

SPECIAL ISSUE: HOMES OF THE YEAR

November 2018

Homebuilding & RENOVATING

How to create your dream home

Britain's
Best
Selling
Self-build
Magazine

HOME DESIGN HEAVEN

*Be Inspired by Britain's
Best New Homes*

Self Builds | Renovations | Extensions



ALSO IN THIS ISSUE

- **21-page heating special**
The complete guide: from underfloor heating to the latest heating innovations
- **How to achieve 'wow' on a tight budget**
- Building Regs and planning conditions explained
- **Make your new home cosy**
- Expert building advice



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5 tips for choosing an underfloor heating system to install yourself

If you are renovating a single area of your home, you might be looking to do much of the work yourself. Whilst traditionally this might involve painting and decorating, there is no reason why you shouldn't consider fitting the underfloor heating (UFH) yourself too – but it is important to choose the right system.

5 TOP TIPS FOR CHOOSING A DIY UFH SYSTEM:

1 Consider the weight of the UFH system

If you are tackling the installation yourself, don't waste time and effort lugging pallet loads of heavy components into the right part of the house. Choose a lightweight system and your back will thank you.

2 Choose quality

There's an old adage that says 'if you buy cheap, you pay twice'. This doesn't mean that you need to buy the most expensive UFH system that you can find, but choosing a quality product will save you both time and money in the long run.

3 Opt for a low-profile system

When you are renovating a property and fitting UFH over the existing floor, choose a low-profile system that minimises any disruption to fixtures and fittings.

4 Ditch the screed for a quicker, easier install

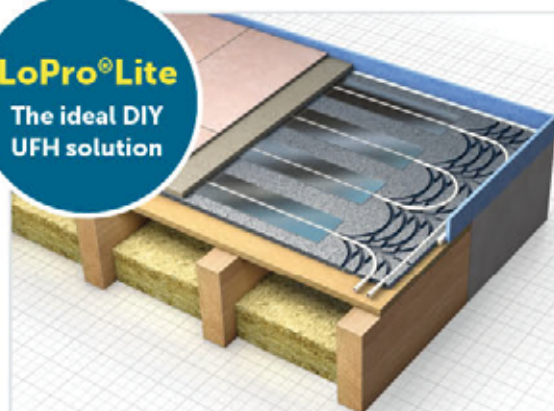
Choosing a completely dry UFH system avoids the need to call in specialist screeding contractors, and also means there is no waiting around for the compound to dry. Floor coverings can then be fitted immediately.

5 Choose a system with pre-routed channels for the tube

Make life easier for yourself by choosing a UFH system where the channels for the tube are already in place. Pre-routed panels and boards make it straightforward to run the tube around the room and back to the manifold, changing direction when needed. They also hold the tube securely in place.

LoPro® Lite

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THE LIGHTWEIGHT HEAVYWEIGHT

In an ideal world, everything would be stronger than it looks and even things that seem delicate would be surprisingly heavy-duty. Nu-Heat's new LoPro® Lite system is the lightweight heavyweight of the underfloor heating world, punching above its weight to deliver the ultimate whole house or single area heating solution. Strong, versatile, low-profile and easy to install, LoPro® Lite will fend off cold spots and fight your corner against freezing floors.

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CONTENTS

November 2018



46

THE BRIEF

All the product advice, design ideas and solutions you need to create the perfect brief for your ideal home

102 **Single-Storey Homes: The Ultimate Design Masterclass**

ON THE COVER

111 **Drawings for Building Regulations**

How do you produce detailed construction drawings for your project? Ian Rock explains all

ON THE COVER

117 **Seven Ways to Achieve Wow Factor on a Budget**

Architect Alan Corfield explains how to make cost-effective architectural decisions that pack a big punch in your home

125 **Planning Conditions Explained**

You've just obtained planning permission for your building project, surely it's time to celebrate? Not necessarily, says planning consultant Ken Dijksman, who explains the importance of examining the planning conditions attached to your permission

ON THE COVER

130 **Big Ideas for Small Gardens**

Make the most of your urban landscape with garden designer Paul Hervey-Brookes' guide

134 **How to Create a Warm Interior Scheme**

Find out how to make your new home feel cosy with our design guide — and why there's more to creating character in a renovation or self-build project than painting the walls!

PORTFOLIO

Whatever your plans, take inspiration from these readers' homes from around the UK

29 **The UK's Best New Homes Revealed!**

We reveal the winners of The Daily Telegraph Homebuilding & Renovating Awards 2018

46 **Born Again**

A clever conversion of a Methodist church, delivered to a tight budget by its owner, results in an eclectic family home

58 **Taking the Plunge**

A stunning Passivhaus home, built on the site of a garage in London, shows that downsizing doesn't mean downgrading

70 **Greener by Design**

One couple futureproof their 1970s home in Sheffield — and make significant cuts to their heating bills in the process



29

ON THE COVER

HEATING SPECIAL

In-depth, need-to-know advice on how to heat your home, from boilers to renewables, and more

145 A Beginner's Guide to Heating Your Home

Energy-efficiency expert Tim Pullen explains the options for heating your self-build, renovation or extension project

150 The Ultimate Guide to Underfloor Heating

From costs, installation to efficiency, our expert explains all

156 A Buyer's Guide to Radiators

A selection of the best new models

159 The Latest Heating Innovations

David Hilton reveals the latest heating technologies which could help you save money on your fuel bills

167 The End of the Open Fire?

Could our modern, airtight homes be the death knell of the open fire? Tim Pullen explains why this could be the case, and offers some pleasing alternatives

171 Renovation Clinic: Your Heating Questions Answered

175 Is Gas the Future?

Utilising mains gas could be the smartest way forward despite media headlines. Energy expert David Hilton explains why

GET IT BUILT

17 pages of building advice to help get your dream build out of the ground

182 A Beginner's Guide to Self-build

Find all the key information you need to start your self-build in our essential beginner's guide — plus, a quick guide to site security

186 Self-build Project Planner

A step-by-step guide to building your own home

190 Calculating your Build Costs

Discover how much it will cost to build your own home with our monthly build cost calculator

193 Building Regs' Guide to Dealing with Contaminated Land

ON THE COVER

198 Your Building Dilemmas Solved

Our experts answer your building questions



EVERY MONTH

17 Self-build and Renovation News

The latest news, products and events

27 OPINION: Is it Time for the Building Regs to Look Forward?

Eco expert Tim Pullen argues that Regs are living in the past when it comes to effects on climate change on our homes

83 Subscribe to Homebuilding & Renovating

Subscribe today — and receive a free Juice Bluetooth Speaker worth £39.99, plus free Show tickets, worth £216!

85 On Site

Our experts reveal the latest on their own self-build, renovation and extension projects — sharing their words of wisdom along the way. Plus, an update on your projects

226 My Best Build Decision

One homeowner explains how an interesting insulation product allowed him to achieve Passivhaus certification on his award-winning self-build



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EDITOR'S LETTER

November 2018

This month, the team and I have the pleasure of announcing the winners of The Daily Telegraph Homebuilding & Renovating Awards 2018. Our annual Awards scheme, now in its second decade (and swiftly moving towards its third), is unique: the Awards don't simply celebrate architectural merit and build quality, but the remarkable stories behind the self-build, renovation, extension and conversion projects entered.

The homes showcased from page 29 onwards, which include both the shortlisted projects and those selected as category winners, are testament to how building projects can transform the lives of their owners, too. For Shelagh Krasno (winner of the Spirit of Self-build award), for instance, building her own home offered an unprecedented opportunity to remain living in a location she loved, against the odds.

This issue is also rather special for another reason. We've tapped into the collective knowledge of energy-efficiency experts David Hilton and Tim Pullen to bring you a 21-page heating special (page 145). From our beginner's guide to underfloor heating to why mains gas remains a viable fuel source despite media headlines, and the innovations which could save you money on your heating bills, these pages will arm you with the information you need to begin making choices about how to heat your home.

Plus, there's our usual mix of design ideas and inspiration, planning advice and building know-how.

I hope you enjoy this packed issue of *Homebuilding & Renovating*. **H**

Subscribe to the magazine and receive a free Bluetooth speaker, worth £39.99 (see page 83 for details)



Claire Lloyd, Editor

has been a member of the *Homebuilding & Renovating* team for over a decade. She's just completed a renovation with her partner Ed, a builder.

MEET THE TEAM



Natasha Brinsmead

is *Homebuilding & Renovating's* Associate Editor. She is at the end of the DIY renovation and extension of an Edwardian cottage.



Daisy Jeffery

is a Features Editor on *Homebuilding & Renovating*. She has been working on the magazine for over five years.



Nick Robbins

Features Editor Nick has a keen interest in design -including a penchant for mid-century modern - and a passion for self-build policy.



Alison Wall

is *Homebuilding & Renovating's* Chief Sub Editor. At the moment, she's renovating a 1970s house in north Worcestershire.



Amy Reeves

Editorial Assistant Amy has a passion for house design. She investigates the latest radiator trends in this issue (page 156).

Extensions

Builds

Renovations

Conversions

Homebuilding & RENOVATING SHOW

Photograph: Simon Maxwell

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THE EXPERTS

November 2018



Darren Bray

Architect Darren is a director at PAD Studio, and is also a guest judge for this year's Daily Telegraph Homebuilding & Renovating Awards.



Oliver Steele-Perkins

Oliver is the owner of Steele-Perkins Project Management. He specialises in pre-construction project preparation for homeowners.



Jason Orme

The former Editor of *Homebuilding & Renovating* magazine, Jason is an experienced self-builder and has just finished renovating a 1960s home.



Paul Hymers

Paul Hymers is a building control officer and has written eight books on home improvements and building homes.



Ian Rock

Chartered surveyor Ian Rock MRICS is the author of eight popular *Haynes House Manuals*, and is a director of Rightsurvey.co.uk.



Andy Stevens

Andy is an award-winning builder and managing director of Eclipse Property Solutions. He also presents a radio show on *Fix Radio*.



Ken Dijkstra

Ken, a former planning officer, is a planning consultant and owner of Dijkstra Planning LLP. He is also the author of *The Planning Game*.



Allan Corfield

Allan runs Allan Corfield Architects, which he set up in 2009. He is an expert in designing high-performing, energy-efficient homes.



David Snell

The author of *Building Your Own Home*, David is a serial self-builder and has been building homes for 50 years. He has just finished building his fourteenth home.



Tim Pullen

Tim is an expert in sustainable building methods and energy efficiency in residential homes (tim@weatherworks.co.uk).



Paul Hervey-Brookes

Cotswold-based Paul Hervey-Brookes is an award-winning landscape designer. Read his article on tips for urban gardens on page 130.



Michael Holmes

Michael is HB&R's Head of Content and Product Development. He also chairs NaCSBA (National Custom and Self Build Association).



Neil Turner

Architect Neil Turner is director at Howarth Litchfield Partnership and specialises in residential design. He's also a guest judge for this year's Awards scheme.



Mark Brinkley

Mark is the author of the ever-popular *Housebuilder's Bible* and an experienced builder. He's just finished his latest self-build.



Lawrence Grigg and Lydia Robinson

Lawrence and Lydia run award-winning practice Design Storey. They're currently renovating a Grade II-listed property.



Charlie Luxton

Charlie is an experienced architectural designer and TV broadcaster. Read about his own self-build project on page 87.



Pete Tonks

Pete Tonks is a design expert and director of PJT Design Ltd. He has been designing self-build homes for over 20 years, and is a specialist in designing oak frame homes.

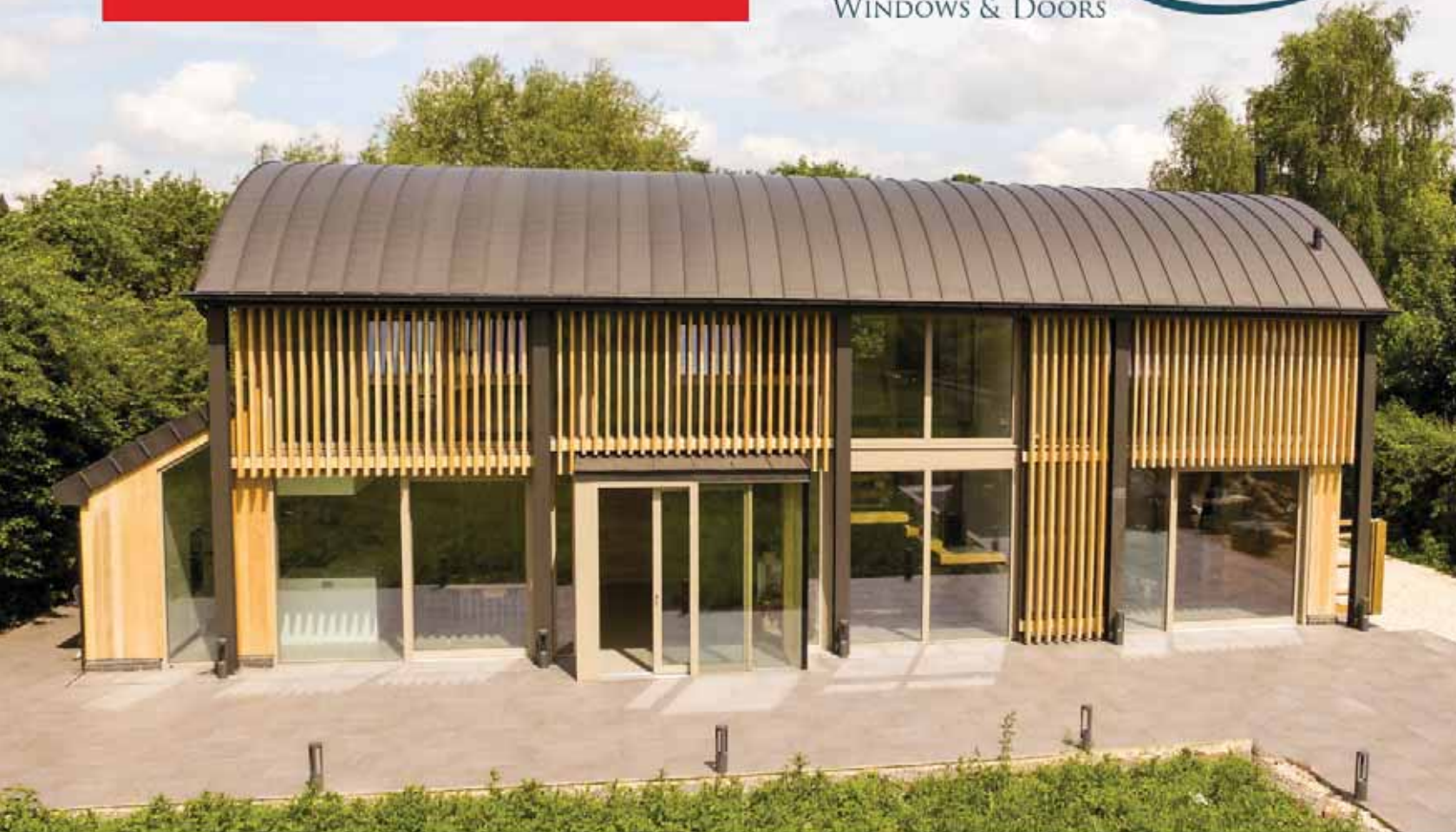


David Hilton

David is an expert in sustainable building and energy efficiency and a director of Heat and Energy Ltd. This month he contributes to our heating special starting on page 145.

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Homebuilding & RENOVATING SHOW

Meet the Experts in Person

Want a free 15-minute consultation with one of our experts (on page 13)? Meet them at The Advice Centre at the Edinburgh Homebuilding & Renovating Show, from 20 to 21 October, and the Harrogate Homebuilding & Renovating Show, from 2 to 4 November 2018.*

homebuildingshow.co.uk

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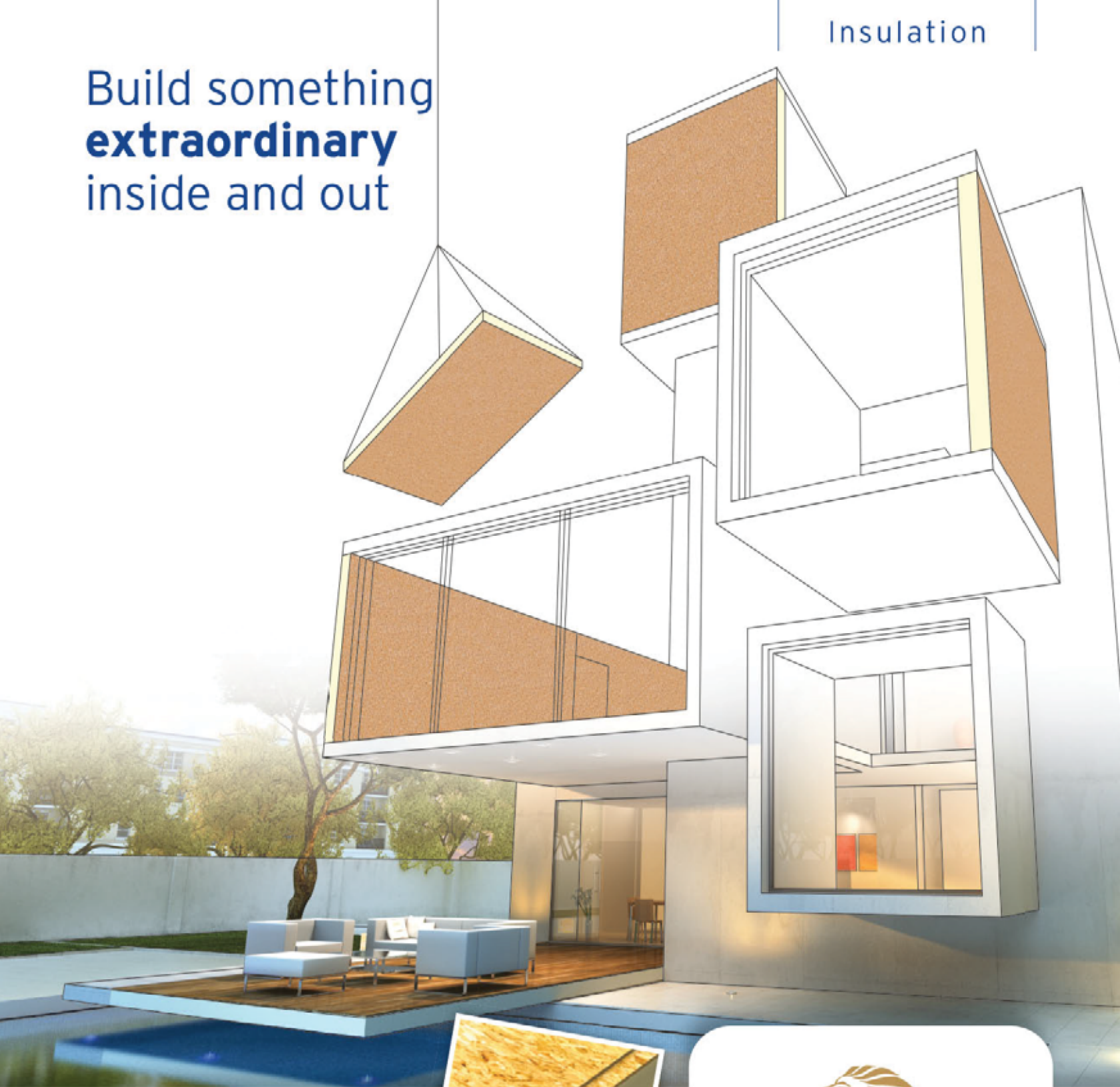
November 2018



Picture THIS

Wall art is one of the big interior trends for 2018, with Pinterest saves for 'big wall art' up a whopping 637% over the year. We're also seeing self-builders and renovators embracing large posters, works of art and photography prints — the larger the better. Shown above is a selection of wall art from online supplier Desenio (desenio.co.uk).

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NEWS

November 2018

RURAL CHOICE

Self-builders in England are more likely to build in rural locations, according to HB&R's *Self & Custom Build Market Report 2017*. The same report also found that the proportion of self-builders, compared with other householders, is highest in the south west region of England, with Scotland coming a close second. London, perhaps not surprisingly given the constraints on land, has the lowest percentage of self-builders.

Comparison of project locations (% of total) by rural-urban split, with distribution of English households (% of total)

RURAL

Self-Build Projects **44%**

Households **21%**

SEMI-RURAL

Self-Build Projects **41%**

Households **40%**

URBAN

Self-Build Projects **16%**

Households **39%**



FOUR URBAN PLOTS FROM PLOTFINDER.NET



Sutton St James, Lincolnshire
Semi-detached four bedroom farmhouse with a range of outbuildings.
£350,000



Sheffield, South Yorkshire
Grade II-listed Victorian bathhouse – one of the last remaining bathhouses in Britain.
£100,000



Tetbury, Gloucestershire
Attractive end of terrace in need of complete renovation.
£225,000



Fareham, Hampshire
Semi-detached house in need of modernisation.
£300,000

BE SMART

Smart security systems are the top of homeowners' most wanted lists, with almost half of us wanting to upgrade to an intelligent system, followed by the ability to schedule and control lights (45%) and central heating thermostats that learn behaviours (43%), according to a survey from Ernst and Young. And in order to obtain these devices, most of us would go to smart tech manufacturers directly, rather than asking for advice on social media.

On the Level

This seamless enamel surface can be easily installed flush to existing flooring quickly, thanks to its 4-in-1 design which revolutionises a traditional shower area. The new Kaldewei NexSys offers a pre-assembled system of waste channel, sloping support, sealing tape and shower surface.



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GREEN NEWS

Are Heat Pumps for Everyone?

Are heat pumps really the way forward for self-builders and renovators, asks David Hilton

When the Renewable Heat Incentive (RHI) was introduced, the Department for Business, Energy and Industrial Strategy (BEIS) expected 513,000 new heat pump heating systems to be installed under the scheme by 2021. At current rates, the actual number will be more like 111,000. Over the past four years only around 60,000 appliances have been fitted under the domestic RHI scheme, compared with over six million boilers. So what is going wrong?

A recent report from the Committee for Climate Change (CCC) has accused the BEIS of not understanding consumer need. It also pointed to high upfront costs, uncertainty about incentive levels and eligibility, and the hassle factor of finding competent installers. The over-burdensome nature of installer accreditation has put many plumbing firms off renewables, leaving the installations down to a few specialist companies. This has resulted in consumers sticking with what they know, both with technologies and installers.

The CCC has an ambition to electrify heating but several industry voices believe that there are more cost-effective ways to meet the carbon reduction challenge. Worcester Bosch has said that heat pumps are not suitable for most of our homes. You might expect this comment from a major boiler manufacturer but they do have a point. An examination of the 640,000-plus homes off the gas grid showed that only about 12% had an EPC rating of C or above, which is realistically the minimum requirement to achieve an efficient heat pump heating system. Any property below that would need disruptive (and potentially expensive) insulation improvements or a hybrid heat pump and boiler design. As it is not the boilers that produce carbon emissions but rather the fuel that they run on, is it not time to add urgency to the process of decarbonising fuels? I am not advocating the wholesale use of food crops used for biofuel but there are great steps being made with waste-to-fuel products and the development of hydrogen boilers. To put it into perspective, LPG is now available as a biogas mix and OFTEC, the oil heating body, states that all liquid fuel boilers could run on low carbon alternative fuel by 2035. For more on innovative heating options, see page 159.



David Hilton

David is an expert in sustainable building and energy efficiency, and is a director of Heat and Energy Ltd.

90%

of our time is spent indoors but most of us forget to properly ventilate our homes. The VELUX ACTIVE with NETATMO, a new voice-activated system, enables homeowners to control their indoor climate. A smart sensor monitors temperature, humidity and CO₂ levels in the home and uses the information to open or close VELUX INTEGRA roof windows to maintain a healthier climate.

SOLAR BREAKTHROUGH

British company Polysolar, has developed a revolutionary product that allows windows to harness solar energy. One domestic trial featured a transparent glass roof to a garage and workshop that met the complete energy needs of the owner's home and electric car. At the moment, the transparent glazing is around twice the price of a conventional window, but this could fall to a 10% premium when volume production begins.



Compact Home Smart Battery

Homebuyers and self-builders are increasingly eco-conscious, and most of us would prefer to save money on our bills. In response, Moixa has produced a smart battery which stores solar energy for use and optimises energy usage by tracking household patterns — with an estimated annual saving of up to £600 per household. ➤



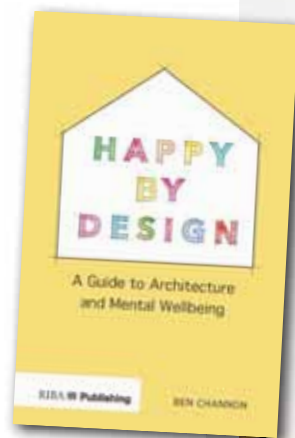
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Happy by Design

Architect and mindfulness teacher Ben Channon looks at ways we can all make our homes a happier place in a new book



Whether you're looking to self-build, renovate or extend, there are dozens of ways to make your home a joyful and uplifting place to live, says Ben Channon, the author of *Happy by Design*, published this September.

The book, published by RIBA Publishing (ribabookshops.com) and priced at £20, outlines Channon's seven principles for a happy home, which we summarise here:

1. LIGHT

This is one of the most important of all design considerations, states Ben. His suggestions include: making sure that the house is orientated sensitively in relation to the sun (orientate within 150° of true south to maximise solar gain and avoid north-facing windows); consider shadows that may be cast by other buildings and trees and consider the size of windows carefully. He also suggests avoiding deep floorplans as these can create dark spaces at the centre of the building — to get round the problem, make rooms either shallower or taller, he says.

Other ideas include using high level windows to combine privacy and light, and using rooflights where there is limited opportunity for normal windows (but focus on normal windows as they provide psychologically important views of the outdoors).

Artificial light is important, too. Bright, harsh light can negatively affect our moods, while a low colour temperature triggers the release of melatonin, which helps us relax.

2. COMFORT

Using tactile materials; considering comfort as well as aesthetics when choosing furniture; making sure the home is comfortably cool in summer and warm in winter; ensuring a good supply of fresh air (ideally with the smells of flowers, grass or rain); and reducing noise are all recommended.

3. CONTROL

Find ways to adjust spaces in your home, using simple approaches, says Ben. Apps and home hubs can help here although no-tech options should also be included (stairs could double up as seating; window shutters that can be physically adjusted can be satisfying). Quiet spaces are also important for the third to half of people who are introverts.



4. NATURE

"It is almost impossible to overstate how good nature is for our minds," states Ben. Finding ways to bring nature into your home is therefore essential for mental wellbeing. He suggests integrating an existing tree into a new building, creating an internal green wall, and making the most of any views of nature, whether that's green space, water or a tree. Other suggestions include creating roof gardens and ➤



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NEWS

November 2018



Don't forget a space for quiet thinking or reflection. A retreat space (not the bedroom) can be included with soft and inviting furniture, dimly lit and well insulated.

improving ecology and biodiversity (insect hotels, green walls or concealed bat boxes, anyone?).

If you can integrate or give views of water, all the better, says Ben. Landscape designers have perhaps the best opportunities to bring water features into the outside space — internally, the choices are either low-maintenance water features or orientating windows to give views of water.

5. AESTHETICS

Visually attractive objects and places undeniably make us happier, says Ben. He suggests using colour wisely and sparingly (yellow, as in this project by Snook Architects, ABOVE, releases the feel-good hormone serotonin; blues and greens bring a sense of tranquillity); creating 'moments of joy' through special features or interesting materials; and avoiding visual monotony, while also making homes easy to understand and navigate.

6. ACTIVITY

Find ways to encourage activity around the home, for example, by making activity playful for adults and children. Rope ladders or climbing walls could be fun ways for children and adults to reach mezzanines or bunk beds, while rooflights above stairs help to reward activity. Or consider a mini gym space with a pull-up bar and small cardio area with a few mats and a Swiss ball, he suggests.

7. PSYCHOLOGY

- Don't overlook the importance of storage, he says. "People with messier homes have been shown to have higher levels of the stress hormone cortisol." Aim for intelligent, integrated and generous storage, he advises. Don't forget storage built into a staircase or below a bed.
- High ceilings bring with them a greater sense of psychological freedom and improve happiness, he points out; vaulted ceilings or double-height areas in a house can achieve this.
- Celebrate the entrance — a good entrance can be welcoming, and helps to create a good first impression.
- Open plan spaces help to encourage frequent contact with family and friends (a way of substantially improving many common mental health problems, he points out). Don't forget that we all need a space for retreat and privacy, though.
- Avoid spaces that are too large, as they can leave us feeling dwarfed or isolated; smaller spaces (as long as they are not unpleasantly small) on the other hand can help us avoid hoarding and give us more free time.
- Where possible, site bedrooms on the upper storey, as this meets our need to feel safe at night time.
- Create a comfortable, pleasant and homely atmosphere through a whole mix of lighting, colour, texture, furniture and design. **H**



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IDEAS & INSPIRATION

It's Time for the Building Regs to Look Forward

With the effects of climate change becoming more noticeable, it's time for Building Regulations to start thinking about the needs of homes in decades to come, argues eco expert Tim Pullen



The government's Environmental Audit Select Committee, chaired by Mary Creagh and with 'green' luminaries such as Caroline Lucas and Zac Goldsmith as members, has recommended that the Building Regs be changed to introduce measures to combat overheating in homes. This is obviously a reaction to the recent heatwave and the realisation that this event is only likely to become more common as climate change progresses.

According to the Met Office, nine of the 10 warmest years in the past century have occurred since 2002. Last year was the fifth warmest in that period and this year may get even higher up the chart. The Met Office's chief scientist, Prof Stephen Belcher, is quoted as saying that while UK heatwaves "may not be the new normal... within a few decades they could be."

Clearly then some action needs to be taken and given that it takes a while to produce new Building Regulations, and even longer for those regulations to come into real effect, then it is not unreasonable to start that process soon.

But do we actually need new regulations? It is a fundamental part of Building Regulations compliance for every new build to have a SAP assessment completed. This is a means of measuring and calculating the energy consumption of a property, and overheating potential has been a specific part of that since 2005. This deals with overheating potential from both solar gain through glazing and internal gain from lighting, central heating pumps, ventilation, etc.

Personal experience would indicate that the issue of overheating potential in the SAP seems to be honoured more in the breach. Neither self-builders nor big housebuilders give the issue a great deal of consideration as the need for concern arises only rarely. In foreign climes – Greece, Italy, Spain – overheating is not dealt with specifically in their

Building Regulations, as it does not need to be. They have always had high temperatures to deal with, and houses are built to cope with it as a matter of routine, generally by including lots of thermal mass. My own 200-year-old home in deepest, darkest Wales has 400mm thick stone walls, and throughout the summer heatwave the internal temperature never rose above 24°C — and did not fall below 21°C. Equally, in those hotter countries, building a house with lots of glazing would always come with appropriate shading.

There are only two ways of dealing with overheating: stop it getting into the house or install sufficient ventilation (natural or mechanical) to get it out. Both of these add cost to the build and it seems unlikely that big housebuilders will accept that cost without a fight.

But maybe the only change that is needed is the enforcement of current regulations. We self-builders are forced to do that anyway but commercial builders may be working to Building Regulations three to six years behind whatever is current, as compliance is required at the time the building is designed, not when it is built. (Building Regs are updated on a three year cycle.)

There are around 24million homes in the UK and new regulations will do nothing to help those properties.

Having said that, the fact of climate change is inarguable and the impact it is likely to have on houses and the way we live in them is becoming clearer. So it would seem equally inarguable that Building Regulations have to change to reflect this new reality. Perhaps the biggest change would be to stop following trends and start setting them — work needs to start on a set of regulations that reflect what we will need in 10 or 20 years' time. **H**

Tim Pullen

Tim is an expert in sustainable building and energy efficiency in residential homes. He is the author of *Simply Sustainable Homes*

"Overheating in homes is becoming an increasing concern... work needs to start on a set of Regs that reflect what we need in 10 or 20 years' time"

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BRITAIN'S BEST HOMES REVEALED

*In our annual awards special, we reveal 2018's most inspiring
self-build, conversion and renovation projects*



The Daily Telegraph Homebuilding & RENOVATING AWARDS 2018

For over two and a half decades, *The Daily Telegraph* and *Homebuilding & Renovating* have teamed up in search of the finest individual homes the UK has to offer. The projects on this year's shortlist, showcased over these pages, have been wonderfully varied — from amazing transformations, extraordinary conversions and cutting-edge self-builds. What's more, our Awards do not simply commend incredible architecture, but celebrate the wonderful people behind these projects.

Which brings us onto the Overall Winner for 2018: Meadowmead is a modern oak frame country home lovingly built by Merry and Ben Albright, after a lengthy (four-year!) planning process.

"The couple have used skill and determination to unlock a dream site on the edge of a village and built a home that any family would covet," says judge Jason Orme. "It's generous and well-planned inside, with the flexibility required to meet the needs of modern family life. Outside, it is the perfect example of a modern barn-style country home — grand and impressive but also honest and homely. It has been designed to perfection, both down to the detail and also in terms of the overall form and shape. Ultimately it is why we build individual homes — and this is a perfect example of the difference building your own home can make to your life."

The category winners this year also include an array of stunning builds: a contemporary Passivhaus built for £250k in London; a sympathetic renovation of a steading building — which had no vehicular access, electricity, fuel, water supply or telecommunication infrastructure when purchased; and a church conversion with an eclectic interior delivered to an impressive budget by its owner.

We hope you enjoy reading about this year's shortlist of amazing and inspiring projects, and we look forward to seeing your home in next year's crop!



THE JUDGES...



Charlie Luxton is an experienced architectural designer and well-known broadcaster, presenting popular homes programmes such as *Building the Dream*.



Darren Bray is an architect at award-winning PAD Studio in Hampshire. He's also a sessional lecturer in architecture at the University of Reading.



Neil Turner is a director at Howarth Litchfield Partnership and specialises in residential design. His home won our award for Best Remodel/Extension in 2014.



Jason Orme is the Editorial Director of *Homebuilding & Renovating* and an experienced self-builder. He recently completed extending and remodelling his family home in Staffordshire.



Michael Holmes is Director of Content at *Homebuilding & Renovating*. He has self-built and renovated 27 homes, and is also Chair of the National Custom & Self Build Association (NaCSBA).



HB&R's editorial team
Claire Lloyd, Alison Wall, Daisy Jeffery, Nick Robbins, Natasha Brinsmead and Amy Reeves have been working for the magazine for a combined period of over three decades.



OVERALL
WINNER



BEST TRADITIONAL-STYLE SELF-BUILD & OVERALL WINNER

LOCATION Herefordshire
PROJECT Oak Frame Self-build
HOMEOWNERS Merry and Ben Albright
DESIGNER Border Oak

Merry and Ben Albright (who both work for the oak frame company that was used in the final build) set their hearts on trying to find the perfect site for their dream home. Four years later, after numerous planning skirmishes, the couple secured a six-acre plot for their two-storey, four-bed house.

Judge Jason Orme commented: "We desperately tried to count their occupations against them, but this is a story about years of hard work, and about how people push themselves to build homes that will make the perfect background to family life.

"Merry and Ben went through all the things that the rest of us experience: the budget constraints, stress and strains. We were sufficiently assured that anyone, given the same determination and skill shown, could learn from their story and achieve their own dream home for themselves."



WINNER

LOCATION London
PROJECT Green Self-build
HOMEOWNER Elizabeth Sharp
DESIGNER RDA Architects

Proving that you can self-build one of the country's most energy-efficient homes on a construction budget of just £250,000, the architects of this 110m² Passivhaus-certified home also managed to design in a garage and swimming pool.

