Murray Place, Barrhead
Post-Occupancy Evaluation

Hanover (Scotland) Housing Association Ltd
Murray Place, Barrhead
Post-Occupancy Evaluation

Ken Shepherd
Development Officer

Hanover (Scotland) Housing Association Ltd
Hanover (Scotland) Housing Association Ltd

- Over 5000 properties under management
- Housing for older people and amenity housing
• Over 5000 properties under management

• Housing for older people and amenity housing

• Various low energy strategies to reduce fuel poverty, such as passive solar, enhanced insulation, solar water heating

• Developments use a variety of construction methods, including current new-build projects in Hamilton, Glasgow and Troon
Amenity housing at Murray Place, Barrhead
Strategy for Transformation:

• Safe Environment
• Passive Solar Strategy
• Garden Court
Reduced Energy Use:

• Passive Solar Strategy

• Fabric First Insulation Enhancements
Reduced Energy Use:

• Passive Solar Strategy
• Fabric First Insulation Enhancements
• Solar Water Assist
• Living Screen
Spring
Summer - shade
Autumn
Winter - low sun gains
Aerial View
Amenity housing at Murray Place, Barrhead

- 4 traditionally constructed 2 bedroom flats
- 5 timber framed cottages
- 7 timber framed 2 storey houses
Amenity housing at Murray Place, Barrhead

- 4 traditionally constructed 2 bedroom flats
- 5 timber framed cottages
- 7 timber framed 2 storey houses

An opportunity to test the performance of different construction types and forms of dwelling, and apply the findings on future development.
Traditional Construction (Flats)
Blockwork walls and concrete separating floors
Timber Frame Construction (Houses and Cottages)
Cellulose insulation and vapour permeable construction
Key POE Study Questions:

- Does the vapour permeable construction improve humidity and internal air quality?
- Does the Warmcel cellulose insulation slump?
- Traditional v timber frame – any pros and cons?
- Solar water heating performance.
- Actual energy in use.
- Actual insulation performance (U-values).
- Detailing and air permeability.
- Workmanship and air permeability.
Murray Place, Barrhead
Post-Occupancy Evaluation

Lessons Learned
Solar Water Assist: POE Findings

• One thermostat not wired up by electrician so no solar delivery
• Reduced performance in one house due to a pipe blockage
• Solar water energy delivery has exceeded hot water demand
Solar Water Assist:

- Interface between trades needs careful coordination on site
- Effective commissioning procedure essential
- Possibly less suited to smaller houses where hot water demand is low
Solar Water Assist:

• Maintenance operatives need to be familiar with system

• Maintenance provider has now sub-contracted solar maintenance

• Now being specified only for larger general needs houses
Thermography:

- Highlighted one small area of missing roof insulation
- No slumping of cellulose insulation
Thermography:

- Air infiltration at eaves
Timber Frame Head Detail:

• Industry-wide standard detail

• Flawed due to difficulty in achieving on site

• Results in air infiltration cooling ceiling and heat losses
ROOF CONSTRUCTION

Marley "Mendip" concrete interlocking roof tiles (minimum headlap and fixed according to manufacturers recommendations) on 50x25mm treated sw tie batters on 36x19mm treated sw counterbattens at 600mm ctrs, and fixed at truss positions on one layer type 1F bitumen based intearable/reinforced sarking felt to BS. 747 on 9mm thick Sterling OSB 3 sarking on pre-fabricated timber trusses at 600mm ctrs.

All roof timbers to be pre-treated with "Tanalith" or equal timber preservative.

WINDOW HEAD DETAIL AT EAVES

Ex. 190 x 70 x 38mm treated sw blocking piece fixed to tips of trusses.

50 x 50mm treated sw batten

Dow Corning 791 low modulus silicone pointing.

Redwood "H-Type" canopy hung windows with sealed double glazed units, for site Micro-Porous stain finish.

12.5mm T/E Cyproc plasterboard with taped & filled joint

100mm girth Cyproc coving in lounges and hallways

100x47mm treated sw wall plate.

100x38mm treated sw straddle required over lintels only

70 x 14mm MDF curtain rail.

50 x 38mm treated sw ground.

