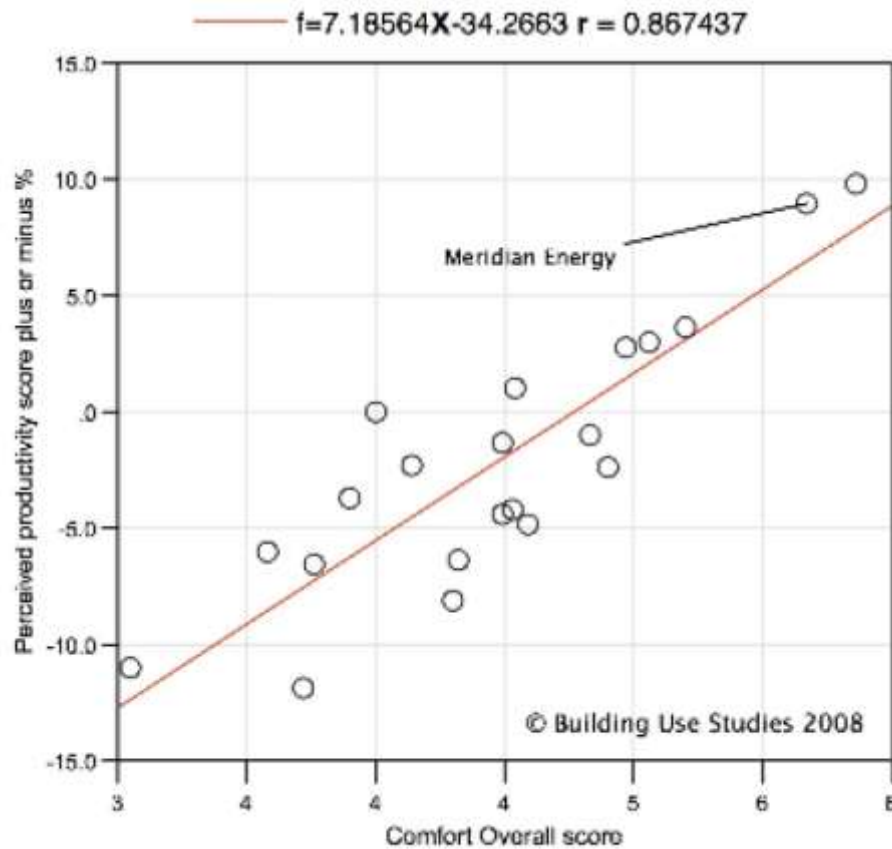


Figure 1 - Comfort Vs Productivity using New Zealand Benchmarks

Comfort vs Productivity – International Benchmark

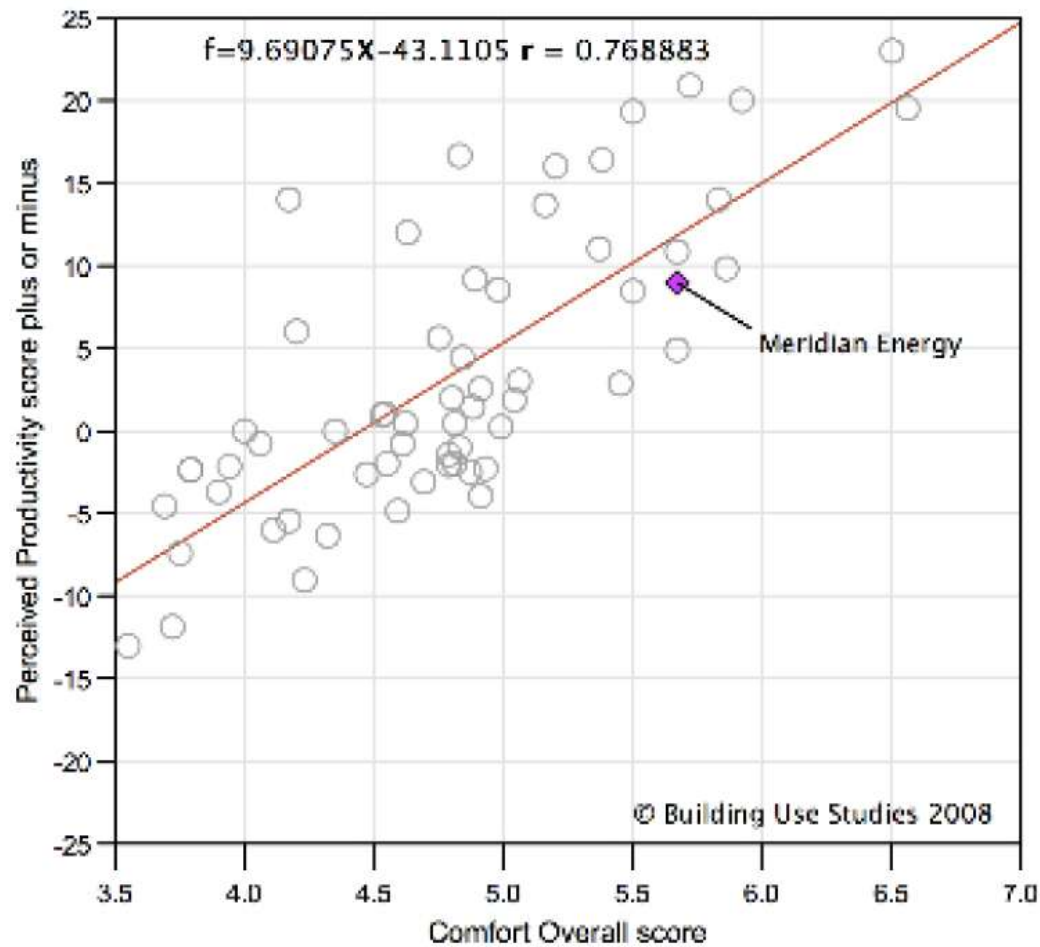


Figure 2 - Comfort Vs Productivity using International Benchmarks



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Recruitment Impact

- High profile Wellington market:
 - Green Building, awards, 5 Star
 - Assume great place to work
 - Close to amenities / town / public transport / waterfront
 - Christchurch not equivalent
- “Will I be working in that building?”
- Point of difference:
 - Role
 - Remuneration
 - Values + Workplace = Alignment
- Engineering community
 - High level of interest
 - How does it work
 - Appreciate the achievement
- “Wowness factor”





People and the working environment

Sickness days

- Oct 06 – May 07 **373 days**
