



Creating homes and neighbourhoods  
that work well into the future  
and don't cost the Earth

# NOW Homes®: Sustainability Now

Presentation to Beacon Stakeholder Symposium

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# NOW Homes<sup>®</sup> Hypothesis



- Using current technology and knowledge, it is possible to build a home significantly more sustainable than current new housing for a price that is affordable to most New Zealanders



- Two NOW Homes<sup>®</sup> have been built in Waitakere and Rotorua
- Homes were designed in accordance with Beacon NOW Home<sup>®</sup> Protocols and to meet the requirements of the Beacon “footprint”
- Homes are occupied by “normal” families with no special training
- Homes are monitored against Beacon’s High Standard of Sustainability



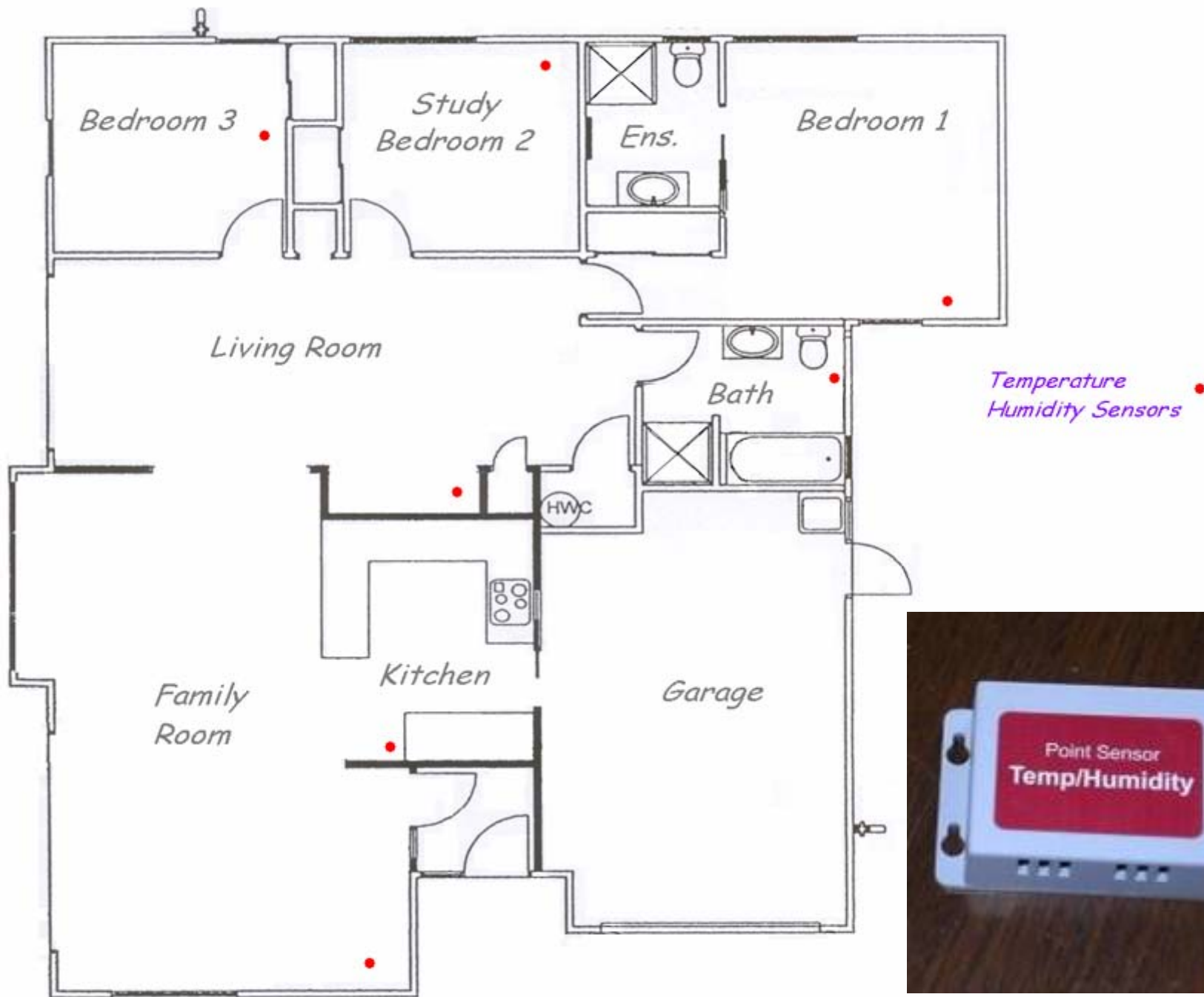
The fundamental objectives of a sustainable home