Redheads linked to Structural Engineer's requirements.
Heat losses

Insulation not installed across head binder

Air infiltration above ceiling cools ceiling edge

Reality
Rigid Insulation board at eaves
Extract Fans:

• Localised extract fans in shower rooms and kitchens

• Smaller fans not achieving manufacturer’s performance

• Pressure drop - possibly due to roof terminals
Extract Fans:

• Larger fans now being specified

• Wall terminals preferred

• Soffit terminals rather than roof terminals
Occupants’ Guide:

• Clear lay terminology to assist in understanding systems

• MEARU format developed with Building Standards

• Avoid plans - use photos and diagrams
Your home: introduction

1. Features
2. Heating
3. Hot Water
4. Electrical
5. Ventilation
6. Maintenance

This quickstart guide is designed to help you get the best out of your home, keeping your bills low and your carbon footprint as small as possible.

On the next few pages, there is an overview of your house and its main design features.

Important Equipment Locations:

**Water Supply Stopcock**
The stopcock is under the kitchen sink.

**Electricity Meter and Fusebox**
The fusebox is in the hall beside the front door, in a cabinet.

The electricity meter is outside, near the front door, in the white cabinet built into the wall.

**Gas Meter**
The gas meter is outside, near the front door, in the brown ground level cabinet.
1. Design Features

Walls
The external walls are made from a 30cm insulated timber frame, with measures taken to reduce air leakage to reduce heat loss. Outside the walls are clay brick, with a mix of facing brick and render. Internally walls are finished with painted plasterboard.

Windows / External doors
These are all high performance with double glazing. The windows open using an “H-type” fully reversible mechanism. On the first floor, the windows allow for emergency escape and are fitted with child proof opening mechanisms. The doors are high performance with security locks.

Floors
The ground floors are chipboard or plywood laid on a 7.5cm layer of polystyrene insulation, which reduces heat losses, and is in turn supported on a concrete floor slab.
Roof
The roof is a timber structure insulated with 30cm of insulation. Externally, the roof is finished with concrete roof tiles. Internally there is a painted plasterboard finish.

Energy Efficiency
All the elements of your house, described here, are insulated to give better performance than required by Building Regulations, so it is possible to live more comfortably and at less cost in this house than in older houses.
2. Heating

Your house is well insulated and built to reduce draughts, so you shouldn’t need too much heat input to keep comfortable.

The warmer you keep your house, the more expensive it will be in fuel.

If it does get too warm, remember to turn off the heating before you open windows.

**Boiler**

Your main heat source is the gas boiler. The boiler heats the radiators and also provides hot water.

Your boiler is a Worcester Greenstar 30CDi and it is located in your kitchen. The fascia panel behind the flap on the boiler shows if everything is working properly and allows you to control a number of aspects of the heating and hot water. For more information, please consult your Boiler manual.

The boiler is controlled by a programmer which also controls the hot water. See section 3 for a description of this.

**Thermostat**

There is a central thermostat in the hall which allows you to control the overall house temperature.
Radiators
The radiators throughout the house provide heat from the boiler. Each radiator has a thermostatic radiator valve (TRV). Adjust each radiator’s TRV to control the temperature in each room.

Gas is expensive and heating is the most intensive use of gas. Even though a good quality boiler is an efficient way to use gas, if you’re looking to save energy and money a first priority would be to make sure you’re using your system efficiently.

Set the thermostat at each radiator to control the temperature in each room.
3. Hot Water

To help reduce the cost of hot water, your house is fitted with solar panels. These assist in reducing your energy bill by providing free heat from the sun to heat the hot water, which reduces the amount of water heating needed from the gas boiler.

There is also an electric immerser within the hot water cylinder, but this is only intended for occasional use, for example if your boiler breaks down.

It’s worthwhile making sure you are using the system as efficiently as possible.

**Hot Water Cylinder**

Hot water is stored in the hot water cylinder in your roofspace.

The water is heated from the solar panels and by your gas boiler. The solar panels heat the water whenever the sun is out.

The cylinder has 50mm of insulation to keep the water warm.

**Programmer**

The programmer located at the boiler controls when the boiler comes on to heat the water in the cylinder.

It also controls the heating and the hot water and heating timing can be set independently.

