BBS/14

Papanui 1: Build Back Smarter Case Study

A report prepared by Beacon Pathway Incorporated

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About This Report

Title

Papanui 1: Build Back Smarter Case Study

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Abstract

The Build Back Smarter Project aims to develop evidence that residential performance upgrades at the point of earthquake repair is able and worthwhile to be implemented as part of the Canterbury earthquakes recovery process. Using the case studies of ten homes, the project is exploring and demonstrating what is possible as part of the repairs. This report documents the third completed case study – the upgrade of a house known in the project as Papanui 1.

Reference

Easton, L. (June 2014). Papanui 1: Build Back Smarter Case Study. Report BBS/14 for Beacon Pathway Incorporated.

Contents

Figures

1 Introduction

Over the past 2 ½ years Beacon Pathway Inc has been undertaking research into how energy and water efficiency and indoor environment quality improvements can be incorporated into earthquake repairs from the 2010 and 2011 Canterbury earthquakes. The research has involved the use of case studies to explore and demonstrate what is possible as part of the repairs. This report documents the seventh completed case study – a house known in the project as "Papanui 1".

2 Papanui 1

Figure 1: Papanui 1

Figure 2: Papanui 1 sleepout

Papanui 1 is a single storey lath and plaster home with a sleep out. The ceiling and floor were already well insulated between and over floor/ceiling joists. Windows were single glazed and wooden framed and both doors and windows were draughty. An aging bathroom extraction fan and the kitchen rangehood were both vented into the ceiling. The house was heated by a heat pump and older wood burner. The sleepout is cold with a flat roof and no insulation in ceiling or walls. It is heated by Econoheaters. There are only windows in one side with a door to each of the bedrooms so it is not well ventilated. Much of the house was lit by downlights.

Six people from an extended family live in the house and sleepout. The family includes a baby (living in the sleepout) and a son with rheumatic fever.

2.1 Earthquake damage

The house was insured by IAG and the Project Management Office (PMO) was Hawkins.

In terms of the scope of the earthquake repairs:

- Foundation repairs
- Ceiling linings were replaced throughout
- Cladding and wall linings were replaced

2.2 House performance assessment and retrofit

The house was assessed using Beacon's House Assessment and Prioritised Plan tool. The pre-retrofit condition and proposed performance interventions are outlined in Table 1 below.

Table 1: Pre-retrofit condition and interventions

Mt Pleasant 1	Pre-retrofit condition	Interventions	Cost (excl GST)
Thermal	Good levels of ceiling insulation	Fitted ceiling insulation over IC-F rated downlights (see below)	
	Some wall insulation	Upgraded to R2.8 wall insulation	$1983
	Well installed R1.8 underfloor insulation Vapour barrier not taped to piles and not pinned in place	Repaired vapour barrier	$201
	No door between laundry and garage	Installed draught proof door between the laundry and garage	$361
	Exterior doors draughty	Draught stopped exterior doors	$45
Hot water	Wrapped hot water cylinder		
Heating	Wood burner in main living area. Bedrooms cold	Installed heat transfer system to heat bedrooms	$755
	Sleepout cold	Installed Energy Star rated heat pump to heat sleepout	$2520
Lighting	Extensive downlights (9 in 18m2) creating gaps in ceiling insulation	Replaced with LED/ IC-F rated downlights. Replace all other bulbs with CFLs	$771
Ventilation	Aging bathroom extract fan/light ducted to ceiling.	Replaced bathroom extract fan ducted externally, and separate light	$285
	Kitchen rangehood installed –ducted to ceiling	Ducted existing rangehood externally	$850

Mt Pleasant 1	Pre-retrofit condition	Interventions	Cost (excl GST)
Water	High flow kitchen and bathroom taps.	Installed tap aerators	$475
Total BBS Retrofit Cost before EECA subsidy			**$8236**

Figure 3: Extensive downlights were replaced with LED/IC-F rated downlights

Figure 4: Wall insulation was installed and existing ceiling insulation topped up to cover the downlights