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Printing:
WG Baird

Distribution:
EM News Distribution Ltd

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Autumn 2015

MOST SELF-BUILDERS BUILD THEIR HOUSE with the thought that this will be a home not only for them, but for generations to come. Usually this means building with materials that will last for 50 or 100 years.

However, building a home that's fit for purpose for that length of time is really the aim. Life will bring about challenges and the house must be able to adapt. New requirements (because of a new baby for example) shouldn't have to pose the dilemma of moving or facing expensive alterations.

In order to design a 'flexi-house' out of 'bricks-and-mortar', one that will still be ideal for you no matter the changes in your personal circumstances, consult the Universal Design Guidelines for Housing recently published by the Centre for the Excellence in Universal Design. We bring you some of the highlights on page 44. For those who are already living in their house and looking to add space within its existing footprint, we're on hand to help too... Your options are converting your garage (p84) or digging down and adding a basement (p48). If you've already converted your roof space, next up is how to finish it all off. On page 79 our interior design expert guides you through the many different options depending on your situation, from a home office to a bedroom for when that new baby grows up.

If it's not just the weather outside that's feeling a bit dull and you need to get in more light to brighten up the inside, our article on how to create new openings will give you an overview of the many things to consider before you start wielding the sledge hammer! Turn to page 54. Wastewater treatment, although it's almost the final one in this round up, is a subject that should come first before starting on any project. On page 88 we have an overview of what options are open to you. And if you were inspired by our previous issue and are now in the market for a pond, check out our guide to populating it with all sorts of wildlife on page 60.

Whether building new or renovating, remember to enjoy the process and to **Love Your Home!** On page 125 you'll find the details of an exciting new show in an exciting new venue – the Titanic Exhibition Centre in Belfast's Titanic Quarter. There's never a dull moment when you're working on your home...

Happy building & improving!

Astrid

Astrid Madsen
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Our panel of experts for autumn 2015

CAELAN BRISTOW

Caelan has worked in architecture, art and design in the UK, France, North America, and Ireland. She is currently completing her dissertation on natural building for an MSc in Architectural Engineering/Environmental Design from the University of Bath, UK.
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BRENDAN BUCK

Brendan Buck, BA (TCD), MRUP (UCD), Dip. (UD), Dip. (EIA/SEA), MIPI is a Town Planner and head of BPS Planning Consultants. 23 Saval Park Rd, Dalkey, Co Dublin, mobile 087 2615871, www.buckplanning.ie

DAVID DONALDSON

Before setting up his practice David Donaldson, BSC Hons MRTPI, worked within the DoE Planning Service for nearly two decades. Donaldson Planning, 50a High Street, Holywood, Co Down, BT18 9AE, tel. 90423320, mobile 07920873600, www.donaldsonplanning.com

FÉIDHLIM HARTY

Féidhlim is the director of FH Wetland Systems, an environmental consultancy business specialising in the design and planting of constructed wetlands, gravel reed beds and zero discharge willow facilities. FH Wetland Systems Ltd., 30 Woodlawn, Lahinch Rd, Ennis, Co Clare, tel. 065 6797355, www.wetlandsystems.ie

CIARAN HEGARTY

Ciaran is a woodwork and construction studies teacher in Moyle Park College, Clondalkin, Dublin. He qualified from the University of Limerick in 2005 with an Honours Degree in Materials and Construction with Concurrent teacher education. He resides in Leixlip, Co Kildare, email ciaranhegarty2005@hotmail.com

STEPHEN MCDONALD

Stephen McDonald, BSc MRICS, has over 26 years' local and international experience providing professional quantity surveying and project management services, claims preparation and negotiation, as well as cost effective solutions to contractual issues and dispute resolution. He's based in Ballymena, Co. Antrim. Tel: 07933-165-130 www.smd-qs.com

KEVIN ORBELL-MCSEAN

With a family background of professional herbal practice, Kevin qualified as a medical herbalist in 1989 and founded the Evergreen Clinic of Natural Medicine in Cork, in 1990, where he practices to this day. Kevin is a Member of the National Institute of Medical Herbalists (est. 1864) and the Irish Register of Herbalists.

NEIL MURPHY

Neil Murphy, DipArch, BArch Sci, MRIAI is the Senior Built Environment Advisor at the Centre for Excellence in Universal Design. He previously worked as a project and site architect for commercial buildings in Berlin and Dublin. Centre for Excellence in Universal Design, Dublin 4, tel. 01608 0400 www.universaldesign.ie

FIANN Ó NUALLÁIN

Award winning garden designer, author and broadcaster, Fiann has a background in fine art, sculpture, horticulture, ethnobotany and complementary medicine. He currently is a co-presenter on RTE 1's Dermot's Secret Garden programme and is a regular *SelfBuild & Improve Your Home* writer. Check out Fiann's blog on www.theholisticgardener.com or send him a tweet @HolisticG

ALAN TOVEY

Alan Tovey, CEng, FIStructE, MCIArb is the Executive Director of the Basement Information Centre and Principal/Director of consultancy Tecnicom. He previously worked with the British Cement Association and before that, a local authority. The Basement Information Centre www.tbic.org.uk

BEN WILSON

Ben Wilson, BArch (hons) MArch RIBA RSUA, set up his practice in 2007. Before that he worked for four years at Richard Murphy Architects in Edinburgh. Wilson McMullen Architects, 19 Glenvale Avenue, Portrush, Co Antrim, BT56 8HL, tel. 7082 5865, www.wilsonmcmullen.com

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Published by **SelfBuild Ireland Ltd.** 119 Cahard Road, Saintfield, Co Down BT24 7LA. **Tel:** (NI 028 / ROI 048) 9751 0570 **Fax:** (NI 028 / ROI 048) 9751 0576 **E-mail:** info@selfbuild.ie **Directors:** Clive, Gillian & Brian Corry

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FOR SUCH A COMMON, everyday item, water has been generating a lot of headlines.

Not so Wiki leaks. Leaks have been a long-running issue, especially in Dublin, and despite an extensive repair campaign, ROI's leakage figures are still double the UK's. While there's quite a bit more detection work to do, (and metering is the way to do it), the reality is there is no such thing as a leak free water supply.

Biting the lead bullet. A statement in June 2015 from Irish Water has set alarm bells ringing around the country. They announced that an estimated 200,000 of their customers are drawing their household supplies through lead pipes. Lead piping is most commonly found in houses built pre 1970 and with homeowners likely to have to find the estimated €3,000 it would cost them to replace with uPVC, Government has responded by setting up a means-tested grant scheme that would provide up to €4,000 for affected households. But why is lead such bad news?

In 'soft' water areas, which means about 40% of Ireland, if this water is delivered via lead pipes, there is the potential for some of that lead to enter our bodies in the water we drink and use in cooking. Ingested lead can damage some of the biochemicals we need to function properly, so the first thing to do is to find out if you have lead pipes[1], then check with Irish Water (or do a test) to see whether you have 'hard' or 'soft' water.