Downsizer Elizabeth Sharp has achieved everything she set out to do, and now enjoys her thermally comfortable, quiet and supremely cheap-to-run home. In keeping with its London mews location, the design nods to an industrial aesthetic, with a light, clean interior designed to showcase the homeowner's collection of antique furniture. (See page 58 for more details on this self-build.) ➤

BEST GREEN HOUSE



WINNER

BEST CONTEMPORARY-STYLE SELF-BUILD

LOCATION Ely, Cambridgeshire
PROJECT Contemporary Home
HOMEOWNER Lucy Cook
DESIGNER Mole Architects

Situated in a conservation area in the East Anglian town of Ely, this striking timber-framed home is notable for its steeply pitched gable-fronted roof and serrated white brickwork façade. Inspiration for the unusual brickwork was drawn from nearby Ely Cathedral and the neighbouring Edwardian homes, where bricks are used decoratively on the street-facing elevations. Inside, the layout offers flexibility, with options for open spaces for entertaining and acoustic separation between rooms for daily use.

LOCATION Usan, Scotland
PROJECT Conversion and Extension of a Coastguard Tower
HOMEOWNER Mr and Mrs Pullar
DESIGNER GAAP Architects

Usan Tower has been brought back to life after spending four decades in an increasingly derelict state. Once a sentinel, standing guard over the North Sea, the Tower has been reborn as a brilliant first-time family home — bought for just £35,000 and converted and extended for £120,000.

The design emphasises the incredible views out to sea, while the modern, zinc-clad extension marks the evolution of the building. Given its position, site access was tricky, and care has been taken to ensure that the home remained as low-maintenance as possible — and that it can withstand the harsh wind and driving rain of the Scottish east coast.

BEST STARTER HOME

WINNER



WINNER

LOCATION Hampshire
PROJECT Traditional Oak Frame Self-build
HOMEOWNER Shelagh Krasno
DESIGNER Frank Dowling

When her circumstances changed, Shelagh Krasno decided to build in the garden of her former house to create an idyllic home in a location she loved. First-time self-builder Shelagh found inspiration for her new home in the pages of a gardening magazine. The result: a one-and-a-half storey oak-frame, cedar-clad home. After a battle to gain planning permission, progress was swift, with Shelagh taking on the role of project manager. She recruited trades based on their character and has created a new-build home that looks as though it has stood for decades.

SPRIT OF SELF-BUILD





WINNER

LOCATION Loch Lomond, Argyll & Bute
PROJECT Renovation and Extension of a Steading Building
DESIGNER Paterson Gordon Architecture

BEST RENOVATION

Purchased with no vehicular access, electricity, fuel, water supply or telecommunication infrastructure, the site – with its glorious loch views – was the redeeming factor for this steading, which had long stood derelict. The striking extensions linked to the rear and side of the steading are contemporary in form, but sympathetic in design, while the original building has been faithfully renovated – the memory of the agricultural nature of the building preserved through the carefully specified materials.



HIGHLY COMMENDED

LOCATION South Devon
PROJECT Contemporary Self-build
HOMEOWNER James Risebero
DESIGNER Field Studio Architects

Commanding an elevated position with far-reaching views across the Devon countryside, this new family home marries contemporary architecture with honest materials. Constructed almost entirely from CLT (cross-laminated timber), the panels have been left exposed internally to give a raw finish, and provide warmth to the minimalist spaces.

This new home features high levels of insulation and airtightness while walls of sliding glass offer a seamless connection with the outdoors; vaulted ceilings and mezzanines add drama to the internal spaces.



BEST CONTEMPORARY SELF-BUILD



WINNER

LOCATION London
PROJECT Renovation and Extension
DESIGNER Amos Goldreich Architecture

BEST EXTENSION AND READERS' CHOICE AWARD

With a brief to turn this home into a larger, more family-friendly space, Amos Goldreich Architecture responded with zinc-clad side and roof extensions that have transformed this Victorian home in London. The extensive internal refurbishments included rearranging the floorplan and changing levels to help with the flow of the interiors and to allow borrowed light to travel. The result is a spacious, light-filled family home that perfectly blends old with new – and a worthy winner of our Readers' Choice Award.



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LOCATION Pucon, Chile
PROJECT Contemporary New Build
HOMEOWNER Javier Ampuero
DESIGNER Ampuero Yutronic

Great care was taken when deciding how best to create a home that worked with its surroundings and made the most of the incredible mountain views. The result is a striking contemporary home, clad in blackened timber to create the impression of a shadow within the landscape. The dynamic, angular form of the home has been cleverly positioned so that all the principal rooms benefit from the views, and the window sizes and positioning have been tailored to make the best use of solar gain. A pared-back interior of timber-clad walls lends a rustic charm to this modernist cabin.

WINNER



WINNER

LOCATION Gloucestershire
PROJECT Church Conversion
HOMEOWNER/DESIGNER
Az Jasat

Az Jasat took on the role of principal designer and project manager in order to stick to his tight build budget when converting a Victorian Methodist church into an eclectic family home.

Judge Darren Bray commended the individuality of the interior, describing it as: "A reflection of the owner's spirit in many respects!"

"This is a wonderful example of how to take a redundant Victorian church and give it new purpose as a home," he continues. (See page 46 for the full story.)



BEST CONVERSION

HIGHLY
COMMENDED

LOCATION Devon
PROJECT Extension
and Renovation
HOMEOWNERS
Mr and Mrs Hall
DESIGNER Roderick James
Architect LLP

This once dated 1920s four-bed house has been completely transformed, thanks to the addition of an oak frame extension and extensive renovation work. From the new kitchen/family room, new and reorientated openings, re-slatted roof and timber cladding, the house is barely recognisable from its former self.

The scheme was also designed to improve the property's thermal performance, while high-quality materials were chosen that will naturally weather over time and enhance the building's character.

EXTENSION





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THE SHORTLIST

Despite running for over two decades, The Daily Telegraph and Homebuilding & Renovating Awards is always full of surprises and we are still inspired by the creativity of remodellers, extenders and self-builders alike. This year is no exception.

All beautiful and well-designed, every house on the 2018 shortlist deserves to be celebrated, from the conversion of a derelict model farm, to the state-of-the-art glass extension in London, complete with glazed roof and swimming pool.



LOCATION Oxfordshire

PROJECT

Remodel and Extension

DESIGNER

Woodfield Brady Architects

An ingeniously designed floorplan, high-quality internal finishes and remodelled façade have completely transformed this dated 20th-century property into one fit for modern family life. Old sections were stripped away, with a two-storey wing added. The exterior cladding and neutral render provide the house with a complete facelift.

REMODEL AND EXTENSION

LOCATION Cheshire

PROJECT Remodel and Extension

DESIGNER Scott Donald Architecture

Sensitively nestled between its 19th-century host and the original boundary walls lies a perfectly formed glass-box extension. With a brief to “open the house to the garden”, architect Scott Donald’s awe-inspiring 3.2m glass pocket doors create a seamless transition between the white contemporary kitchen and the natural world beyond.

The kitchen extension is now the hub of the home. This project also saw the creation of a basement level with home cinema and games room, and care has been taken to create a smooth transition between traditional and contemporary spaces.

REMODEL AND EXTENSION



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FACIT HOMES

CONVERSION

LOCATION Wiltshire
PROJECT Conversion
HOMEOWNER Joanna and Simon Kitching
DESIGNER Elkins Architects

Sitting quietly behind its original (restored) gates, one would never guess that a beautiful family home lies behind the entrance, all wrapped round a large courtyard with views out over the countryside. It's also hard to believe that this charming home was a former model farm that had been left derelict.

Bringing the agricultural buildings into the present day, the owners have converted the existing buildings and even rebuilt the curved roof, which the impressive living room sits under. This sensitive conversion project showcases how unloved agricultural buildings can be brought back to life, with modern technologies (including a ground source heat pump) added to make modern living easier.



CONTEMPORARY EXTENSION

LOCATION London
PROJECT Contemporary Extension
DESIGNER Guarnieri Architects

Behind the Victorian façade of this terraced property in south-west London lies an extension which forms a striking contrast to the traditional red-brick exterior. Thanks to an inspired concept from Guarnieri Architects, the interiors of this period home have been completely stripped back, with minimalist rooms in abundance. The jewel in the crown, however, is the impressive two-storey glass box extension to the rear, which provides impressive views of the garden from the kitchen diner via full-height glazing. A glazed roof and swimming pool complete the picture. Luxurious materials used throughout the home, including marble and slate, also add wow factor.





LOCATION Lake District
PROJECT Extension and
 Renovation of a Farmhouse
DESIGNER Architecture519

Looking from the lakeside up the valley, you'd be forgiven for thinking this farmhouse extension has always been part of the view. Firmly rooted in the vernacular of the Lake District, the two-storey extension is set back from the original building, remaining subservient to the preceding structure and the dominating landscape.

Framed in oak, the open-plan living space resists any attempts to mimic a period interior and instead sits comfortably beside the large expanse of glass that fronts the structure before melting into the entryway of the farmhouse. Careful level changes and sensitive restoration create a hybrid that unashamedly revels in the history of the farmhouse as well as its future as a modern home.

EXTENSION AND RENOVATION



LOCATION Kelvedon, Essex
PROJECT Traditional-Style Self-build
HOMEOWNER Adrian and Sandra Girling
DESIGNER Matthew Girling

This charming traditional-style self-build features red bricks with lime mortar on the exterior ground floor and a dual curved roof over the entrance. Render and natural timber cladding above the brickwork, meanwhile, conveys a more lightweight feel. Once inside, an open plan layout on the ground floor has varying floor and ceiling heights to cleverly differentiate the living, kitchen and dining spaces.

TRADITIONAL-STYLE SELF-BUILD



LOCATION North Sheffield
PROJECT Remodel and Renovation of an Existing Home
HOMEOWNER John and Joan Bloxam
DESIGNER Paul Testa Architecture

Architect Paul Testa was tasked with renovating a small and dated bungalow on an awkward multi-level plot on the edge of the Peak District. The result clearly shows that smart, forward-thinking design can create a light-filled, energy-efficient and accessible home, despite such unpromising beginnings. For more on this home, see page 70.

REMODEL AND RENOVATION





GREEN HOME

LOCATION Hertfordshire
PROJECT Passivhaus Self-build
HOMEOWNER Daniel Luhde-Thompson and Sarah MacLaren
DESIGNER Nicholas Tye Architects and Gresford Architects

A 'fabric first' approach was adopted for this modernist, certified Passivhaus in Harpenden, Hertfordshire. The five bedroom home was built from a timber frame, which was constructed off site with insulation and airtight membrane already installed — with the result that energy bills are almost non-existent. Entering the home, visitors are greeted with a through view to the mature garden, via large sliding doors. Other stand-out features include a colourful kitchen, handmade by a family member and finished with contemporary concrete worktops, and an en suite bedroom with access to a Japanese bath on a private roof terrace overlooking the garden.



CONTEMPORARY-STYLE SELF-BUILD

LOCATION London
PROJECT Contemporary Self-build
DESIGNER Gutfeld Architecture

Hackney Backhouse is a two-storey, three-bed home built on the site of a former garage and workshop in a conservation area. The striking home is screened off from the busy road by vertical Corten louvres that provide privacy while keeping the house in touch with its environment.

The tight 8m x 11m plot was excavated in order to create the two-storey home, with open plan living and kitchen space on the first floor and the bedrooms created at basement level. Floor-to-ceiling glazing, two discrete sunken courtyards and superb lighting make this home a fabulous example of smart urban design.



CONVERSION

LOCATION Cheshire
PROJECT Barn Conversion and Extension
DESIGNER Hayes & Partners

Retaining both integrity and character, this barn conversion effortlessly unites a once disused agricultural brick building with contemporary materials to create a modern home. An unassuming glass corridor enabled the stable wing to be converted into bedrooms, beautifully framing the original exterior walls.

The eponymous two-storey pigeon house had previously been divided but now homes a guest suite that celebrates the original timber structure in tandem with the modern extension.



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LOCATION Hampshire
PROJECT Remodel and Extension
HOMEOWNER Joy and John Cousins
DESIGNER The Classic Architecture Company

Joy Cousins and her husband John, both in their mid-80s, chose to extensively remodel their home with the aim of futureproofing it. Central to this idea was the creation of a separate 25m² carer's suite above the detached garage, a lift from the open plan lounge/kitchen area to the master bedroom, and a large swimming pool to allow the couple to keep fit. The dramatic transformation has created a warm, inviting home with all the comfort and accessibility that the couple were seeking.

REMODEL



LOCATION Lewes
PROJECT Remodel and Loft Conversion
HOMEOWNER Bronwen Wright
DESIGNER fiftyoneeight Architecture + Interiors

A loft conversion and remodel have completely transformed this terraced home. Bronwen Wright, with some help from her architect brother Angus Eitel, came up with an affordable scheme that took just five months to complete — delivered on time and on a £120,000 budget. The new loft conversion houses the master bedroom that looks towards Lewes Castle while the open plan kitchen/living area downstairs creates a greater connection between the house and the garden — devised with the help of interior designer Clare Pascoe.

REMODEL



LOCATION Cornwall
PROJECT Extension to a Cottage
DESIGNER Stan Bolt: Architect

Dating back to the 1890s, this granite cottage boasts unbroken panoramic views of the Atlantic and Cornish coast. The original home is now accompanied by a generous extension that makes the most of those awe-inspiring views and connects the house to its landscape — with surrounding terraces and courtyards seamlessly linking to the new living spaces.

Judge Darren Bray commented: “This project is a masterclass in simple, low-key contextualism.” The slate roof floats above the extension, supported by minimally framed glass gables, and cements it to the local vernacular.

EXTENSION

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BEST CONVERSION

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BORN AGAIN

Az Jasat has taken an approach which is both creative and highly technical in the conversion of this Methodist church — resulting in a family home that is ingenious and striking

Words **Natasha Brinsmead** Photography **Simon Maxwell**





Impactful Spaces

The large kitchen diner space is housed in a later addition to the church, built in 1959. There was a further structure to the rear which has now been removed, with only the roof remaining.



Modern Rustic

The kitchen diner (LEFT) features new kitchen units made by a local joiner. They sit alongside an island (designed and made by Az) and an upcycled dresser. The full-height aluminium bifolds (BOTTOM LEFT) and glazing lead out onto a new terrace, located where a now-demolished structure once stood on site.

The Staircase

The new staircase (BOTTOM LEFT), made from steel and timber, was designed by Az. The ply balustrades are a temporary measure that Az had CNC machined; they will be replaced by laser-cut metal profile in time.

The term ‘wow factor’ gets bandied about a bit too often these days and so perhaps doesn’t really do Az Jasat’s conversion of a Methodist chapel justice. But it is hard to imagine anyone walking through the unassuming threshold and into the voluminous space beyond and not having a ‘wow’ moment.

“I was looking for somewhere to live in Stroud and didn’t want a small bachelor pad,” begins Az, a mechanical engineer by profession and former nightclub promoter. “I’d always wanted to do a conversion.”

The original front section of the Methodist chapel had been built in 1901, with the middle section constructed later in 1947, before the rear was added in 1959.

“The chapel was for sale through a local agent, but didn’t yet have planning for domestic residential use — plus it was entirely rotten inside thanks to the wood panelling covering the damp brick walls, with mushrooms growing through the floor and dry rot everywhere,” he explains.

Az put in an offer £28,000 lower than the guide price of £125,000 and was turned down, before a lucky twist of fate.

“I went to an exhibition and met an artist

called Clay Sinclair who was displaying his work in a mock church setting,” says Az. “He had a pew as part of his ‘church’, borrowed from a Methodist church so I told him about my failed offer. Clay happened to know the local vicar who had informed him that very morning that the buyer of this church had pulled out. On the back of this information, I put in a new offer which was accepted.”

But the good fortune offered by the exhibition didn’t end there. “I was sitting next to a lady at the exhibition, who I didn’t speak to at the time, but who I met again a short while later — she is now my partner and we have a four-week-old baby. The painting Clay was displaying now hangs on my wall.

“Planning sailed through,” adds Az. “I think it was because the church is in a residential area and I wasn’t making any external changes.”

The application for a change of use had to be made through the local authority but according to Az, the “church was just glad to see it restored”.

Az called in a favour from his colleague David Light for concept drawings, later taking over the design work himself. “I had strong ideas of what I wanted,” he explains. “So I developed the concept into planning and detailed construction drawings — I wanted to challenge all the obstacles thrown my way and work out ways of doing things that didn’t initially conform. I didn’t want just a standard specification.”

Because Az was converting a non-residential building, he needed to conform to modern Building Regulations. “It might have been easier if it was listed in some ways,” says Az. “That way, I might not have had to add so much insulation. As it was, I had to use modern insulation materials that weren’t designed for this type of building in order to reach Building Regulations. Every wall now has internal insulation and plasterboard.”

The original windows all remain in place within the main section of the building, with Az adding double glazing.

He drew on his background in engineering and CAD to produce all the construction drawings, as well as the electrical and pipework layouts, acting as main contractor, principal designer, project manager and client. “I visited the house regularly, and the design developed as the project evolved.” ➤

The homeowner

Az Jasat

The project

Church conversion

House size 108m²

Build time

May 2017 - May 2018

Size 250m²

Plot cost £97,000

Build cost £180,000

Value £500,000



Az describes his approach to the conversion as “engineering meets art”. He had the whole building laser scanned at the start of the project, before a colleague made a 3D model of it. “There was lots of measuring and remeasuring to ensure ceiling heights and new partitions worked,” he says.

“I employed a builder for all the construction work, such as fitting the new supporting steels, and he helped out with project managing too,” he continues.

Az was keen to maintain the original details and voluminous feel of the building, highlighting features such as the organ, while making it fit for modern family life.

“One of my main challenges was how to avoid slicing through the original windows when creating a first floor,” he explains. “I wanted to retain as much of the double-height space as I could. It was hard to get enough bedroom space while doing this — so there are only three bedrooms on the first floor, with a fourth on the ground.”

The first floor is now accessed by a staircase designed by Az, using steelwork from the same steel fabricator who made the main steels for the house. In order to maintain the double-height spaces in the living area, the bedrooms and bathrooms have been located towards the rear of the house, supported on huge new steels, left exposed. These sit alongside the original steels that have been sandblasted.

At the rear of the house lies the large kitchen diner, housed in a single-storey structure with a dramatic high pitched roof. A fully glazed gable end, with bifolds, opens out to a new patio space.

“Throughout the project I was looking for creative ways to stick to my budget,” says Az. “I couldn’t spend more than £180,000 to make it worthwhile.”

The result is a home that has brought the unique nature of the building back to life, displaying its original features in all their glory, yet propelling it into the 21st century.

“My professional life centres on technology in the construction industry and applying Building Information Modelling (BIM), cloud computing and prefabrication techniques to reduce project risk,” concludes Az. “I’ve had to relax those principles with the chapel and take a more organic approach, sympathetic to this quirky old building.” **H**



Making an Entrance

The front door leads straight into the double-height main living space. The organ and pipes are all original and now form a striking feature. Az worked alongside interior designer Emma Taylor to achieve the look he was after.



Reconfigured Spaces

Huge new steel beams support the new first floor spaces, including Az's home office which now overlooks the living space. By ensuring that the first floor only partially spans the ground floor, most of the huge original windows remain unobstructed. A rooflight pulls in extra natural light.





A Family Home

Although the church remains virtually unchanged from the front (ABOVE), inside it has been transformed into a comfortable family home (TOP). On the first floor (LEFT), changes in floor level mean that some double-height spaces have been retained on the ground floor. The eclectic lighting scheme was designed and implemented by Az.

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Clever Solutions

The bedrooms and bathroom combine modern design with original features including the uppermost sections of the old arched windows and original wooden trusses. The sanitaryware is from Mira and Kohler.



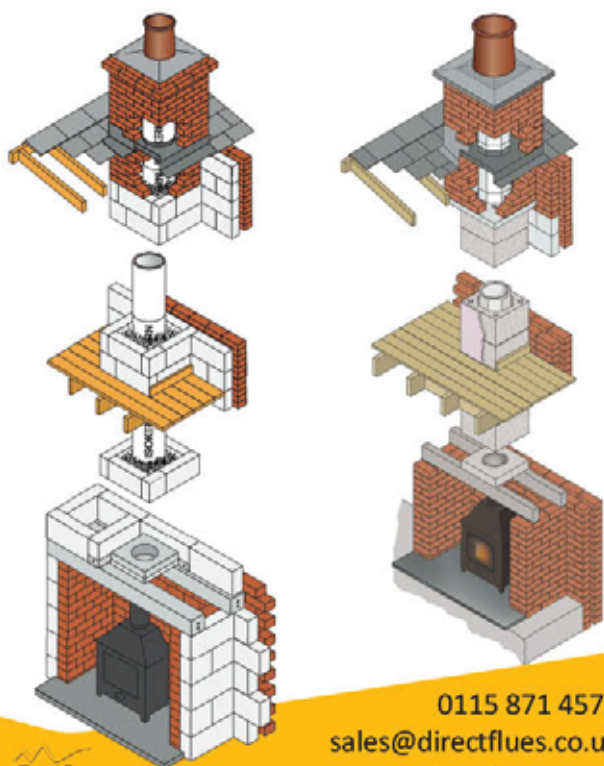
A Light Touch

The addition of some well-placed rooflights has meant that the first floor is full of natural light – and avoids any issues with overlooking.



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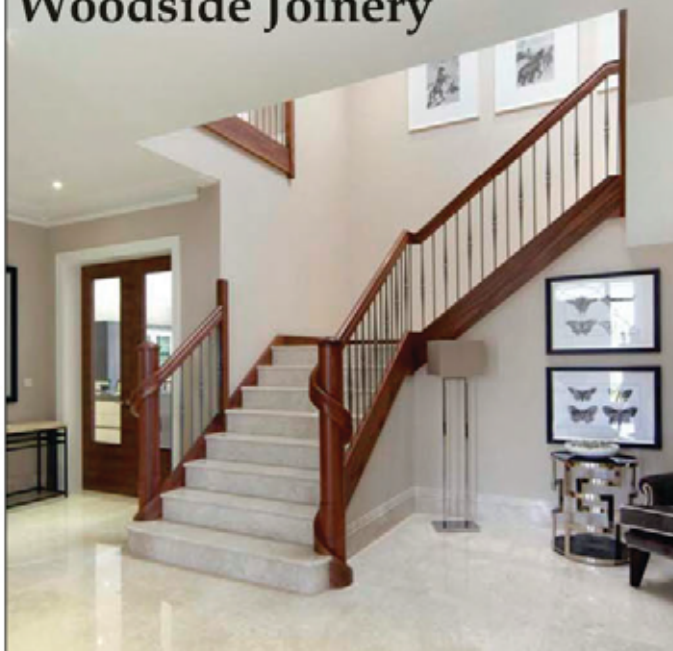
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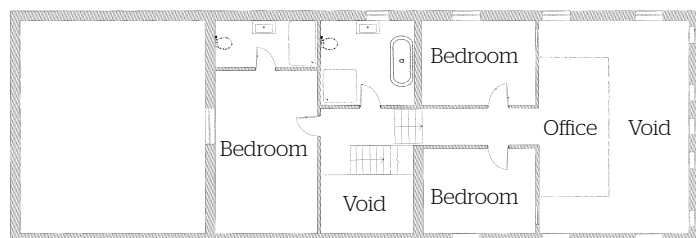
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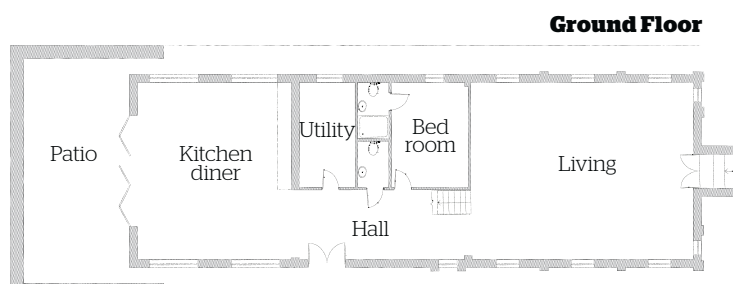
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PROJECT NOTES



First Floor



Ground Floor

The Floorplan

On the ground floor, the living space, hall and kitchen diner are all double-height spaces, while the utility room, guest bedroom and en suite have lower ceilings to allow space for three bedrooms and two bathrooms on the first floor above.

Suppliers

Architect David Light (concept); Az Jasat (construction)

Structural engineer Peter Bartlett (MDHP): 01453 824551

Builder Matt Gardiner of Inspired Build: 07974 341393

Materials Travis Perkins: travisperkins.co.uk

Damp treatment Roy Hooper (Framptons): 01453 821101

Interior designer Emma Taylor: 07805 320623

Joinery John Grant of G K Joinery: 01453 885075; Paul Large of Crest Kitchens & Joinery: 01453 297374

Windows and bifolds Nick Hambling of Countryside Windows: 01242 821122

Glazing Gary Mouat of C N Glass: 01295 263364

Steelwork and stairs Dave Barnes of North-sound: 01453 872259

Roofing Dave Johnson of Westshires Scaffolding & Roofing: 07775 731876

Sanitaryware Kohler: kohler.com;

Mira: mirashowers.com

Screed Partridge Screed-ing: 0800 077 8886

Flooring Jamie Robins of Rock and Wood: 0845 466 0192

Sandblasting Ron Rowlands of Harvey Moon: 01285 651260

Decorating Mark McMahon & James Partridge: 07791 916748

VAT reclaim Jayne Daniel of J M Daniel: 0161 763 5304

Paint and Paper Paint Library from Bailey Paints: 01453 882237

Colour consultant Jane Peckitt (Bailey Paints): 01453 882237

Plumbing Justin Hicks of Hicks Heating and Plumbing: 01453 756126

Electrics: Sam Lawler and Leon Vincent

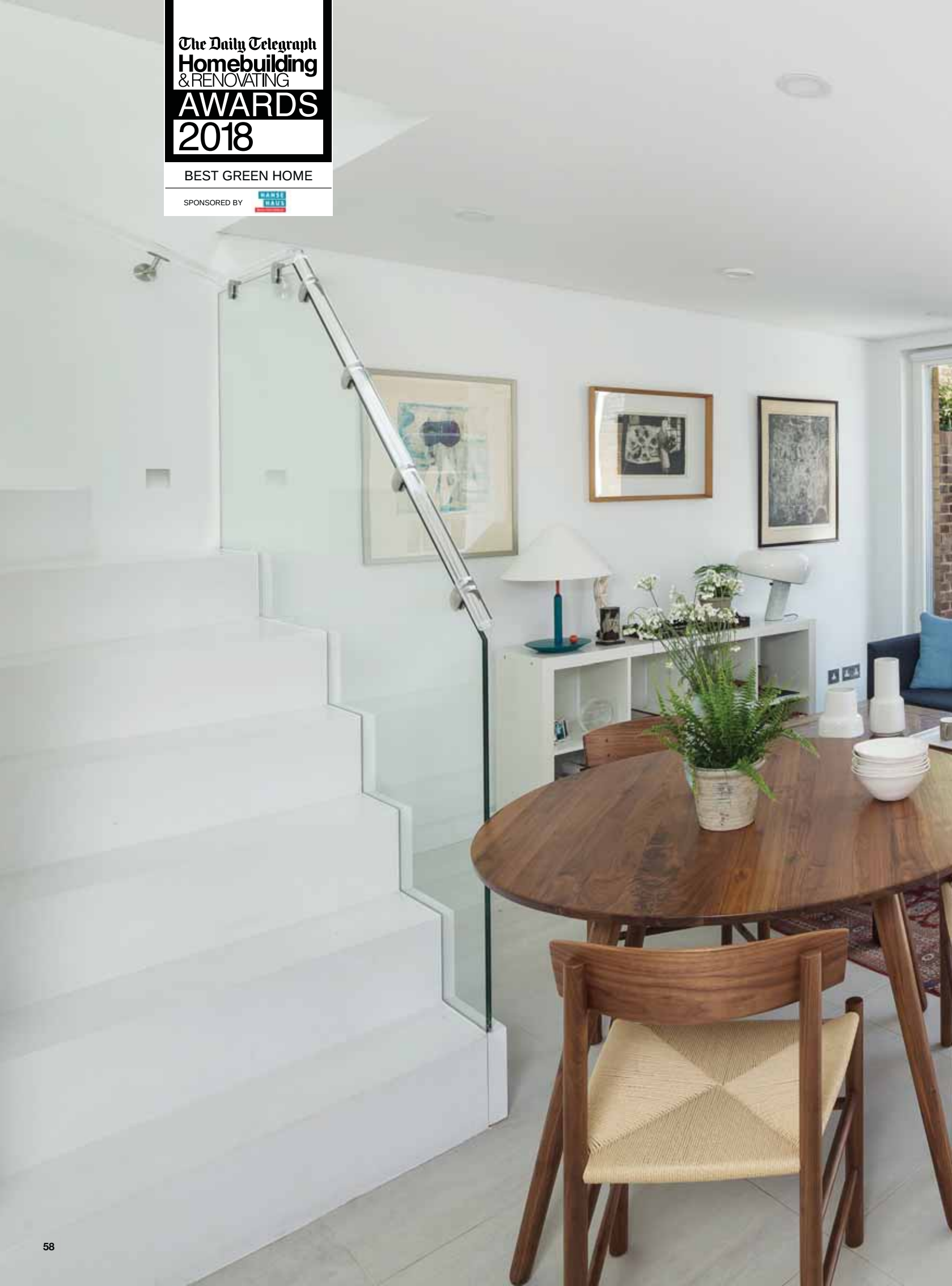
Building control Mark Sheehan: 07779 341875



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BEST GREEN HOME

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TAKING THE PLUNGE

Clever design has allowed downsizer Elizabeth Sharp to build a super energy-efficient mews house in south London on a modest budget, complete with a swimming pool in the rear courtyard

Words **Alison Wall** Photography **Simon Maxwell**
Stylist **Hannah Bort**

The homeowner Elizabeth Sharp

The project Passivhaus self-build

Location South London

Construction

Structural insulated panels (SIPs)

Build time October 2016-February 2018

Plot cost £200,000

Build cost £245,000

Value £1million

If you're going to self-build, it helps to know exactly what your absolute 'must-have' is — regardless of what your family or architect think. For London-based physiotherapist and downsizer Elizabeth Sharp, the number-one item was a swimming pool. "Everyone was aghast at the idea, but the pool is the jewel in the crown for me — it's an absolute joy and I know myself that exercise is a very important part of getting older," she says.

Not surprisingly, given her obvious enthusiasm, she swims in her outdoor hydrotherapy pool every day. The load-bearing pool cover doubles as decking in her rear courtyard, while four solar PV panels on the roof provide most of the energy needed to heat the water via a stand-alone heat pump.

Elizabeth's other top motivation for building her own home is more familiar to many *HB&R* readers, but just as personal. She spent four happy decades living in a five-storey, Grade II-listed Georgian house before deciding to self-build on the site of her old home's garage and rear garden. "The house was beautiful but the heat was going straight through the windows," she says. "I have poor circulation and I was really worried about being cold. If I was going to downsize I didn't want something that would cost a lot of money to heat."

Luckily, she chose to work with RDA Architects (who had already redeveloped a gym for the family-owned fitness business) and they were keen to build a Passivhaus-certified home for her. Coincidentally, they'd already built one in the same street five years previously (see page 68 for more on the German standard for eco homes). At the time, Elizabeth knew little about this ultra low-energy building option, which



is characterised by massive amounts of insulation, triple glazing (and in this case, quadruple for the skylights), strict attention to airtightness, and mechanical ventilation with heat recovery (MVHR).

She was soon sold on the idea though, once it became clear that she could achieve the standard for a modest build budget of £250,000. As far as costs went, it helped that the house is relatively simple in form, and small — at around 110m², it's less than half the size of the average 247m² self-build in the UK*. Another bonus: the architects were able to buy hard-wearing commercial-grade vinyl flooring, ➤



Rear Courtyard

Clever design has meant that the courtyard of this tight urban site has a small swimming pool (ABOVE) – installed by Home Counties Pools & Hot Tubs – with a load-bearing cover that acts as decking when not in use. The deep narrow site has a two metre drop on one side, and the ground is not particularly stable. As a result, extensive groundworks, deep pile foundations and a concrete slab were needed to get the project out of the ground.

Industrial Feel

Red cedar louvres soften the brick and steel exterior of this Passivhaus-certified mews house, which sits on the site of Elizabeth's old double garage. "We wanted to make the house look industrial, in keeping with its origins as a service mews," says architect Richard Dudzicki. The front elevation also features chamfered timber soffits and slight variations in the brick depth, which bring interest to the simple exterior. A first floor terrace (RIGHT) is accessed from the bedroom.







Materials Palette

A simple materials palette, with clean lines, shadow gaps between the walls and ceilings, and flush skirting boards, provides a suitably low-key backdrop to Elizabeth's collection of antique furniture and paintings. The staircase is a particular favourite of hers. "I absolutely love it – it's beautiful," she says. Ample storage, such as in the Italian kitchen (OPPOSITE), also aids the calm and uncluttered feel.

porcelain tiles and other materials at rates considerably cheaper than retail prices, on the back of projects they had already completed, including the physiotherapy practice and gym that Elizabeth runs with her family. They also designed and ordered the bespoke Italian kitchen direct from the manufacturers, another useful saving.

Some elements of the build were more expensive than expected, however. This is a prime London conservation area, so the planners insisted on brick for the exterior of the SIPs (structural insulated panels) home, rather than the cheaper render option first specified. So, as a compromise to both planners and budget, the architects chose to clad the exterior in brick slips, which also saved valuable space by reducing the width of the walls.

Surprisingly, building to Passivhaus standards was not the most challenging or expensive part of this build. That dubious accolade went to the moment the original contractors went bust, leaving Elizabeth halfway through the project with no

obvious way forward. Elizabeth describes this period as "nail-biting," – something of an understatement as at the time she was financing the build through a bridging loan while waiting for her original house to sell. Luckily, one of her sons, Alexei, a novice developer at the time, stepped in to finish off the house with plenty of support from the architects and from the original build crew, who were keen to stay.

"The construction workers were honest, decent guys – that was important to them, it wasn't just about a job and money," remembers Alexei. "It was about finishing a project and feeling good about that." The crisis did strain the budget, though, and meant that the original project timeline slipped by a good two months.

Nevertheless, the end result is undoubtedly worth it. Internally, the architects have made the most of the modest space, with an open plan kitchen and living space across the ground floor, three bedrooms upstairs, masses of discreet storage space throughout, two roof lanterns at the front and back of the house, and a garage large enough for an electric car with plug-in point. "I came from a home where every room had a function, such as the music room, and I was concerned about what it would feel like with it all being in one space," says Elizabeth. She needn't have worried: "RDA have designed a very clever layout and given me three bedrooms in a house not much bigger than my old garage."

She's also been pleasantly surprised by the whole business of downsizing. "I've been getting rid of clutter and that's very cathartic. I sold my old house last week and that's a good feeling," she says.

While Elizabeth now has the warm home she craved, with annual energy bills of around £300, it's also cool during the hot summer months. "I can open the rooflights and the windows front and back, and get a lovely through draught," she says. "If it gets very hot, I can also pull down the blinds." Another unexpected bonus of the super-insulated and airtight structure is its excellent sound insulation. "It's incredibly peaceful here, even with construction going on next door," she says. "I can shut the front door and feel happy to be in this very comfortable and calm environment." **H**



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Skylights allow natural light to flood into the property and provide solar gain to help keep the house warm. Pale-hued fittings, sanitaryware and furnishings also add to the home's light and spacious feel. "One of the most enjoyable features is the way the sunlight seems to permeate the whole house," says Elizabeth.



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PROJECT NOTES

The Floorplan

The modest 110m² plan incorporates three bedrooms, integral garage, an open plan living/dining space and first floor terrace off the master en suite bedroom.