 - Oct 07 – May 08 **325 days**
- Variance: 48 less sick leave days**

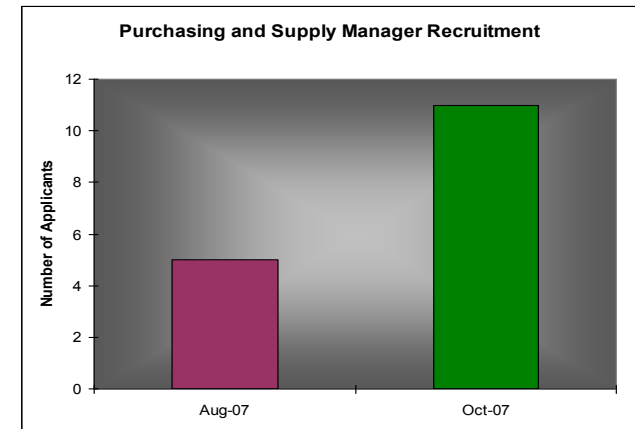
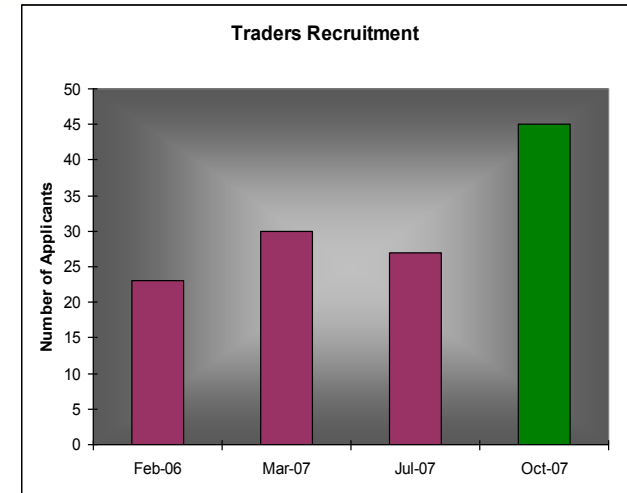
Recruitment

- Trader **70% increase**
- Purchasing & Supply Manager **120% increase**

Exit Interviews

“... employee specifically mentioned the building being a great place to work.”

Craig Scott-Hill - Senior People Consultant





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So...what have we learnt along the way?



Key learning's



- Performance Specification
- Commissioning
- Metering
- Thermal comfort
- Proactive vs Reactive
- BMS visibility
- Continuous education
- Modelling and the 'real world'
- Tolerance for change
- Love & working environment
- Alignment
- Learning curve
- Taking the lead
- You can do it!!!

Further reference

<http://www.meridianbuilding.co.nz>