# Waitakere NOW Home<sup>®</sup>

- 3 bedroom home
- House size 146m<sup>2</sup>
- House built for \$240,000
- 4 person household (2 adults, 2 children)
- Average income
- Energy Climate Zone 1
- Metered water supply







# Year 1 Waitakere NOW Home<sup>®</sup> Monitoring – Key Findings



- Home performing very well – monitoring<sup>1</sup> supports hypothesis that is much more sustainable than a standard new home:
  - 33% less energy used than comparable home
  - 45% less energy used by the household than their previous home
  - 40% less reticulated water use than surrounding households
  - Home is warm, dry, comfortable and healthy – and much loved by the family who live there

<sup>1</sup>Monitoring programme designed and undertaken by BRANZ Ltd

# Performance of the Thermal Envelope



- Performing very well in terms of moderating temperature – heater used only twice in winter – cold mornings in a very cold winter
- Mean winter temperatures in bedrooms and living spaces all above WHO minimums
- Winter temperatures in bedrooms are sometimes outside the comfort range
- The house can overheat on summer evenings – particularly when the windows are closed
- Some modifications are being made (shading, ventilation, security stays) to improve indoor environment quality and summer temps.



# Solar Hot Water System



- Solar hot water system delivered approx 50% of hot water needs to home – saving of approx 2500 kwh/yr or \$425 off power bill
- Electricity savings give 10 year payback period (direct \$ for \$)
- Manual boost may be having an impact – are looking at the effect of moving to an automatic controller
- Use of rainwater tank water in hot water system is a significant contributor to the low reticulated water usage in the home



# Water Use

- Reticulated water use is an average of 100 litres per person per day
- Reticulated water use per capita is 40% less than Waitakere City average and 66% less than Auckland Region average
- Actual per capita water use is slightly more than WCC average (189 lpd vs 167 lpd) – therefore no reduction in wastewater discharge
- Dual flush toilet a key feature for water efficiency
- Rainwater tank is providing 46% of the total water used in the home
- The first summer rain tank ran dry, but not this year– so expect better performance from Year 2 results





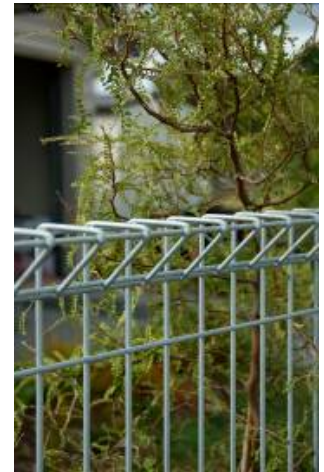
# Humidity and Ventilation

- Humidity levels generally fall within recommended ranges for healthy homes – 20-70% humidity
- Difficult to compare with other homes as little local humidity data available
- Winter humidity levels do exceed 70% frequently in some rooms
- Auckland climate, lack of mechanical ventilation, clothes drying behaviour and reliance on tenants opening windows, all likely to be factors in humidity levels



# Outdoor Environment

- Extent of vegetable garden too much for the family who don't have "green fingers" – but natives are low maintenance and growing well
- Gravel outside bifold doors doesn't combine well with polished concrete floors
- "Fishbowl" like nature of metal fence is impacting on the family's enjoyment of their outdoor space
- Isolated location (away from a residential neighbourhood) means that family do have security concerns at night
- Surveillance and security issues may be contributory factors to lack of use of the clothesline