Suppliers

Architect RDA Architects:
rdauk.com

Contractor CLC Build:
clcbuild.co.uk

SIPS supplier Kingspan
TEK: kingspan.com

MVHR consultant
Green Building Store:
greenbuildingstore.co.uk

Passivhaus certifier
MEAD: Energy &
Architectural Design Ltd:
meadconsulting.co.uk

Kitchen (design modified
by RDA Architects)

Comprex: comprex.it/en

Pool Endless Pools
distributed via Home
Counties Pools & Hot
Tubs: poolboy.co.uk

Windows Living
Wood Windows:
livingwoodwindows.co.uk

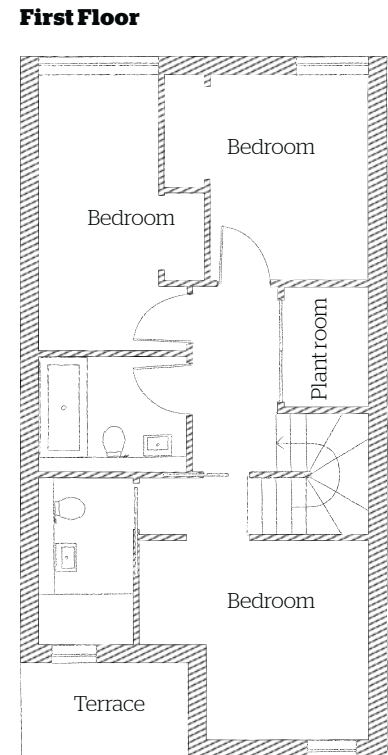
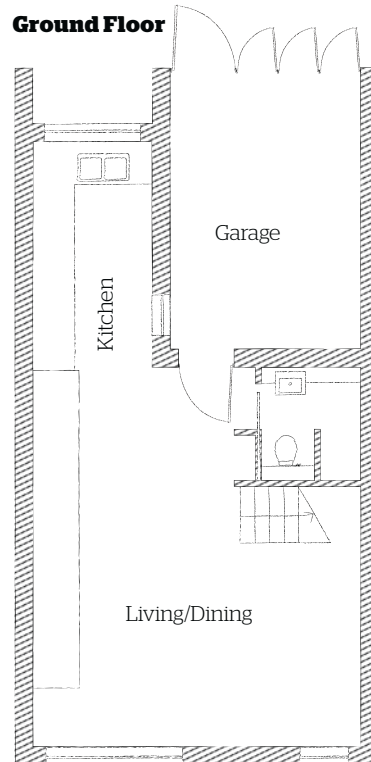
Floor tiles Feri & Masi:
feri-masi.com/en

Bathrooms Supplied by
Wet Zone: wet-zone.co.uk

Brasswear Cea Design:
ceadesign.it

Build Costs

Foundations and structure	£145,000
Windows and doors	£30,000
Utilities	£40,000
Decorations	£10,000
Contractors' costs	£20,000
Bathroom sanitaryware and brassware	£10,000
Swimming pool	£80,000



The Knowledge

BUILDING A PASSIVHAUS ON A BUDGET



Over the years, the German building standard known as Passivhaus (incidentally, a wholly voluntary standard) has attracted several myths, not all of them helpful. This award-winning project manages to topple several of them, the biggest of which is this: you need deep pockets to build this way. In fact, a self-builder can expect to spend around 3% more for a Passivhaus construction than for a more conventional build route (no more, say, than the cost of upgrading to a top-end kitchen).

Elizabeth spent just £250,000 on construction costs (the pool was an additional £80,000), although you may have to pay more post-Brexit, according to the project's architect Richard Dudzicki; he states that construction prices in London have shot up by 16% since the referendum.

Richards suggests specifying SIPs (structural insulated panels) or timber frame as a sensible way to keep costs down on a Passivhaus project, along with avoiding the temptation to add underfloor heating. The levels of insulation needed to reach Passivhaus insulation mean that it's an unnecessary expense, unless the Passivhaus Planning Package (PHPP) software indicates that it's needed. Likewise, several self-builders have paid for a woodburning stove in their Passivhaus only to find the house far too efficient for their

modest heating needs.

Does building in this way mean that you need to construct a large house? Again, not necessarily. Even though the building physics associated with heat loss and airtightness favour large volumes, this small home still managed to achieve certification. And what of the claim that Passivhaus restricts the architect to the simplest of box forms? Again, this project shows otherwise. "I wanted something that was easy to run but not a box with low ceilings," says Elizabeth. Her architect has delivered on this, although Richard admits that the integral garage required some ingenuity to overcome potential thermal bridging problems.

Elizabeth's project also shows that building to Passivhaus standards does not necessarily need a construction crew highly experienced in the methodology, although again, it does help. But it does require careful planning to factor in such site-specific elements as the orientation of the sun and shading. For example, like many urban areas, Elizabeth's plot was shaded and surrounded by tall buildings — two factors that affect the amount of light and sun reaching the house and had to be factored into the calculations.

The tight plot also meant that the architects had to find a way to balance the need for super insulation without losing valuable floor space. "Normally with other construction routes, super-insulated walls could be up to half a metre thick, but choosing 140mm-thick SIPs [from Kingspan] meant that the total wall build up, including extra insulation, was just under 300mm, similar to a standard construction," explains Richard. "Using SIPs also gave us a way to build an airtight structure. The finished building achieved an airtightness of 0.43m³/hr, over 20 times better than Building Regulations. We were only able to achieve this by closely monitoring the envelope throughout the build and repeatedly testing and adjusting."

The architects are now monitoring Elizabeth's house for temperature stability, humidity, volatile organic compounds (VOCs), particulate matter and occupant comfort for 12 months. They then plan to use the information to adjust the MVHR settings in the property. "So far, we can see that the temperature is very steady, even in the sun, at 19-22°C," says Richard. They've also noticed that during building works, a lot of dust found its way into the house, so the MVHR filters needed changing. "Looking ahead, Elizabeth can expect to make considerable savings on running costs for the next 20-plus years," concludes Richard. "The house has an energy rating of less than 15kw/m², around one-tenth of what a normal house of this size uses and far more efficient than current Building Regulations require." **H**



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GREENER BY DESIGN

John and Jean Bloxam have remodelled and extended a 1970s bungalow in South Yorkshire to create a futureproofed home that's also light, warm, economical to run

Words **Tony Greenway** Photography **Jeremy Phillips**





Preparing for the Future

The layout of this 1970s bungalow has been reconfigured and extended to suit the couple's needs now and in the future. An extensive energy-efficiency scheme also means the house is warm, light and very economical to run.





The homeowners

John and Jean Bloxam

The project

Remodel and extension of a bungalow

Location

North Sheffield

House size 108m²

Renovation time Jan 2016 - Sept 2016 (external landscaping completed Feb 2017)

House cost £340,000

Build cost £244,000

Value £650,000 (estimated)

When John and Jean Bloxam relocated from London to Sheffield, they were looking for a sustainable retirement home which was light, warm, economical and easy to live in — not to mention, futureproofed. The couple have always liked design and John is proficient at DIY, so they initially toyed with the idea of a self-build, but finding land proved difficult. “I’m also at an age where I don’t want to spend years on a building site, although two decades ago it might have been a different story,” adds John.

So instead the couple began looking at existing properties to renovate, including three in north Sheffield. One, a bungalow built into a hillside, had incredible views of the Peak District and immediately stood out from the rest. “It was the view that sold it to us,” says John. “We could see the possibilities the building offered.”

RECONFIGURING THE LAYOUT

The interior of the three-bed property was dated and in dire need of refurbishment, so John and Jean engaged architect Paul Testa to help them design an energy-efficient home and to reconfigure the existing layout.

The old front door opened into the kitchen, which the couple wanted to change. And so the back entrance was duly remodelled to

become the front entrance. An old PVCu lean-to was demolished and replaced with a small extension (with an external ramp at its approach for easier access) to incorporate the new entrance hall and a utility room. The old, small front entrance off the kitchen now serves as a pantry.

Instead of keeping the property’s two small adjoining bathrooms (the main bathroom and the master en suite), it seemed more practical to combine the rooms into one large space. A old small side extension was built to improve the size of the master bedroom too, while an interior wall was knocked down between the kitchen and the living/dining room to make the area large, airy and open plan.

The north-facing hallway was dark, and so rooflights were added to flood the space with natural light. A rooflight was also included in the bathroom, directly over the shower, and huge picture windows in the bedroom and living space also maximise natural light and views.

Paul’s knowledge proved invaluable when it came to applying for planning permission for the extensions; the property is in a conservation area and a few hundred metres from the National Park boundary. He also helped navigate John and Jean through all the different stages of the build — the design, tender, contract and ►

completion. “We had regular site meetings on a once-a-month basis at least and also when necessary. Even though I didn’t have to get involved in those, I was able to when needed and available,” says John, who together with Jean lived with relatives during the build.

A SUSTAINABLE HOME

The couple wanted to make the building as thermally efficient as possible, so a bespoke insulated drylining system was fitted to the interior of the external walls (more on page 80). “It makes ethical and economic sense,” says John. Thermal efficiency was further improved with triple-glazed windows throughout. “This isn’t a Passivhaus, but it does get very close to the AECB Standard Certification (previously known as the Silver Standard),” says John.

The couple commissioned local company Sheffield Sustainable Kitchens to design and install the kitchen, as well as a range of items for the interior – including the home office, bedroom wardrobes and utility room – from sustainable materials. The kitchen worktops, for example, are made from reclaimed iroko school lab benches.

“We enjoyed taking a style lead from the mid-century modern vibe of the house,” says Rob Cole, the owner of company. “There were also some interesting challenges, such as finding a way to install the hob and an extractor in front of the window to avoid spoiling the view. In the end, we used an induction hob with integrated downdraught extractor to keep the clean lines.”

Architect Paul Testa adds: “The project was a rare gem; it was clear everyone involved was working together towards a common goal. From the client to the contractor (Terry Huggett Developments), the kitchen supplier and plumber, it felt like a shared vision for a beautiful, sustainable and comfortable home. It’s been one of the most enjoyable construction projects we’ve been involved with.”

For the couple, the house is a pleasure to live in. “We wanted a building that would maximise light and views and make movement and access very easy for us, both now and in the future,” concludes John. “And that’s exactly what we’ve achieved.” **H**



The Kitchen

The kitchen is built from sustainable materials where possible, with worktops made from reclaimed iroko lab benches. A downdraught extractor built into the hob (from BORA) keeps clean lines in the room, with no obstruction to the view.

The Living Area

The wall between the kitchen and living room was removed in order to let the natural light in and highlight the view from the Velfac picture windows.









The Master Bedroom

Adding an extension to the side of the house allowed the Bloxams to increase the size of their new master bedroom (ABOVE) – the existing bedroom has been converted into the spacious dressing area. The extension also offered opportunity to create a large picture window with integral seat (a feature also introduced in the living room, OPPOSITE), to capture uninterrupted views of the garden and valley below. The cill and reveals are made from oak-veneered MDF. The main bathroom (LEFT) sits adjacent to the master bedroom.



The Lower Ground Floor

The lower floor features a guest room/library (LEFT). The ceiling was raised by a couple of inches to compensate for the space lost when raising the floor to include insulation. A sliding door (which slides back across the bookcase) is a clever space-saving solution here. This level also features a storage room, built into the hillside (right of shot).



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Build Costs

Contractors' fees (including
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and external works)

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Extra build costs (including
north wall foundations,
diversion of stream,
repointing, acid clean of
stonework)

£14,000

Professional fees

£9,500

Kitchen

£19,000

Kitchen hob

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Flooring

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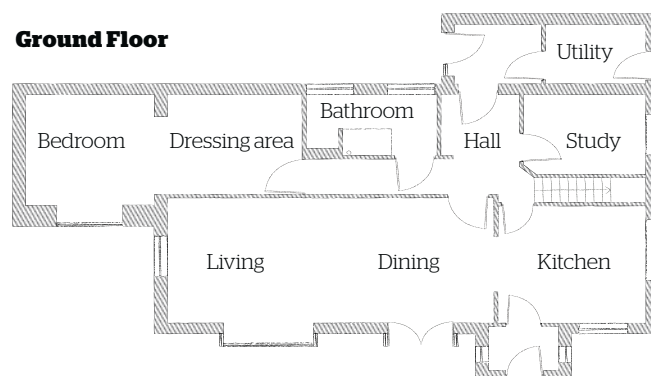
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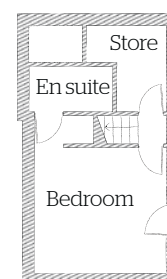
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Ground Floor



Lower Ground Floor



The Floorplan

To create a bigger open-plan room, the wall between the kitchen and living area has been removed. The north side of the building was extended to create a larger master bedroom. A second extension provides a new utility and entrance hall, accessed via a ramp installed to tackle the multi-level plot.

Although John and Jean knew what they wanted to achieve, their plans only really came to life when they employed architect Paul Testa, who they could work closely with and who was willing and able to project manage the entire renovation.

Paul was also highly instrumental to the energy-efficient scheme. “From the outset we aimed to achieve as close to the AECB building standard as was spatially and financially reasonable on the project,” he explains. “It follows the broad methodology that is used for Passivhaus but has a lower performance threshold and a less onerous process for certification. We find it a very useful office benchmark for all the projects we do that aren’t specifically aiming for Passivhaus.

“The existing bungalow was cold, dark and damp. It was a priority for Jean and John that this became a warm, comfortable and healthy home in which to retire,” continues Paul. “The existing construction had almost no insulation, despite the elevated and exposed hillside location. The block and stone cavity walls were not suitable for retrofit cavity wall insulation and the timber floors and roof were not insulated.

“The priority was to improve the thermal performance of the building fabric — a fabric-first approach. This involved three key aspects:

● INSULATION

“We insulated between the suspended timber floor joists with rigid insulation, as well as insulating the exterior walls with a drylining system and adding rigid insulation between and above the roof trusses. The glazing throughout the building is also highly efficient as we used high-performance triple-glazed Velfac windows and Fakro rooflights.

● AIRTIGHTNESS

“We overboarded the floor joists with OSB and taped the joints to prove an airtight structural deck; the walls were sealed with an intelligent vapour control membrane



The Knowledge MAKING EXISTING HOMES EFFICIENT

as was the roof. This was carefully taped at all joints, penetrations and to the window frames.

● VENTILATION

“A considered and properly designed ventilation strategy is key to the comfort and health of a building. In this house we utilised a mechanical ventilation with heat recovery (MVHR) system. This is ducted around the building supplying fresh, pre-heated air to the bedrooms and living spaces and extracting dirty, moist air from the kitchen, bathroom and

utility. The heat recovery element ensures that minimal heat is lost through ventilation but the occupants are still guaranteed a consistent supply of fresh air to give the best possible internal air quality.

“Retrofit work is highly challenging because houses like this are pretty fixed in their geometry and orientation. There were various building elements that inevitably led to coldbridges [which can allow heat to escape and/or cold air to enter] in the construction, and there were some minor spatial constraints also on internal wall insulation and the duct routing for the MVHR system. So this also needed careful planning and delivery on site.

“As we took a fabric-first approach to the project we didn’t particularly consider renewables such as heat pumps and biomass heating as the budget wouldn’t stretch that far. However, the house benefitted from a large array of existing solar panels on the south-facing roof which were carefully removed and refitted after the re-roofing works. These were old enough to be paying the best Feed-in Tariff (FiTs) rate, so were well worth retaining.

The house now has combined gas and electric bills of £800/year but with a FiTs payment of £1,800/year, the couple are making a handsome annual profit of £1,000.”

Concludes John: “It was good to have someone who was able to suggest possible options including calculating the effect on thermal efficiency of each potential cut when we needed to reduce costs. Ultimately, that was an invaluable part of the decision-making process.” **H**

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ON SITE

Each month, we follow our experts and HB&R readers as they embark on their own building projects – passing on their words of wisdom and advice in the process

THE SELF-BUILDER



Charlie Luxton is an experienced architectural designer and broadcaster, presenting programmes such as *Building the Dream*. He's building his own home in Oxfordshire.



THE ECO RETROFITTER



Paul Testa is an architect with an interest in sustainable design. He is beginning a project to retrofit his 1960s house in north Sheffield to become an energy efficient home for his family.



THE EXTENDER



Ian Rock is a chartered surveyor. He is currently in the midst of adding a 100m² extension to his late 20th-century home in Buckinghamshire.



THE REMODELLERS



Katie Gutteridge and Andy Thomasson are tackling the renovation, remodel and extension of a pair of 1930s farmworker cottages in the East Midlands on a tight budget.



YOUR PROJECT



Tamara and Martin Hamill moved into a Scandinavian-style bungalow with the aim of transforming it into an accessible modern home.



YOUR COMMUNITY



Each issue, we follow a number of your projects – including our regular diarists. This month, we check in with self-builder **Jonathan Durndell** and renovator **Sarah Drew**.



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THE SELF-BUILDER

INTERIOR PROGRESS



Now that the building is weathertight, Charlie turns his attention to the interior of his self-build project, starting the interior fit out and first fix

We've now reached the stage where we're starting the early stages of the interior fit-out, including first fix plumbing and electrics. Some of the internal walls are also being built. In particular, a timber studwall has gone up which has made a huge difference to the kitchen, dining and living space; this was previously one big open-plan area but the studwall has helped to sub-divide this space.

It's also one of the only bits of timber stud in the whole building. In the future we might add a sliding door because there's no acoustic separation between the spaces, but not yet. The wall is absolutely fine being built as a lightweight partition because it's not there to stop noise. The rest of the building is constructed in load-bearing concrete block which gives real acoustic separation and thermal mass, as well as a really solid surface from which to hang pictures.

We've started doing the cement rendering, which is the plaster finish we're going for. The last thing we wanted to do was dot and dab the walls with plasterboard so that you end up with a hollow sound — I want something that's really sturdy.

We wanted to make our concrete blockwork airtight and the way to do that is a two-coat cement render. The first coat is scratched up and battened with 12mm timber battens to help get the levels nice and straight. Then, the battens come out and the channels are filled before the second coat of sand and cement goes on.

The walls are going to have a trowelled, sponged finish rather than struck plaster. The sand-cement



Cement Rendering

To make the building airtight, Charlie has used a two-coat cement render. The first coat is finished with a trowelled texture and the second with a sand-cement mixture.



mixture is grittier so there's a real texture to it. I wanted the walls to have a handmade feel to them; it provides a contrast to the expansive, smooth concrete floor and flat plaster ceiling.

The commencement of the first fix work has made the biggest difference to the house inside for months, and it has been thrilling just to see the cement going on and the whole room getting plastered; even just with the first coat you start to feel the spaces as they're going to be and that's hugely exciting. **H**

NEXT MONTH: FINISHING THE INTERIOR PLASTERWORK



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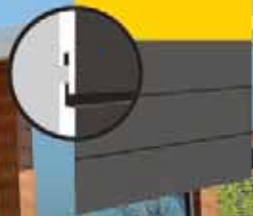


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THE EXTENDER

TRADES AND DIY

Ian Rock begins phase two of his extension project as he replaces the heating system and takes on more of the manual work himself, starting with the floorboards

With all the external works now signed off, we've been busy preparing for the second phase: transforming the crude shell of the extension into a living space. The internal works have been divided into jobs where specialist trades will be needed and tasks that I can manage on a DIY basis. Taking personal control of a building project means you need to draw up a detailed programme in the form of a flowchart highlighting key stages which are dependent on other tasks being completed in advance. This helps identify which jobs are time critical.

Mindful of the fact that decent tradespeople are generally booked up well in advance, we actually started the ball rolling a couple of months ago by inviting quotes. Choosing to run your project in this way has the advantage of putting you firmly in the driving seat, but you need to devote a lot of time to tracking down competent trades and sifting through quotes. Luckily there's no pressing deadline to get our extension completed so we can focus primarily on quality and price.

HEATING THE HOUSE

It's often the case when extending your home that the existing heating system turns out to be a bit wheezy and past-it. Our boiler has done good service but is in the autumn of its life. It's also in the wrong position now that the house has been extended, so a provision has been made in the budget for a new heating system to serve the enlarged house.



I had originally hoped to deploy the latest eco-friendly technology, but working to a fairly tight budget meant that the sums for alternative heating sources like solar hot water and heat pumps in the final analysis didn't add up. The most economical and practical solution was simply to install a more powerful oil-fired boiler augmented by a new 'solar diverter' to channel surplus electricity from our existing solar PV panels to the hot water cylinder.

Prices quoted just for installing a new boiler initially came in at well over £5,000 which struck me as a bit on the high side. So it made sense to cut out the middleman and buy our chosen Worcester Danesmoor 25/32 online along with the manufacturer's filter and flue at a total cost of £2,238 (inc. VAT). After factoring in the cost of labour to install it, we ended up saving over £1,200 on the initial quotes.

I was lucky to find a local heating engineer called Edward Smith trading as Helix Heating; a young, quietly spoken guy who clearly knew his stuff and wasn't too proud to listen to the client's requirements! Ed made some sensible recommendations, and aided by his apprentice took three days to do the job, even taking the trouble to offer us some temporary heaters while the heating was cut off.

While you've got the system drained down, it's worth checking for signs of erosion and seepage staining too, so we took the opportunity to replace the old rusty pump and a defective motor valve fitted to the hot water cylinder.

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“We all have our favourite pieces of kit and my personal weapon of choice is the demolition concrete breaker”

Although modern condensing boilers are far more efficient and compact than those from previous generations, it's striking how much they weigh — ours tipped the scales at a heady 112kg, and some external oil boilers can weigh twice as much. One factor that sometimes gets overlooked at the design stage is the positioning of the flue. For oil boilers the minimum distance from any opening windows is 60cm (double that stipulated for gas boilers).

Ed returned the following day with the completed paperwork for the five-year manufacturer's warranty and a copy of the OFTEC documentation he'd submitted to building control. But that wasn't quite the end of the story because we'd stumbled upon one of those classic 'grey areas' that afflict building projects. None of the heating guys we got quotes from were too keen on doing the related wiring, regarding that as a spark's job. So we agreed to postpone Ed's electrician installing the new clock programmer, utilising a makeshift timer until the first fix electricians were in place.

HARD GRAFT

It's slowly dawning on me just how busy I'm going to be with a monster list of DIY jobs, so to make time I've backed out of a whole bunch of non-essential pastimes like bell-ringing and yoga classes. The first DIY job I wanted to tick off the list was finishing fitting my traditional Victorian redwood floorboards upstairs (costing about £700 in materials for 40m²). It's hard to beat real wood flooring for warmth and character but it needs to be laid with care, leaving 10mm expansion gaps at the edge of the room which can later be neatly concealed under the skirting boards. I've known cases where builders have failed to leave sufficient expansion gaps, combined with using timber that wasn't fully dried out, resulting in floors dramatically bowing. To secure the boards I use super-slim lost-head floor screws rather than traditional brad nails which tend to split modern kiln-dried wood.

Some DIY jobs hold more appeal than others, but the advent of cordless power tools has been a tremendous boon. I guess we all have our favourite pieces of kit and my personal weapon of choice is the demolition concrete breaker. One of my best buys to date has been an excellent mini SDS breaker which cost the



Demolition and New Studwork

Ian has now demolished the wall between the kitchen and new extension (ABOVE), and has begun to construct the new studwalls (LEFT) elsewhere, ready for first fix.



grand sum of £60 and does the job of power tools thrice the price. True, after more than 20 minutes of power-chiselling the vibration can become a tad wearisome (risks of 'white finger' and hand-arm vibration are well documented for long-term use), and picking fights with heavy chunks of masonry obviously necessitates taking sensible protective measures, but a spell of creative destruction brings its own rewards.

First up was the remaining lower wall where our kitchen has been enlarged and partially knocked through into the new rear extension space. This needed to be cut down to size so it could host a new oak worktop to form a neat kitchen island. To my delight the breaker cut through hard render and dense concrete blocks like a ray gun through probiotic yoghurt.

The most urgent DIY job on my list is to construct the stud partition walls ready for the first fix electric cable runs. In my experience it's a false economy to use thin 65mm studwork and I'm not a fan of flimsy metal stud partitioning used by developers, preferring more substantial traditional 'four-by-two' studwork (100 x 47mm). However, it's essential to select the timber very carefully in store because it's easy to get lumbered with lengths that are bowed and warped, making it all but impossible to build true and level. **H**

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THE REMODELLERS



PLANNING & PREPARING

Katie and Andy Thomasson prepare their plot for the renovation of two stone farm cottages and find the tradespeople essential for the work



Having only recently submitted our plans, and not daring to spend (and potentially waste) any money starting the building work until they were officially approved, we began by trying to establish contacts with tradespeople.

Building up an entire contacts book from scratch can be quite a difficult task and our first task was to find a groundsman to help prepare the foundations. Our designer, Mark, put us in touch with Robert — a knowledgeable landscaper, who also has experience in laying foundations. Robert suggested the first thing we did was to prepare the driveway, which was muddy, uneven and featured an entrance too narrow to accommodate lorries delivering materials to site.

He levelled the site, topping it with a generous quantity of hardcore so that vehicles wouldn't get stuck in the mud, and removed one of the gateposts, widening the entrance onto the drive.

We then needed to line up a team of stonemasons, which proved harder to find than we'd anticipated. Luckily, the only stonemasons



in the local area are due to complete their current project around the same time that we anticipate them being ready to start on ours, so no time will be wasted waiting.

While we sweated on the final outcome of our planning application, we prepared the rest of the site — which included the removal of 24 15m-tall conifer trees (LEFT). It was a time-consuming and exhausting process. All the trunks will be cut down to become firewood (a procedure that I think will be ongoing for a couple of years to come!).

We knocked down the stone outbuildings attached to the back of each house, as these would've eventually obstructed the views once we'd fitted the bifold doors. Uncertain as to whether or not the corrugated roofs were made of asbestos, we took no chances in dismantling and disposing of them very carefully — wearing full protective clothing and an asbestos-graded face mask. We're stacking the stone on pallets, with the intention of salvaging them to be used in the building project.

By the time we're done knocking down walls, we'll have just enough stone to build the front of the two extensions, tying them in seamlessly with the existing houses. This is something that the planning officer who provided us with pre-app advice was keen for us to include when we submitted our full planning application — and we also hope that it will save us some money when it comes to supplying the stone for the masons to lay. **H**

**NEXT MONTH:
PLANNING PERMISSION APPROVED**



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THE ECO RETROFITTER

CHOOSING THE RIGHT PROJECT



In his first diary, architect Paul Testa discusses why he chose to retrofit a 1960s house rather than build his own home

Iwould love to build my own home; what architect wouldn't? However, finding land at an affordable price is one of the biggest hurdles for anyone looking to self-build. So when my wife and I decided to embark on a project, we did look for a plot but couldn't find anything in the areas of Sheffield where we wanted to live.

Luckily, I also have a soft spot for retrofit and remodelling — I love the idea of taking an existing structure and extending its life. True, it's not necessarily cheaper (especially when you factor in VAT) but it certainly has less carbon cost than building from scratch.

So we started looking for a house with potential. For me this meant something mid-20th century. I much prefer the look, layout and space standards of '60s/'70s houses than their later equivalents. They're also blessed with huge windows so are already light-filled and feel generous. We didn't want to buy anything much older as the restrictions on what you can do, either in terms of legislation — or our own moral standards — are often likely to be much greater.

A house of this age is also likely to be built with modern construction and materials. This makes things more straightforward and is less likely to throw up significant unknowns during the build. Only time will tell on that one.

I would have preferred to buy a detached house as this tends to make retrofit easier; you don't have a party wall to contend with. However, when we saw this place (ABOVE) on the market



we decided to go and see it. The house is close to great schools (how important does this become once you have kids!), the neighbourhood is lovely, and the views across to Wharncliffe woods — one of my favourite mountain bike locations — are stunning. North Sheffield is also still a pretty cheap place to buy, especially compared to the south west of the city.

The house is right for us and our retrofit plans in many ways. It hasn't really had any modernisation since it was built in 1968. The electrics and heating system need replacing, it has two extensions already — but they're badly conceived (and built) so are also ripe for replacement — and it's certainly not warm or efficient to heat.

This has made the last five years in the house less comfortable and slightly frustrating. We have, though, had plenty of time to think and rethink about the way we use spaces. We definitely know what works and what doesn't, and we've stretched the life of things like the boiler to their absolute limit. We now have the opportunity to reconfigure everything to suit the way we live as a family.

It's been a long time getting to this point; I started surveying and drawing the house to develop designs back in 2014. Now four years on we're ready to get started. The family are all really excited to see the project develop over the next few months. **H**

NEXT MONTH: RETROFITTING BEGINS



YOUR PROJECTS

MAKING A MOVE

Tamara and Martin Hamill were looking for an accessible home for their family of four when they stumbled upon a 1980s bungalow



Tamara Hamill and her husband Martin are about to embark on her first renovation project — transforming a 1980s self-build into an accessible family home fit for the 21st century. While dated, the property suited the needs of her family: her eldest teenage son suffered brain damage prior to his birth and will need support throughout adulthood. “He has an Intellectual Disability and is autistic, but, like his brother is funny, smart and opinionated,” smiles Tamara.

“The bungalow ticked all our boxes and sat on a third of an acre plot. I was looking for a project as we had only ever bought new houses and this time buying a new house felt like a cop out,” she says of the property.

The bungalow is a timber kit home, shipped over from Sweden in 1986. A local builder was commissioned to erect the kit and then assembled a brick skin and concrete tiled roof.



Scandi-style Interior

Tamara and family will be living in their bungalow – with its ‘sauna-style’ clad ceilings and dated interiors – while they transform it into an accessible family home.

For its day, the house was really well insulated and built. The rooms are all well-proportioned and the garden faces south. However, the interiors need attention. “It has a decidedly ‘70s vibe throughout, with pine ‘sauna-style’ ceilings, coloured bathrooms and a dated conservatory. The front of the house won’t win any prizes either,” admits Tamara.

Despite the cosmetic shortcomings, Tamara was “smitten” with the house on first viewing. The house was being sold via sealed bids and Tamara put her “best and final offer” in before husband Martin or the two kids had even stepped foot inside the house.

“It was eight months after the bid was accepted that we were able to move in. Those first few days were quite a shock,” Tamara continues. “We had left a large, four-bed, modern house, and we are now using the ‘dining room end’ of the lounge as our bedroom! There is lots to do and we are going to be living like this for some time.”

The family engaged an architect to design a scheme to turn this two-bed bungalow into a contemporary four-bed home fit for their family. The plan involves removing the old conservatory, building a new detached garage and adding three small extensions and a porch to the house. The extensions will fall under Permitted Development, but the porch, projecting from the front of the house, and the garage will both require planning permission which will come later in the development scheme.

“I can see the potential in this house and, luckily, our architect can see it too. I’ve accepted that Christmas won’t see me get a new bedroom or shower though,” Tamara laughs. “Work will begin properly in the new year.”



YOUR PROJECTS



Building Up

A new chimney is being built (ABOVE) while work on the internal blockwork starts (BELOW).



Jonathan Durndell, a chartered building surveyor, is building his home in his spare time

Managing the build has been fairly easy up to now but progress has been slow as it is difficult finding spare time to work on the build.

The scaffolding for the next lift has been completed and we have started the building of the internal blockwork walls and chimney stack from ground floor ceiling to first floor ceiling. The chimney stack is located centrally in the house, which may provide a small heat gain internally. The chimney itself consists of clay pots surrounded by brickwork, and when completed, a flexible flue liner will be installed and linked to the woodburner by a registered HETAS engineer.

Over the next few weeks we hope to have the internal walls completed and then make a start on the external walls up to joist level. We'll also have to establish where the internal door openings are going to be as there have been some very minor changes to the position of the staircase.

The next stage is to continue all the masonry up to first floor lintel height, where we will then build in the lintels and construct the brick arches over the window openings. Following this, we will continue the masonry up to second floor joist level.

Work is getting harder travelling up and down ladders but it is great exercise!



YOUR PROJECTS

Sarah Drew is modernising a stone cottage in Wales - her first major renovation project - at 65. The project is throwing up plenty of challenges

Renovating is a somewhat tedious undertaking when you think about it. Waiting for quotes, waiting for someone to bother to turn up to give you the quote, even, and then waiting some more for a start date. And thus I continue to linger in limbo, this time for the carpenter to come and address the issue of what you and I would call doors but what the previous incumbent of my cottage thought was a challenging shapes game for early learners.

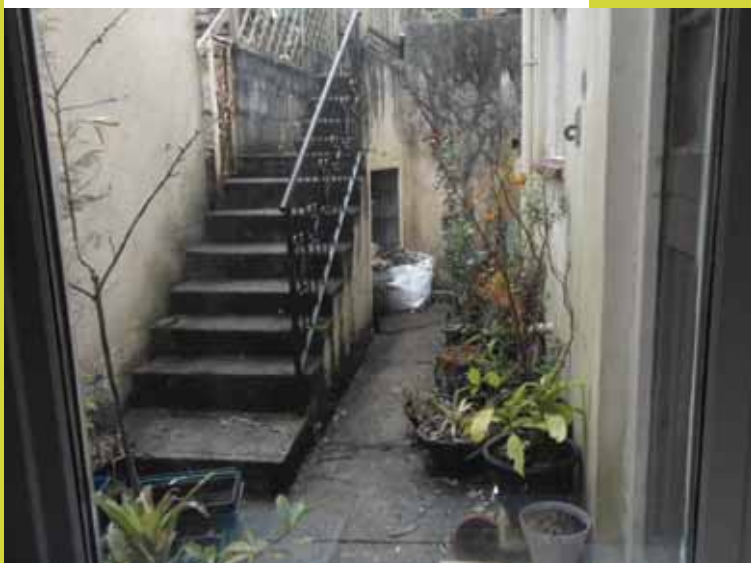
Some of my doors will not fit their openings at all, while others have a 20mm gap all round just to be on the safe side! The back door is one such door; currently I can only bolt it closed from the inside. A manic rodent seems to have chewed the bottom half of the bedroom door too; there is a stonking great gap between it and the floor.

Happily, my courtyard garden is all that I envisaged it to be; I am very pleased with my labours and how it has turned out. No better place to sit when waiting for people to turn up! 



Courtyard Transformation

Despite slow progress inside the house, Sarah made the most of her 'limbo' period and cleared up the exterior courtyard.



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we can complete a 200m² property on a turn-key basis within just 14 weeks) and on budget. To give you full peace of mind, Hanse Haus homes undergo countless external and internal quality checks — and a motivated workforce and first-class building materials are a matter of course. To ensure quality and individuality, we take care of carpentry ourselves, from staircases and windows to balconies and special components. A site manager presides over everything, and qualified German craft-people are also sent to construct your Hanse Haus home.

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MAGE SIMON MAXWELL

102 *Single-storey design masterclass* **111** *How to get your Building Regs plans drawn*
117 *Seven ways to achieve wow factor on a budget* **125** *Planning conditions explained*
130 *Big ideas for small gardens* **134** *How to create a warm interior scheme*



GETTING SINGLE STOREY HOMES RIGHT

From introducing natural light to connecting to the garden, we share our design secrets to creating a great single-storey home



Single-storey living can offer a number of benefits — accessibility, futureproofing and the opportunity to connect to the garden being among them. But despite the many plus points, the word ‘bungalow’ still throws up negative connotations for some.

“People tend to think of post-war, poorly constructed properties, and even I was paranoid about building a ‘bungalow!’” admits architect Stephen Blowers of Designcubed, whose clever London-based, single-storey self-build was covered in the pages of this magazine some years ago. “In order to stop my self-build feeling like one, I specified big windows and plenty of rooflights, and adopted a split-level living area, where the lounge steps down by 0.5m from the open plan kitchen diner.”

Building a new single-storey house or renovating an existing bungalow presents a opportunity to create a unique home, tailored around your needs.

Lateral Design

A subtle way of adding interest to horizontal elevations is to introduce different materials. In this project by Strom Architects, the porch and front door are clad in the same timber cladding as the rest of the house, but oriented in a different direction to signpost the entrance. Frameless glazing, meanwhile, helps to break up the elevation and casts through-views out to the landscape on the other side of the house.