Everyone uses hot water differently but the key is to set your boiler programmer to heat only as much hot water as you need - and only just before you need it!
5. ventilation

This house has been designed and built to be reasonably airtight to reduce draughts which makes it more energy efficient. This is good for comfort and lower fuel bills, but it makes it even more important that the ventilation system is well managed to avoid stuffiness, condensation and mould.

**WC Extract Fans**
The shower room and wc fans are connected to the light switch and have a run on timer to help remove moisture.

![WC extract fan](image)

**Window Trickle Vents**
All of your windows have a trickle ventilator in the head. These trickle vents should be left in the open position where possible as they provide background ventilation which helps to prevent condensation and mould.

**Kitchen Extract Fan**
The extract fan in the kitchen helps to remove smells and steam from the kitchen when you’re cooking. It simply draws air outside, with replacement air coming from the rest of the house and the trickle vents. It’s always worth using this when you’re cooking to avoid steam and smells spreading to the rest of the house.

![Kitchen Extract Fan](image)
Laundry
The best place to dry laundry is outside, but that is not always possible. The thing to remember is that laundry generates a good deal of moisture which can help cause mould if it’s not vented away.

If the weather is warm, then drying near an open window is OK, but if not, it is best to dry laundry in the bathroom so that the moisture is removed ‘at source’ through the extract fan grille.

Carbon Monoxide Monitor
Your house has a carbon monoxide (CO2) monitor in the kitchen.

It alerts you to any problems with gases from the boiler. If the CO2 alarm goes off, open windows, switch off the boiler, and leave the room to a well-ventilated area. Contact Hanover to tell them the alarm has been activated.

Keeping Cool
When it is warm outside you can cool the house by keeping the doors open inside and opening windows.
6. Maintenance & Resources

Your house should be checked regularly to ensure it continues to work well for many years.

Poorly maintained systems are inefficient and cost more to run.

Ongoing maintenance should be arranged with Hanover (Scotland) Housing Association Ltd.

Every Month

Ideally, check fans are running when turned on and contact Hanover if they are not.

Every Year

Hanover arrange an inspection of all major items such as boiler, solar assist hot water system, CO2 monitor, external gutters etc.

Check that your own appliances such as your cooker are working properly.

If your welcome pack does not contain the information necessary or it is lost, please contact Hanover (Scotland) Housing Association Ltd on 0131 557 0598

Information can also be found online.

Heating

Boiler: Worcester Greenstar 30CDi
www.worcester-bosch.co.uk
http://www.worcester-bosch.co.uk/homeowner/literature/gas-boiler-literature/greenstar-30cdi-classic-system-literature

Hot Water Programmer: Drayton Lifestyle
www.drayton.co.uk
http://www.draytoncontrols.co.uk/homeownerzone/products/timecontrol/LP722programmer/

Ventilation

Extract Fans:
www.airflow.com
Handover Procedure:

- Solar systems pre-completion commissioning protocol
- Occupants’ Guide being used on new projects
- Training for occupants on entry
- Refresher training for occupants after 6 weeks
- Solar re-commissioning after 6 weeks
Energy in Use:

• Varied across the three properties

• All houses comfortable and easy to heat

• Higher internal temperatures = higher energy use
Energy in Use:

• Highest electricity consumption in kitchens

• Efficient fridge offset by large screen TV
Energy in Use:

• Window opening = higher energy use
  
  but

• Window opening = better indoor air quality
Construction Method:

• Traditional wall U-values worse than calculated
• Timber frame wall U-values almost exactly as calculated
• Thermal mass may have benefits in stabilising temperatures
• Vapour permeable construction no discernible benefits
Construction Method:

• Either form of construction is appropriate

• Hanover preference remains traditional construction for flats
Facilitating POE on Current Projects

- In line heat flow meters on hot water supply
- In line heat flow meters on solar water systems
- 13 amp socket in meter cupboard for logging equipment
- Consumer unit tails easily accessible for CT clamps
- Sub circuits correctly wired and accurately labelled
Aims of POE on Current Projects

• Checking performance of updated eaves detail
• Measuring and comparing gas and electricity use
• Measuring solar water contribution on larger houses
• Checking extract fan performance
• Recording indoor air quality and window opening
• Testing for VOCs