There is a very low limit on lead levels for human safety purposes (a ratio of 10 parts to every billion water parts by volume). If you exceed that limit you should renew the pipes without delay, if not there's no need to panic but you can still take advantage of the Government grant scheme and install uPVC piping.

Note that if you replace your lead pipes, Irish Water will cover the cost of replacing the connection between your house and the mains; contact them on operations@irishwater.ie once work is completed with the invoice from your plumber to prove you've carried out the upgrade.

The Cryptonite factor. Good news comes to those living in Galway and other areas affected by cryptosporidium[2]. A next generation ultraviolet (UV) treatment known as 'pulse light' has been shown to cause irreversible damage to parasites and antibiotic-resistant bacteria, even distroying parasites resistant to traditional chlorination thus making the water safe to drink

As this technology has only been proven to work in a lab, the next phase consists of extensive field trials and it is those results that will inform a wider roll-out. As with all cutting edge research, it may take some time before this approach becomes commercially available for everyday use. Boil notices aren't gone just yet...

Additional information
Professor John Sodeau, Department of Chemistry and Environmental Research Institute, University College Cork, www.johnsodeau.svbtle.com
Leaks report: www.ciwem.org
Lead: www.fliuch.org/2015/06/17/remove-lead-pipes-or-risk-losing-supply-irish-water-ltd-warns/
www.water.ie/help-centre/questions-and-answers/lead-pipes-information-for-customers/
Pulsed light treatment: www.epa.ie/pubs/reports/research/water/research145developmentofapulsedlightapproachasanovelsolutionindrin.html#.VZEz5lKGNrg

1 According to Irish Water these will usually be inside the house so you can check them yourself: dark grey or black (unless painted) in colour, dull coating and joints appear to be 'swollen'. A simple test is to scrape the pipe gently with a coin or a knife – if a shiny silver strip is revealed, then the pipe is lead.
2 According to the ROI Environmental Protection Agency (EPA) at the beginning of this year, more than 20,000 people, on 20 public water supplies, were affected by boil water notices. The EPA's current Remedial Action List (May 2015) lists 36 schemes as having "Inadequate treatment for Cryptosporidium" serving 209,015 people. The recent EPA drinking water report indicated that E.coli was detected in 10 public water supplies, 63 small private supplies and 32 private group water schemes in 2013.

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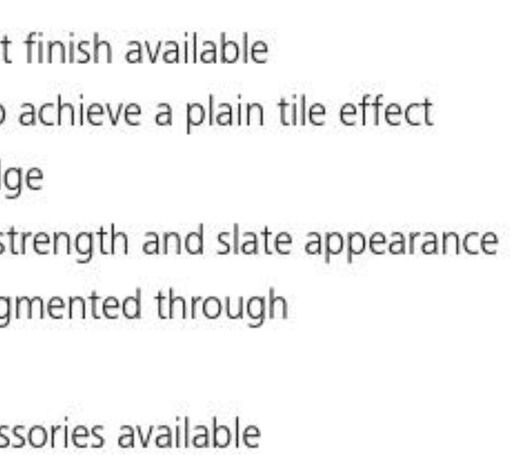
Up on the roof

RE-ROOFING IS AN EXPENSIVE business and a slate with a 30 year guarantee for structural soundness and 20 years for colour is one that is worth investigating. Made by **Tegral Building Products**, the new **Thrutone Endurance** fibre cement slate has been developed to give density of fibre combined with high flexural strength. These features are complemented by a silicone paint finish delivering high water repellence and frost resistance. In addition, this slate has achieved BES Standard 6001 for being made from responsibly sourced materials; the company is the only Irish and UK manufacturer to do so. If you need a new roof over your head and would like to know more about this top of the range slate, call **Tegral Building Products Ltd., Kilkenny Road, Athy, Co Kildare tel. 059 863 1316 www.tegral.com**

CAUSEWAY **Slate Effect Tiles**

Causeway Riven



Causeway

Causeway Slate Effect Tiles

Northstone manufacture the Scott range of roof tiles and have fifty years experience making roof tiles in Toomebridge, Northern Ireland.
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Colour samples

Product Samples

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Northstone manufacture roof tiles in one of the most modern, and energy efficient tile plants in Europe. In keeping with the Northstone environmental policy, the Causeway incorporates recycled product and by design the Causeway uses less raw material per m² than other roof tiles. Products are manufactured to; ISO 9001, 14001 and 50001 quality, environmental and energy management systems.

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Excellence in architecture

THE WINNERS OF THE 2015 IRISH ARCHITECTURE AWARDS include some interesting domestic properties, three of which caught our eye. The first is for **Best Housing,** with the winner a project by **Shaffrey Associates** of two villas which are a response to creating space and light in a dense and historic area in Monkstown.

Taking the prize for **Best Extension** is **Gate Lodge by Donaghy + Dimond** which features the use of wood on the exterior to complement the surrounding landscape.

Our third selection is the winner of the award for the **Best House** which went to **Scott Tallon Walker Architects** for their **Keeper's House and Lodge.**

http://www.riai.ie/news/article/the_winners_of_the_2015_irish_architecture_awards1