The secret to making single-storey living work for you is a clever design scheme. Here, we set out the top design considerations and solutions, with a little help from design experts well versed in the art of designing ‘bungalows’.

SEPARATING LIVING SPACES FROM BEDROOM ACCOMMODATION

“In the UK, it’s part of our culture that we like to feel that we’re going somewhere to go to sleep, which is easily defined within two-storey homes,” begins Stephen Blowers. “In Europe, single-storey houses are more common. Quite often bedrooms will lead straight off the main open plan living area — in this country we feel uncertain about that as it’s not what we’re familiar with.”

As such, creating separation between the living and sleeping quarters is a priority for many when designing a single-storey home. Your layout will be dictated by many factors, including the site, but the form will have one of the biggest impacts on where you position the bedrooms.

“A lot of linear buildings [such as longhouses, found on the coast and in Scotland] will have a corridor running down one length of the building, with all the bedrooms leading off, while the living accommodation is positioned to the other side of the house,” begins architect Darren Bray of PAD Studio. “This arrangement can also help dampen sounds coming from an open plan living space. For ultimate privacy, position the master bedroom at the end of this corridor.”

L, H and U-shaped floorplans offer opportunity to separate out public and more private space. “When separating the living and sleeping accommodation in our own single-storey home, we did it in blocks, with a door between the two to keep the public and private areas separate and create a clear transition from daytime to nighttime,” explains Stephen Blowers of Designcubed.

Strom Architects has taken a rather different ➤



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approach in some of its projects, as architect Will Mathers explains: “While some houses will have the bedrooms to one side and the living spaces to the other, in projects I’ve worked on we tend to centre the open plan family space – the kitchen, dining, living areas – and bookend this with the other accommodation. The Quest, for example [shown on page 102], has a master bedroom suite at one end of the home, with the guest bedrooms and home offices at the other end of the long living space. If there’s only two people living in the house, this format allows the guest bedrooms to be closed off when not in use.”

As these examples go to show, there are various methods of separating bedrooms from living spaces. Your architect or designer will be able to work up a floorplan which works for you, while also factoring in privacy and practicality.

ENHANCING SECURITY

“When it comes to security, you don’t need to make any more or less measures than you would with a two-storey house,” says architect Martin Bell of Transform Architects.

“However, I think some people can feel uncomfortable with bedrooms on the ground floor. For those who like a window open at night, you can specify night vent systems which open to a maximum of 99mm. Sensors on the windows can also be added for security measures, along with the usual alarms and locks on the doors.

“For clients with disabilities, we will also put a smoke alarm in every room. This might sound extreme, but smoke has to travel 3m before an alarm is raised and by this time the room with the fire could be causing serious damage; an alarm in each room will alert the homeowner at the earliest opportunity.”



A Traditional Approach

Proof that bungalows need not be boring or strikingly contemporary to be interesting, this charming single-storey home from Border Oak utilises a twin gable design, offering pleasing symmetry. A mix of timber cladding, brick and render, together with an oak frame porch, lend a country feel. The interiors also benefit from lofty vaulted ceilings.

INTRODUCING NATURAL LIGHT

“One of the key design principles for successful single-storey new builds is avoiding overly deep floorplans,” begins Michael Holmes, Chair of the National Self and Custom Build Association. “This will inevitably lead to rooms ‘locked’ within the footprint which do not have external walls — in turn, the opportunity for windows and/or doors to the garden is lost.”

Avoiding box-like forms and opting for long, linear floorplans or U, L or T-shaped arrangements will enable most rooms to benefit from a view of the outdoors. The latter could also allow you to create a sheltered courtyard garden.

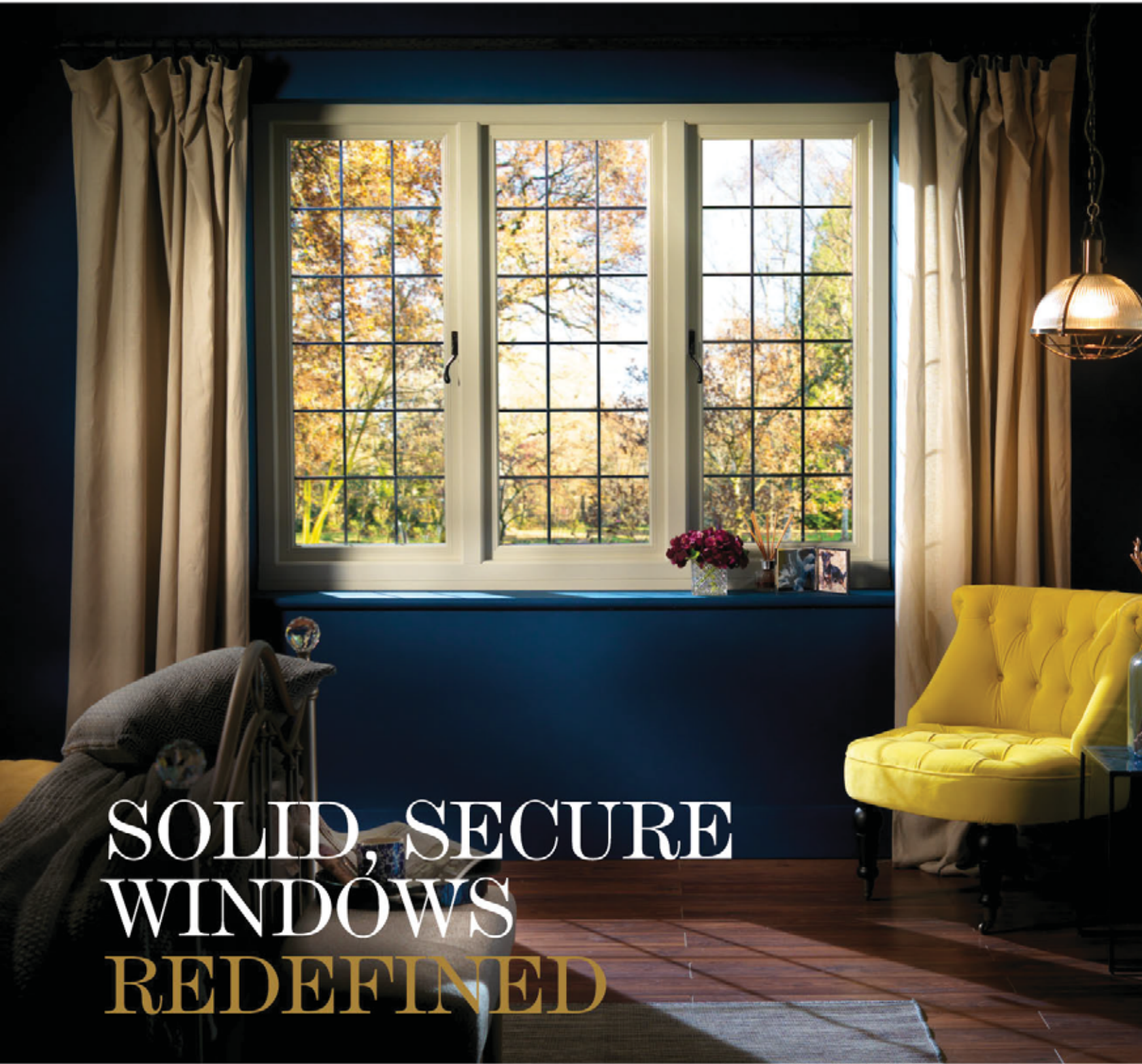
Where you do have a courtyard arrangement, be sure to take privacy into account when positioning the glazing — inward-facing rooms may inevitably overlook one another. In this instance, you might find architectural as well as landscaping devices can help to screen off rooms from view, including ➤



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A photograph of a modern interior featuring a large, three-pane window with a white frame and multiple small panes. The window is flanked by light-colored curtains. The room has dark blue walls and a wooden floor. A yellow tufted armchair is on the right, and a dark armchair is on the left. A small table with a vase of red flowers and some books sits on the windowsill. A pendant light hangs on the right.

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On some sites, deep floorplans and internal rooms or circulation space will be inevitable. But there are ways of enhancing these spaces. Rooflights can bring in light from above. Lightpipes are another means of introducing natural light into the heart of a floorplan.

CONNECTING TO THE LANDSCAPE

Glass is a fundamental material for allowing lateral homes to feel connected with the outdoors. Importantly, glazing can help rooms feel larger, too, as Will Mathers explains: “To make open plan family spaces feel more generous in single-storey homes, a great tip is to have one side of the space completely of glass.

“It’s a great visual effect as it feels like you’re borrowing space from outside and that the outdoor areas are part of the room.”

BREAKING UP THE FAÇADE

One challenge when building a long, linear property is how to add interest to the façade. “Designing a horizontal plane is not that dissimilar to designing a vertical plane,” says architect Martin Bell. “If you’re looking to combine materials, say render and timber, where you might have different materials for first and ground floor on two-storey homes, you can relieve certain elements of a single-storey building to provide interest, such as gables and projecting elements of the building.”

“In terms of elevation, by creating a couple of planes it is possible to add interest,” continues Will Mathers. “A porch, for instance, jutting out from the rest of the elevation could be clad in one material, while the rest of the home is wrapped in another material — almost like a drawer coming out of a cabinet.” ➤



A Contextual Home

Divided into two wings – housing the bedroom and living accommodation – this low-profile, single-storey home by Dualchas, in Scotland, features a pitched roof to accommodate the generous ceiling heights of the rooms. Internally, the use of lofty vaulted ceilings, open plan living and large glass expanses make this home feel generous in size, while timber cladding to the walls and ceiling creates warmth.

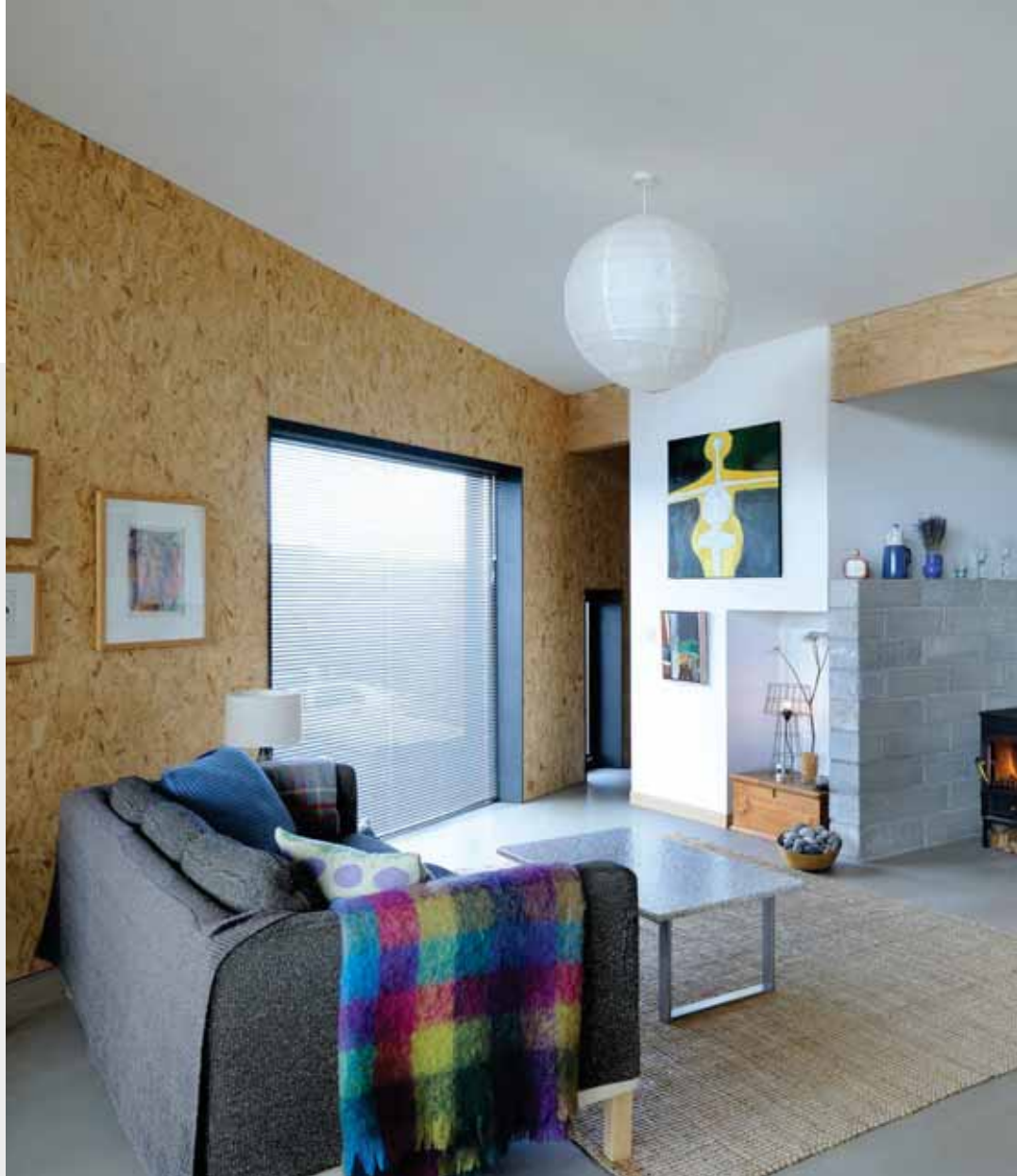
Externally, timber cladding also wraps the building and references the materials found in the local vernacular.

Working with the Site

Designed by Scottish-based practice Rural Design, Black House utilises a triangular form, with the wide end of the home comprising living accommodation which benefits from a wall of glass, while the narrower end of the building houses the bedrooms.

In order to bring natural light into the centre of the deep plan, light pipes inject daylight where traditional openings couldn't be accommodated. To add interest to the simple form, panels of yellow powder-coated aluminium add colour against the black fibre cement cladding.

Where the landscape slopes slightly, working with the terrain instead of against the site can be cost-effective. A change in level on site has allowed for a step down within the open plan kitchen, living and dining space to help zone the areas within the home.



It is important to remember that the choice of your cladding materials will also be affected by the local vernacular, and perhaps your local planning authority (more on page 125).

THE IMPORTANCE OF ROOF DESIGN

One major decision is whether you'll opt for a pitched or flat roof; the latter tends to lend itself to more contemporary designs.

"Flat roofs are ideal for keeping the property low-profile too, and avoid impeding on the neighbours' views if you're being overlooked," adds Will Mathers of Strom Architects.

"We used solid concrete as the flat roof material on The Quest; however, traditionally a single-ply membrane would be used," he says. "The flat roofs of the past with their leaky membranes put a lot of people off; however, these products have come on in leaps and bounds in recent years. Companies such as Bauder also offer a green roof system where you could have anything from a sedum to a wild flower meadow over the membrane, and helps embed the property within the surroundings."

Internally, your ceilings can help transform a single-storey home into something rather special

— allowing opportunity for vaulted ceilings under pitched roofs, for instance.

You can add drama with varying ceiling heights too, as Alan Dickson of Rural Design points out: "Taller ceilings in living spaces work effectively and create a sense of volume, while bedrooms and bathrooms could have a lower ceiling height. If you're going to make the most of the height of a building, however, you'll need to decide on this early on as your roof structure will inform this — a trussed roof, for instance, isn't going to be suitable for creating a vaulted ceiling; your architect will be able to inform your decision."

CONSIDER PROPORTIONS

When it comes to proportions, there are general rules to follow in terms of practical living space. "Think about how many people will be using the rooms, and look at standard furniture sizes — you don't want to have a room so large that you need eight sofas to fill it, and likewise you need space to accommodate your furniture with room to move around," explains Neil Stephen of Dualchas.

"Think of focal points too; a 5m x 3m room might feel long and narrow, but it's how you dress



the space, where you choose to position windows, the TV, a fireplace and so on.”

“If you’re also designing your internal spaces with accessibility in mind, you’ll be working off a wheelchair plan,” adds Martin Bell. “For circulation areas, door openings and rooms, you’ll need to make sure spaces are wide enough to accommodate turning circles for wheelchairs. Corridors spanning 6ft wide is also recommended, and level thresholds are a given.”

DISCREET PARKING

One of the challenges when positioning the home on the site is where to position the parking. After all, you don’t want to feel like you’re overlooking a carpark when sitting in the living room, or from bedroom windows.

In order to screen the parking from the building, introducing trees, hedges and borders as part of your landscaping scheme can help to provide the interiors with a more pleasant outlook. Better still, include a garage or carport to the side or away from the main house itself.

“As for driveways, try to use more organic materials such as shingle, gravel or stones found from



the local vernacular instead of a harsh tarmac,” says architect Darren Bray of PAD Studio.

CREATING THE ILLUSION OF SPACE

In cases where you’re limited on space, incorporating various areas (kitchen, dining, family room) into one open plan area will help the room to feel larger. Tall ceilings can also create the illusion of a larger, more generous space.

“The key message we try to get across to people is that spaces can be flexible — and to also consider rooms you actually need. Just because you’re used to having five bedrooms doesn’t mean you still need five bedrooms, especially if the kids have flown the nest and you don’t have guests over all the time,” explains Darren Bray. “Some clients forget they’re in a position to downsize, and when you’re restricted on space you have to prioritise what you need instead of what you want.”

A FINAL NOTE ON BUILD COSTS

Single-storey buildings are inevitably going to be more expensive to build per m² than two-storey homes. “If you’re looking to achieve the same footprint as a two-storey home, you’re going to incur the costs of double the foundations and double the roof — not to mention wider wall spans,” explains Martin Bell. “People also forget that two-storey houses save on space. A 300m² house will ordinarily be 150m² over two floors — a single-storey property will need a plot large enough to accommodate a 300m² property, ideally with outdoor amenity space.”

One way to help save on groundworks costs, however, is to work with the landscape. “If there is a slight change in level, incorporating this into the design with a step down can solve the costly issue of having to level the site, and can also be used to zone spaces too,” explains Alan Dickson from Rural Design. “The most cost-effective layout will be a simple box, and it’s compatible with most sites. It’s when you introduce turns and corners with L, U and T-shaped floorplans that the cost increases,” concludes architect Martin Bell. **H**

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DRAWINGS FOR BUILDING REGULATIONS

Chartered Surveyor Ian Rock explains why you need Building Regulations drawings, who can produce them and how much they will cost

It's well known that you need to submit a set of scale drawings with planning applications in order to illustrate your proposed design. But the next stage, producing detailed construction drawings, can be a bit of a grey area that sometimes gets skimped or overlooked, risking serious problems occurring further down the line.

THE BUILDING REGS EXPLAINED

By law, most construction work needs to be carried out in accordance with the Building Regulations. The main exemptions are for peripheral things like small porches, conservatories or detached garages (up to 30m² floor area). So once you've secured your planning approval, the focus needs to shift to proving that your design ticks all the right technical boxes. This is where detailed construction drawings come in, since their main purpose is to demonstrate compliance with the 'Approved Documents' which together comprise what are broadly termed the 'Building Regulations'.

Traditionally, the main aim of the Building Regulations was to ensure that new buildings were structurally stable and safe to inhabit without risking life and limb. But in recent years their scope has broadened dramatically. Today the Approved Documents comprise a series of detailed guidance manuals (ranging from A to R) covering everything from structure and fire safety through to security and electronic communications. One area that particularly exercises the minds of designers is how to meet or exceed thermal efficiency targets.

In effect, the drawings show how your giant construction kit of a building or extension is all going to fit together, and as such, it makes these drawings well-suited for tendering and getting the project priced. It also means the builders will have an approved set of plans to work to, which should go a long way to preventing potentially disruptive misunderstandings later on site.

For a straightforward project you might be able to use a decent set of planning drawings to get

quotes from builders, but you'd need to specify things like the materials, required finishes and services in order for this to be accurate.

Before any work starts on site an application to building control must be made, by either the homeowner or the builder. There are two ways this can be done and the fees are about the same in both cases:

FULL PLANS APPLICATION

For most construction projects a 'full plans' application is made to building control. Importantly, this means that any issues regarding non-compliance with the regulations can be thrashed out before building work starts. The application comprises:

- A full description of the proposed works.
- Sets of technical drawings (plans, elevations and sections etc).
- Structural engineer's calculations.
- A location or 'block' plan showing the building relative to neighbouring streets and houses etc.

The detailed specification describing the building works is usually written on the drawings but can equally be submitted as separate documents. In fact, presenting the more complex stuff separately saves cluttering up the drawings and can be useful for demonstrating things like compliance with energy targets.

Once building control are satisfied that the work shown on the plans fully complies, they should send you a 'Plans Approval' notice. If not, they will normally ask for further clarification.

BUILDING NOTICE

It's possible to save time by skipping the full plans application by instead submitting a Building Notice a couple of days before starting work on site. You still need to complete a form giving details of the building work together with a site plan (1:1250 or 1:12500 scale) showing the boundaries of site ►



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and drainage details. You may also be asked to provide marked up sketch drawings (typically copies of those used for planning) together with structural engineer's calculations and energy performance details.

With this method you're basically promising in advance that you'll comply with the Building Regs on site. This might be feasible for some small domestic alterations or a very simple home extension where you have unshakeable faith in your designer and builders. But given the complexity of the Approved Documents it doesn't take a genius to spot the potential for site inspections uncovering stuff that contravenes the regulations while it's being built, such as the wrong type of insulation or too much glazing. If work has to be stopped or re-constructed it could prove disruptive, as well as financially crippling.

Another reason to avoid this method is that it doesn't necessarily save you much time. It's not always appreciated that with a Full Plans application that you're actually allowed to start work on the same basis, with just a couple of days' notice. However, where time pressure is an issue, it's probably better to compromise by waiting a couple of weeks or at least until it's clear there are no major concerns. What's more, the Building Notice method is not allowed if you're proposing to build over, or close to, a public sewer.

CONCEPTUAL DRAWING VS BUILDING REGS' PLANS

The plans required for building control are considerably more detailed than those submitted for planning, and are often commissioned as an additional service once planning consent is in the bag. It's important to note that there's no point commissioning relatively expensive technical drawings before planning consent has been granted. For one thing, the planners may well demand design changes or could even reject your application outright.

There's a huge gulf in terms of the technical knowledge between drafting outline sketches and illustrating complex construction details. At first glance, a set of architect's drawings for Building Regulations purposes can appear pretty daunting, packed with dense technical jargon and obscure numeric references. This is why even DIY designers who've successfully produced their own planning drawings commonly opt to employ a designer at this stage in the game.

However, if you take the trouble to study professional drawings in a bit more depth, it

“There's no point commissioning expensive technical drawings before planning consent has been granted”

soon becomes apparent that much of the detail is repetitive, comprising fairly standard chunks of specification 'blurb' and making liberal use of quoting BS numbers to prove compliance. The required technical phrases are available online together with pre-drawn illustrations showing all the design detailing.

WHAT SHOULD THEY INCLUDE?

The drawings must clearly show the proposed building works and explain the construction, and specifically include:

- A section plan drawing showing a cross-section 'sliced through' the middle with details of wall construction, insulation, joist depths, floor levels, room heights, and any stairs (typically drawn to 1:20 or 1:25 scale). This is often the plan that has most of the specification written on it.
- Plan and elevation drawings, with technical notes describing proposed works with materials specs.
- Plans should clearly show the heights and dimensions of all key parts of the building such as foundations, windows, and roof structures. The types and thicknesses of materials must be shown as well as the external ground levels and internal floor levels. You also need to show the routes, depths and slopes of the drains (foul and surface water) plus the positioning of inspection chambers/rodding points, and how pipes are protected under walls etc.
- The specification describes each part of the building in detail, reiterating the types and thicknesses of materials that may also be shown on the drawings, along with the specific brands of insulation and their performance figures (K-values etc). If they are not already shown on the drawings you'll need to provide additional information and calculations explaining how your design meets the various U value heat loss targets and complies with limits on total permitted areas of glazing.

WHO CAN COMPILE THEM?

A lot of larger architectural practices now employ technicians so they can offer a full package including 'technical design for Building Control', comprising:

- Production of the technical drawings (plan, ➤

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elevation, section etc.) and specification details.

- Coordination with the structural engineer.
- Making the Building Regulations application.

Most architects produce technical drawings as a progression of the design work already undertaken for the planning application, rather than drafting them without prior involvement.

You can also appoint anyone who is competent and experienced at producing technical drawings for your type of project. People offering 'architectural services' come from varying backgrounds, such as qualified chartered surveyors or engineers, but qualifications aren't as important as knowledge and experience. A good designer or architect should also be able to make useful suggestions on things like positions of stairs and doors to achieve optimal use of your space.

The only proviso here is the question of Professional Indemnity Insurance (PII). If serious defects were later to occur that could be attributed to design error, and the property had been sold to a third party, the designer could potentially face a legal claim for damages, unless it could be proven to relate to the structural engineer's input. Similarly, with self-builds, unless covered by the NHBC (National House-Building Council) or equivalent warranty, mortgage lenders may require an architect's certificate with associated PII cover to fall back on in the event of them suffering a loss.

Some self-build projects are undertaken by 'package companies' who manage the whole deal from preliminary design through to completion, including all necessary technical drawings and calculations. This has the advantage of being all-inclusive with a fixed price in advance, although it isn't normally the cheapest option. Firms offering standard 'kit house' designs may already have prior LABC (Local Authority Building Control) type approval, reducing the work involved by demonstrating compliance to just site-specific factors such as foundations, drainage and services.

You could also have a go at drawing them yourself — *a full article on how to do this will be featured in December's issue of this magazine.*

THE ROLE OF THE STRUCTURAL ENGINEER

Whether you choose to submit a Full Plans application or not, building control normally require calculations from a qualified structural engineer. And if you plan to make any structural alterations to your existing house, such as knocking through new openings, these will also need calculations.

Depending on the size and complexity of the project, and whether site visits are needed, engineer's fees typically range from around £400 for run-of-the-mill extensions to £3,000 plus for more complex houses. You can find local structural engineers at rightsurvey.co.uk.

HOW MUCH DO BUILDING REGULATION DRAWINGS COST?

Traditionally architects worked on a percentage fee basis, charging around 3% of the contract value to draw and submit planning permission plans and another 3% for 'working details' and tendering.

Today you could expect to pay a little less, particularly with an individual home-based designer who might charge only around £25 per hour and have a turnover below the VAT threshold, legitimately saving you 20% on their services.

For Building Regs drawings, expect to pay from around £700 for a single-storey extension, and around £1,200 for a two-storey extension, excluding additional charges for structural calculations, building control application fees and any party wall agreements.

LABC fees are published on local authority websites and typically cost around £1,000 for a new house but less than half that for an average extension or loft conversion. In total, for the average new house you could expect to pay around £2,000, less if planning drawings have first been commissioned as there's a certain amount of overlap.

Large architectural practices can charge £75 or more per hour for this sort of work, and producing detailed technical drawings with a specification for a bespoke new house could set you back as much as £10,000. In all cases, where a fixed fee is agreed it's worth clarifying the scope for future amendments should any significant changes later be required.

HOW LONG DO THEY TAKE TO PRODUCE?

This depends on how busy your designer is. A reasonably straightforward job shouldn't take much more than three or four days. If the engineer's calculations are holding things up, it's normally possible to save time by submitting them after your main application.

For building control to process a Full Plans application the stipulated period of five weeks should be sufficient assuming there are no major issues. Remember, you don't have to wait for 'plans approval' before starting work on site. **H**



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WOW 7 WAYS TO ACHIEVE FACTOR ON A BUDGET

Introducing striking architectural features needn't break the bank, explains architect Allan Corfield, who lists his seven top cost-effective ways of adding wow factor

So you have decided to embark on a renovation project, or even opted to build your own dream home. Like the vast majority of self-builders and renovators in the UK, you will most likely be doing this as you want to have an input in the design process. This is brilliant as it leads to better-quality spaces which are more personal and tailored to your lifestyle, ultimately creating better homes.

As it's your project and you are going to be involved in the process, you have an unprecedented opportunity to add character as well as an element

of wow factor. Traditionally we think of these features as kitchens or bathrooms, however there are other striking design elements – a statement staircase or window seat, for instance – which can be built into your new extension or home. You're probably thinking that you can't afford these on your budget? Fortunately, self-builders are renowned for being inventive and thinking outside of the box. If you do your research, use your budget wisely and hire the right designers, it's possible to create wow factor on even the tightest of budgets.

Turn over as I reveal my top seven features. ➤

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IMAGE: KEITH HUNTER

1 FEATURE STAIRCASE

The primary reason for having a staircase is to travel from one floor to another. But they can add so much more to your home — a staircase can separate two living spaces within an open plan room, become a piece of art in its own right, and can even bring an element of fun to a home. Options can range from a standard off-the-shelf timber unit costing from £300, or (quite literally) rise all the way to a cool £20k+ for a sculptural floating design, for instance — so be very careful what you wish for!

Staircases can be made on site by a joiner, built and delivered to site by one of a growing number of online staircase companies, ready for your builder or carpenter to assemble, or be designed and fitted by a specialist company. Your final decision will probably come down to two areas: the complexity of the staircase design and what you can afford.

If you are opting for a traditional staircase then the chances are that your joiner will make this up on site, which gives you the chance to build in some storage — either a utilitarian cupboard with a door, or something a little more creative (with hidden storage in the treads, for example).

However, if you are going for something more contemporary and can't afford to go to a specialist firm, then this is where you have to be a bit more creative. This floating stair (pictured), for instance, with timber treads and glass balustrade would have cost around £20,000 from a specialist firm. However, we went to a metal worker to fabricate the hidden steel, a timber floor company for the oak treads and a glass supplier for the balustrades; we split the work into packages and then brought it together on site. This meant that the client was paying standard rates for the parts, rather than higher rates from a specialist. The results paid off and this stair and balustrade came in at under £9k; it still looks amazing but cost a fraction of the price a specialist installer would have charged. ➤



2

VOLUMES

Creating volume may not be an obvious choice when it comes to creating wow factor in your home. However, we all live in volumes and the space which surrounds us has a massive impact on our feelings and our moods. Small, cramped spaces can feel oppressive, whereas high open spaces are exciting and uplifting. Imagine the impact of opening your front door every day and walking into a double-height atrium space; you would feel great. Buildings have the opportunity (if designed correctly) to make people happier.

Creating a higher ceiling is also great for bedrooms, and this can be easily achieved by having a cathedral-like vaulted ceiling. Using a construction method like SIPs (structural insulated panels) or CLT (cross-laminated timber) for the roof structure means that there are no traditional roof trusses obstructing the space. In more standard methods of roof construction you would have your roof insulation and then structure below it, basically made up of lots of pieces of timber, with a flat ceiling. With a modern method of construction such as SIPs, this forms both the insulation and the structure in one panel. A SIPs panel can span up to 5m without any intermediary support, going from eaves up to a ridge beam, thus freeing up the space where the roof truss would be and giving a vaulted space, which can be used for a mezzanine or for high ceilings. A further benefit of using CLT is that the timber panel structure can be left visible, giving a stunning exposed timber feature. Likewise, oak frames are also really impressive in double-height volumes, as you can see the exposed structure.

Obviously building with any of these methods will involve working with a specialist supplier, however they will limit most of the extra cost (over traditional construction) by the speed of erection. The follow-on trades will be doing their normal work at their normal cost, so picking CLT, SIPs or an oak frame shouldn't add any other additional costs to the rest of the build.



3 FEATURE GLAZING

As glazing becomes higher performing it's becoming easier to specify large expanses of glass. In particular, full elevations of feature glazing are very popular, not to mention a great way to bring the outside in and can completely transform a space.

We've all walked into an office building with a double-height atrium with floor-to-ceiling glazing and been amazed by the scale and light — this is called curtain walling, and is usually made from aluminium frames, designed for the commercial market, and can be very expensive. These systems can be used in residential projects, however the relative small-scale order can make this method cost-prohibitive.

But there is a way to get the same 'wow' feature at a fraction of the cost, by using standard alu-clad timber windows stacked on top of each other. Windows need to be secured at all four corners to stop them falling out. If you are stacking normal windows on top of each other you may be able to just secure down through the cill into the head of the other windows. If you are stacking multiple windows over a larger opening then you will need to introduce a piece of structure — this can be as simple as a small metal plate called a flitch plate, which is cost-effective and easily installed. This approach can be used to create large atrium spaces or glazed gables and will create a stunning wow feature.

As long as you involve your engineer and the window company in the design then there shouldn't be any issues.

5 CORNER WINDOWS

Corner windows often feature in contemporary self-builds, particularly where there is a certain vista to frame. It is one of the most expensive types of glazing and is really seen as a luxury feature, which often gets removed to cut costs. To get the most dramatic effect, the corner window is created by gluing two panes of glazing together with no visible structure. This is expensive to achieve: as there is no frame connecting the glass, the structure that would support the corner is removed. This structure needs to be hidden and cantilevered above the window, back into the building.

Obviously corner glazing is not for everyone — in fact it's for a minority — but there are various other methods that still give the dramatic effect. One solution is to keep the glass-to-glass connection, but express the structure inside the window. This can be a painted circular post and become a design feature. Another route, and perhaps the most cost-effective, is to connect two standard windows together via a piece of structure (either timber or steel), which sits in the line of the window. Although this adds a vertical element which will block some of the corner window drama, it still gives a similar effect. The structure can then be covered internally and externally with a metal cover flashing, in the same RAL colour as the window.

This approach still gives wow factor but is cost-effective as it uses standard parts and is easily completed with a variety of windows (even PVCu).

With corner glazing, it's worth getting your architect to prepare a detailed window and door schedule, and also have your engineer check the glass specification in the quotations to avoid any nasty surprises. ➤

4

SHADOW GAPS

These are high-end design features that you see in museums and art galleries, but also look stunning in contemporary homes. A shadow gap is created by applying two layers of plasterboard, with the second board falling slightly short of the floor. Here, an aluminium strip is fitted at the bottom of the board (where the skirting board normally goes) and it creates a 20mm gap between the floor finish and the wall — creating a shadow and suggesting that the wall is floating over the floor. This can also be fitted around doors and windows to continue a sleek modernist look. Bear in mind, though, that there is a loss of internal space associated with the additional layer of plasterboard.

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BUILT-IN NICHEs

Building in well thought-out recesses (or niches) in the walls next to your shower or bath can really add a touch of class. These can be really useful little spaces to store your towels or products. To add that extra wow factor, add in a light that shines down on the glass shelves within the niche. (Make sure that the light is IP65 rated, so it can be fitted safely in this wet area.)

It is important that these are designed in from the start, as you need to make sure that the stud wall is deep enough to accommodate this feature. I would suggest making the recess at least 170mm deep, therefore it isn't going to fit into a thin timber stud partition. These can be built on site cost-effectively by your joiner, and then tiled over to create a waterproof seal by your tiler.

6



7

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Not everyone can afford a fully automated lighting control system, but you can add a simple and cost-effective alternative in certain key areas. PIR sensors can be purchased for between £10 up to £45, and will turn a light or lights on as soon as motion is detected. They can be used for security purposes, or as a guide up and down the stairs or hallway in the evening when you don't want to wake other members of the house by turning lights on and off. These can be attached to LED strip lights and secured to the back of cabinets or in recesses to create stunning light features, too. **H**

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PLANNING CONDITIONS EXPLAINED



*You've just been granted planning permission, surely it's time to celebrate?
Not necessarily says planning consultant Ken Dijkman, who explains why the
conditions imposed as part of your permission may need careful examination*

After all the hassle, expense, uncertainty and frustration of dealing with objectionable neighbours and perhaps several different planning officers, you are finally holding your precious planning permission in your hand. Surely the battle with bureaucracy is over and you can just get on with building the house of your dreams? Is it time to celebrate and crack open the bubbly? Yes, but only have one glass because it's not over yet. You have just joined the ranks of what the media likes to describe as a developer who is 'landbanking' — in other words, you have a planning permission to build a house, but you are not able to start building yet.

Quite apart from the need to meet Building Regulations and to agree the technical details of how you build your new house or extension, you now need to apply to discharge the inevitable planning conditions that are attached to the planning permission itself.