# Waste

- Detailed management and monitoring of construction waste
- 189kg of waste diverted from landfill – only 8% of that generated
- A total of 2.3 tonnes of waste sent to landfill
- Major construction wastes
  - plasterboard
  - timber
  - concrete
  - packaging
  - contractors (drink bottles etc)



# Occupants' Views

- Love the home – its warmth, spaciousness, healthiness and efficiency, and the ease of keeping the concrete floor clean
- Haven't needed to use dehumidifier and electric blankets, and have used heater only twice
- Health of kids (asthma) also greatly improved
- House is very quiet (insulation + double glazing) – but do notice noise when the windows are open



# Research vs Demonstration Home

- Increasing awareness of the home – and frequent requests for viewing of it and its features
  - 350 people through on 4 March Eco-Day
  - Strong interest and desire for more information from across community and the government sector
  - Strong interest in NOW Home® website (and from people wanting to buy/build NOW Homes®)



# Rotorua NOW Home<sup>®</sup>

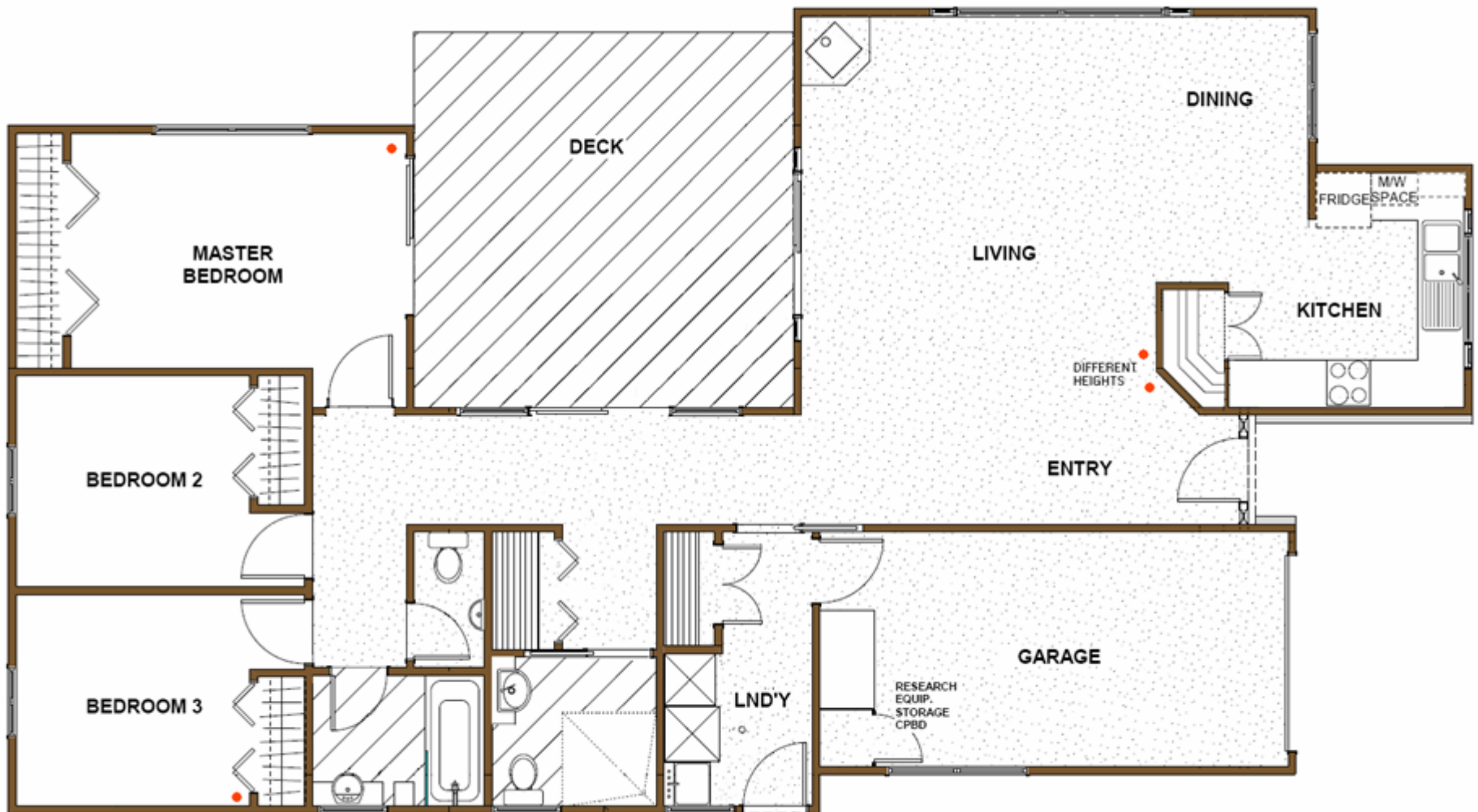


- Is a collaboration with Housing New Zealand Corporation so affordability was a key consideration
- Accessible design and functional requirements introduced specifications additional to the Waitakere home
- 3 bedroom home
- 141 m<sup>2</sup> (plus 24.8 m<sup>2</sup> concrete deck)
- Energy Climate Zone 2 (Central Plateau)
- No household user charges for water use
- Was tenanted in October (5 people)





# Plan of Rotorua NOW Home®



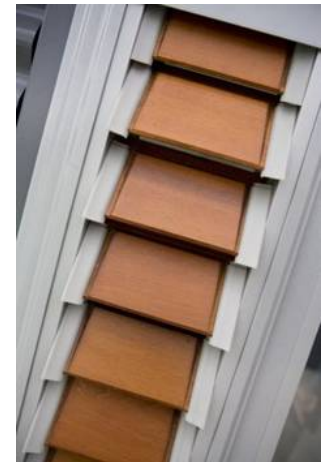
# Additional features of the Rotorua NOW Home®

- Materials – chosen using BRANZ LCA Tool
- Colder climate means a pellet burner is included for heating
- House designed specifically for barrier free access