LEFT: South Elevation - Shaffrey Associates - Mount Temple

ABOVE: North Elevation - Shaffrey Associates - Mount Temple Photo: Tom Fahy

BELOW: South Elevation Gate Lodge

ABOVE: New Entrance Hall Gate Lodge Donaghy+Dimond Photo: Peter Evers

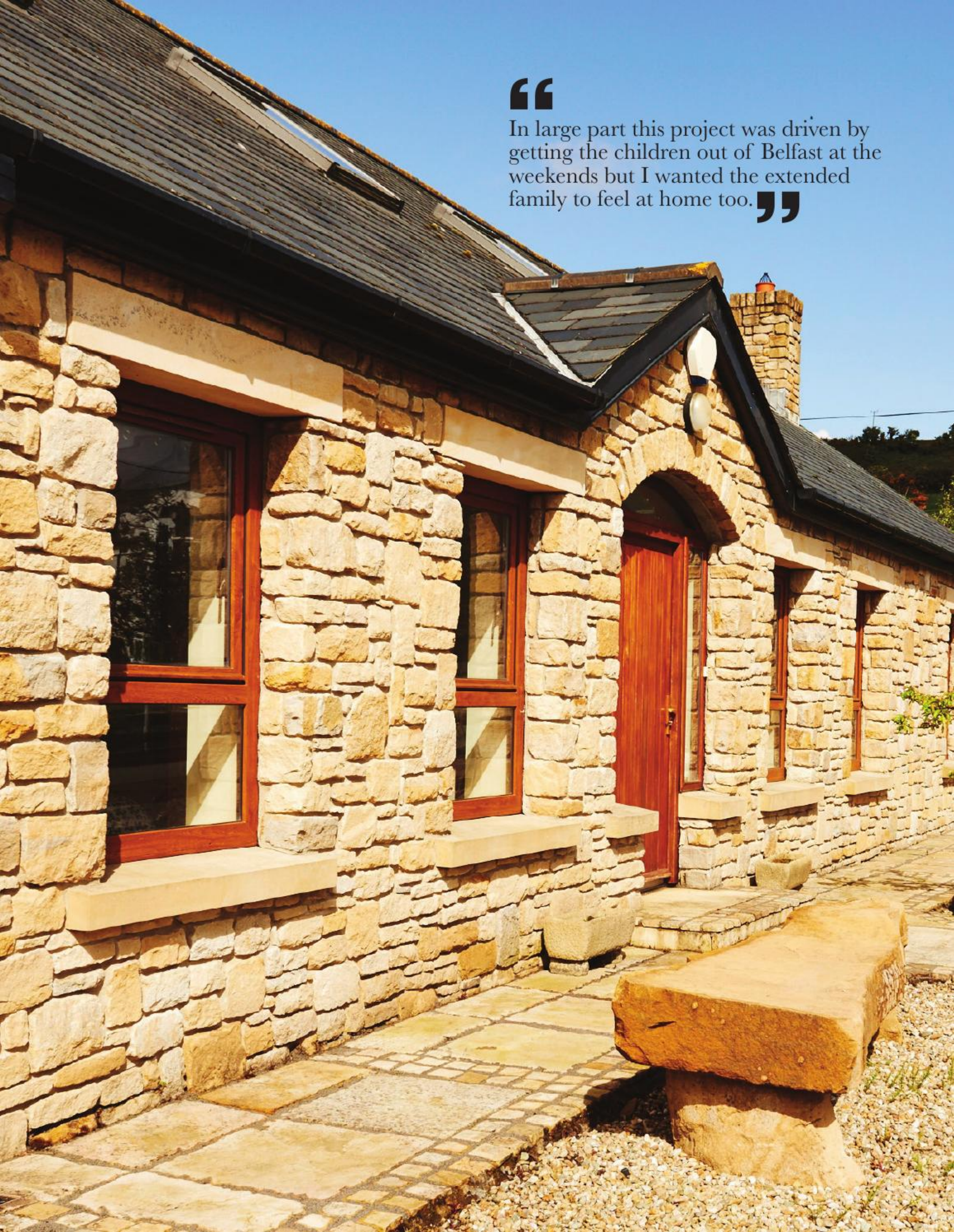
BELOW AND RIGHT: Exterior - Keeper House Photo: Peter Cook

Knock! Knock!

THE OLD ADAGE 'SEEING IS BELIEVING' is one that is especially true of sustainable building. With our homes representing such a major investment the choice of design and building materials is critical to get right. If you are planning a self-build and would like to know more about both of these as well as meet those who have gone down this road before you, and see the homes they now live in, then the place to be over the 28 – 30 August 2015 is the **Green Door festival of rural architecture and design.**

Organised by **Inspirational Homes Leitrim**, it all kicks off with talks, a debate and a look at a €25,000 self-build at 7.30pm at the Dock in Carrick on Shannon, price €10 including refreshments. Over the next two days there are more than 35 homes open for visiting in the region from 10am - 5pm, free of charge, including the runner up in RTE's recent *Home of the Year.* Add to that a Geodesic dome making workshop (€15), film night (€5), childrens' workshop on rainwater measuring, exhibitions, further talks (all free) and bus and bike tours (€5) there is literally something to fill every minute of the three days.

For more information www.inspirationalhomes.ie
tel. 087 7781914 jo@inspirationalhomes.ie.



“In large part this project was driven by getting the children out of Belfast at the weekends but I wanted the extended family to feel at home too.”

Beach holiday

Jack McCabe has been holidaying in Co Donegal for as long as he can remember, coming here as a child with his parents, a tradition he continued with his own family.

Renting served its purpose but no property offered what he really wanted in a holiday house so when the opportunity arose to buy the perfect site he jumped at it.

"I'd been looking for a site for a long time and eyeing a particular piece of land in the hope it would come up for sale. When it eventually did, I couldn't resist," says Jack. "It's 100m/300ft from a blue flag beach and has a view over the sea. The ideal place to watch meteor storms at the end of August and, if you're lucky, the aurora. Being so close is ideal, you can come straight up from the beach to the garden to gather around the dining area..."

One for all...

The dream soon took form as Jack went about designing the house. "In large part this project was driven by getting the children out of Belfast at the weekends but I wanted the extended family to feel at home too. It's funny, I used to bring my nephew down here and now he comes with his kids."

Jack's connection to Donegal is a strong one as he views it as the antidote to city living, something the house had to reflect. "There's six of us including the dog, living in Belfast. The result is stuff everywhere, everything crammed and us crushed. I wanted this house to be the opposite of that, a minimalist haven of calm. Open plan, spacious ▶

More photographs available at **www.facebook.com/selfbuild**

The planners agreed to allow full height glazing at the back but not at the front.

and above all, clutter-free!"

The house sleeps 13 which means the whole family can come and stay for the weekend, including grandparents and cousins. "For the elderly relatives we have a bedroom and bathroom downstairs; upstairs there's bedrooms of all sizes. The smallest one has bunk beds in it." In total there's six bedrooms and four bathrooms, two of which are ensuite.

"There was a list of things I knew I wanted and needed to fit in the square footage, that's really what drove the design," explains Jack. To match the holiday pace and inescapable daily rituals, he made sure the kitchen and living areas were close together. "No one wants to cook on their own when they've come to catch up or have a chat. So the kitchen is L shaped and large enough to allow for a few people to make food at the same time." With a meter wide range cooker, there's plenty of room for more than one chef!

While he did think of everything in terms of the holiday set up, housekeeping wasn't top of the agenda at the time. "If I were to change anything it'd be to add a wee utility room for the brushes and vacuum," he says. The washing machine is in the kitchen. "For the upkeep of the windows we get someone to clean them on the outside every three months, inside we do it ourselves."

"It also rains a lot in this area, and with children, you need to have something to do inside. So from experience I knew I had to have a good sized living area; it's 40ft long by 20ft wide, with a double height ceiling to give the illusion of space." To add to the sense of airiness and fun, helical stairs provide access to the upstairs.