WHAT ARE PLANNING CONDITIONS?

The whole world of planning is seriously misunderstood, and nowhere is this more obvious than when people talk about 'having planning permission'.

Yes, you now have the right to build a house or extension, and if you have a detailed planning permission, its design and siting are all agreed. But almost inevitably there will be further details that need to be submitted and formally agreed by the local planning authority. For a major development these planning conditions could take another couple of years to resolve. As a self-builder with only one

plot, or as an extender, these additional details should (ideally) be agreed within a couple of months.

It is important to understand that some conditions must be dealt with before you start the development. Failure to comply with these 'pre-commencement' conditions can, in some cases, result in the planning permission being declared unlawful. While other conditions must be dealt with prior to the occupation of the house, some are there to place restrictions on what you can do in the future.

To give one example of a typical planning condition: all planning permissions expire and have an end date by which development must have started. So a planning permission will normally include a condition stating that development must commence within three years of the date it was granted.

Another common condition is that the external materials to be used should be agreed by the local planning authority before work starts on site. Some local planning authorities ask for details, while others ask for samples of your proposed bricks and roof tiles.

Another example is a condition that requires a landscape planting scheme to

be submitted (and agreed) and implemented in the next planting season following the commencement of the development. It's also quite common to see a planning condition that requires the submission details of the proposed access to a site that will demonstrate minimum visibility splays in each direction to ensure that people entering and leaving can do so safely. This is one of the ➤

*"This is the key point:
you have planning
permission, but it is
subject to all the conditions
attached to it and failure
to discharge them
can render that
permission void"*

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most important and risky conditions because you may assume that because planning permission has been granted the site access arrangements are satisfactory. But access conditions can require the submission of technical drawings, and failure to prove that you control the land necessary to deliver the necessary visibility could prevent the planning permission being implemented.

This is the key point: you have a planning permission, but it is subject to the requirements of all the conditions attached to it and failure to discharge them can render that permission void. So before agreeing to buy a site, or completing on the purchase, it is essential that you are satisfied that the various planning conditions can be complied with.

One of the big criticisms of planning conditions is that they involve delay. This is especially true where extra details are sought regarding ecology, and where ecological surveys, arboricultural assessments and tree protection plans may be required. Planning conditions can also be very expensive — a brief condition requiring the submission of an archaeological assessment and programme for excavation could cost tens of thousands.

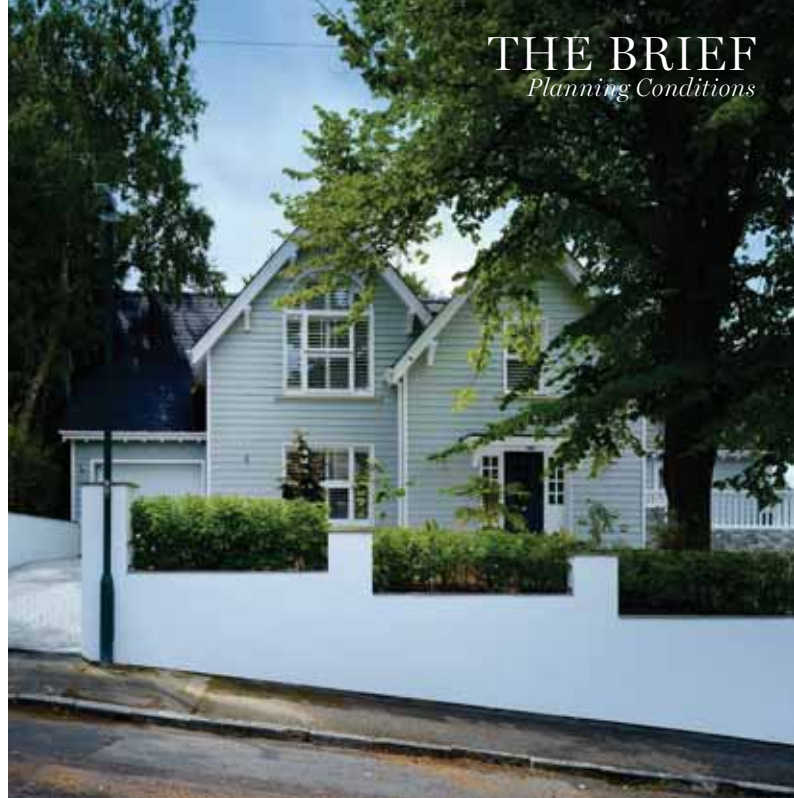
Some conditions, on the other hand, are very straightforward and are there to help protect neighbouring homes. For instance, a condition may stipulate that particular windows are obscure glazed to protect neighbours' privacy, or may require the erection of a fence between two properties.

Similarly, a condition may require a planning application to be made for future development. More specifically, the property's Permitted Development rights may have been removed as a condition, or a condition could require the retention of parking spaces or prevent the conversion of a garage. It's important you bear these things in mind because they might impede your future plans.

You may come across a house in the countryside that is surprisingly cheap, only to discover that it has an agricultural occupancy restriction. This is a planning condition that requires that the occupants of the house work in agriculture, and failure to comply with that can result in enforcement action, and ultimately prosecution.

HOW DO I DISCHARGE THE CONDITIONS?

This may all sound pretty scary but, in most cases, planning conditions just need to be dealt with. A form entitled 'Application for approval of details reserved by condition' will need to be filled out; you quote your permission reference, the condition number and submit whatever it is they have asked for. The local authority then (in theory) has eight weeks to agree or refuse the submitted details. In practice, the length of time a local planning authority will take can vary dramatically depending on the scale and complexity of the permission and the attitude of the planning officers. For an extension or self-build plot, eight weeks should be the maximum time they need to work with you to agree whatever is necessary.



RETAINING MATURE TREES

Paul and Gemma Sinclair, with the aid of architectural technician Tony Holt, remodelled and extended their dated chalet bungalow to create a stunning New England-style home. However, a blanket Tree Preservation Order (TPO) meant frequent communication with the local planning authority was required, particularly to ensure the retention and protection of a large mature tree to the front of the property, as a condition of planning.

A fee is payable for every application to approve the details. The fee for the approval of conditions attached to a householder application (for example, extensions) is £34; for a new single dwelling it's £116.

It's a very good idea to submit details in relation to all the planning conditions at the same time, as you'll then only pay one fee. If you submit them separately you pay a fee to clear each condition — costs could soon mount up!

HOW CAN I ENSURE PLANNING SUCCESS?

The worst-case scenario is that the local planning authority refuses to agree with what you submit. For example, they might not agree the materials you want to use. In this case you can either try and negotiate an alternative, or you can lodge an appeal, which is dealt with in the same way as a normal planning appeal and could take six months to resolve, with no guarantee of success.

As such, my advice is that you should attempt to reduce the number of conditions attached to your permission to the bare minimum in the first instance. To take an easy example: if during the application process you talk to the planning officer about the materials you want to use and they agree them, this can be used to avoid the need to impose a condition on requesting samples. A condition can be drafted to require that you use those materials. This does require a helpful and positive planning officer — and contrary to popular belief they do exist! ➤

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“Getting your planning permission is not the end of the story — there will almost certainly be further matters to be agreed by the council or limitations put in place that are imposed through planning conditions”

This approach can also work with issues like tree protection plans, access and highway details and landscape drawings. If you provide as much detail as possible during the consideration of the application this can avoid the need for the council to impose conditions to request those details on the permission.

Another technique is to ask to see the draft permission notice before it's issued, and you can then request that, where possible, the conditions require approvals following commencement of development above slab level. This means you can progress with the foundation works, and the discharge of conditions should not hold up the build.

If you buy a plot of land with planning permission that is already subject to conditions, my advice is to look at the conditions very carefully and decide whether you can live with them. It is possible to make a planning application to modify or remove the conditions. Obviously you must have a good reason and it has to be acceptable in planning terms. A typical example would be an occupation restriction limiting the use of the house to agricultural workers. You can apply to have this removed and it can be successful if you can prove that there is no demand for this accommodation in that area; this is a complex business (and a whole article in its own right), but the point is that conditions, like planning permissions, can often be modified.

Also remember that conditions are subject to enforcement time limits. This means that if you buy a house with an old planning permission and someone has breached one of the conditions continuously for more than 10 years, then it is likely to be immune from enforcement action. This is known as the '10 year rule'. It's another example of the flexibility in the system when you know how it works.

In a nutshell, dealing with planning conditions is more bureaucracy and it could delay your build programme, but if you know this in advance, you can take it all into account. Getting your planning permission is not the end of the story; there will almost certainly be further matters to be agreed by the local authority or limitations put in place that are imposed through planning conditions. It's important you comply with these before commencing and that you go into this process with your eyes open. **H**



Ken Dijkman

Ken, a former planning officer, is now a planning consultant and owner of Dijkman Planning LLP.

FIVE COMMON PLANNING CONDITIONS



Time Limit

All domestic planning permissions typically include a condition stating that development must commence within three years of the date it was granted.



Materials

Local authorities often want to see a sample of the cladding materials you hope to use as a condition of planning — for instance, the roof tiles and bricks.



Trees

If trees are present on site in close proximity to the build or covered by a Tree Preservation Order, you may be required to take measures to protect them.



Drainage

Planning applications have to detail the disposal of both surface and foul drainage. You may have to submit subsequent detailed drawings.



PD Rights

Some approvals may restrict the scope of your property's Permitted Development rights — or have them taken away altogether as a condition.



FOR SMALL GARDENS

If your urban garden is small, shady, even noisy or polluted, don't despair. Landscape designer Paul Hervey-Brookes shares his expert tips for making your small space stand out

Although many of us dream of a large sprawling garden, the reality of living in an urban area often means you inherit a small outside space. And if you're extending your home, you may end up with a smaller garden by default. But just because your outside space is small doesn't mean you have to curtail your ideas. A well-designed space can be a far more engaging and comforting place to be, and provides opportunity to create something really special.

FIRST STEPS: CREATING YOUR BRIEF

The first essential step of any design where space is limited is to draw up a list of 'must haves'. Think about activities, uses and even basic things like 'Do I want a washing line?' Next, draw up a list of things you'd like to have, such as somewhere to eat, lighting options or luxuries like a woodburning

oven. Jot down the type of garden you'd like to design — traditional or a more exotic holiday-inspired space, perhaps?

If you are keen on growing your own vegetables, or want a fruit patch, then add this to your list, too. It's easy to forget something important to you when faced with a compact space, so getting all this information down on paper is the best way of establishing your priorities.

GET TO KNOW YOUR SPACE

Once you're happy with your lists it's time to get practical. Whether you intend to use a garden designer or carry out the work yourself, the one thing you need to do to really appreciate the space is to spend time observing and detailing information about it. If it helps, draw a plan and note down where the sun rises and falls, whether there's a

IMAGES (LEFT TO RIGHT): GARDEN CLUB LONDON LTD; ALISTAIR NICHOLLS; CO PAUL WAGLAND



“Sun traps make great Mediterranean-style spaces”

prevailing breeze, and where the shady and sunny areas are. Listen to what's going on around you, where noise tends to come from, what views you do and don't like, and if there is anything – such as a neighbour's bathroom window – you don't want to spend time looking at.

These details will form the core of your new garden design, helping you to create a space that works well and is within your budget.

BUDGET & PROJECT PLANNING

If you're working to a tight budget, then good quality paving, lighting and boundary treatments should be where the money goes first – these elements will last the longest and really set the tone. Purchasing smaller, less established plants will also help to save money; they won't ruin the design of your garden and they will grow into it in time.

If you're planning major works, it's a good idea to talk to your neighbours, especially about access if you share a drive or side alley. Some mini diggers and other equipment can go through the house but other items will be too big. You can crane equipment over the house but this will inevitably be more expensive.

Large-scale works will require a landscape professional; they will be able to talk you through the options and the likely costs involved. It's also worth noting that if you don't have a drive, your local authority will require a permit for parking skips on the road (at a cost, of course).

Top tip: If you're planning a renovation or extension project, think about how you could use some of the equipment you have, like diggers and skips. You'll already have them on site so if you can combine the work, you'll save on costs.

CHOOSING THE RIGHT PLANTING

Once you've established the size of your budget and the scale of your design, you can now pick your plants. Knowing if you have a sunny spot or a shady space will help you determine the types of plants you can grow easily.

A shady garden may at first seem less than desirable for some homeowners, but can actually provide opportunity to include an oasis of lush green foliage, creating a sense of the exotic.

Enclosed small spaces are often a microcosm, sheltered from the elements, which means you can grow a wider variety of plants that wouldn't survive the winter elsewhere in the country.

'Sun trap' gardens will allow you to create a Mediterranean-style space with somewhere to sit and sunbathe, or to create beds of fruits or woody herbs.

Regardless of the volume of sun or shade, always choose plants with more than one point of interest. A plant with good summer flowers, and winter fruits or foliage, such as *Amelanchier*, rewards you year round. Small trees or shrubs with decorative shredding or peeling bark, especially, allow for more varied lighting options over winter that will keep the space interesting. ➤

Seating Areas

Creating zones in your small garden can help make the space seem bigger. Boxing off a seating area with planting in rendered purpose-built beds is a great way to zone an area.

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Don't feel the need to make a minimal space an overly tidy one. To get the most from it, a little controlled cottage wildness will make for a wildlife haven and add an extra dynamic to the space.

Other key considerations in urban gardens in particular may include pollution and noise:

Managing pollution As a rule, large leaved plants tend to absorb more carbon dioxide. Trees, especially ones with raised pores known as lenticels on the stem, such as Hornbeam, deal with urban pollution well so can effectively filter air quality around your home.

Reducing noise Planting shrubs and trees that are dense and twiggy will help reduce noise pollution, as will layering planting at different heights. The noises you pinpointed on your list will begin to determine where you plant these beds and a layout should form organically.

MAKING THE SPACE FEEL BIGGER

Adding a water feature, such as a still round disc or oblong trough, is a simple and effective trick to make any space feel bigger. The water captures the light and views of the sky above making the space feel bigger by virtue. It's a simple trick often overlooked. Don't be tempted to incorporate mirrors: they are bad for small birds and have none of the wildlife-enhancing qualities of still or moving water. The other neat trick that allows you to imagine the space is larger is to obscure the view. This could be a sunken area or taller planting allowing for two zones of activity within the space. By making such a distinction the mind sees the garden as larger and this sense is reinforced by using different areas for different activities.

Borrowing a view is another way to create a feeling of space. If within your field of vision there's a building with architectural interest or a beautiful tree, then anchor it into your space and frame it as part of the whole to add a sense of volume.

Lastly don't rush, think through every step and you can't go wrong! **H**

NEXT MONTH:
How to create a family-friendly garden

Feature Elements

Multi-level elements in this Garden Club London space (ABOVE) – firepit, seating and shrubbery – create an illusion of depth in this small garden, making the overall area feel elongated.

7 Top Tips for Small Gardens

1 Choose multi-tasking plants Choose plants with more than one point of interest, including those that offer winter foliage and fruits, as well as flowers.

2 Borrow views If there's a tree or a lovely architectural feature you can see from your garden, find a way to capture it in the view.

3 Create different zones Add a sunken area or taller planting, or steps leading to a secluded spot – including different zones will make the garden seem larger than it actually is.

4 Capture the light and the view of the sky

Water works well for this, as does a round disc or oblong trough – the overall effect is to create an illusion of space.

5 Make the most of the shade If your space is shady, don't be perturbed, use it to your advantage and plant lush jungle-like varieties that thrive in this environment.

6 Create a quiet space Plant shrubs and trees that are twiggy and dense to create a canopy letting in dappled sunlight. This planting will help to reduce noise pollution, too.

7 Find space for wild flowers Introduce cottage-style wild flower planting to your small space. It'll help entice wildlife into your garden.





HOW TO CREATE A WARM INTERIOR SCHEME

It can be a challenge to make the interiors of new homes feel warm and characterful in the absence of original period details — our simple design tips will ensure your new home or extension feels anything but cold and clinical

Your home, be it a contemporary masterpiece or of a more classic design, should feel like a retreat, somewhere to recharge at the end of the day or congregate with loved ones.

There is a misnomer that sleek, clutter-free, minimalist interiors can't feel warm and welcoming. Likewise, fans of period homes will argue that even traditional-style new builds can never have the character of authentically old buildings.

While it is true that it tends to be more of a challenge to create warm and cosy spaces in new homes and extensions, all it really takes is forward-planning, and a few tried-and-tested tricks of the trade. Here we share our top design tips for creating characterful new interiors in your project.

BUILD IN CHARACTER

The 'bones' of a building provide just as much in the way of character and warmth as final finishes such as paint and fabrics.

Of course what this means is that warm interiors are something you need to think about at the initial design stages, not just as an afterthought — simply painting a room a warm colour will not be as effective as planning in character from the off. There are a few ways to inject warmth during the planning stage:

Room shape: Avoid box-shaped rooms. Alcoves, chimney breasts, deep bay windows and partial room divides all add interest and dimension — so important for character.

Ceiling heights: Sloping, vaulted or dual-level ceilings offer so much more in the way of character and interest of form than a uniform ceiling.

Floor levels: A split-level layout is the ideal way

to introduce interest into a home — even a single room, such as a kitchen diner, can benefit.

Expose the structure: Keeping the inside of a house unwrapped, so to speak, is a sure-fire way to add character. Leaving certain structural elements exposed, such as timber beams, ceiling joists, or perhaps even electrical conduits in more industrial-style interiors, means plain walls or ceilings are broken up, avoiding a look that is too clinical.

BE COLOUR CLEVER

The colours in a room will dramatically change its feel — but colour on the walls is not the only way to achieve this. While paint is undoubtedly one of the simplest and most economical ways of injecting a feeling of warmth to a room, there are lots of other elements within a space that can be used to provide cosy-feeling colours.

Flooring is a good example — warm, creamy tones of natural stone, earthy quarry tiles and rich-toned woods will instantly warm up a space, where as harsher pure white and glossy black tiles tend to look colder.

Colour is also a useful way to break up large, vacuous spaces (which should be avoided at all costs if you want your interiors to feel welcoming) — create cosy zones and corners using warm shades on certain walls.

INTRODUCE TEXTURES

The overall feeling in a room is hugely influenced by the textures within that space. This doesn't just translate into cushions and throws — the walls, ceilings, flooring and fixtures and fittings can all play their part. ➤

“Warmer colours visually advance”



JO HAMILTON, creative director at London-based Hamilton Interiors (johamilton.co.uk)

There are many ways to bring warmth to a scheme, but colour selection is the most obvious. Cooler colours such as blues, greens and violets are calming and serene, whilst warmer colours — reds, oranges and yellows — are vibrant, alive and fun. These warmer tones visually advance and make the space feel cosier, so are an excellent way to add that homely touch.

Use natural materials, such as warm-toned woods and metallics. Choose a range of fabrics and textures that work well together without being too matchy-matchy, and layer. An uncontrived mix of hand-woven linens, plush velvets and softly patterned prints in differing scales, adds a soft feel to your space.





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Combine Materials and Textures

Rather than sticking to just one type of wall covering throughout a space, mix up the materials you use to add interest and a more intimate feel. Here, timber cladding sits alongside stone, plaster finishes and slate tiles, for a look that complements the mid-century modern-style furniture from Walter Knoll (walterknoll.de/en).



Although a painted finish is the most common choice for walls, you might instead consider timber cladding, a textured plaster, fabric wallpaper or a more unusual final finish such as orientated strand board. Take a look at combining different textures in a room too, such as a section of wool carpet set into a timber floor.

INSIST ON GOOD LIGHTING

Lighting is so often overlooked as a source of visual warmth despite the huge effect it can have on a space. People are realising that a single, central pendant will do nothing in the way of bringing a room to life, but it is surprising how often lighting opportunities are missed. A good lighting scheme can create a cosy glow in a subtle way.

The key to creating a warming lighting scheme is to layer up. This means combining ambient (or general) lighting such as that provided by recessed downlights or wall lights, with other sources, such as a selection of side lamps at various heights, hidden LEDs for a glow behind shelving or picture lights.

Set each 'layer' of light on a separate circuit so that you can pick and choose according to the mood required. Dimmers are also a must.

CREATE SOCIABLE SPACES

Homes which encourage the people in them to congregate and converse are much more welcoming than those with vast open planes of emptiness.

There is certainly a place for cosy corners meant for one, and wide open corridors free of obstructions, but they need to be interspersed with crowd-friendly areas in order for a house to feel inviting.

Good examples include seating arranged in such a way that people come together — with sofas and chairs facing one another, around a central coffee table. Kitchen islands with seating are another good example. ➤

"Don't 'over light' your home"



JIM LAWRENCE, Jim Lawrence Lighting
(jim-lawrence.co.uk)

The key is to find a healthy balance. You don't want to 'over light' an area and make it feel artificial. Where it might be difficult to install overhead lighting, wall lights are a foolproof go-to. Otherwise, a mixture of table and floor lamps with dimmers are ideal for altering the atmosphere according to the setting, for example in a living or dining room. We suggest pendants in these spaces too, to bring another layer of light when necessary, and for adding a main point of interest to your home décor.

In bedrooms, to retain the warm atmosphere, use low level outlets such as picture lights, reading lamps or wall sconces for a softer look.

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Homes with Heart

CLOCKWISE FROM TOP LEFT: Combine wall colours with a nod to the natural world, such as Farrow & Ball's SS17 Trend Colour, Studio Green, with modern finishes like polished concrete floor; Deep, bold hues can bring timber panelling to life, particularly when combined with a cosy velvet chair such as the Matador armchair from Terence Conran (contentbyterenceconran.com); Varying ceiling heights can add interest and drama – as demonstrated in this extension; Shuttered concrete panels on the ceiling and walls have been softened with more rustic timber and stone panelling for a look that is both contemporary and warm; Painted wood panelling (finished in Farrow & Ball paint) is ideal for breaking up expanses of wall.



MIX AND MATCH STYLES

There is no reason why a modern house has to be furnished with only modern fittings and fixtures — there is still a place for a little bit of history. A well-sourced find from a reclamation yard or an antique fitting passed down through the generations will slot beautifully into an otherwise contemporary, minimalist scheme, adding a more individual, less formulaic touch.

It is personal touches that give a home personality and remove the risk of things feeling too sterile.

CREATE A FOCAL POINT

Without a point of focus, a room can feel lacking in character. A focal point creates a natural gathering point, drawing people in and therefore making for a space that feels sociable and inviting. In period properties the fireplace tends to be the most obvious focal point to highlight — a feature that warms physically, as well as visually.

In the absence of a fireplace, a large picture window framing a show-stopping vista makes for a ➤

“One of the key considerations in warm interiors is the use of natural materials”



LUIGI MONTEFUSCO, Director of LBMVarchitects (lbmvarchitects.com)

One of the key considerations when creating a warm interior scheme is the use of natural materials. Using wood flooring in an organic finish such as natural oak is a great way to add a sense of warmth to the scheme, especially when paired with neutral off-white paintwork that accentuates the natural light entering the room. Avoid ice white and blue colour palettes, instead opt for soft neutrals and hues with undertones of red. Fabrics and furniture also play a big role in bringing a scheme together, with cosy rugs and tactile velvets establishing a strong sense of comfort often associated with warmth, and antique furniture pieces introducing a lived-in quality and unique sense of personality that transforms the space.



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stunning focal point. Large pieces of artwork, huge mirrors, even banks of built-in shelving covering an entire wall, set off by a bright-coloured wall behind, can make perfect focal points.

USE NATURAL MATERIALS

There is something inherently warm and comforting about natural materials as opposed to synthetic ones — they have a tactile quality with a reassuring, timeless appeal.

Consider natural timber for flooring, work surfaces, interior cladding on walls and even ceilings. Stone is another material that lends warmth, from creamy limestones to tumbled travertine.

Finally, don't overlook natural soft furnishings such as linen, wool and leather. **H**

“Light influences mood”



CELERIE KEMBLE, Interior Designer, partnership with Arteriors (arteriorshome.com)

My best advice would be to introduce the right amount of lighting. It's important to understand that it is one of the strongest influencers of mood in a room. Choose your lighting so that it can come from many sources and heights, which softens shadows and allows your lighting to remain variable for different occasions.

A room should be like a stage where you can use lighting to highlight or downplay certain areas at certain times. There is no need to match all your lights, such as all-brass or all-nickel — find lighting that helps break that monotony.



MERRY ALBRIGHT, Border Oak (borderoak.com)



When designing a home I tend to incorporate both 'actual' warmth and 'perceived' warmth. Actual warmth can come from a specific source such as a woodburner, open fire or range, all of which can be used as design focal points in a room, but also provide an exceptional ambience which is hard to describe. People typically, but unconsciously, congregate around a roaring fire or range cooker, gravitating to the warmth whilst enjoying the social, homely ambience they can create.

Perceived warmth tends to come from materials, textures, craftsmanship, lighting and colours — we like to layer these factors up in Border Oak homes, so that you create a multi-dimensional feeling of atmosphere. An oak frame will provide the perfect backdrop for those looking to create a sense of warmth.

Combine subtle textures such as wooden wall panelling and natural flooring, as well as other tactile experiences — handmade door latches, window seats, bespoke staircases all add to the feeling of comfort, quality and sensory reassurance. Clever use of colour and lighting (both natural and artificial) also play a part in creating a warm atmosphere in a new home and help showcase the various layers of the structure, texture and experience within your home.

“People unconsciously congregate around a focal point such as a roaring fire or range”





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1 Eye-catching and original, the ME from Nordpeis is a woodburning stove with a host of inspiring mounting and installation solutions. With its circular design, the ME can be put on a pedestal, box or bench, or even wall mounted — the ultimate in avant-garde style. Nordpeis ME, priced from £2,495, nordpeis.co.uk

2 The CL5 Wide from Yeoman offers the presence of a larger stove, while maintaining heating temperatures to suit most living spaces. It's a great choice if you're looking for a bigger freestanding stove with minimal footprint or modest heat output, and is

also available with the optional multi-fuel kit to burn smokeless fuels. Yeoman CL5 Wide, from £1,279, yeomanstoves.co.uk

3 Timelessly styled, the Sheraton range from Stovax presents classic design with sophisticated, modern touches and state-of-the-art combustion. There are two sizes available in both woodburning and multi-fuel options, both of which are Ecodesign Ready for the cleanest burn. Stovax Sheraton, from £1,095, stovax.com

4 With Nordic style and sleek black glass, this tall and stylish stove from Gazco makes the ultimate in

contemporary gas stoves. With soaring flames mirrored on all sides of the firebox and with the option for modular installations, including a wall-mounted version, the Loft creates an impressive focal point, and can even be controlled from the comfort of your sofa. Gazco Loft, from £2,195, gazco.com

5 Varde's latest stove, the Bornholm, features large side windows for a panoramic view of stunning flames. This woodburning stove ensures a high efficiency 5kW heat output, and also features a useful area for storing logs and accessories. Varde Bornholm, priced from

£1,195, vardestoves.com

6 Joining Dovre's iconic Vintage stove range is the new Pure White enamel finish, giving you three colours to choose from, including Anthracite and Grey enamel, in this very on-trend retro aesthetic. Multiple sizes are also available. Dovre Vintage, from £1,845, dovre.co.uk

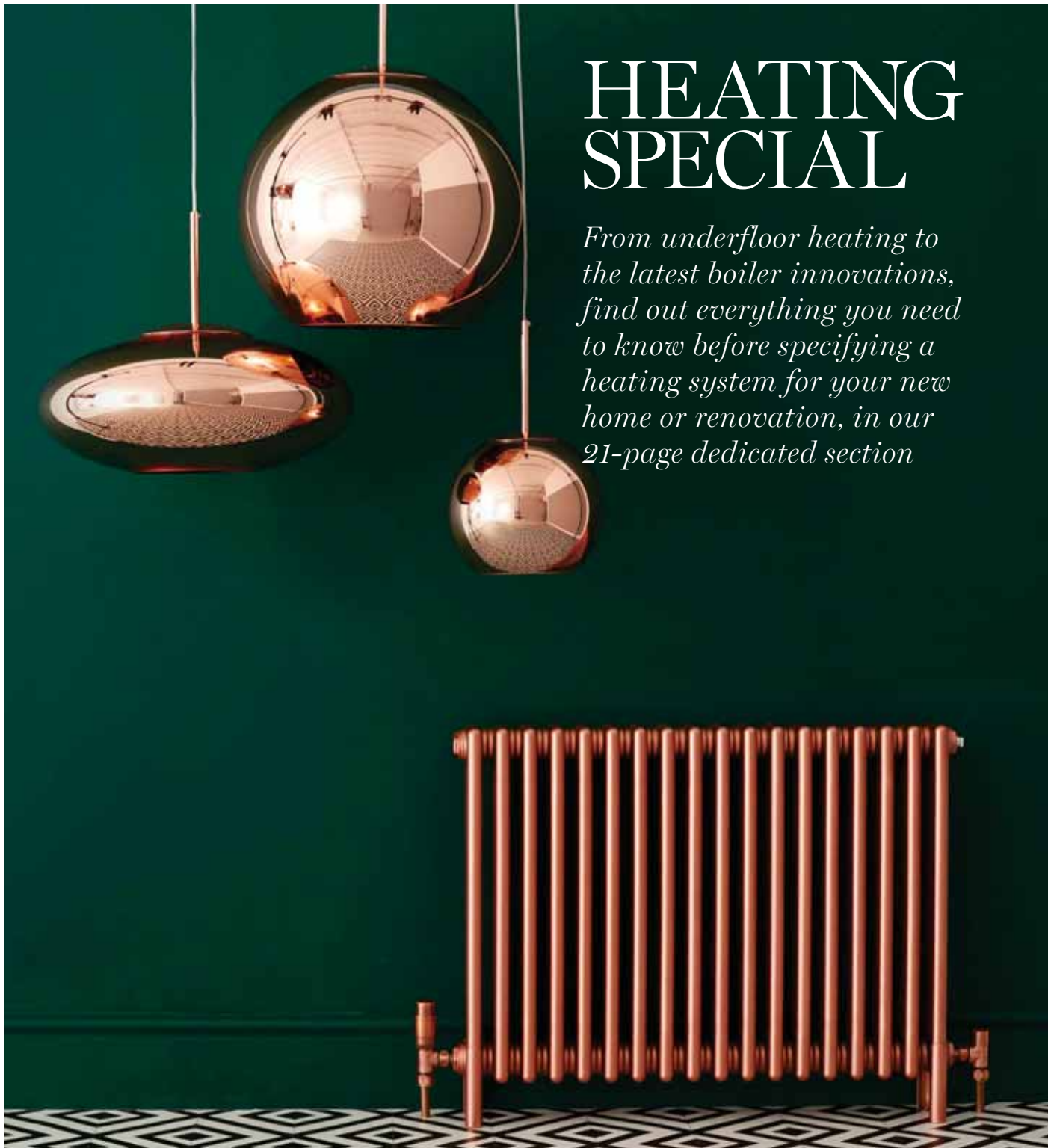
7 New to Lotus' luxury range of stoves is the woodburning Jubilee 10. This stove, featuring contemporary styling, offers three different door handle options, and 4kW of heat — perfect for a variety of homes. Lotus Jubilee 10, from £1,495, lotusfires.com **H**



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HEATING SPECIAL

From underfloor heating to the latest boiler innovations, find out everything you need to know before specifying a heating system for your new home or renovation, in our 21-page dedicated section

- 147** *A beginner's guide to heating your home* **150** *Wet underfloor heating explained*
156 *A buyer's guide to radiators* **159** *The latest heating innovations*
167 *Is the airtight home the death knell of the open fireplace?*
171 *Renovation clinic: Your heating questions answered* **175** *Is mains gas the future?*

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A Beginner's Guide to HEATING YOUR HOME

Choosing a heating system for your self-build or renovation project is a key decision, but where do you start? Energy-efficiency expert Tim Pullen explains all

Choosing a heating system for your self-build or renovation project will present a number of options, and will be one of the most important decisions you make. Not only is this going to affect your experience of living in the house (hot water for cleaning and warm temperatures during bleak winters being crucial), but your selection will also determine the running costs of your home.

The starting point for any heating system design has to be calculating how much heat is needed in the first instance. By this we do not mean the local plumber's best guess, or even the energy efficient SAP or EPC calculation — we mean a detailed calculation carried out by a properly qualified heating engineer. Only with that figure in hand can we start thinking about the most appropriate heat source and heat emitters (radiators, underfloor heating, etc.).

And while it's not in the scope of this article, it's important to note that investing in the fabric of the building (i.e. through adding insulation) to minimise your heating demand in the first instance, is a very good place to start.

WHERE TO START

Choosing a heating emitter is often the starting point for many projects. The three main options for heating emitters are underfloor heating, radiators and skirting board heaters, and there are often strong opinions about all of them.

Underfloor heating (UFH) now tends to be the emitter of choice for many self-builders and extenders, for the comfort, efficiency and the extra wall space it gives. Radiators are cheaper than UFH and choice is as much about aesthetics as it is by the amount of heat needed. Skirting board heaters are not yet as popular as we might have expected 10 years ago, but they do have a lot to offer, especially in retrofit projects, being something of a halfway-house between UFH and radiators.

There is an argument that the decision on emit-

ters is the right place to start as it affects everything else. The counter argument is that without knowing how much heat is needed it is not possible to calculate how big the radiators need to be, how much UFH is required or if the walls are long enough for skirting heaters. Perhaps the answer is that the two things have to be taken together.

HOW TO CHOOSE A HEAT SOURCE

The big decision is whether to go with just a boiler or go down the route of installing a renewable energy system, and if so, whether it will be the sole heat source. A gas boiler supplemented by solar thermal panels or an air source heat pump is becoming an increasingly popular option, and for good reason. Heat pumps — ground source and air source — are gaining popularity with the desire for more thermally efficient houses and increases in the Renewable Heat Incentive (RHI — the government's scheme to incentivise the take-up of renewable heat-generating technology). In situations where there is a very high heat demand in older houses, wood pellet boilers are still a good option. Although, bear in mind the RHI tariff is not as generous as it was.

The reality remains that if mains gas is available it is difficult to ignore. But beyond that, all options are available, and the best and perhaps only way to make the right decision is to start with the heat requirement and all the other factors individually rather than considering a heating system as a single entity.

A CONTROL SYSTEM IS VITAL

The control system will be largely dictated by the system being installed. The criticality is that the control system must allow the temperature to be set for each room. It is uncommon that a house will need every room to be heated to the same temperature at the same time (think guest bedrooms which receive occasional use). Getting that right will make a noticeable difference to the heating bill. ➤



Tim Pullen

Tim is an expert in sustainable building methods and energy efficiency in residential homes. He is also the author of *Simply Sustainable Homes*.

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The second criticality is, daft as it sounds, understanding how the system works. In the 'good old days' we had a single, maybe two, thermostats with a dial, which roughly set the temperature (plus or minus 4°C), and a timer on the boiler to tell it when to turn on and off. Life is a bit more complex now. There could be UFH to the ground floor and radiators in the bedrooms; there could be more than one heat source with a boiler supplemented with solar panels; and there are 'intelligent' systems that apparently learn when we want the house heated and to what temperature.

Many heating system suppliers will say that the major reason for revisiting a site will be to explain how to use the control system. Personal experience also indicates that a good number of people put up with whatever the system is doing because they don't really know how to change it.

The control system is as important as the heating system itself and without knowing how to operate the system it is not possible to gain the full benefit of the investment.

HOT WATER CYLINDERS EXPLAINED

Combi boilers are the only option that do not require a hot water store. That apart, there are a number of other reasons for choosing another option (which include a hot water store) — not least, the increased efficiency of all the other options and that combi boilers preclude the use of any form of renewable energy.

The traditional, not to say old-fashioned, copper cylinder is now largely a thing of the past. They are too small and too inefficient for a modern self-build or renovation project. We want more hot water than they can supply, we want good pressure at every outlet and we want to store hot water, from solar panels for instance, when it is produced.