# Other differences in the Rotorua NOW Home®

- More extensive use of passive ventilation
- Perimeter insulation of concrete slab
- Butterfly roof with central gutter
- Underground concrete 5000 litre rainwater tank



# NOW Homes<sup>®</sup> - Opportunities



- Moving from a Research Home (with small Demonstration component) to mass production and wide uptake
- With detailed research understanding of existing NOW Homes<sup>®</sup>, performance, we are developing protocols for piloting at large scale and then commercialisation
- Regional differences (climate, local environmental issues, urban typologies) means there is a need to verify performance across New Zealand – we will do this as part of piloting process
- Opportunity to partner with commercial builders/developers to test broad scale implementation in a range of locations

# Conclusions

- New homes are easily able to be developed which use substantially less resources and are healthier and more comfortable than “standard” homes – at no greater cost
- Waitakere and Rotorua NOW Homes® are being used to provide real life data verification of performance able to be achieved
- Technology is not the issue – what is needed is engagement by the consumer and the value chain to deliver high performance homes
- Next steps to move to a commercialisation model, with a mass NOW 100 homes pilot testing NOW Home® Protocols leading into commercial delivery of the product

# NOW Home<sup>®</sup> Suppliers



- CHH Woodproducts
- Climate
- Dimond
- ECO-Block New Zealand
- EECA
- Energy Options
- Fisher & Paykel
- Fletcher Aluminium
- Winstone Wallboards
- G J Gardner
- Glover Real Estate
- Aquatica
- New Zealand Steel
- Kresta Blinds
- Nulook
- Pilkington New Zealand
- PlaceMakers
- Resene Paints
- Ross Roofing
- Exel Group
- Tasman Insulation
- The Laminex Group
- Joinery Direct
- Total Fascia
- Heirlooms