Once he'd finalised the design he found a local architectural consultant who was also a building surveyor, to put his vision onto paper. "He helped me a lot with practical elements, his input was invaluable," adds Jack. "For instance, I wanted the double height ceiling and he suggested we add a mezzanine. It's our billiards room now and I don't know what we'd do without it!" Adding a split level also enhanced the feeling of spaciousness Jack wanted to achieve. ▶

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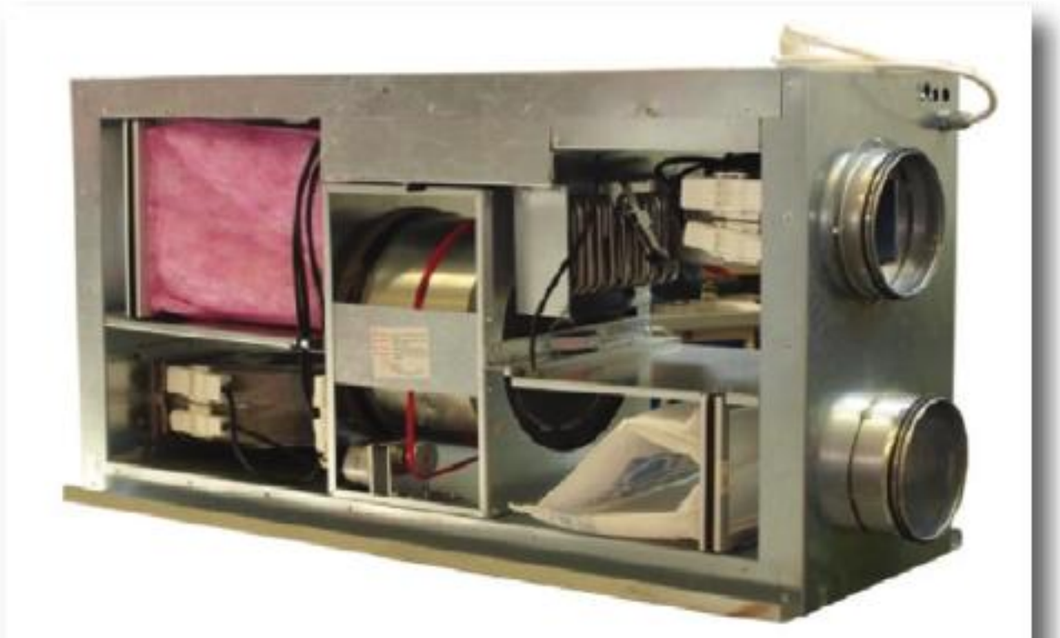

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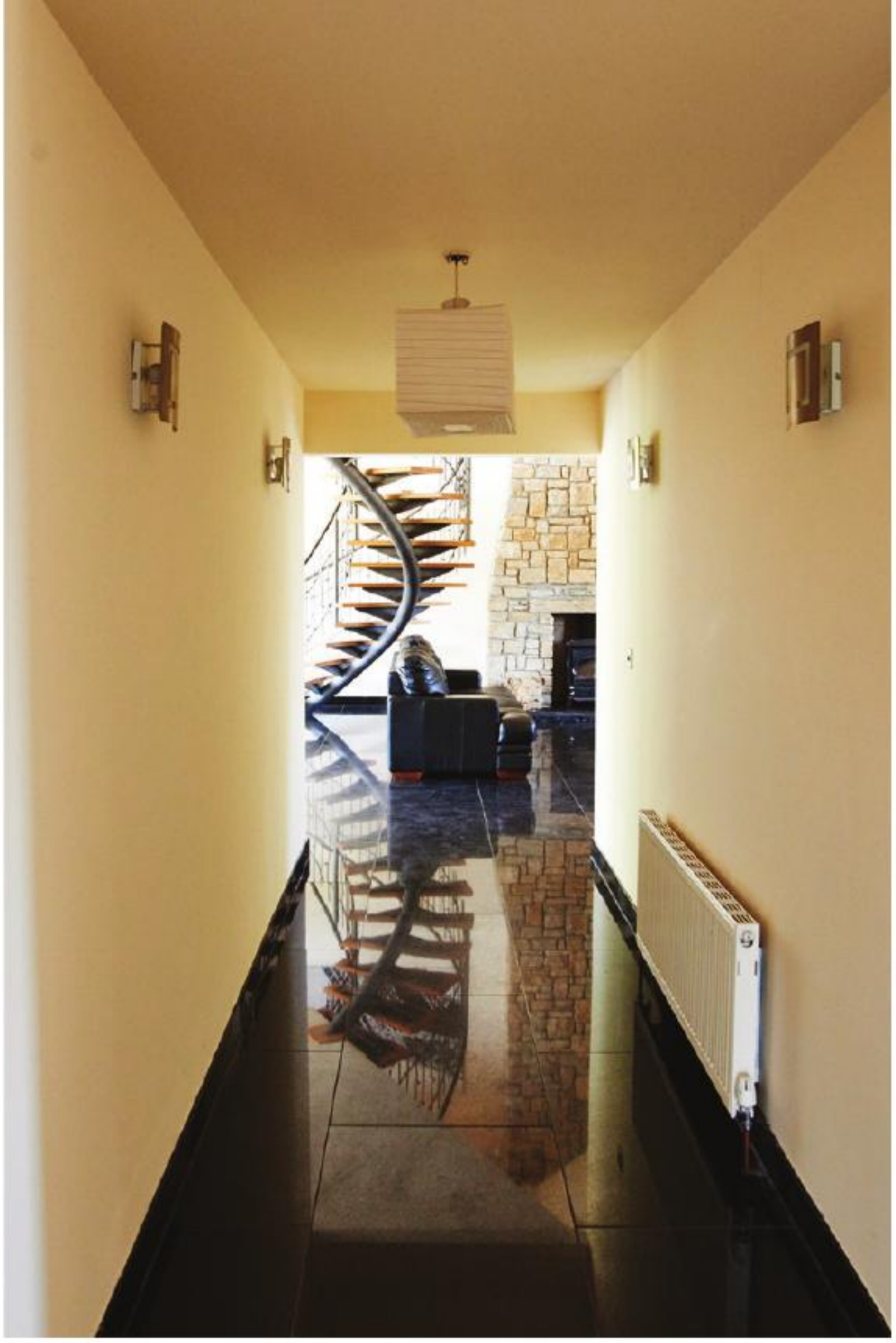
The open plan with mezzanine above caters to holiday living



Stone was used throughout to make the building sand-proof

Sand-proof

"My wife has a fear of mice so we chose a solid concrete floor with black granite above, and the skirting is granite too. It's impossible for them to get in anywhere, although we do get the odd spider through the windows!" Jack sells stone for a living so he was well placed to specify many of the building materials.

"The fabric uses all natural products," he says. "While we rendered the side and back, we used Donegal sandstone for the façade. My aim was to match some other homes in the area, although not those in our immediate proximity! The idea was to convey a Donegal feel, I felt that was important to the holiday experience."

Most other stone used on the project he imported himself. "For the roof we chose a natural slate of Chinese origin; the company has a guarantee with certification and helped with the roof design, they offered a good price too." Jack put in 200 sqm of sandstone for the patio areas, and the floors inside are granite.