The volume of the cylinder will be determined by a calculation which takes into account the space

heating requirement of the house, the number of bathrooms and the number of people in the house.

The decision is then for a vented or unvented cylinder. Vented cylinders do not maintain any pressure so ensuring good pressure at the tap or shower relies on something else, typically a header tank in the loft or a pump. Unvented cylinders, which include thermal stores, do maintain pressure and deliver water to the outlet at mains pressure. But they come with a higher price tag and an annual maintenance bill. A thermal store will also maintain water at layers of different temperatures (called stratification) which is useful for multiple heat sources and the requirements of different outlet types (i.e. UFH and hot water).

You'll generally be guided (or told) by your supplier or installer what cylinder to install. The advice would be to do some research and take part in the decision - there is a fairly wide spread in terms of efficiency and price.

CHOOSING YOUR FUEL

To begin, there are no good economical reasons for using electricity for heating purposes, unless all the electricity being used is produced on site from a renewable energy source. Equally, LPG does not make a lot of sense. A litre will cost around 47p (according to Which?) and will deliver about 7kWh of heat, or about 6.7p/kWh. Heating oil is now about the same price per litre and will deliver about 10kWh, or about 4.8p/kWh.

Mains gas (when available) is the cheapest fossil fuel option in terms of installation, capital and running costs. Renewable energy systems still have a relatively high capital cost but their low running cost make them the better long-term option.

To compare the cost of fuel options, we take a look at the capital costs of various types alongside the annual running costs and how this will stack up over the years, below. **H**

FUEL COST TABLE

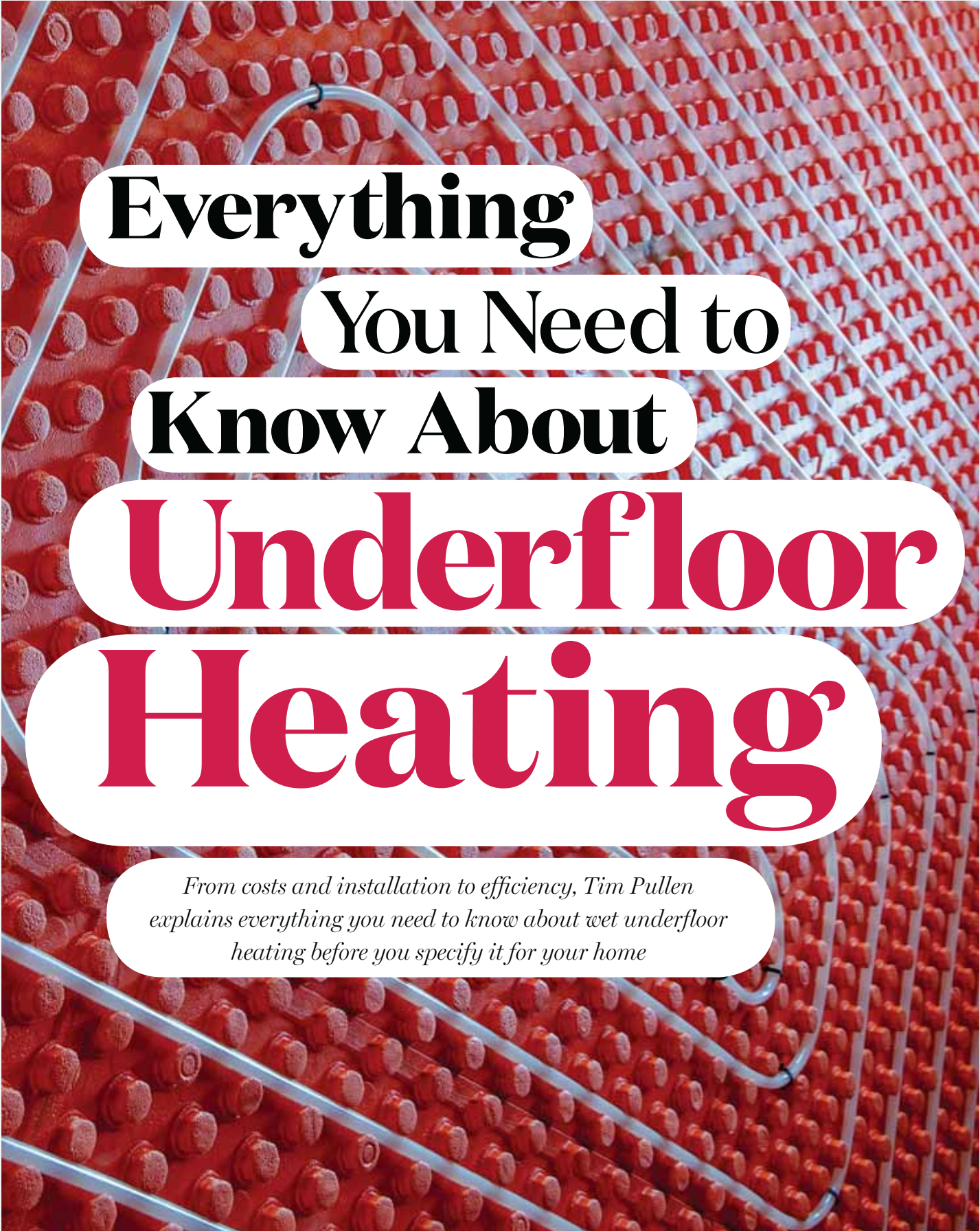
FUEL	CAPITAL COST	FUEL PRICE (PER KWH)	ANNUAL RUNNING COST	RHI INCOME	FUEL COST OVER 7 YEARS	TOTAL COST OVER 7 YEARS	FUEL COST OVER 10 YEARS	TOTAL COST OVER 10 YEARS
MAINS GAS	£2,500	£0.06	£850.50	N/A	£8,576	£11,076	£14,916	£19,916
OIL	£5,000	£0.04	£630	N/A	£6,886	£11,886	£12,544	£22,544
LPG	£4,000	£0.07	£1,102.50	N/A	£12,045	£16,045	£21,942	£29,942
ASHP	£7,500	£0.15	£750	£1,049	£7,566	£7,723	£13,161	£13,318
GSHP	£12,000	£0.15	£562.50	£2,031	£5,670	£3,453	£9,862	£7,645
BIOMASS	£15,000	£0.06	£866.25	£1,011	£6,839	£14,762	£10,397	£18,320

Based on an annual heat requirement of: 15,000 kWh/yr of a typical house

Capital cost includes installation and ancillary equipment

Fuel cost includes inflation at 12% for electricity, gas, LPG and oil and 4% for biomass

10-year cost includes replacement boilers for gas, LPG and oil



Everything

You Need to

Know About

Underfloor Heating

From costs and installation to efficiency, Tim Pullen explains everything you need to know about wet underfloor heating before you specify it for your home

Underfloor heating (UFH) is a technology that 20 years ago was lost in almost total obscurity; at best, only available to the rich and famous. Now there are not many self-builders or renovators who don't at least think about it. Anecdotal evidence seems to show that most then go on to install a system. This change has been brought about by a number of factors, principally that UFH is now far more affordable, which in turns leads to greater familiarity and more access.

HOW MUCH DOES UFH COST?

UFH is still more expensive than a comparable radiator system — estimates vary from 20% to 50% more expensive. Chelmer Heating suggests that the system itself is likely to cost £18 to £22/m². Nu-Heat suggest an installed cost of around £40/m². The figures will vary with the size of the property, the amount of heating it needs and whether it is a new build, renovation or conversion.

Retrofit will always be a bit more expensive, but it could be a lot more if existing timber floors need to be taken up or concrete floors excavated. There are low-profile systems, developed specifically for that situation, that can be installed directly onto existing floors that offer significant savings in retrofit situations. Nu-Heat's Lo-Pro system, for example, was developed for this situation.

UFH is not cheap and never has been. The issue is that the value of houses has increased hugely in the past 20 years so the amount spent on the heating system has fallen as a proportion of the overall build cost.

GETTING THE FLOOR STRUCTURE RIGHT

There is some discussion as to whether the insulation in the floor needs to go on top of the floor slab or below it. There are specific Passivhaus designs that will wrap the whole floor slab in a great deal of insulation on the basis that the slab provides thermal mass, useful in capturing solar heat in the house. There are others who suggest that only about 10% of the heat in a UFH system is lost to the ground so insulation is not a major issue. (It is not clear how that loss is calculated but even 10% might be considered a lot.)

Building Regs require a floor U value of no more than 0.22W/m². To achieve this, the floor build-up would typically consist of: the damp-proof membrane, concrete slab, at least 100mm of rigid foam insulation, the floor screed with UFH pipes housed in it, and the floor finish.

The issue here is what is known as the reaction time: that is the time taken for the heating system to bring the room to the desired temperature and to cool back down again. This is largely governed by the thickness of the screed.

A standard sand and cement screed would typically be 65mm to 75mm thick and the UFH could take upwards of two hours to heat the room, but take a similar period to cool back down again. This may be fine in the lounge or kitchen as we tend to spend a lot of time there, but might be less acceptable in a bedroom.

If the UFH pipes are housed in the concrete floor slab, which could be 150mm thick, then the time taken to warm the room will be well over four hours, which would dramatically change how the system can be used.

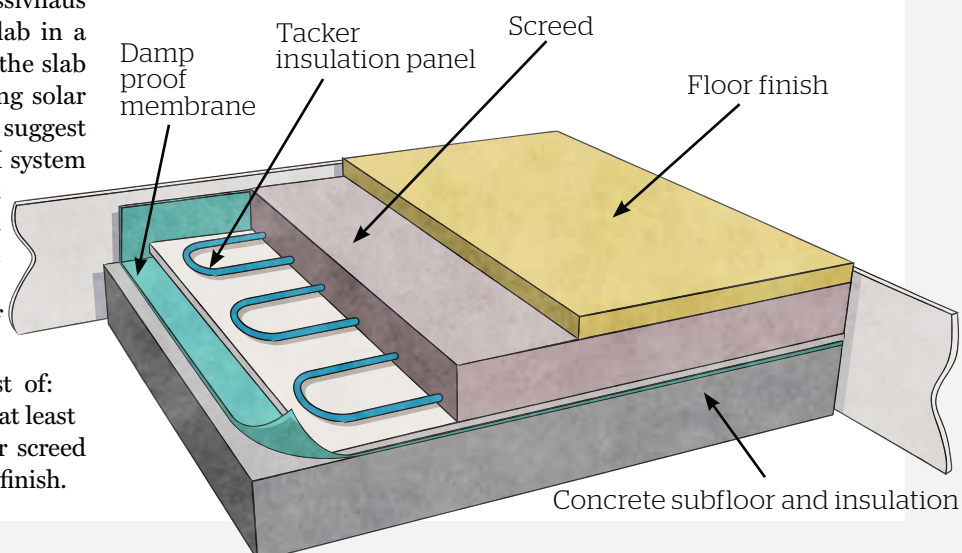
A further option is the same build-up but with a thinner flow-screed, 35mm to 40mm thick, instead of sand and cement. That would bring the reaction time down to 30 to 40 minutes, which is similar to a radiator system.

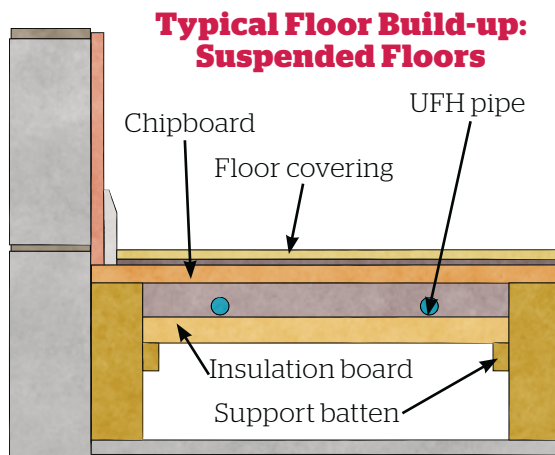
Which is right, which is best, will depend on the construction of the house itself and how the UFH system is to be used.

UFH AND SUSPENDED FLOORS

A common option for suspended timber floors (ground or upper floors) uses a system where the pipes are installed between the floor joists on foil-backed rigid-foam insulation (Kingspan, Celotex or similar). The insulation itself is supported by battens which are nailed to the inside of the joists. ➤

Typical Floor Build-up: Concrete Subfloor





The pipes are clipped to the insulation board using pipe clips, and the ends of the joists are notched to allow the pipes to pass from one channel to the next. The pipes are then covered with a lightweight aggregate to fulfil the same function as the screed on a solid floor.

An increasingly popular option is to use a spreader-plate. This is an aluminium sheet that both houses the UFH plate and spreads the heat evenly across the floor. Another option is the Lewis Deck system from CDI-ICM.

Specialist UFH systems for joisted floors, such as Nu-Heat's ClippaPlate system, can either be installed over the joists from above (before the floor deck is fitted), or between joists from below (before the ceiling is in place). "This system is also great for retrofit as with no height build-up, these UFH systems avoid any disruption to fixtures and fittings, and floor coverings can be fitted as soon as the floor deck is in place," says Emma Brown of Nu-Heat.

CHOOSING A FLOOR FINISH

Tiles, stone or similar are generally accepted as the optimum covering as they absorb and spread the heat rather than insulate, but they are not the only option. Wood is thought to insulate and reduce efficiency but thinner profile (12mm or 15mm) engineered timber flooring has little noticeable impact on heat output.

Carpet is generally considered a no-no but the Carpet Foundation carried out research in conjunction with the Underfloor Heating Manufacturers Association which shows that some carpets can be used with UFH. The research showed that a carpet and underlay with a thermal resistance of less than 2.5 tog does not have a significant impact on efficiency. According to the Carpet Foundation, a typical 80% wool to 20% nylon carpet with a standard underlay will have a tog value of 1.0 to 2.2.

What this ultimately means is that you can use whatever floor covering you want but it is a good idea to tell the UFH designer so that the pipe layout can be properly specified.

GETTING THE PIPES RIGHT

The pipes are obviously a critical component in a UFH system. One of the main concerns is what happens if there is a leak? The answer is that there must not be a leak. Each room or zone will have pipes laid in a single length with no joints. They must accept bends, radiate heat and last at least as long as the house.

UFH pipes come in two forms: single layer and multi-layer. Multi-layer are usually made up of five layers: inner and outer layers being PE-RT (a form of polyethylene), and an oxygen diffusion layer in

A Step-by-Step Guide to UFH Installation



1 UHF company, Wunda Group, connect floor heating pipe to manifold.



2 Next, they place the pipe onto insulation layer.



3 The pipe is then secured to insulation using pipe staples.

the centre sandwiched between two adhesive layers. This type of pipe is easier to bend, retains its shape better and is more puncture resistant — and more expensive.

Single-layer pipes tend to be made from PEX, or crosslinked polyethylene, a form of plastic pipe made from a high-density polyethylene polymer. PEX pipe is available as either Oxygen Barrier PEX or PEX AL-PEX. This latter pipe has all of the qualities of regular PEX plus the ability to hold its form once bent into the required shape.

Which type of pipe is best is a very difficult question to answer. Both have their advantages and both offer long guarantees — 50 years seems to be the minimum and ‘lifetime’ is common. The decision is often more to do with what the chosen supplier is happy with than with the pipe itself.

What is for certain, however, is that the pipes must always be pressure tested before the screed is laid, which is probably obvious but often omitted. But equally critical is to ensure the pipes are full of water while the screed is being laid so that if there is any damage it will be immediately obvious and can be fixed before the screed laying is finished.

CONTROLS AND MANIFOLDS

Controls for an underfloor heating system come in two parts: a digital zone control that will determine the temperature of each room, and the manifolds and valves that the zone control operates.

The zone control will be placed somewhere where the homeowner can make adjustments, while the manifolds will be placed out of the way — under the stairs or in a cupboard — so as to be unobtrusive.

Neither of these need trouble the homeowner too much and what you get will be largely determined by the supplier.

There is no regular maintenance regime associated with UFH, but if things do go wrong, it will typically be with the control systems rather than the UFH itself. Valves and electronics will either work or not and they only need to be maintained when they stop working.

EFFICIENCY: UFH VS RADIATORS

UFH operates at a much lower temperature than radiator systems (40°C compared to 65°C) and so requires less work from the boiler. UFH also heats the bit of the room that is actually occupied first, whereas radiators heat from the ceiling down.

Estimates as to the improved efficiency (and they are estimates) vary from 15% to 40%. It’s difficult to give credibility to these figures as it is not clear what weight they give to the occupancy pattern, how hot the homeowners want the house or how they will use the system. Brent Witherspoon, MD of Chelmer Heating says: “It is probably more like a 15% improvement. The lower temperature UFH runs at has a big impact, but if the system is not set-up properly it could be heating the house when there is no one in it.”

UFH AND RENEWABLES

UFH works well with renewable energy systems, particularly heat pumps. In fact, it is almost a prerequisite of heat pumps that they are used with UFH. But both UFH and heat pumps are complex systems and getting the whole heating system to work in perfect harmony can be tricky. This can be made worse by getting the system from three different suppliers: the UFH supplier, the heat pump supplier and a separate installer. There is likely to be a price advantage in this but things are more likely to go wrong. ➤



4 The pipe is then fixed at correct spacing.



5 The pipe is all laid out. Multiple loops can make up a large space.



6 Screed arrives ready-mixed.



7 Screed is poured to the correct depth.

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HOW TO RUN THE SYSTEM

There is a decision to be made on how to run the system, which is largely determined by the thickness of the screed. A thick screed will give a long reaction time, especially if the UFH pipes are housed in the concrete slab. With a reaction time of over four hours, it is best to run the UFH system 24 hours per day. The system would be run at a lower room temperature – maybe 15°C or 16°C – to provide background heating to the whole house, with highlight heating (i.e. a woodburning stove) in the rooms that are actually occupied.

With a thin screed and a reaction time of around 30 minutes, the system can be run in a similar way to a radiator system. There may still be a need for highlight heating but this will be more for aesthetic purposes than heating.

WHAT COULD GO WRONG?

Leaks are the obvious concern but these are extremely rare, and if the system is properly pressure tested before the screed is laid the risk can be eliminated. Room and floor thermostats are critical for the operation of the system and it is surprising how often these are not wired up correctly. Even wireless systems can be incorrectly set-up and again thorough testing before the installer leaves site is the answer. User error and a failure to understand the system is also common.

But perhaps the key issue is design. Brent Witherspoon of Chelmer Heating says: “Getting the design right is critical. There has to be a room-by-room heating calculation, taking insulation, glazing and construction into account.” Emma Brown of Nu-Heat agrees: “Choose an expertly designed UFH system that is tailored to your home’s unique characteristics and it will keep

Electric UFH

Electric UFH is often touted as the cheap alternative to wet UFH, and easier to install in a retrofit situation. As such, it may be a good idea in a small, single area like a bathroom or en suite being added to the house or updated, where it is difficult to get a wet system installed. It will cost roughly half as much to install but it will cost three times as much to run.

One of the most common, and worst, uses is in a conservatory. Typically these areas need a lot of heat and are used for relatively long periods of the day (compared to a bathroom). Then running cost becomes the key issue and the extra trouble and expense of a wet system is well worthwhile.

every room at the perfect temperature.”

If the design is wrong it is unlikely that the homeowner will know until they have lived in the house for a whole heating season — by which time it’s probably too late. Specialist UFH companies will probably be more expensive than the plumber down the road, but they are also probably more likely to get the design right. They employ people with that specific expertise, which might be why they are more expensive.

IS UFH WORTH IT?

Radiators have served us well for many years. They are cheaper to buy than UFH, they are well understood and available with huge choice as to size, style and installers. But they are less efficient and take up floor space. Perhaps the biggest problem is that in larger rooms they can produce a temperature difference of up to 4°C from the radiator to the opposite side of the room.

People want more energy-efficient houses and a system that gives a 15% reduction in energy demand cannot be ignored. And that is to say nothing of the greater comfort and the increased floor space that it brings. **H**



8 Self-levelling screed is carefully poured over secured pipe work.



9 Screed is stabilised with chemical spray.



10 The final process is tamping the screed.



THE LATEST... RADIATORS

The modern radiator is anything but boring, says Amy Reeves, who investigates the trends and what you need to consider before buying

Style is the name of the game for modern radiators. Self-builders and renovators are no longer simply looking for efficient and space-saving heat emitters, but those which enhance an interior scheme, too — from low visual impact models to those that demand attention.

WHERE TO START

The first step in choosing the right radiators for your home is calculating the BTU (British Thermal Unit) energy requirement of each space. “All radiators have a specified heat output so once you know how much heat the room needs you can choose the type, size and style to suit your taste and the room,” says energy-efficiency expert Tim Pullen.

Calculators are available on most radiator manufacturers’ websites: factors such as the

dimensions of each room, the size of any window openings and how many external walls are present are used to determine an estimate for the heating output suitable for the space. Alternatively, your heating engineer or plumber can make this calculation for you.

Traditionally radiators tended to be positioned under windows or on external walls, as cold air pushes the heat around the room, but with increasing standards of energy efficiency and airtightness in homes, there is a new flexibility around where radiators can be placed. According to Ellie Sawdy of radiator specialist Bisque, placing a radiator under your glazing might actually undermine the efficiency of the system: “This can sometimes be ineffective, particularly in older properties where heat escapes through draughty



windows. Look for tall, slimline options which can fit either side of a doorway, or a compact model which can fit in a tight alcove.”

Efficiency is essential in modern home life and this is where control – of individual radiators as well as whole house heating – is essential. “Thermostatic radiator valves (TRVs) are now ubiquitous, but think about digital programmable valves instead,” says Tim Pullen. “There are lots to choose from at around £25 each, and they really do reduce your heating bill by only heating rooms when and to what temperature you want.”

HOTTEST TRENDS

No longer are cheap, pressed steel radiators the only option; designer radiators are available in many different styles, shapes, sizes and finishes.

While luxury radiators can come with a high price tag, they usually offer a sleeker installation including hidden brackets for hanging your radiator on the wall.

“My advice is to treat buying a radiator as a luxury purchase,” says Steve Birch, sales director at Aestus. “Investing in a quality radiator is far more effective in the long term,” concurs Bisque’s Ellie Sawdy. “There’s no point watching the pennies and purchasing a cheap radiator you’ll have to replace

“Thermostatic radiator valves are now ubiquitous – think about digital programmable valves instead. They really do reduce your heating bill”

after a few years, due to rusting, peeling, dulling and so forth.”

The latest lightweight aluminium models allow the home to be heated quickly while offering a sleeker, more modern aesthetic. In a more traditional home, cast iron designs can be matched to the decor and retain the warmth for longer.

Warmer-look metallic finishes such as copper, antique bronze and brass are becoming popular decorative features in their own right. What’s more, many manufacturers of premium products offer a colour-matching service, or models with acid-etched patterns. **H**

1 Mirrored panel

This glass-fronted heater combines space heating and a mirrored or metal fascia. Prices from £199.99 excluding VAT (dimplex.co.uk).

2 Terma

The vertical ribbon design from B&Q has undergone a rust protection process. Available for £550 (diy.com).

3 Rose Copper Classic

The Rose Copper finish radiator from Bisque contains genuine copper overlaid with a matt lacquer to prevent further tarnishing. POA (bisque.co.uk).

4 Outcorner

The Outcorner from Frontline Bathrooms is available in two sizes. From £345 (frontlinebathrooms.co.uk).

5 Ledbury

The Radiator Company’s Ledbury can be colour matched to any Farrow & Ball paint. From £1,476.90 (theradiatorcompany.co.uk).

6 Norden Oval Tube

With a space-saving footprint, this radiator is priced at £169.97 (bathroomtakeaway.co.uk).

7 Arteplano

This Bisque individually acid-etched copper model is also sold in a brass or flat-painted finish. Prices from £1,946.40 (as before).

8 Surf Lifestyle

The Surf Contemporary (Aestus) is manufactured from high quality mild steel. Available in a matt white or black finish for £704.40 (aestus.co.uk).

9 Milano Riso

Space-saving and electric, BestHeating’s Milano Riso range is finished with middle connection valve insets for a flawless finish. Prices from £289.95 (bestheating.com).

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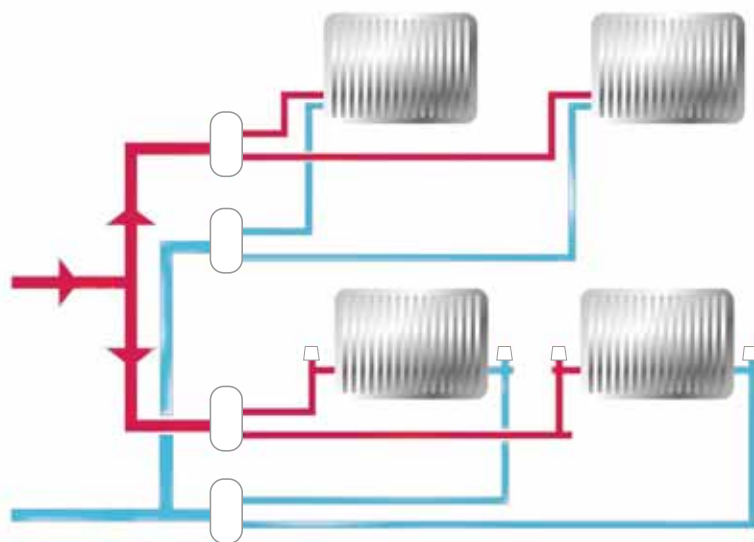


GREAT HEATING INNOVATIONS

David Hilton takes us through the latest heating technologies for self-builders and renovators. Chosen well, he believes they could make the difference between a good house and a great home — and potentially make a big impact on energy bills

Get better connected', 'the next must-have product' — these are familiar slogans for new electronic gadgets and apps that claim to make our lives easier. But, it's not often we strike up a conversation with someone about our new innovative heating system or brag about better efficiencies with a ventilation product. But things are starting to change. Home heating gadgets are ramping up and carving a place in our connected, 'always on' world. Underfloor heating has certainly become an aspirational product for those wanting to free up the walls, and solar panels (although mostly driven by financial incentives) have long featured on many homebuilding and home improvement wish-lists.

There are also a number of other products that I have 'discovered' that seem to break the conventional mould and add a spark of innovation and convenience that should be considered when approaching a building or renovation project. ➤



ADVANCES IN RADIATORS

There have been great improvements to the energy efficiency of heat generation technologies as well as advancements in heat recovery products, but what about heat distribution? Radiators have become much more efficient in design and in the use of materials used, like aluminium – it's a good heat conductor.

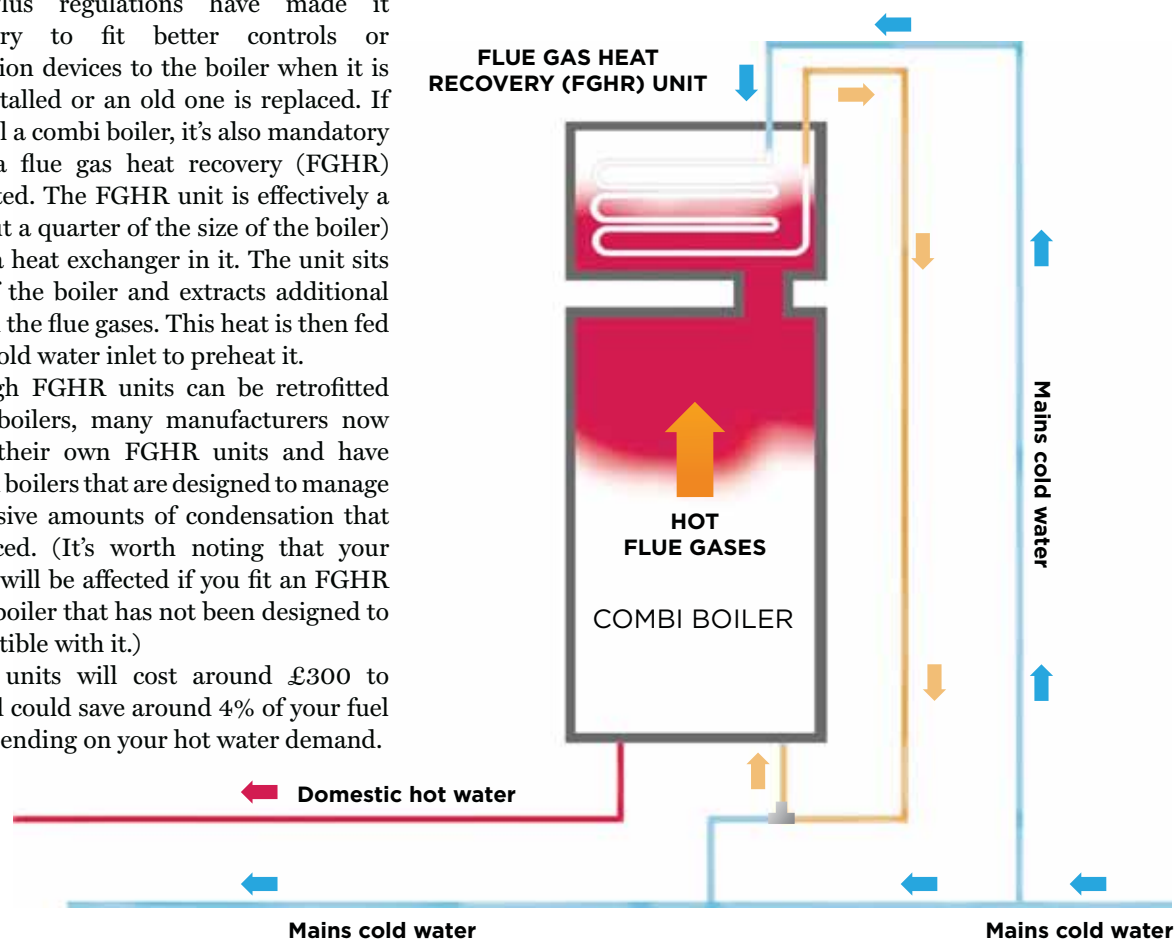
Most radiator manufacturers now also include a calculator to adjust the size of the radiator according to the flow temperature of the internal water. I have also seen apps that make balancing radiators easier in standard parallel systems. We are seeing radiators plumbed from water manifolds with a separate flow and return pipe to each radiator, too. This allows for easy integration with underfloor heating systems as well as the simple control of multiple room by room zones.

More Efficient Boilers

Boiler Plus regulations have made it compulsory to fit better controls or optimisation devices to the boiler when it is newly installed or an old one is replaced. If you install a combi boiler, it's also mandatory to have a flue gas heat recovery (FGHR) device fitted. The FGHR unit is effectively a box (about a quarter of the size of the boiler) that has a heat exchanger in it. The unit sits on top of the boiler and extracts additional heat from the flue gases. This heat is then fed into the cold water inlet to preheat it.

Although FGHR units can be retrofitted to most boilers, many manufacturers now produce their own FGHR units and have dedicated boilers that are designed to manage the excessive amounts of condensation that is produced. (It's worth noting that your warranty will be affected if you fit an FGHR unit to a boiler that has not been designed to be compatible with it.)

FGHR units will cost around £300 to £500 and could save around 4% of your fuel costs, depending on your hot water demand.



3 HEAT PUMP DEVELOPMENTS

Heat pump technologies have also progressed and we are seeing more manufacturers including better levels of connectivity in their controllers. As heat pumps are predominantly installed in more rural areas, it makes absolute sense to have controls that enable an engineer to log on and interrogate them before travelling to site, which may be a considerable distance. By monitoring the systems the engineers can also offer optimisation advice and adjust the system to suit evolving lifestyle requirements. Manufacturers such as Mitsubishi Ecodan, Stiebel Eltron and Heliotherm have remote monitoring and interrogation packages, and many other manufacturers are quickly catching up. Make sure you ask for details before assuming that full functionality is automatically available, when specifying.

We have recently seen more heat pumps on the market that can achieve higher flow temperatures, too. Not too long ago, we were pretty much restricted to a maximum flow temperature of 55°C – not ideal for hot showers and the like. Some manufacturers have started using two different refrigerants in what is known as a cascade

system to achieve higher temperatures. Single refrigerant systems are also achieving higher temperatures using compressors that re-inject the gas to create higher pressure, and therefore higher temperatures. Although high temperatures should not ideally be designed in for space heating, we still need the high temperatures for efficient hot water for showers etc.

What's more, Mitsubishi Electric has launched a 4kW air source heat pump in its Ecodan range that has CO₂ as a refrigerant. This refrigerant operates at very high pressures and as a result has very high flow temperatures (around 80°C). In high performance homes, such as Passivhaus or near Passivhaus, where the hot water demand is more than, or equal to, the space heating load, this product becomes very efficient. This is certainly an exciting product for the future, especially in high performance 'fabric-first' designs.

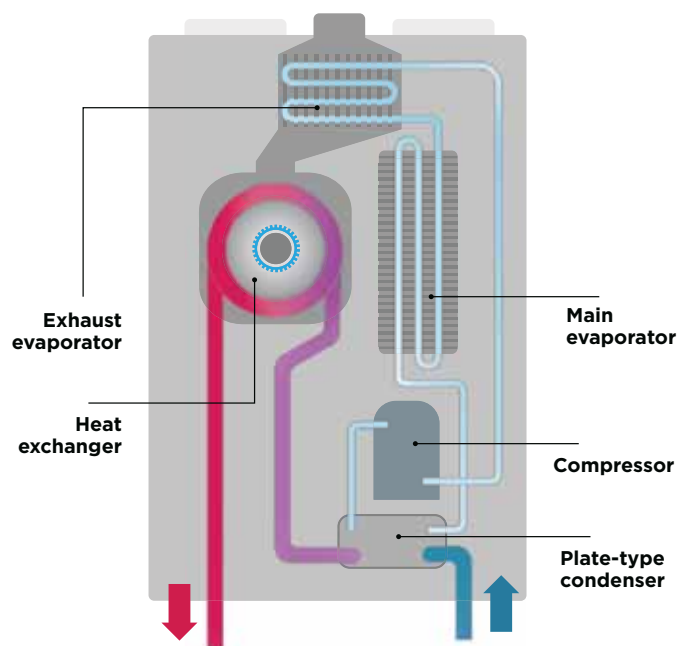
Also Viessmann is due to launch a quiet air source heat pump which is designed to deliver a noise level of 35dB at 3m, which means it can be installed next to a neighbour's property without causing noise problems.

4 Hybrid Heat Pumps

Instead of using a FGHR unit on a boiler there is now a product that integrates a small heat pump in a combined hybrid system. The integration of two heat sources (often a heat pump and a boiler) in a hybrid, or bivalent, system is nothing new, but these systems have many complex variables and need to be designed and commissioned carefully in domestic properties.

To address these problems and simplify things, Sime has introduced the Murelle Revolution 30, which combines a traditional combi type boiler (either natural gas or LPG) with a small heat pump. The unit can provide space heating and domestic hot water. The unit is not much bigger than a traditional combi boiler (900mm x 600mm x 350mm) and the manufacturer reports that it has an effective combined seasonal heating performance of 134%, which is a lot better than a standard condensing gas boiler!

As it is a wall-hung product and has a hermetically sealed refrigerant circuit, the Revolution 30 can be installed by a Gas Safe registered installer in a single installation without also needing an F-Gas registered installer on site to install the refrigerant.



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In-Wall Heating in Practice

The owners of this eco-refurbishment in south Wales, Nigel (ABOVE) and Chris Humphrey, chose to install heating pipework in the walls rather than under the flooring. Going down this route avoids disrupting the home's original terrazzo floors in the hall and kitchen, and oak parquet in the sitting and dining rooms.



5 Underfloor or In-Wall Heating?

The general rule of thumb for underfloor heating is that the harder the floor surface, the better the efficiency. In existing properties, and those where sensitive or insulating floor finishes are specified, it may not be possible to use underfloor heating. In these cases, the in-wall heat pipe radiators from 3Thermo could be an alternative solution.

This discrete radiator system is either embedded in the plaster in a typical masonry wall or fixed behind the plasterboard in a studwork wall. On existing walls there is also the retrofit option to embed the system in a concrete panel that can then be surface mounted onto existing walls.

As with conventional underfloor heating systems, it is important to make sure that the panels are not covered by insulating materials or located behind furniture, as this will impede its effectiveness. It is also prudent to make sure that the finishes close to the panels are compatible with heat variation. ➤



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Affordable Micro Heat Pumps

Micro heat pumps (also known as exhaust air heat pumps) are very small air source heat pumps that are integrated into a hot water cylinder or mechanical ventilation heat recovery (MVHR) unit. They have a much lower heating capacity than standard air source heat pumps but can produce high flow temperatures. They tend to use a different refrigerant from standard outdoor heat pumps units as the inlet air temperature is higher as it comes from inside the home. They are also mainly used for higher temperature purposes such as hot water preparation, are usually built into the hot water cylinder or an MVHR unit, and draw around 500Watts and deliver around 1,600W of heat.

They use refrigerants that can achieve higher temperatures but consequently need input air above 7°C to be efficient. This air can be drawn from the wet rooms such as the kitchen and the bathroom where the air temperatures are usually higher and the air needs to be exhausted to atmosphere anyway to expel the moisture.

One innovative variation is the ability to still run the fan (without the compressor running) to extract air from the wet rooms even if there is no requirement for hot water. Not many exhaust air heat pumps can do this but the Earth Save Products' Ecocent can. It costs less than £2,000 and that includes the 300 litre cylinder with the built-in heat pump and the plumbing kit. The Ecocent is listed as a mechanical extract ventilation (MEV) unit for Building Regulations purposes, eliminating the requirement for decentralised extract fans. It is an attractive feature if you don't have the prescribed airtightness levels for MVHR systems but still want mechanical ventilation and the ability to recover some of the waste heat.

In addition, micro heat pumps are being integrated into whole house MVHR units to add heat or cooling to the room. This is a very mild form of heating or cooling as the energy can only be distributed to the room at the air flow rate required for healthy occupation, and therefore should only really be considered as a primary heating system in high performance homes. Total Home Environment has just launched the HPV Series system which it describes as a full ventilation and heating solution with zonal control to three areas off the unit. Each supply room can be further zoned, thanks to integrated ceiling or wall-heated terminals.



7

WIRELESS CONTROL

On existing heating systems it is best to try and introduce multi-zone controls so that different rooms can be maintained at different temperatures and are not subject to the temperature in the hallway (because that is where the thermostat sensor is), for instance. But if the property is already decorated the prospect of chasing walls to install wires to each room and then redecorating all over again may just be a bridge too far.

There are, however, a number of wireless systems now that can control multiple rooms with no installation disruption. These systems typically have a control hub connected to the boiler that is accessed through an app on a phone or mobile device. Each room (or zone) has a thermostatic sensor on the wall and a motorised radiator valve. You then set the desired room temperature on the app and the sensor in turn sends a signal to the radiator valve to open and thus heat the room. When the room temperature is met, the sensor will signal the radiator valve to close down.

All the components in the system have batteries so no retrofit wiring is required, and good-quality batteries are expected to last around six months before they need changing.

Manufacturers such as Heat Genius, Drayton, Worcester Bosch and Honeywell all have versions of these that can add a significant saving to your heating bill by allowing you to control where, when and by how much you heat each room. Starting at around £200 for the base controller and app and then an additional £100 per room, these systems could represent a really good investment, especially if the property is already decorated. **H**

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The End of the OPEN FIRE?

As our homes become increasingly airtight, does it make any sense to include an open fire in your new home? Possibly, but there are other, better alternatives, argues Tim Pullen

Many older homes have a fireplace or two and increasing numbers of self-builders are including one in the design for their new home. The crackling heart-warming allure of a log fire, with its dancing flames and familiar scent, is still a strong one — as is the idea of a well-insulated, thermally efficient home.

Obviously, the point of insulation is to retain the heat in the house. Heat escapes through the fabric of the building, so we insulate. But heat also gets carried away on the air leaving the building, and by cold air entering. Around 30 years ago, the Building Regulations started imposing limits on the amount of air that can leave the building — the permeability or airtightness of the building changed from a minimum to a maximum, and that maximum has been decreasing ever since.

Any form of combustion — gas boiler, oil boiler, woodburning stove or open fire — needs air as well as the fuel being combusted. In most cases, the amount of air needed is relatively small and can be supplied either directly from an external air supply or from the room, without undue impact on overall thermal efficiency. The exception is the open fire, where the volume of air needed has to meet the volume of air extracted by the chimney — and that can be a lot.

THE EFFECT OF AN OPEN FIRE

In a room 5m x 5m x 2.4m, insulated to Building Regs' standard, including airtightness, the peak heat demand for that room will be a little over 1.2kW. Add an open fireplace and the airtightness in that room plummets and the peak heat demand rises to 2.9kW. You might think that the fire will make up that shortfall itself — and when it is burning well, it will. An average size fire that is burning well will draw around 5m³ of air per minute. The room holds 60m³ of air, so it can supply the fire for just 12 minutes. Thereafter it is drawing air from the rest of the house, none of which is benefiting from the roaring log fire.

However, the chimney will draw a similar amount of air when the fire is not lit, and the lack of airtightness in that room affects the thermal efficiency of the whole house. The house has to be able to supply that 5m³ per minute or the chimney will stop drawing properly and smoke will enter into the house.

What's more, it can have a financial impact. It is said that a fireplace has the same effect on the heating demands of the house as leaving a window open. A house with 200m² floor area and 2.4m ceiling height, with insulation and airtightness to current Building Regs, but with a single open

Built-in Dampner

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fireplace, will have a peak heat load of 17.5kW and a space heating energy demand of 17,700kWh per year. Remove the fireplace and those figures drop to 10kW peak and 10,500kWh per year. That's a difference worth about £450 per year. A good proportion of that loss could be saved with assiduous use of a flue-blocker when the fire is not lit. There are problems with these – such as how to insert it when the fire is still lit and you want to go to bed – but they do work otherwise.

An open fire is attractive and it can be lived with in a modern, well-insulated house and maybe the extra running cost is affordable. However, it is difficult to conceive that this is anything but the nailing together of two incompatible ideas.

ALTERNATIVES TO THE OPEN FIRE

Woodburning stoves Many people who want an open fire say a woodburning stove is 'just not the same'. This is true in all respects except for the smell, the crackle, the look of dancing flames and, of course, its efficiency. A woodburning stove is likely to be better than 65% efficient (an open fire is 30% at best) and typically (but not always) being made of heavy-duty steel, it is a radiator as well.

You can specify models which draw their air supply directly from the exterior, thus maintaining the home's overall airtightness. "Some stoves may be additionally sealed, or 'leak sealed', to vastly reduce leakage essential for air pressure tests for modern, airtight houses," says John Nightingale from Stoves Online.



This guillotine-style glass door can be lifted up for an open fire, or kept down for controllable burning that is safe to leave. The Fondis Stella 700 woodburning stove in a Sienna Agean limestone fire surround is from Firepower (firepower.co.uk).

Bioethanol fires Bioethanol is an alcohol made by the fermentation of plant sugars. It is, notionally at least, a renewable fuel and is now available to fuel domestic stoves and open fires. These machines are available as both stoves and open fires, generally produce 2kW to 3kW heat and do not need a chimney or flue. The fire or stove might cost £500 to £1,500 but you will save £4,000 to £5,000 on the chimney and fireplace. These give the look of a living fire with the convenience of being able to turn it on and off. They do not need an air supply (other than that in the room) so have no impact on the airtightness or thermal efficiency of the house.

Convection boxes If nothing but an open fire will do, think about a convection box, such as the Riva Open Convector from Stovax; this is a modern steel version of the Victorian curved stone fire-backs. These conduct the cool air through the fire ensuring that the maximum heat possible is pushed into the room. More interestingly they have a damper control that can be used to limit air flow to control the heat output, which also serves to reduce draughts when the fire is not lit. **H**

FURTHER CONTACTS

Bioethanol Fireplace bioethanol-fireplace.co.uk

Charnwood charnwood.com

Chesneys chesneys.co.uk

Imagine Fires imaginefires.co.uk

Stovax stovax.com

Stoves Online stovesonline.co.uk



Tim Pullen

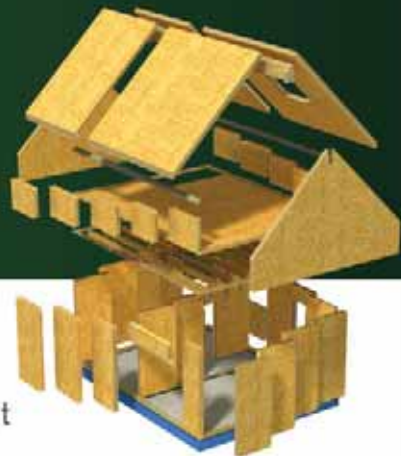
Tim is an expert in sustainable building methods and energy efficiency. He is also the author of *Simply Sustainable Homes*.



IMAGE: CHARNWOOD STOVES (RIGHT)

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Q We've recently bought a home to renovate and we had hoped to keep the existing boiler as it's relatively new. However, the hot water never stays at the right temperature for very long. Is the boiler the wrong size for the house perhaps?

A **TIM PULLEN SAYS:** If the boiler is too small it would be running for much longer than might be expected, which would be fairly obvious. And, it might never reach the desired temperature in the first instance.

You suggest that the water 'never stays at the right temperature for very long', and presuming there is a hot water cylinder, the implication is that the water does get to the right temperature, but is then used up. Therefore the cylinder size would be the first thing to look at. If it's too small for the domestic hot water and space heating required by the household, it would cause this effect. It may be poorly

insulated, which again would have a similar effect. "The old copper cylinders were very inefficient, never large enough, with small primary coils (which gives a slow re-heat time), and bad insulation causing the cylinder to lose heat very quickly," confirms heating specialist Brent Witherspoon of Chelmer Heating. In either case it would take a while for the boiler to catch up with demand.

Another possibility is the water consumption. Power showers, having more baths, and even having more people in the house, can use a great deal more hot water than the system was designed for and that could cause this effect. The solution would again be a bigger hot water cylinder.

With the information available it is really difficult to give a definitive answer. The best advice is to get a competent plumber in to check the system out. It is probably not the boiler, and that needs to be confirmed, but it could be the boiler set-up and/or the hot water cylinder.

Q We're hoping to replace the radiators in our home with underfloor heating. How disruptive will the work be?

A **TIM PULLEN SAYS:** It is always going to be disruptive. There are two options: conventional underfloor (UFH) which would be 40mm to 75mm thick and would go below the existing floor, meaning either excavating a concrete floor or lifting floorboards. The second option is a low-profile UFH system, like the Nu-Heat Lo-Pro system; these systems are less than 20mm thick and sit on top of the existing floor.

Low-profile systems generally allow you to deal with one room at a time, while conventional systems generally require the whole floor – throughout the house – to be dealt with at the same time. This is because conventional systems require a screed, be that either flow-screed

(which is the 40mm one) or a sand and cement screed (which is the 75mm one). In addition, the UFH pipework to each room or zone needs to be taken to a central manifold, and then connected to the hot water cylinder. There needs to be cabling for control systems installed and the pipework to the existing radiators taken out.

The low-profile systems are designed specifically for retrofit situations but as a stand-alone project there is still a lot of work to do and that can only upset the happy running of the house. Having said that, UFH does increase comfort, reduce running costs and open up more floor space. The advice would be to get two or three potential suppliers in and talk through exactly what has to happen. This will give you a better idea of the extent of the disruption and how long it is likely to last (bear in mind that it will always take longer than you are being told). ➤



Tim Pullen

Tim is an expert in sustainable building methods and energy efficiency in residential homes. He is also the author of *Simply Sustainable Homes*.

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Q We want to replace our electric storage heaters with radiators and update our heating system. Where do we start, what's involved, and how much will it cost?

A DAVID HILTON SAYS: As you have electric storage heaters you will have no pipework or radiators. Let's assume you want to install a gas-fired central heating system. First you will need to get the gas connected. A calculation will be done to determine the size of the meter required based on your maximum demand; the utility company will then provide a quote to install a pipe and meter.

The next decision will be whether to opt for a system boiler (with a hot water cylinder) or a combination ('combi') system that produces instant hot water and has no hot water store. If you have more than one bathroom it's probably best to go for a system boiler. You will then need to plan where the pipes will run (either chased into a wall or boxed in within some form of surface-mounted trunking), as well as where the boiler and hot water cylinder (if you have one) will be installed.

The radiators can either be installed in a traditional parallel system, or to a manifold with separate pipes to each radiator. New boiler installations also need to comply with Boiler Plus regulations, meaning you will need some form of control for the boiler. As you are putting in a new system you can choose whether you want a wired or wireless control. Manifolds are easier to control as all the wires to the valves are in the same place, but you still need to have thermostats in the room. Alternatively, wireless systems can be installed that have battery-powered thermostats and you also have the option of battery-powered radiator valves for parallel radiators.

The cost of retrofitting a central heating system will depend on the scale of the project. A system boiler will cost around £700-£1,000, and a combination boiler will cost £900-£1,400. The installation of the boiler is around £1,500. A hot water cylinder will add around £700-£1,000 plus installation, which could also be up to £1,000 depending on materials and pipe runs. Installing radiators will cost around £500 per radiator as a generic estimate, but it is difficult to assume the pipe lengths and installation complexity. The controls may also cost around £100 per room.

If you are off mains, then an oil boiler would cost around £1,200 to £2,000, or an air source heat pump will be around £10,000 to £15,000, but you may be eligible for incentives that pay back a large percentage of the installation costs.



David Hilton

David is an expert in sustainable building and energy efficiency and a director of Heat and Energy Ltd.

Q We're creating a new utility by converting one of the smaller rooms adjacent to the kitchen, and would like to install an electric underfloor heating system here. What are our options?

A DAVID HILTON SAYS: You can quite safely fit electric underfloor heating (UFH) to an existing floor but there may be an up-lift in the floor level, which could result in uneven thresholds. The ideal scenario is to excavate the floor and install some insulation (to reduce conductive heat loss) followed by a heat-resistant backing board or screed, before laying electric UFH. This is not always possible, and therefore it is worth shopping around as there are a number of different products that are aimed at different installation profiles.

The thinnest system (best-suited to tiled surfaces) has wires attached to a thin mesh and the whole product is less than 2mm thick. The floor levels are not raised as the tile adhesive is applied directly onto the mesh and the heater then effectively sits in the adhesive layer. Expect to pay around £45/m² to £50/m².

For fast installation (and costing around £55/m² to £60/m²), a system with a matting can be used that

decouples the tiles from the subfloor. The matting is laid on the floor and the wires are pushed into preformed cut-outs. The adhesive is applied to the matting and, as it is not applied direct to the subfloor, potential future seasonal cracking risk is mitigated.

Soft finishes such as carpet, vinyl and laminate can be a challenge and foil-type systems are designed for this scenario. There's no requirement for a screed with this type of solution and you can expect to pay around £40/m² to £50/m².

If the room is of an irregular shape or there are permanent fixtures, then a loose wire system is best-suited. The heater is a durable but flexible cable that is stuck to the backing boards and is embedded in the levelling compound or adhesive. Installation is a bit more detailed but the product allows for a lot more design layout variation. Expect to pay around £50/m² to £55/m².

The cheapest system at around £15/m² features a cable that is bedded in a screed. This system has thicker wires and allows for floor finish changes without damaging the wires. The system is slow to react and should be designed for long-term space heating and not for quick task heating for short periods of time. **H**



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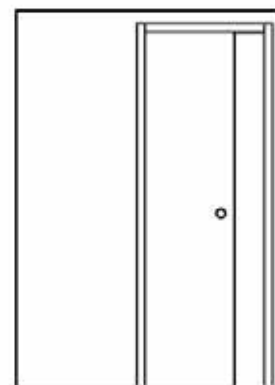
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Is Mains Gas the Future?

How should we heat our homes, not just now, but in 10, 20 or 30 years? Energy expert David Hilton believes that staying with the gas grid - with promising options for delivering low-carbon gas or even hydrogen - could be the smartest way forward

When deciding on heating systems for our homes we are often tempted by the latest 'eco' products and the urge to futureproof. Sensational headlines like 'UK gas supplies are running out' are rallying the common perception that gas is going and we should focus on electric-based heating systems instead. But what's the truth behind the headlines?

WHERE ARE WE AT THE MOMENT?

In real terms the electrical grid simply does not have the capacity to supply enough power to heat all UK homes. However, gas in its current form is getting more difficult to find, and its embodied carbon footprint will not help with meeting any of our carbon reduction targets. So what's next?

The gas grid is currently around 284,000km long and supplies gas to about 23.4million customers, which is around 80% of UK households. Around five years ago, government policy papers called for a large switch from gas boilers to (electricity-powered) heat pumps. But although electricity is easy to generate from renewable sources, it is far more expensive and difficult to store, especially given the erratic spikes in consumer demand. For heat pumps to be successfully rolled out at that scale, the UK would need to more than double its generation capacity and also invest significantly in storage capacity for times when demand is high.

On the other hand, the gas grid can already meet the variable demands, especially during winter, which makes it a very good and functional asset. The real answer is therefore fairly straightforward: if we want to reduce carbon then we don't need to switch away from gas. We just need cleaner gas. ➤





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WHAT IS CLEANER GAS?

There are a number of potential low-carbon solutions being considered now, such as biomethane and hydrogen.

Natural gas is currently still the cleanest of the fossil fuels and in the UK it still also compares very favourably against many heat pump technologies, due to the carbon intensity and transmission losses of the electrical grid. Our natural gas is mainly made up of methane, and although it is a fairly clean fuel, it still releases carbon when burned. So, low-carbon alternatives could dramatically cut the emissions and add life to the existing gas grid.

Low-carbon gas can be collected from organic waste in a number of different ways. Anaerobic digestion is the decomposition of the organic waste in an oxygen-free environment; the methane produced is then put into the gas grid for use in homes. This biomethane is still a carbon-emitting gas but it is considered low carbon because it is produced from organic waste that would have broken down anyway and released its carbon emissions naturally. There are currently around 90 biomethane plants already injecting gas into the grid, but with limited supply of appropriate and sustainable organic feed, the potential for this technology is limited to around 5% of the current gas demand.

Cadent (formerly National Grid) has also tested the first BioSNG (synthetic natural gas) plant in Swindon. BioSNG can be used in the same way as natural gas. It is still methane but because it is developed through gasification, a much wider range of waste can be used, including household rubbish, that would normally have gone to landfill. The project partners report that the BioSNG has a carbon footprint that is 80% lower than natural gas, depending on whether the waste is biological or synthetic (plastic). If this is then combined with carbon capture and storage (CCS) – a technology that captures 90% of the carbon dioxide emitted from fossil fuels – Cadent claims that BioSNG could actually be carbon positive with reductions of around 190%. They also suggest that, long-term BioSNG could meet around 33% of the UK's heating demand if most of our waste is used for production.

There's also a case being argued that it could be time to move away from methane for heating altogether and switch to hydrogen, which would result in a 75% reduction in carbon emissions. Hydrogen-powered heating is not new. Natural gas

has only really been used since the 1960s. Before this, the country used what was referred to as 'town gas' – largely hydrogen with a small amount of methane and CO₂ – for almost 100 years.

Hydrogen is not explosive, poisonous or radioactive and only emits water and heat when it's burned, but its high temperature production is carbon intensive and it relies on CCS to be classed as low carbon. Hydrogen appliances would be almost identical to the products that consumers are familiar with (i.e. our natural gas boilers), and as hydrogen doesn't produce CO₂, the poisoning risk is also eliminated. Once the UK's iron gas pipes have been replaced (by 2032), then around 90% of the grid would be suitable for hydrogen.

However, significant investment in hydrogen production, storage and CCS infrastructure is needed. The good news is that the government has committed millions of pounds, and many manufacturers are developing demonstration appliances that can use hydrogen.

In the shorter term, hydrogen could be injected into the current grid with concentrations of up to around 20% by volume, which can be tolerated by most existing natural gas appliances (but not things like gas turbines and industrial machinery). However, this would only realistically result in around a 6% reduction in emissions.

A move from natural gas to hydrogen has many advantages and is technically possible, albeit with administrative hurdles and much research required to prove its safety. The way we are metered and billed, for instance, will need to change, as we are currently billed on the amount of energy we use rather than the actual volume.

The government and industry are all waiting for the results of the low-carbon gas trials, and any programme of change to the gas grid would need to be initiated by the mid 2020s if it is to be completed by the target deadline of 2050.

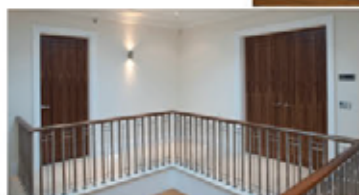
Low carbon changes can be made, so if you're on mains gas my advice is still to use it — or to connect to it if you're building a new home. A move away from the gas grid would not realistically be futureproofing at all and could actually be a move in the wrong direction. Electricity-producing renewables certainly have their place, particularly in well-insulated, airtight homes, but the greening up of the gas grid is the most feasible and also most likely solution to heating the existing UK housing stock by 2050 and beyond. **H**

"If you're on mains gas, my advice is still to use it"



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HOTTING UP

As the dark nights are drawing in, get savvy with your heating to keep warm all winter

Have you turned on your heating yet? With winter fuel bills rising every year, now is the ideal time to look at how you can reduce your energy use while still keeping cosy.

The latest smart heating control system from trusted British heating experts Drayton, by Schneider Electric, allows you to manage your heating room by room, so you only heat the space you're using to the temperature you prefer, saving energy and money, while keeping your family more comfortable, too.

TOP TIPS TO HELP YOU BE WISER WITH YOUR HEATING IN THE COLD WEATHER THIS WINTER

1 It's a personal thing — choose intelligent radiator thermostats so you can create different heating zones. Set the temperature in the living room to 20°C, but have cooler bedroom temperatures and lower temperatures in empty spare rooms. This could reduce your energy use by up to 20 per cent compared to using a smart thermostat alone.

2 There's an app for that — control your heating remotely from an app,

so you can delay it coming on or turn it off when your plans change. This will help you to avoid wasting energy and money by heating an empty home.

3 Keep up with the weather — make further savings with heating controls that learn how long your home takes to react to temperature changes and weather conditions, and then finds the most economical way to run your heating.

4 'Alexa, turn my heating on' — opt for smart speaker integration so it's even easier to manage your energy use. Simply ask Amazon Alexa or the Google Assistant to turn down the temperature.

5 Home and away — ensure your heating's off when no one's home. New technology (like IFTTT) allows you to automatically stop your heating from running when the last family member heads out for the day.

6 You can enjoy all of these energy-saving benefits with the Wiser system from Drayton, by Schneider Electric. What's more, we've teamed up with Drayton to offer you the chance to win a

Wiser heating control system worth up to £1,000! This includes a room thermostat, radiator thermostats for every room and two smart plugs. Drayton will follow your winter journey with a video diary, sharing your home renovation story and how Wiser has helped you and your family to live more comfortably.

For more information and to enter the competition, visit wiserfamily.co.uk or follow @DraytonHome on Twitter. **H**

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GET IT BUILT

Your 15-page in-depth, practical guide to getting your self-build, renovation or extension project built — plus project schedules and your questions answered



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198 Your Build
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THE BEGINNER'S GUIDE TO SELF-BUILDING

This beginner's guide takes you through the key elements of formulating and starting a self-build project — from organising the finances to making sure you have the right insurance for the work

According to a Building Societies Association survey, one million people would like to build their own home in the next 12 months. Yet there were just shy of 13,000 self-builds completed in the financial year 2016/2017. A shortage of plots and the subsequent rise in price of those that are available explains part of this disconnect, but it is clear that there are people willing and able to self-build, but struggling to take the first step.

The process of self-building is challenging, but like any major life step, it can be made easier by arming yourself with as much information as possible.

Finance Your Build

Getting your finances in order is the first and

complete your build.

First, perform a realistic audit of your current financial situation, and then contact lenders to see what you will be able to borrow to fund your project. Mainstream lenders tend to be wary of lending on self-build projects, but there are specialist lenders who will be able to provide a range of options, like BuildStore, and provide tailored mortgage advice.

Self-build mortgages differ from traditional mortgages in that the funds are released in stages (either in arrears, where the money is made available after a stage of the build has been completed; or in advance, when it's released at the start of each build stage).

At this point it's also worth estimating (roughly) your

where in the country you plan to build — our build cost calculator on page 190 and homebuilding.co.uk/calculator should help.

Remember, you'll also need to account for the cost of your plot, which will consume a sizeable chunk of your budget and set aside between 10% and 30% of your budget as a contingency. The golden rule is this: build cost, plus plot cost and contingency, should total less than the value of your finished house.

Secure a Plot

Specialist plotfinding services (like plotfinder.net) are incredibly useful here, but they shouldn't stop you from being proactive.

Drive around the area you're looking at to spot any potential opportunities, get on the website of local authorities and scan through the planning applications, and use Google Earth to identify any potential infill plots or where there might be room to build in existing gardens. Don't be afraid to speak to friends and family about opportunities on their land, either. Plots will rarely fall into your lap, so you'll need to be savvy to secure one.

Also, make sure you register with your local authority under the Right to Build (righttobuildportal.org), which requires local authorities in England to keep track of the demand for serviced plots in their area.

Choose a Build Route

The term self-build can be something of a misnomer — you don't have to lay every (or any) brick to self-build. A broader definition would see a self-builder as someone who commissions the home they end up living in.

It's important to decide on your build route early in the design process as it will have major implications on the costs. The majority of projects are handled by a main contractor/builder or subcontractors project managed by the homeowners.

However, you can also appoint a turnkey or package supplier that will handle all aspects of the design and build process. This comes at a cost, of course, but is suitable for those looking to be hands off.

Create a Design Brief

Most self-builders will employ the services of a professional when it comes

“Getting your finances in order is the first and most important consideration when it comes to preparing for a self-build”

most important consideration when it comes to preparing for a self-build. There are no two ways about it: you'll need to ensure that you have access to enough money to

build costs. Typically these can range from anywhere between under £1,000/m² to over £3,000/m², depending on your build route and level of involvement, desired finish, spec and



Getting out of the Ground

There's plenty of work to be done before you can start to build.

to the design of their house – whether that's an ARB/RIBA-affiliated architect, an architectural designer or an in-house designer at a package company.

"Whoever you choose, you will need to know that you can have a good rapport and are able to get on well together," says Design and Materials' Beverley Pemberton.

"A good designer is also a good listener and they will have flair, creativity and experience," she continues. "Ask to see references and examples of the designer's work, know their track record of planning approvals and ensure that they have a thorough understanding of the planning system."

Before approaching a professional, you will need to know what your priorities are for your new home and come up with a brief. Make sure, as well, that your designer returns final drawings that are achievable within your budget.

Get Approval

Planning can seem like a

complicated beast – lessened somewhat if you find a plot that has planning permission already granted on it – but it's about understanding the situation within the context of where you want to build.

You should receive an answer within eight weeks of submitting your application, but be sure to keep track of your application.

Receiving approval is not the end of your relationship with the planning officer. All planning permissions are granted with conditions attached. These can range from specifying what type of roof materials must be used to the date the project must start by.

Failure to address the conditions will invalidate your consent, making any work done illegal. Conditions must be formally discharged (or satisfied) in writing, usually through a form obtained through your local authority – and with a fee attached, of course.

You'll also need to submit detailed building drawings

for Building Regulations' approval (or a Building Warrant in Scotland). Building Regs are national legal standards for design and construction that apply to all new builds. The assessment on whether your build will gain approval can either be carried out by your local authority's building control team, or you can appoint a private approved inspector.

You may also be able to sort your structural warranty through an approved inspector, which may save some costs.

Go out to Tender

Much like finding a designer, choosing a builder for your project requires plenty of research on your part. Ask your designer, friends, building control, neighbours and anyone else you know who's had building work done for recommendations.

Meet and interview as many as you can and ask them to quote on your project based on tender documents that your

designer may have helped you to prepare.

Sort Your Insurance

As soon as contracts are exchanged on your plot, you will need to have insurance – usually a specialist policy for self-builders. A comprehensive self-build policy is advised. The policy will cover public liability, building works, employers' liability and personal accident.

Arrange for Services

Getting services to your site can cost between £500 and £10,000+, depending on your situation and whether the connection needs to be made across private land (where you'll need to secure a wayleave to grant access to dig) or public highways (which may involve road digs). Though electricity and gas are not essentials during the build, a water supply is needed early on.

Start Building

Read our self-build schedule (page 190) for an idea of what to expect next. **H**



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SITE SECURITY

Experienced self-builder David Snell shares tips to make sure that your building site is secure when work has finished for the day

Though this article will cover site security when work begins, the most important job needs to be done well before that point. In fact, it needs to be done as soon as you own the site: take out a self-build site insurance policy to cover you for employers' liability, public liability and contractors' all risk.

Insurance is a great backstop, but the fact that a body will reimburse you for loss, less any excess, won't ever make up for the loss of time and the interruption to continuity. Neither will it compensate for the sense of violation. So, site security is also essential.

Securing the Site

Right from the word go, it's necessary to secure the site from unwanted intruders. Contrary to what most people think, your primary concern shouldn't necessarily be determined thieves. Children are attracted to building sites and, in the evening, when the site is empty, may be persuaded that trenches are great places to play. While later in the project, scaffolding may appear as an almost irresistible climbing frame. And don't forget that animals may also fall foul of the dangers inherent on a building site.

There are of course the deliberate thieves and they need to be kept out or deterred. Heras fencing - con-

sisting of strong steel mesh panels fixed together and footed in heavy bases - can be hired or purchased quite easily. If you do purchase them, then it's almost certain that you'll be able to offload them for the same money when you've finished on site.

Any gates should be securely padlocked at night. It won't deter the determined thief but it will make them think twice and make their activities harder and more noticeable.

Hiring or purchasing a secure lock-up, such as a metal container, is a very good idea, too. This should be one of the first things on site, as soon as the ground is cleared and before materials start to arrive. But think carefully about its positioning; you won't want to move it once it's installed.

As soon as power is on site, arrange for a floodlight with a PIR sensor to be affixed to the container or mounted on a stout pole. (Your neighbours won't thank you for any sound alarms that might wake them in the night and they won't want any light shining into their bedrooms when a cat sets them off, so be careful with positioning).

Neighbours are the most effective security option. Give them your numbers so that they can contact you if they notice anything untoward.



Top Targets

There's no doubt that professional thieves aren't, in general, interested in sand and cement. They're waiting for the high cost second fix items that normally arrive and are stored directly into the new home.

Unpack them on the day of arrival. That makes sense, in any event, as most goods should be checked for damage on arrival. But, from the thief's point of view, once they're out of their boxes, items are much more difficult to sell on.

Your tools and plant will also be a likely target should it be left exposed on site. To combat this, make sure that any hand tools are taken off site at the end of the day and that any larger items are safely locked away in the container each night. You can also remove the wheels from mixers and the like, which need to stay near the mixing station. Plant, such as dumpers and diggers, should be locked up and

the keys either taken home or hung up in the container.

Should I Live on Site?

There's no doubt that your site is going to be more secure if you do live on site. But that's not always possible or desirable and there are, of course, inherent dangers for young families in doing so.

Putting a caravan on site with timed lighting can act as a deterrent, as can timed lights in the house once it gets to a more advanced stage. But getting your new neighbours involved, as they already live on site, is the best course of action - so introduce yourself early and try to keep them on side. **H**



David Snell

The author of *Building Your Own Home*, David is a serial self-builder and has been building homes for 50 years.