"The choice of stone throughout was both for look and durability; sand will damage most floors." They also chose Donegal sandstone for the feature fireplace. When you approach the house, the front appears quite modest. "It looks like a storey and a

half bungalow," says Jack. "I've never met anyone who wasn't surprised once they walked through the door – it's a lot bigger than it seems." The garden also unfolds many surprises with a BBQ area and stone tables protected by a wind break. To one side of the lawn is a vegetable garden with green house and associated watering system for tomatoes.

Playing by the rules

Being in a scenic part of the country, the planners insisted the front façade look relatively plain. "They requested one change of drawings and that was to remove the floor to ceiling window at the sea-facing side. Instead we had to put in two ordinary windows; at the back the full length glazing was allowed."

Jack chose the direct labour route, hiring all of the various trades himself. "The building surveyor helped me find the right people in the area and a relative of mine used to be a builder's merchant at the time so he helped a lot sourcing materials, bringing them on site and organising delivery from other suppliers. The border to Derry is only 28 miles away, that's where he was based." The business has since gone into receivership.

Everything went smoothly until building control showed up. "We broke the terms of the planning permission when we built the house, we used the ▶

attic upstairs and went ahead and put in windows. We were told we'd also built the building six or eight inches too high and the inspector stopped all work on the house. Thankfully our building surveyor was able to show that the level they had taken was too high, he sorted everything out. In the end it took us 11 months to get retentive planning permission." The project started in 2007 with the design stage and they broke ground in 2008; due to delays it was completed in 2010.

Jack says an experience like that teaches you to play by the rules! For the next project he won't be as easy going. "As we get older our priorities change, the children don't want to go to Donegal every weekend," he says. "I live in Belfast and I'd like some ground around me. I'd like to build my own home, but we need to free up capital first so we're thinking of selling." He shouldn't have long to wait for a buyer.

Plot size: 1/3 acre
House size: 240sqm
Build cost including site: €350,000
House value: €400,000 to €450,000
BER: C1

Build spec

Insulation: 160mm PIR ceiling and floor, pumped cavity blockwork with EPS beads.
Windows: double glazed.
U-values: walls and floor value between 0.27 and 0.6 W/sqmK, roof between 0.2 and 0.4 W/sqmK.

Astrid Madsen

info

The companies listed below provide products & services relating to this article.

Architect
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"We fell in love with it instantly, but never really thought it could be ours..."

Family ties

Strengthening bonds within a family often involves gatherings for special events, perhaps even a joint holiday or two. Brothers-in-law Ryan Livendale and Callum Scott cemented their relationship with a slightly more unconventional approach...

"It all began when my wife and I first viewed a house for sale in the most idyllic position. It was a charming, lovingly cared for semi-detached rustic bungalow with a garden cascading down to the Irish Sea. The panoramic views meant that on a clear day you could see the coast of Scotland. We fell in love with it instantly, but never really thought it could be ours, however, more than six months later we received a dream Christmas present when we took possession of the keys."

"For the next ten years it was our family's constant weekend and summer bolthole with many wonderful times and memories. When the property adjoining ours came up for sale, after some negotiation my wife's brother became our new neighbour," relates Ryan.

"Over the next few years and with growing families, we talked many times about how we might develop or extend our homes, and eventually we decided to engage an architect to help us realise our plans and dreams. For inspiration we bought every house and home magazine conceivable and visited The Self Build Show in The Kings Hall for three years in a row!"

"We met with a local Architectural Technologist, Glenn Thompson, and were quickly impressed with his ideas and approach to our project; he was convinced that if we wanted to make the most of our sites we should knock the existing properties down and construct two new ▶

More photographs available at **www.facebook.com/selfbuild**

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builds – and that's what we did, also saving a considerable amount on VAT as new builds are exempt."

From one semi-d to another

The brief was to replace the old semi-d with a modern equivalent. "We maximised the size of the site as far as was reasonable," adds Ryan. "We were able to extend the footprint on both sides of the house and to the sea front." The properties are two storey, designed to match the adjoining ridge level to avoid Planning Service raising objections. "The building line had to be retained, which is how we ended up with a flat roof on the living room."

"Callum was initially sceptical but flat roof technology has improved hugely and the system we specified came with a 25 year guarantee. Our Architectural Technologist had a strong vision, his treatment of the house and the architecture was what sold it to Callum in the end."

The two houses are a mirror image of each other and while very similar inside, the floor plans are slightly different to accommodate the individual needs of Callum's young family and Ryan's focus on high tech and open plan living.

Ryan's house has four bedrooms, one downstairs with a wet room, and two living rooms in case his daughter has friends around. The kitchen used to be at the back of the property but now the large open plan living kitchen is the heart of the house facing the sea. On the first floor is the master bedroom with sitting and dressing area looking out over the sea, there's a vaulted ceiling with cathedral window and sliding doors onto the balcony.

Collaborative work

The choices they made were guided by Glenn. "He has very strong ideas, he's opinionated and protective of his design, which is a good thing because you need a vision to achieve what we have. We also had a clear idea about what we wanted and took his advice, I think that's the best way to work on a project like this. I had served my time in the building trade so anything to do with construction is familiar to me, I think that gave me an advantage."

"The building line had to be retained, which is how we ended up with a flat roof on the living room."

In a previous life Ryan had worked abroad as a joiner. "In the US and Germany, there's a lot of timber frame houses so I became familiar with that building method, but it wasn't suitable for us because it would have been more expensive and perhaps impossible to get the timber frame to the site given the tight access between the houses along the private lane. The only advantage from our point of view was speed and that wasn't a requirement. Also considering the location we weren't totally comfortable with using wood." Instead they chose a traditional block and cavity wall rendered to match the surrounding houses.

Mr Gadget

"My wife calls me Mr Gadget and sure enough I did invest quite a bit in different technologies," ▶

The oak finishes speak of the seaside

laughs Ryan. "I put in a home entertainment system, every room is wired for sound and there's speakers outside. There's a central point for TV and internet so there are no boxes in the living room or other parts of the house."

"It's amazing the amount of wiring in the cupboard! How do they know what goes where? It's a mystery," jests Ryan. Their designer also encouraged them to embrace modern technology. "Glenn's mantra was to make our lives easier. He said we shouldn't have to switch on lights at the lamp shade – it should be at the door. I wouldn't have thought of things like that but they do make a difference to the every day."

"For electrics in general we were very clear about what we wanted because we knew if we changed our mind during the build rewiring could cause the budget to run away." There's LED lighting throughout inside and out; CAT 5 cabling to facilitate internet and IPTV.

"We went with a high specification inside, something out of a catalogue! Not just the modern conveniences but also the finishes, there's a generally contemporary style." For instance the ground floor including the skirting is fully tiled, a very continental touch. "It suits the home so well we went for it, along with the modern light oak wood finishes, creating overall a very contemporary styling."

Other so-called gadgets include an American fridge freezer and instant boiling water. "I like to cook with gas but we had trouble getting the

mains supply to come to us," says Ryan. "Due to the distance from the feed located on the road we were refused a connection but we eventually gained approval after I suggested we have the trench to the house dug at our expense by our contractor. We didn't want an oil tank or LPG so this was our only option."

Ryan's ability to troubleshoot in situations such as these was quite typical during the build.

Life experience

"We've been fortunate but we also researched everything to death! Measure twice, cut once… nothing is truer," continues Ryan. "During the design process Glenn did show us other layouts, but because we'd lived here we knew what we needed so that part of the process was relatively painless." What was much more trying was going through planning, taking nine months to clear the case with the Planning Office. "We'd hoped to start in May to get the best of the weather as it can get fairly horrible in winter, but we weren't able to begin until October 2012. The project took nine months to build."

Ryan and Callum had a number of objections from neighbours concerned with how the new two storey builds might affect their views and, understandably, create disruption during construction. "While nobody has a right to a view we didn't want to obscure anyone's outlook ▶

"The key bit of advice I would give anyone undertaking this type of project is to ensure you have the right partners, i.e. architect and builder..."

either, and we made sure we didn't. The planners came out and, being objective, they disallowed the objections. There was no reason to halt the project."

At the design stage Ryan and Callum visited their neighbours to show them their plans which included re-laying the two shared private lanes. "The improvement to the lanes and communal parking area is ten-fold, and it is beautifully finished."

"We also had some site access difficulties to overcome as the driveways from the road are very narrow," adds Ryan. "Sometimes materials had to be unloaded on the road and man-handled to the site, or a special delivery vehicle had to be used." At one stage a lorry damaged a wall and Ryan engaged a surveyor to check it, thankfully there was no cause for concern.

To make access easier, they eventually asked a friend on the lane if they could take his fence down. "Without him agreeing, it would have been very difficult to get the building materials on site," says Ryan. They built him a new fence when the work was completed.

"Building the houses was quite problematic the whole way through, we had daily complaints," recalls Ryan. "Our approach was to let them know about delivery days and keep them in the loop. We're not the first nor will we be the last to build a house, so if you want to do it work your way through it and keep the neighbours informed, bring them along with you."

The complaints were handled by Callum as he was living down the road with his father during the build. "It was a stressful time for him," says Ryan. "I was on hand to deal with the specifics, and that helped relieve a bit of the pressure, but for some of our neighbours it was the fact that we were building that was an issue. We couldn't do anything to change that!"

Callum was on site daily to keep an eye on things and let Ryan know of any problems. "There were many, many phone calls! It was quite demanding fitting it in with work as there was a lot of running back and forth. It was frantic for a period and I loved it. From the beginning we knew it would be challenging and there would be difficulties but I didn't mind that. I don't get frustrated or stressed, perhaps my corporate work environment has something to do with it! Most weekends Peter the builder worked away on site and Callum and I were there as well to take decisions. Peter was fantastic, very understanding and accommodating."

All access

Glenn produced an invaluable document for Callum and Ryan, a comprehensive 34 page ▶

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specification list. "He drew it up to go along with the architectural drawings, building regulations, accredited details and structural engineer's calculations. We used this to tender the project to five individual construction companies ourselves. Having appointed the builder (Peter Fletcher) after thoroughly checking his references, we managed the build directly with Peter."

The builder wasn't the lowest priced (there was a huge difference from lowest to highest), but they felt he was the best person for the project and as the build progressed the decision proved to be a good one. "Peter was superb to work with and made what can be a stressful experience more bearable," says Ryan.

He worked with his father and was very precise. "We got high end oak frames and the doors all fit perfectly, I'm fussy when it comes to these things and they were forewarned by my wife! It's just that I've seen so many self-builders make a mess of it, hiring the wrong builder. In a way we were very fortunate; but we did go with someone we felt was conscientious and recommended to us by Glenn. When there was snow on the ground he showed up on site, that shows his true mettle."

"The key bit of advice I would give anyone undertaking this type of project is to ensure you have the right partners, i.e. architect and builder. After this research what you want, agree the budget and stick to it (within reason), cover it off in every detail on your tender document, and if you change anything after the build has started agree the cost in advance. Finally, don't get stressed or frustrated – you're not the first person to build a house, and you will get there!"

Sea breeze

Glenn suggested wood fascias and soffits stained black but he couldn't convince Callum and Ryan. "We chose a uPVC that shows the grain so it looks like wood. It's low maintenance, provides UV protection and all it requires is a power hose once a year. We also have uPVC bargeboards. "

In terms of landscaping, civil works were required. "There was a steep slope to the site so we had to build a retaining wall; this was backfilled when the existing properties were demolished, the rubble was used to level the site and create a sizeable patio areas at the seaward side of the houses. This also saved considerably on carting material on and off site. The two private driveways and communal parking area were fully levelled and finished to a high specification with SMA (stone mastic asphalt)."

"We actually spend a lot of time outside – we had a BBQ at Christmas! – so the patio had to be right. We put down a high specification stone surface, which looks like marble and is very easy to keep even though we're right by the sea. Drainage is also very good, despite the expanse there is no water sitting." The garden was re-laid with cultivated roll out lawn turf.

"We used all new technology, so new that we had to ask our designer to explain what we were getting! A major consideration was protecting the house from the sea salt so we used a render with a silicone enhanced water repellent, it also stops moss growing, and it was pre-coloured so there was no need to paint."

The colour debate actually turned out to be a lively one. "My wife wanted pink. In another location it might have been nice, but not here, Callum and I didn't want it to stick out like a sore thumb! Also Glenn had to make a sketch for the planners of how the house would sit in relation to the roofs of the adjoining properties and I don't think a pink finish would have been popular with them either."

Being by the sea and to avoid rust, any exposed metal had to be in stainless steel whilst the windows are aluminium with a marine grade polyester powder coating, charcoal black grey outside, off white inside. "We hose the windows down on a regular basis because of the salt sea air, and so far I have to say the frames are coping really well."

Enjoy the view

Indeed, the windows were a major consideration. "The view is spectacular and we wanted to make the most of it. The windows really mean a lot," explains Ryan. "Unfortunately the people whose tender we accepted went bust half way through the project; thankfully we hadn't gotten to the stage of paying them a deposit."

"We were very conscious at the time that we were in a recession, I've known people get caught out with deposits, builders disappearing. So we set up a payment schedule, our builder got paid on a weekly basis and we had an account with the builder's merchant for supplies which we also paid weekly."

"For the windows, when we found an alternative supplier who did the same windows, we put down a minimal deposit and paid most of it when they were fitted. We spent £30,000 on them in total."

"The big cathedral window upstairs was a concern for the structural engineer. "There's a lot of wind outside, actually the winds are really ▶

horrendous, and originally we were told we couldn't do it. But I persevered! I argued we could, it's a major feature and we really didn't want to lose it. The window company worked with us to figure it out and we did." The flat roof, open plan design and glazing all meant a steel frame was required.