SELF-BUILD PROJECT PLANNER

However you're getting it built, you'll need to know how a house is constructed. Here is our definitive guide to each stage of the process

Prepare Site

- Groundworkers create site access
- Clear site and strip vegetable soil; stacking material to be retained out of the way
- Set up site hut and equip with drawings and safety equipment
- Set up toilet
- Secure lock-up/lorry container (hired in or purchased) to be positioned
- Water board to bring supply to stopcock on boundary
- Plumber to connect water standpipe
- Surveyor marks out building on cleared site and transfers the lines to profiles well clear of any construction work
- Bring in bricks and blocks and stack clear of future construction
- Set up mixer station close to cement store and sand heap

Foundations/oversite

- Groundworkers excavate foundations
- Wait for approval of building control and warranty inspectors
- Position any reinforcement bars, mesh or cages in the trenches
- Position any

- compressible material or slip membranes required within the trenches
- Lay ducts for services to enter through the foundations
- Arrange foot scaffold if necessary and shutter for any steps in the foundations
- Pour concrete footings and tamp to level
- Obtain approval from building/warranty inspectors to proceed
- Bricklayers build up foundation blockwork to damp-proof course
- Install cranked air vents
- Install drainage exit lintels
- Fill cavities with lean-mix concrete to level with external ground level
- Bed and lay damp-proof courses, linking these with any radon membranes or barriers

Start the Superstructure

- Groundworkers to dig service trenches and lay pipes and ducts to proposed stopcock/meter positions
- Load out concrete floor beams to each bay and position
- Install drainage and vent pipes proud of the oversite
- Infill floor beams

- with blocks
- Lay coursing blocks and position ventilator grilles
- Brush grout
- Arrange for building control/warranty inspection
- Commence building superstructure
- Install templates for future windows and doors, etc.
- First lift of scaffolding required

Superstructure

- Bricklayers continue superstructure brickwork and blockwork, including work on any chimneys
- Install and bed lintels, including fireplace lintels
- Install flue liners as work proceeds
- Build in meter boxes for gas and electricity
- Electrician to install temporary consumer unit within electricity meter box
- Service suppliers to carry out their work to the boundary
- Plumber to reroute water supply to stopcock position
- Electricity providers to install meter and connect
- Second scaffolding lift required
- Arrange crane to lift first floor beams onto each bay and position (if required)

- Position the plasterboard batten clips
- Lay infill blocks
- Brush grout

Superstructure Continued

- Continue building superstructure to wallplate
- Third and then fourth lift of scaffolding required
- Wallplate to be scarfed, bedded and tied down with proprietary wallplate straps
- Warranty inspection sometimes required
- Carpenters to build end trusses as templates
- Continue building up gable ends and chimney
- Additional lifts of scaffolding required at the gable ends
- Plumber to fit lead flashings, trays and skirts to chimney
- Plumber to install vent pipes and flashing skirts as they come through the roof
- Bricklayers to top out and fit chimney pot
- Bricklayers to point chimney flashings

Construct Roof

- Carpenters to sling roof trusses, and trusses to be fixed down to wallplate
- All binders and bracing to be fixed at node points

- » Layboards to be fixed to valleys
- » Dormers to be constructed at this point
- » Fascia and soffit to be fixed together with any necessary ventilation grilles or strips
- » Warranty inspection sometimes required
- » Any roof tanks must be installed at this point

Roof Covering

- » Roofers begin to cut and lay undercloaking to the verges
- » Roofers to felt and batten
- » Tiles/slates to be laid
- » Ridge/hip tiles to be laid and bedded
- » Valley tiles to be laid, or fibreglass or lead valleys to be laid
- » Plumber to dress down flashings and skirtings
- » Decorators to paint/stain fascias, soffits and barges

Exterior & Interior Fittings

- » Plumbers to fix guttering
- » Window suppliers to fit external joinery
- » Plasterers to carry out any external rendering
- » Scaffolding to come down
- » Plumbers to fit downpipes and

- connect to drainage upstands/gullies
- » External decoration
- » Carpenters to commence first fix by fitting door linings, building any studwork partitioning and fixing window boards
- » Carpenters to fix plasterboard noggins and box in vent pipes
- » Plumber and carpenter to liaise with building of any necessary stands in roof
- » Carpenter to fix loft trap

First Fix

- » Plumbers to lay flooring membrane and insulation, taping all joints and sealing up to the damp-proof course
- » Underfloor heating (UFH) loops to be laid and fixed
- » All first fix plumbing for hot and cold and waste within floor zones to be laid
- » Internal gas pipework installed
- » UFH pipework to be brought to manifolds and outlet positions
- » Supply and fix company to pump in and lay level floor screed and leave for three days
- » Protective hardboard/cardboard to be laid on screed

- » Electrician to fix carcass wiring for lighting and power circuits together with all backplates
- » Consumer unit/units to be positioned
- » Wiring taken to external lighting points
- » TV aerial/satellite cables to be installed to required positions
- » Internal telephone wiring to be installed to required positions
- » Home entertainment/smart systems/alarms to be carcassed

Drainage & External

- » Groundworkers to begin digging the trenches for drainage runs
- » Trenches backfilled to 150mm with pea shingle
- » Drains laid to required falls
- » Brick/concrete section manholes constructed, or purpose-made manholes, rodding eyes and gullies set in runs
- » Building inspector to approve laid drains
- » Drains haunched over with pea shingle
- » Drainage trenches backfilled
- » Work to connect to main sewer in road to be carried out by approved contractors
- » Carpenter to finish

- boxings and noggings ready for plasterer
- » Groundworkers to commence driveways and pathways
- » Bricklayer to build any fireplaces and hearths
- » Gas meter to be installed and connected
- » Plumbers and electricians to liaise on all cross bonding and earthing

Ceilings/Drylining

- » Main staircase to be fitted by the carpenter and protectively covered
- » Dryliners/plasterers tack ceilings
- » All external and blockwork walls lined with plasterboard on dots and dabs
- » All studwork walls and pipe boxings tacked with plasterboard
- » All joints and angles filled and scrim taped
- » All abutments of differential materials jointed with mesh
- » All joinery to be sealed internally and externally with mastic
- » Dryliners/plasterers to skim coat all walls and ceilings
- » Decorator to paint/treat backs of all skirting and architraves



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» All roofing insulation to be installed

Second Fix Carpentry

» Carpenters hang internal doors
 » Skirting and architrave to be fitted by carpenters
 » Bottom tread of staircase to be fitted, balustrading and handrails to be fitted, as well as linen cupboard shelving
 » Fit of loft door and ladder
 » Timber floors to be laid by carpenters or specialists and protected
 » Ceramic floor tiles to be laid by specialist tilers and protected
 » Carpenters/specialist suppliers to fit/build built-in bedroom and bathroom furniture
 » Kitchen units to be fitted

Second Fix

» All wiring connected to consumer unit
 » Boiler to be positioned, plumbed and then wired in
 » Sink units to be plumbed in, earthed and cross bonded
 » All sanitaryware to be fitted and plumbed in
 » Radiators and towel rails to be fitted and plumbed in
 » Underfloor heating loops

to be connected to manifolds
 » Electrician to check cross bonding and earthing to all sanitaryware, sinks, radiators, etc.
 » Boiler to be wired in; control systems and room thermostats to be wired in
 » Plumber and electrician to attend firing up and commissioning of boiler
 » All pipework and connections to be flushed through and pressure tested
 » Central heating to be left on 'test'

Decorating

» Worktops, made from the previously taken templates, to be fitted
 » House to be thoroughly cleaned with all debris and dust removed to outside
 » Decorators to snag any holes, blemishes or rough patches on walls, making good
 » Internal timber to be sanded smooth or rubbed down with wire wool
 » Decorators to paint all walls and ceilings, mist plus two coats of emulsion
 » Internal timber to be knotted, painted, primed, undercoated and top coat glazed, or internal timber to be two-coat stained
 » Specialist tilers to fix

ceramic wall tiles to kitchen and utility
 » Baths to be filled, in order to settle, before tilers fix any wall/splashback tiles
 » Water meter to be installed

Landscaping

» Groundworkers or landscape gardeners to level the ground and prepare
 » Topsoil from storage to be placed where required, with extra shipped if necessary
 » Site hut to be removed or re-sited if intended for use as a garden shed
 » Secure site storage to be sold off or returned to hirers
 » Groundworkers to complete driveway surface
 » Patio slabs to be laid
 » Bricklayers to build any required dwarf/decorative walling
 » Lawned areas to be levelled ready for seeding or turfed
 » Approved contractors to complete any bellmouth and kerbing to road

Completion

» Whole house to be thoroughly cleaned out
 » All windows polished and all labels removed from glass and appliances

» All polystyrene packing to be removed from cookers
 » All stabilising bolts to be removed from washing machines/driers
 » Site toilet and any remaining plant on hire to be off-hired
 » Readings to be taken on all meters
 » Central heating switched to 'run'
 » Telephone company to connect
 » Contractors to install TV aerials and/or satellite dishes
 » All trades return to work through items on the snagging list
 » Carpets to be laid
 » Local authority to be advised of completion to arrange for council tax valuation
 » Energy Performance Certificate to be prepared and sent to building control
 » Building control final inspection and issuing of Completion Certificate
 » Warranty inspector's final inspection and issuing of warranty
 » Arrange protective covering for floor surfaces prior to delivery of furniture
 » Switch self-build site insurance policy to homeowners' policy **H**

CALCULATING YOUR BUILD COSTS

A simple cost estimating guide for people building their own home

One of the most important aspects when planning your self-build or home renovation/extension project is working out how much it is going to cost. This figure will depend on the size and shape of the house, the level of your own involvement, where in the country you intend to build, and the materials you're going to use. If you can make even rough decisions about these factors, then you

can begin to work out how much it is going to cost.

As a very general rule of thumb, expect a building plot to cost between a third and a half of the end value of the finished house. The costs of building a house will then depend on the variables listed above. All building work is usually quoted on a cost/m² basis. For example, a typical new four bedroom self-built home is around 200m² (with 100m² on two

storeys) and usually varies between £1,000-£2,000/m² (although self-builders can achieve costs of between £300-£3,500/m²).

Renovation costs are more difficult to establish as they involve many variables, but allow at least £1,000-£1,500/m² for work. This, added to the cost of the plot/house and with a 10-30% contingency, should result in less than the final end value of the house.

The table below, based on information from the Building Cost Information Service (part of RICS, the Royal Institution of Chartered Surveyors), is updated monthly to help you work out a more accurate estimate (note that these figures are for build costs only and do not account for VAT, which is not charged for self-build projects).

There is a free online version at homebuilding.co.uk/calculator.

		BUILD ROUTE A (DIY + Subbies)			BUILD ROUTE B (Subbies)			BUILD ROUTE C (Builder/Subbies)			BUILD ROUTE D (Main Contractor)		
		Standard	Good	Excellent	Standard	Good	Excellent	Standard	Good	Excellent	Standard	Good	Excellent
SINGLE STOREY													
<90m ²	Greater London	1346	1557	1873	1425	1649	1983	1504	1740	2093	1583	1832	2203
	South-East	1180	1366	1643	1250	1446	1739	1319	1527	1836	1388	1607	1933
	NW, SW, East & Scotland	1073	1243	1494	1136	1316	1582	1200	1389	1670	1263	1462	1758
	Mids, Yorks, NE & Wales	1026	1188	1429	1087	1258	1513	1147	1328	1597	1208	1398	1681
91-160m ²	Greater London	1232	1496	1943	1305	1584	2058	1377	1672	2172	1450	1760	2286
	South-East	1081	1311	1704	1145	1388	1804	1209	1465	1905	1272	1543	2005
	NW, SW, East & Scotland	984	1194	1552	1042	1264	1643	1099	1334	1734	1157	1404	1826
	Mids, Yorks, NE & Wales	941	1141	1484	996	1209	1571	1052	1276	1658	1107	1343	1745
161m ² +	Greater London	1097	1439	1806	1162	1524	1912	1226	1609	2018	1291	1694	2124
	South-East	962	1262	1584	1019	1336	1677	1076	1410	1770	1132	1484	1863
	NW, SW, East & Scotland	875	1148	1442	927	1216	1527	978	1283	1612	1030	1351	1697
	Mids, Yorks, NE & Wales	837	1099	1378	886	1163	1459	935	1228	1540	984	1293	1621
TWO STOREY													
90-130m ²	Greater London	1295	1498	1840	1371	1586	1949	1448	1675	2057	1524	1763	2165
	South-East	1136	1314	1615	1203	1391	1710	1270	1468	1805	1337	1546	1900
	NW, SW, East & Scotland	1033	1196	1470	1094	1267	1557	1155	1337	1643	1215	1407	1730
	Mids, Yorks, NE & Wales	988	1144	1405	1046	1211	1487	1104	1279	1570	1162	1346	1653
131-220m ²	Greater London	1091	1321	1675	1155	1398	1773	1219	1476	1872	1283	1554	1970
	South-East	957	1159	1469	1013	1227	1555	1070	1295	1642	1126	1363	1728
	NW, SW, East & Scotland	870	1055	1337	921	1117	1415	972	1179	1494	1024	1241	1572
	Mids, Yorks, NE & Wales	833	1008	1278	882	1067	1353	931	1126	1428	980	1186	1503
221m ² +	Greater London	1006	1288	1617	1066	1364	1712	1125	1440	1808	1184	1516	1903
	South-East	883	1129	1419	935	1196	1503	987	1262	1586	1039	1329	1670
	NW, SW, East & Scotland	803	1028	1291	851	1088	1367	898	1149	1443	945	1209	1519
	Mids, Yorks, NE & Wales	769	982	1235	814	1040	1308	859	1098	1380	904	1156	1453

HOW IT WORKS

1 Identify your build route from the four options

Your level of involvement in the project will influence the build costs. For simplicity, the four most common build routes have been identified below:

● Build Route A: DIY + Subbies

Building on a largely DIY basis, substituting around 30% of labour costs with DIY, and employing help with the rest of the building work. Materials purchased directly.

● Build Route B: Subbies

Building using tradespeople hired directly – you will be project managing, but there is minimal DIY involvement. Most or all materials purchased directly.

● Build Route C: Builders/subbies

Building using a main contractor or package supplier to complete the structure to a weathertight stage, with the remaining work undertaken by subcontractors and most materials purchased by self-builder direct from suppliers.

● Build Route D: Main contractor

Building using a main contractor. Building in this way requires the least involvement from the self-builder.

2 Identify your expected level of specification

The standard of specification

that you choose will have an enormous influence on your build cost. For estimating purposes, three general categories of quality have been identified:

● **Standard:** This serves as a basic build quality equivalent to that offered by most speculative developers. A house may include standard softwood joinery, studwork partitions, a contract kitchen, basic sanitaryware and radiator central heating.

● **Good:** This is equivalent to that offered by quality developers. Features may include high-end off-the-shelf softwood joinery, blockwork partition walls, contract quality kitchen and sanitaryware and underfloor heating (UFH) downstairs.

● **Excellent:** A very high standard. This house may include hardwood joinery, blockwork partition walls, a bespoke kitchen and quality sanitaryware, and UFH, for instance.

3 Multiply the figure by your house size

We have used gross internal floor area as a measure (it's the most common in the industry). It's the area of a building measured to the internal face of each perimeter wall for each floor level. It includes areas occupied by internal walls and partitions. **H**

THREE CORNISH SELF-BUILDS FOR DIFFERENT BUDGETS

Build cost £225,000

Size 300m²

Location Cornwall

Build time 27 months

Simon and Debbie Palmer

built a contemporary family home, despite a fire after 12 months on site – causing the works to go back to footings stage. The finished property has been clad in white render and cedar, and small portholes in the front door are testament to the property's coastal location.



Build cost £263,000

Size 84m²

Location Cornwall

Build time Four months

Andy and Natasha Righelato

have replaced a run-down 1960s bungalow on an elevated plot above a Cornish beach with a chalet-style retreat – making it the perfect family holiday home on the coast. The timber-clad property benefits from an upside-down living arrangement, with vaulted 4.5m-high ceilings in the open plan kitchen/dining/living area, and full-height glazing offering views of the beach below.



Build cost £1million

Size 350m²

Location Cornwall

Build time 11 months

Colin Price and Sharon Toye

demolished their 1960s seaside home to create a contemporary property which makes the most of the site's dramatic coastal views through large expanses of glass. Clad in a simple palette of white render and topped with a slate roof, the house has been built in blockwork. It appears single storey from the more private front elevation, with the sloping site allowing for the home's two-storey nature to be revealed at the rear.



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A BUILDING REGS' GUIDE TO CONTAMINATED LAND

The Regs have plenty to say about keeping you safe from the nasties that may be lurking on your plot, as Paul Hymers explains



Paul Hymers

Paul Hymers is a building control officer and has written eight books on home improvement and building homes.

Building Regs don't just cover the technicalities of building, renovating or extending your home. They're also concerned with keeping us healthy and safe in our own homes, as Part C - Site preparation and resistance to contaminants and moisture - covered in this article, goes to show.

What are Contaminates?

You'd expect to find contaminants - or contaminated soil - on brownfield plots where, perhaps, an industrial building, petrol station or coal yards stood. However, its presence is not always so obvious, and a site history check may reveal a lighter industrial past or agricultural use resulting in contamination.

Even when nature has recovered the land, the legacy of its past can remain in the soil after the source of pollution has been forgotten. Plots in towns or villages that once saw timber yards or a garage can remain contaminated for decades later and soil reports can read like an inventory for chemical warfare. Mercury, arsenic, lead, phosphates - every kind of poison known to man seems traceable.

An old timber yard site, for example, may be rich ➤



“The legacy of an industrial past can remain in the soil after the source of pollution has been long forgotten”



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in copper-chrome-arsenic (CCA) from timber preservative spilled over years of wood treatment; a garage plot may be rinsed with hydrocarbons from spilt fuel; and even seemingly green land used for agriculture can be polluted by insecticides from years of crop-spraying.

Dealing with Contamination

The process for revealing if contamination is even likely starts with a desktop study. This is an in-depth historical check of the plot, and the first of potentially four stages to work through and one that is often made a condition of planning permission.

Even where it isn't a planning condition, requirement C1 of the Building Regulations requires precautions to protect health and safety from contamination in the ground.

The good news is that even when the chemical analysis of the soil on site reveals a multitude of contaminants, often the levels are extremely low and below the action level set for each contaminant at which they can be a risk to our health.

Some chemicals and metals present may not be directly harmful but they could be damaging to eco systems or the groundwater and so they do affect us indirectly.

The controls therefore allow for a surprisingly wide range of circumstances, from residents growing their own food to aquifer areas where groundwater



Soil Clearance: The Right and Wrong Approach

Contaminated and root-infested soil is removed before work begins to excavate a foundation trench (ABOVE). The image (RIGHT) shows the problems caused by digging a trench before stripping away the contaminated topsoil first.

is collected for our water supplies and even (and this bit absolutely astounds me) soil digestion. Yes, humans eating the soil. Apparently it is quite common among children under two, meaning small traces of some contaminants are still a threat.

Assessing your Plot

Contaminated land assessments are undertaken by environmental or geo-technical consultants in four stages:

- Desktop study (including conceptual site model)
- Site investigation report

“Some chemicals and metals could be damaging to eco systems or the groundwater”

Where found in a presence exceeding the set action level for each contaminant (which is set out in the Regs), they may well have to be dealt with, but only when there is a defined receptor path through which they can cause us harm. A receptor path is the link between contamination and human harm, such as via a watercourse, underground aquifer or growing vegetables in the garden.

(including site walkover survey and soil analysis)

- Remediation strategy
- Validation and certification.

Desktop studies are the foundation stone of any assessment, since they look at the site history, geology and location and provide the baseline about whether the site is likely to be contaminated or not. The CSM (conceptual site model) in-



cluded is a risk assessment that identifies the receptor pathway from the source to the recipient (e.g. small children living in the home or aquifer water zones).

In the case of 'mobile' contaminants, some will have definite paths – such as radon gas or methane, where the vapour will head to the surface. Other chemicals can sink to pollute the groundwater and so on.

The Site Investigation Report

If the desktop study recommends it, this report will involve a site walkover survey and soil sampling to identify any chemicals present, or even drilling boreholes to test groundwater for contamination or to monitor rising gas levels.

Soil and water samples are usually sent to a laboratory for analysis but soil screening for volatile organic compounds (VOCs) and petroleum hydrocarbons ➤

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(TPH) can also be carried out on site using a photo-ionisation detector.

The report will identify what contaminants are present as well as their concentration levels and whether they are inert or mobile. All chemicals

have different action levels that once reached will be considered too high to be ignored if a receptor path is present.

Your garden surrounding the home is the main problem. Soil will be valuable at the surface as a growing me-

dium for vegetables and it will be exposed for children to come into contact with. For these reasons alone, contaminated land has to be dealt with effectively.

Remediation

This is usually a specialist contractor's job, with British Standard documentation setting out how it should be done. The report needs to conclude with any remedial treatment necessary and most importantly, an analysis of the cost. If there are particular hotspots on the plot then there may be options: for example these 'hotspots' could be removed by bulk excavation and refilled with topsoil, or they may be covered over by a hard-surface driveway and parking area, or even be diluted or bio-treated.

It is also possible that continual long-term monitoring of the soil is needed, particularly where contamination of groundwater is a risk. Given the 'perceived risk' generated by such monitoring exercises and the threat of devaluing or blighting your new home, you might want to think long and hard about building on a plot where long-term monitoring is required.

Common solutions to contamination, include:

- Removing contaminated soil. It's the commonest solution, but a licence for transporting it to a landfill site will be needed.
- Biochemical or fungal treatment to stabilise the contaminants may be an option as a form of natural treatment, but it's only available for certain

chemicals. Metals, like lead and iron, can't be treated in this way.

- Flushing contaminants out with water or other chemicals as a method of washing the soil can also be done with some contaminants, and indeed even vacuum suction treatment can deal with petrol hydrocarbons and other volatile pollutants.
- If the nasties can't be economically taken out of the soil, they may be able to be contained within it by an impervious layer that prevents them from surfacing. Clay is a natural containing material that is often used to line landfill sites – in particular thicknesses it prevents any gases from migrating through. Plastic linings have also been used before for the same purpose, but beware: as they have life expectancies beyond comprehension, they themselves serve to contaminate the environment.

Validation and Certification

The re-testing and certifying of the soil after treatment is the final part of the process, since it will prove that protection is effective or the ground has been effectively cleansed.

Your building control officer and mostly likely your home warranty surveyor will require copies of this certification before your new home is deemed safe for occupation. **H**

NEXT MONTH: Parts J and L explained

GAS CONTAMINATION

Landfill (methane gas)

When left to dissipate in the open air, methane gas presents no harm but this gas has a tendency to migrate through fissures in rocky soils and turn up where you least expect it. Building within a radius of 250m from a landfill site will invoke requirements for methane-sealed barriers, where the gas could migrate to form a potentially explosive mixture in the cavities and subfloor voids of a house. In different soils, the risk of methane migration varies tremendously. In wet sticky clay it may scarcely travel a metre or two, whereas in a fissured chalk or gravel it could migrate for considerable distances.

Radon

In parts of the country a natural radiation called radon is present. Background radiation is present in everyday life from quite a few different sources, ranging from mobile phones to cosmic rays! So why single out radon as a threat to our health and take precautions when housebuilding against it? Studies of those exposed to high levels of it suggest they have a higher risk of developing lung cancer and since radon is a ground-bearing gas, keeping it out of the home isn't complicated or particularly expensive.

The geology where radon is present is generally granite, and could be chalk or other rocks. Hence, areas like the south-west of England have the highest levels, but it results from the uranium decaying in all soils and rocks.

As radioactive gas, the particles can be inhaled and attached to the tissues of our lungs, irradiating them, and of course the higher the levels of radiation, the higher the risk of it causing us harm. The government has set an 'action level' and prepared an atlas of the country indicating the areas where radon prevention is needed for all new homes.

You can carry out a free postcode check online or obtain a site report at ukradon.org for £3.90 which identifies if basic or full protection measures are needed. The levels that could enter your home will vary depending on the inside and outside temperatures, but are normally higher at night. Ventilation can help to disperse radon, but it's better to stop it getting in to begin with, by using a sealed membrane in the floor construction and taping all the joints and gaps.

ASK THE EXPERTS

Looking for expert advice on your project? Our team of homebuilding experts are here to answer your need-to-know questions. This month, they advise on Passivhaus, draughtproofing and more

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Finally, come along for a free 15-minute consultation with an expert at our dedicated Ask the Experts stand – available at our eight Homebuilding & Renovating Shows across the UK (homebuildingshow.co.uk).



How do we bring services to our rural plot?

Q We hope to build on the edge of a village, on a plot which is bordered by fields. There's no mains gas and no electricity or water on site. Who do we get in touch with and what do we need to consider? *Bob Chambers*

A DAVID SNELL SAYS: You have choices here. Firstly, you need to find out who the grid suppliers are for each of the services (gas, water and electricity) and send them plans of your proposals asking for a quotation for supply.

It will all depend on how far they've got to come and what sort of terrain they've got to cross, including roads and private land. It's possible that they simply won't be able to get them you. It's also possible that they will be able to give you a price for their work but that the price won't include the cost of any wayleaves that may need negotiating over private land or land not in your ownership.

It's also possible that the owners of that private land might either want extortionate amounts of money for the rights you are seeking or simply don't want to play at all.

At any of those points you may decide that the whole thing is not worthwhile. Or you may decide that the costs involved are outweighed by the fact that, without these services being readily available, the land is really cheap.

You may decide to investigate being off grid for all or some of these essentials. Self generation of electricity has come on in leaps and bounds in recent years, particularly with the advent of battery storage. It probably still can't provide the same lifestyle expected in a suburban home, but it can be made to work.

Water can be obtained from a borehole in most regions across the UK. The fact that there's no mains gas would put you in company with a great many self-builders who opt for a plethora of alternative heat or firing sources – from oil and LPG to renewables – which are consistently advertised and explained within this magazine.

How Much Does Scaffolding Cost?

Q We're building a three-storey house and need to begin obtaining scaffolding quotes. How long would we need to hire scaffolding for, and what kind of price would be realistic for this service?

Billy Mason

A DAVID SNELL SAYS: It's quite possible that a three-storey house has the top floor with rooms in the roof and

that, therefore, to all intents and purposes, and as far as scaffolders are concerned, it's the same as for a two-storey house. Without sight of the plans it's impossible to be precise on costs, which could be anywhere between £5,000 and £8,000; possibly a little bit more if the shapes are complex. As to how long you'll need it, then once again it's the proverbial piece of string.

Many scaffolding companies quote for a 10-week hire, which generally assumes that the scaffolding should be ready to come down by week 14. But if you have a sloping site and

you need a foot scaffold then it'll be required a lot earlier.

Shop around. Companies starting up or going through a lean period might well be prepared to give a cheaper price. Always insist on hire and erect as the scaffolding companies have the necessary and relevant insurances.



David Snell

The author of *Building Your Own Home*, David is a serial self-builder and has been building homes for 50 years. He has just finished his fourteenth home.



What Could be the Cause of my Draughty Home?

Q There's a cold draught coming up from under the suspended timber ground floor of my lounge. What could be causing this and how should I go about solving this problem?

Jane Spriggs

A IAN ROCK SAYS:

Many houses built from the Victorian period onwards had ground floors made of 'suspended timber' construction. These comprise a series of structural timber joists supported on short 'sleeper walls' or brick piers, and the joists are covered with wooden floorboards or, more rarely, chipboard panels, similar to upstairs floors. Underneath your lounge floor there will be a void probably of at least a couple of feet deep with air flowing through it. If you take a look outside at your lower main walls, just above ground level, you should see a series of small air bricks with holes in, designed to allow air to flow through and ventilate the floor. This helps disperse moisture thereby preventing damp-related problems, such as rot and wood beetle, developing in timber floors. So it's essential that timber ground floors are kept well ventilated. Unfortunately it's not

unknown for homeowners to sometimes seal these up in a misguided attempt to prevent draughts.

The solution to draughty floors is to approach the problem from indoors by stripping back any floor covering such as carpets and sealing gaps between floorboards or underneath the skirting.

For this purpose you can buy flexible rubber 'floorboard gap fillers' which are sold in three sizes – thin, standard and thick. Larger gaps can be sealed by cutting and gluing matching strips of wood, or where appearance isn't an issue, expanding foam can be applied or mastic sealant for smaller gaps.

To really make a difference to heat loss through suspended timber floors you need to insulate the floor, by cutting and wedging rigid insulation boards between the joists, for example. However this is quite a labour-intensive job. Alternatively, laying a carpet over a professionally fitted thick underlay (sometimes applied over a thin hardboard base) should boost room warmth as well as helping to block draughts.



Ian Rock

Chartered surveyor Ian Rock MRICS is the author of eight Haynes House Manuals, and is a director of Rightsurvey.co.uk.



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How Do You Install a Timber Window?

Q We're self-building our first home and to save on costs we are taking on a lot of the work ourselves. One concern we have is measuring up and installing our timber windows – do you have any advice on getting this right?

Matt Stevenson

A MARK WINTER SAYS:

If you're purchasing timber windows from a reputable supplier, they will be designed and manufactured to a standard which gives them ultimate quality and performance. But if they're installed poorly, even the best quality windows can be compromised. If done the right way, it will save both time and money in the long run and prevent damage.

The first thing is to measure up accurately. The opening must be between 10mm and 20mm bigger than the total window size, so if you're measuring an existing space make sure to take 10mm (5mm each side) from the smallest point of the opening. This means you can input your window specification accurately.

Before you continue with fixing the window, you should ensure the window is packed on all four sides and is level. Side packings should be located where the fixings will be. Both the sill and the head packings should be no more than 150mm away from the vertical part of the frame, known as the jamb, and should be under each mullion (the vertical part of the frame that splits the window). It's essential when fitting your window to ensure the frame doesn't become distorted. At this stage, you should also double-check that the casements (the hinged sash which is fitted inside the jambs) work and open fine, too.

Now it's time to place the fixings. Side fixings should be fixed 150mm from the top and bottom of the window frame and there should be no more than 450mm between every side fixing. Large windows which are more than 1,800mm wide should also have fixings in the centre of the head and the sill. Pre-drill your frame and wall to help when fixing your window in place.

You can fix your windows into brick-

work using either a screw and anchor plug or a self-tapping concrete anchor. The fixings need to be at least 25mm deep but we would always recommend going in 50mm using 8mm x 120mm fixings.

To prevent air infiltration between the window and the wall, you will need to seal the gap. You can use an expanding foam seal and then use another seal on the top, preferably a silicone or polysulphide-based sealant.

If your windows aren't pre-finished, they should be finished in dry weather before they are fixed into place. It's worth choosing a good-quality finishing material; opting for the cheaper product will mean you'll end up having to reapply it sooner.

If done properly and with care and consideration, you should be able to install your windows with ease and to a good standard.



Mark Winter

Mark is director at
Wooden Windows
(woodenwindows.com)

How Do I Re-route My Kitchen Plumbing?

Q My new kitchen design involves re-routing the plumbing. What will this involve and is it a big job?

Dominic Silver

A MICHAEL HOLMES SAYS:

Relocating plumbing in a kitchen is a fairly common occurrence, particularly if you're extending. Planning permission is not required, and updating taps and white goods shouldn't involve much work.

However, relocating the entire kitchen will result in design challenges. A common way to re-route pipework and waste pipes is to place them under concrete floors – in which case, a shower

pump under the sink may be needed to propel water around the property to maintain water pressure. If the design calls for walls to be knocked down, it's always wise to consult building control before work starts.

If your kitchen is being moved only slightly from its original location, a skilled plumber could carry out the relocation works within a day at their standard day rate. However, if the kitchen needs substantial relocation, it is more likely to take two to three days, so expect to pay £250-£300 per person, per day, with labour and materials as extra. **H**



Michael Holmes

Michael is HB&R's Head of Content and Product Development. He also chairs NaCSBA.



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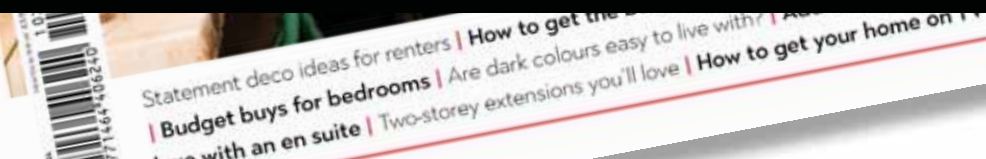
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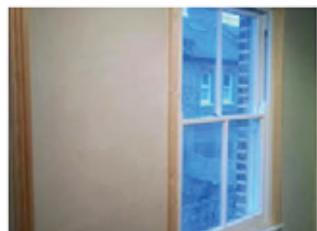
Spacetherm WL improves thermal efficiency of London apartment

Spacetherm WL (Wall Liner) has been selected to improve the energy efficiency of a Victorian built apartment in south-west London.

A complete refurbishment of the apartment at Quill Lane, SW15 has been undertaken by Ecoalex, specialists in green infrastructure design, build and maintenance. The requirement was to deliver improved warmth and thermal performance, whilst addressing the condensation issues often associated with solid walls.

Alex Woodcraft, Managing Director of Ecoalex explains: "The apartment spreads over two floors and the front wall of the solid wall construction loses a large proportion of the heat. The roof area was insulated with layers of insulation and insulated plasterboard. The solid wall construction and design of the property meant that space for internal insulation was limited. We chose to apply Spacetherm WL (Wall Liner), from the A. Proctor Group, a high-performance laminate specifically designed to be adhered to the internal surfaces of existing solid walls without the need for mechanical fixings. At just 13mm thick, and given the limited wall space, the use of Spacetherm WL was ideal."

Spacetherm WL consists of Spacetherm aerogel insulation blanket bonded to 3mm Magnesium Oxide Board, for use in applications where improved thermal



performance is required with limited space. Spacetherm WL can be used with a variety of decorative finishes such as paint, wallpaper and tiles.

"The Spacetherm product was really easy and quick to apply," comments Alex, "the boards were fully installed and finished with a lime plaster skim in just two days."

Typically, a solid wall will have a U value of around 2.1 W/m²K. Following the application of Spacetherm WL this can be reduced to around 0.8 W/m²K, dependent on the wall structure.

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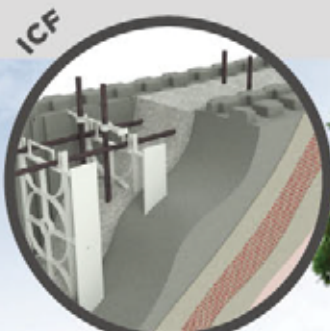
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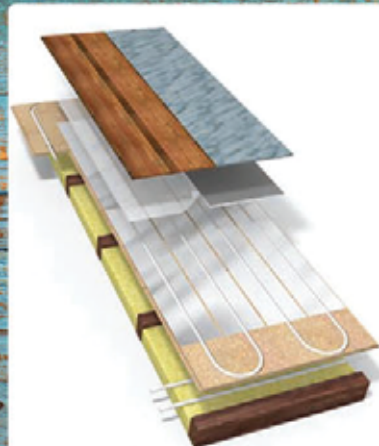
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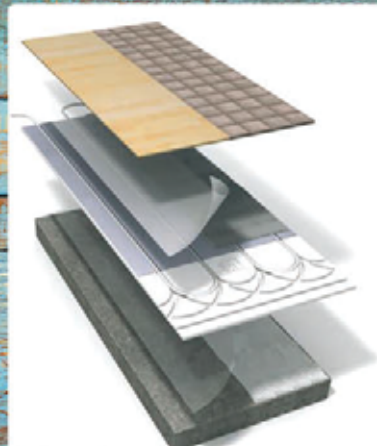
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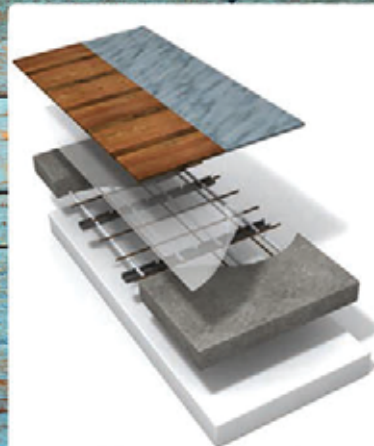
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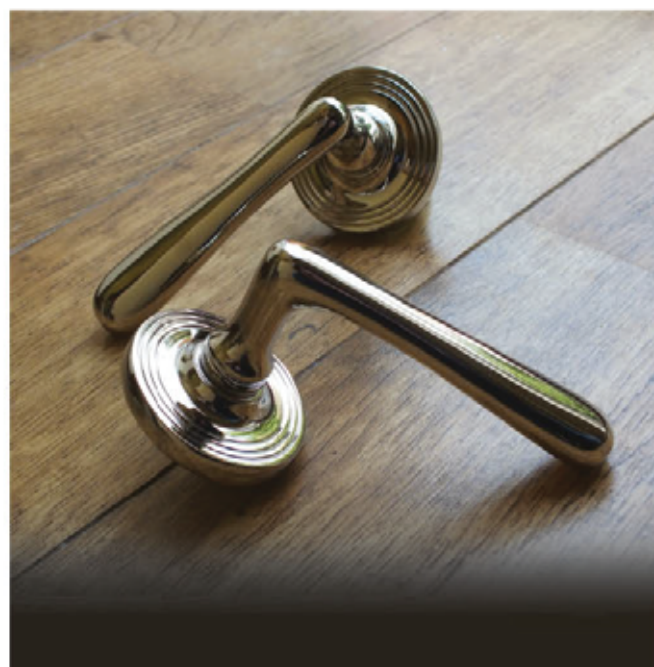
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Garador Appoints New Managing Director, Neil Discombe



Leading UK based garage door manufacturer, Garador, is pleased to announce the appointment of Neil Discombe as their new Managing Director. Neil joins Garador with a solid background in Industrial Engineering with a Degree & Diploma in Advanced Manufacturing Technology and extensive experience in leading manufacturing facilities in Europe and Asia. In his new role, Neil will focus on the development of Garador's production facility, as well as continuing its commercial success. For more information on Garador and its products, please visit www.garador.co.uk

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December 2018



IMAGE C/O DWA ARCHITECTS

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- *Decorating: Trade secrets revealed* ● *Renewables: A beginner's guide*
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OUR BEST BUILD DECISION...



Jon Martin, who along with partner Noreen Jaafar built the award-winning Treehouse, explains why his best build decision was the insulation that allowed him to sail towards Passivhaus certification

The Treehouse, the award-winning home that my partner Noreen and I built, was a technically demanding build, especially as we decided from an early stage that we wanted to achieve Passivhaus certification. Of all the things we did and the many decisions we made, I think the best was to use Icynene spray foam insulation throughout the build (though we did end up using rigid insulation boards on the roof).

It was that decision, having spoken to lots of people, that I think helped to achieve our airtightness figures. Once the foam had been sprayed, we tested the airtightness and had results of 0.57/h@50Pa (Pascals) even before we had taped the windows — which is below the Passivhaus standard of

0.6/h@50Pa. After taping, that rating came down to 0.32/h@50Pa.

The house is quite a tricky shape for installing insulation, but this method made all the difference; the spray foam got into all the areas we would have struggled to insulate neatly otherwise, and it saved us a vast amount of time. It seems like any extra expense for the insulation was effectively recouped by the speed with which the job was done. Yes, there were other ways of doing it, but it would have taken a massive amount of time and effort.

We chose the water-blown material, which is open-celled and breathable. We were glad we did when we realised one of the membranes had split and water had got in at one point. Ten days later it was bone dry. That's the benefit of the open-celled stuff over

the closed-cell: if you do get a failure somewhere it will dry out and dry out quickly. When you are working with 400mm of insulation like we were, that's important.

I have to say that I hummed and hawed for a long time, but I spoke to the energy consultant, and my relatives in Canada where it's far more common, and it just made sense for our project. We were looking to have just 500W of heating in the 210m² home, so we knew getting the insulation right was integral to the project — and having gone through the recent harsh winter, we know we did.

An added bonus has been that it does seem to cut out more sound. It doesn't take the low frequencies out, but seems to deaden road noise and other noises completely. **H**

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