"Given what we've created I can't think of anything to change," enthuses Ryan. "The families get on so well, we lift out our dividing fence for parties, lunches, it happens quite frequently. We really are fortunate. We're celebrating Callum's 50th with a big party, and, looking back, we realise that the build actually strengthened our relationship. We were talking about whether we'd do it again and I'd love to; Callum says never again! It was fabulous, it's one thing off my bucket list."

The plans for the future are rooted in this seaside location. "We intially built the house as a holiday home but always with the thought that we'd end up living in it. We are in our new home more than a year and a half and, although the fond memories of our rustic bungalow and the picture of it on our wall will always be with us, a new chapter has begun and I don't envision us moving."

"Now as I sit in the splendour of our new home, I feel proud of what we've created and I wouldn't change a thing, but I still have to pinch myself to believe it is real." ■

Astrid Madsen

House size (each): 2,600 sqft
Plot size (for both houses): 0.23 acres
SAP: 77 (C)

Build spec

Construction: Block cavity wall with partial fill 60mm phenolic board , U-value 0.24W/sqmK coated on the outside with water resistant pre coloured render, warm roof with 50mm phenolic board insulation over rafters and 80mm phenolic board between the rafters, U-value 0.16W/sqmK, ground floor 150mm phenolic board with under floor heating.
Windows: powder coated aluminium windows, double glazed K Glass 1.4 W/sqmK
Heating and hot water: gas boiler, under floor heating controlled by individual digital thermostats in each room, pressurised hot water system. Mechanical ventilation with heat recovery.

info

The companies listed below provide products & services relating to this article.

Chartered Architectural Technologist
Glenn Thompson of GT Building Design, mobile 07719912695, www.gtbuildingdesign.com
Builder
Peter Fletcher, mobile 07906910833
Structural Engineer
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Are you popcorn ready?

How to replicate that theatre going experience on a budget.

First, a word on the best systems money can buy. If you're building new, **home automation** is an ideal solution as it works off a centralised platform for movies, music, radio and anything from lighting controls to security systems. There's no boxes or cables (a huge benefit!), speakers are often integrated into the building fabric and you can control it all from your phone; in one word: seamless.

Considering the amount of work involved and the wiring, it could be a significant outlay. In the case of a retrofit, wireless home automation systems are available too but remember that some amount of cabling is always required.

If having a really good cinema experience is high on your 'wish list' then you will have the budget to go to a specialist company to see what's on offer. Even if you don't, do visit one to test the sound and get a feel for the controls. The live audio and tactile experience will beat any review you can read of it! Bring along music you know well to gauge the quality.

Image

The budget conscious and environmental option is to use your existing TV. In that case check it's HD ready (that it has an HDMI port for streaming or for Blu-Ray, see below). If not you can use a simple DVD player and settle for the kind of image quality we've lived with over the past decade. You can always invest in a new TV, or projector, at a later time.

Buying new, television sets nowadays are High Definition: from simple HD, which is now standard, to 4K Ultra HD, which is four times crisper (four times as many pixels) than HD. Projectors and TVs can be bought at this higher resolution but at roughly double the price. The UHD set should be able to upscale your cable satellite or digital TV content to this higher quality but it won't be able to provide it on streamed content that's not specifically 4K UHD.

Three dimensional viewing (3D) is an option for both television sets and projectors and the extra cost isn't as high as investing in 4K UHD. You can even buy a TV that converts regular 2D content into 3D and allows you to specify how much depth to give the image. There's also a model that allows two video game players to use the same screen (instead of split screens), technology which enables two persons to watch different programmes or movies at the same time; it's all done with the help of special glasses.

An important consideration is screen size, the minimum set nowadays in 32" but that will be too small for a home theatre. And believe it or not, there is also such a thing as too big (see table above right).

Also make sure the seating isn't too low when compared to the image – home cinema manufacturer THX says that for a pleasurable experience you shouldn't have to look up any more than 15 degrees.

Shape apparently doesn't matter much; according to television manufacturers curved screens allow you to have the best seat regardless of where you are in the room, however reviews seem

To allow for a movie going experience, you can use the following guide:

TV size	Distance from seating
35”	3.5 to 5ft (1 to 1.5m)
40”	4 to 6ft (1.2 to 1.8m)
50”	5 to 7.5ft (1.5 to 2.3m)
60”	6 to 9ft (1.8 to 2.7m)

Source: THX

to suggest it doesn't add much to the image quality but it does to the price.

If you can afford it, there's little doubt that the most cinematic way to go is with a projector. The size of the image will depend on the distance between the screen and the device so this can easily be adjusted with the above table for distances.

Sound

Drums rolling… a lion roaring. How do you recapture that feeling? While your TV probably already has decent speakers, investing in a sound system is the key to turning your living room into a home cinema. The important thing to consider is the bass, on the technical side look for a good woofer and subwoofer for an electrifying effect. If you buy surround sound or standalone speakers, as a rule of thumb, the bigger the better. Unfortunately it's not possible to connect these speakers directly to your television, you will need an audio-visual receiver, also known as an amplifier, as a link.

The common surround sound options are 5.1 (five speakers, one subwoofer) or 7.1 (seven speakers, one subwoofer). The size of the room will play an important role in determining how good a system you need to achieve the cinematic effect, and how many subwoofers you require. Generally one subwoofer is enough for an average sized room in a typical house, especially if you're not going for a high end system.

Ideally, for surround sound you should place a speaker at each side of the screen and at either side of where you'll be sitting. In the 7.1 configuration you add two speakers at the back of the room. If you have two subwoofers, put them in the middle of opposing walls and if you have one, place it in the middle of the front wall. This is only a guide, you will have to play around with their positioning to get the optimal effect.

Then there's the cabling… the better the sound system the more significant the amount of wires. To decrease the numbers, wireless options are available but remember that means each speaker will require a power point.

Most manufacturers supply bundles, including speakers and DVD player, but check that the receiver or amp is part of the package as it may not always be. Sound bars are an in-between option which connect directly to the TV (no need for a receiver or amp and therefore increasingly popular); there's even a model that adjusts to the room's acoustic environment.

The low budget option is to reuse what you may already have in your home: a stereo! Remember those? You can connect it to your television via an HDMI cable, as long as both the TV and the stereo have a port. If not you'll have to use a lot more wires (coaxial and digital cables). The reason it works is the stereo has an amp. ▶

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Content

Where do you get your content from? Back in the days of terrestrial TV we used simple aerials cabled directly into the TV, free of charge, but the resolution wasn't great. Dishes picking up content from satellites provide better resolution (and more channels), especially with an HDTV. This service comes with a box and is often subscription based. In ROI free terrestrial TV was digitised (Saorview) and requires a different aerial; the television set needs to be HD (there's a list of approved TVs on their website www.saorview.ie) and works with a box that can be bought through retailers. Telecoms providers can provide cable TV or set you up with high definition broadband TV, (with a box); these options are subscription based.

Streaming, (viewing content 'live' off the internet), has become a popular means of watching television on mobile devices; the leap to the television was really only a matter of time. After all, size does matter when you want to watch a movie. A 'smart' TV set will connect to the internet directly via wi-fi or Ethernet cable. Otherwise dongle-type devices or boxes (one-off buy), are physically connected to the television. These in turn communicate wirelessly (usually via wi-fi or Bluetooth) with your mobile device - so anything that is seen on the phone or tablet can be transposed to the TV. Some of the content can be uploaded directly to the TV, via an app or the box, so the resolution of your phone or tablet doesn't necessarily matter.

Streaming is not an option if you have low broadband speeds so consider a server to download and store your movies for later viewing. Otherwise dust off the old DVD player! Antiquated as they may seem, DVDs are still popular and with Blu-Rays the picture quality can be excellent and become an integral part of your home cinema – although your TV does need to be compatible. In terms of connectivity there are HDMI and HDMI 2.0 ports on your television set: this is what you will plug your devices into. HDMI will communicate with current technology, HDMI 2.0 is for 4K UHD content. Remember that in all cases you need to make sure the content is compatible with the device you plan to show it on.

When streaming, your remote control will be your tablet or smart phone. And did you know that most remotes have an app? If you lose or break yours, no need to buy a universal one anymore…

Sitting pretty

Last but not least think of where you'll be sitting and what you need around you. You could buy second-hand cinema seats but make sure to try them out because while they will look the part, they may not always be very comfortable. For a better 'fit' you could buy them new, complete with flip up arm rest and seat!

Purpose made chairs for home cinema viewing also exist and arguably provide the ultimate in comfort. Apart from the inevitable plush fabric, they tend to be bulky and so to maximise space, often offer reclining options that can work even if placed very close to the wall. Cup holders can be integrated into the arm rest, other features may include storage bins, swivel trays and, with a power connection, motorised recliner, a USB port and LED lighting; they generally come in twos (or more).

Sofas with corner sections provide a more informal style than rows of seating

If you want to put in two rows of seating think about the head height; if you choose the same seating type this will require an incline, e.g. a step or slope. If it hasn't been built into the room, a platform could be retrofitted for the back row – you could even use pallets! To avoid tripping hazards, consider two types of seating in the same style, e.g. upright seats at the back and lounge or laid back seats at the front.

Other options include a seat you simply love to sit in; just remember to place it well in relation to the image as sofas and love seats tend to be lower than armchairs.

Interior designer tips! Comfort is the priority when considering seating and the ideal is the recliner suggested earlier as it offers good neck support, but not everyone may want the structured look of rows of chairs.

A softer more informal style would be to introduce a combination of large comfy sofas which are available in sections and can be built to your requirements or re-arranged depending on the number of viewers. These sofas come with corner sections, perfect for viewing and also with divans for lounging. ▶

Top 10 home cinema must-haves

1. Speakers: the ticket to your cinematic experience but they do require an amplifier to connect to your TV. A sound bar connects directly to the TV but the quality doesn't tend to be as good.

2. TV or projector: will everyone be able to see the screen? Do you want the TV to be hidden when not in use? Projector's retractable screen is handy but you need to have a sturdy platform hanging from the ceiling to accommodate the device.

3. Cables: there will be a lot of these so think of tripping and fire hazards when linking up the systems; the complexity of the sound system will add to the amount required.

4. DVD player, streaming device, (recording) box or server: where will they go? Invest in furniture and/or consider putting some in the utility or other room if feasible.

5. Remote control: ideally this will be your phone or tablet.

6. Black-out blinds or curtains: essential if you plan to use a projector – you must keep light out to maximise picture quality. Practical too for early viewings on long summer days.

7. Artificial lighting: some TVs come with their own LED lighting to enhance the viewing experience; you could choose to add some of your own in the room. For parents who prefer their children not to watch TV in the dark, a side lamp may come in handy too.

8. Soft furnishings: will dampen sound (echo chambers consist of hard surfaces); if you have a wood floor or tiles, add a rug. If the room needs curtains, go for a neutral colour as the feature in this case is the movie. The heavier the material the less echo you will get, but if you'd prefer a light fabric you could always use a heavy lining for the same effect.

9. Noise barriers: if you are building new consider adding acoustic insulation in the walls and ceiling to stop the sound from travelling through the house.

10. Don't forget: the coffee table for feet and popcorn, and a side table for drinks, as well as comfy chairs, pillows...

You could even choose different coloured fabrics for the sections to make the scheme more interesting. You could also introduce single high back chairs along with these sofas to create interest and also choice for the viewers. These chairs can be easily moved depending on demand. Remember to position the seating so that it complements the height of the projector or TV to avoid neck strain.

The comfy corner sofas will look great with novel scatter cushions, good to bury your face in for the scary bits! A great idea for kids are extra large floor cushions which can be stowed away or kept visible as they look great in complementary fabrics. You could also introduce a large footstool covered in fabric, which can double up as a coffee table. Stackable tables are ideal as they are light and great for drinks and snacks. ■

Astrid Madsen

Additional information
Tracey-Jane Watson, Emporium Soft Furnishings, 2-10 Maghera Street, Kilrea, Co L'derry BT51 5QN tel. 2954 0119 www.emporiumni.com traceyjane@emporiumni.com

Hifi Hut, H11 Centrepoint Business Park Oak Road, Dublin 12, tel. 01 902 2969, www.hifihut.ie, sales@hifihut.ie

Indicative costs

Standard HDTV: from £250/€300
4K UHD TV: from £600/€650
Projectors: from £1,500/€2,000 with 3D capability
Popular streaming devices: Google Chromecast (€39), Apple TV (€79)
Bundles (speakers, player and wireless system): from £300/€350
Surround sound 5.1: from £350/€400
AV receivers/amplifiers: from £250/€300
Sound bars: from £150/€200 but can be bundled free when buying HDTV

Prices are indicative only and refer to mid-range products

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A home for life

Whilst the population of Ireland as a whole is, in world terms, predominantly young, the people on this island are also a part of the general trend of living longer.

In the UK for example, the number of people over 65 is set to increase by nearly 50 per cent by 2032 to over 16 million.[1] In ROI 22 per cent of the population will be over 65 by 2041.[2] Additionally, in comparison to any other age group, there are higher proportions living in rural areas and most of this age group (79 per cent) own their own home. Yes, we are also fitter in our sixties and seventies but because we are living longer, more of us will require assistance for many years as we become less flexible and vulnerable to debilitating but not immediately life threatening conditions such as dementia. The cost of care is huge and it is well known that the quality of life for people who can continue to live in their own homes and communities is superior to the alternatives.

This article is an overview of firstly, the building blocks of Universal Design (UD), a framework for the designers and specifiers of new builds, extensions and renovations to create homes that are beautiful to live in for people of all ages, sizes and needs.

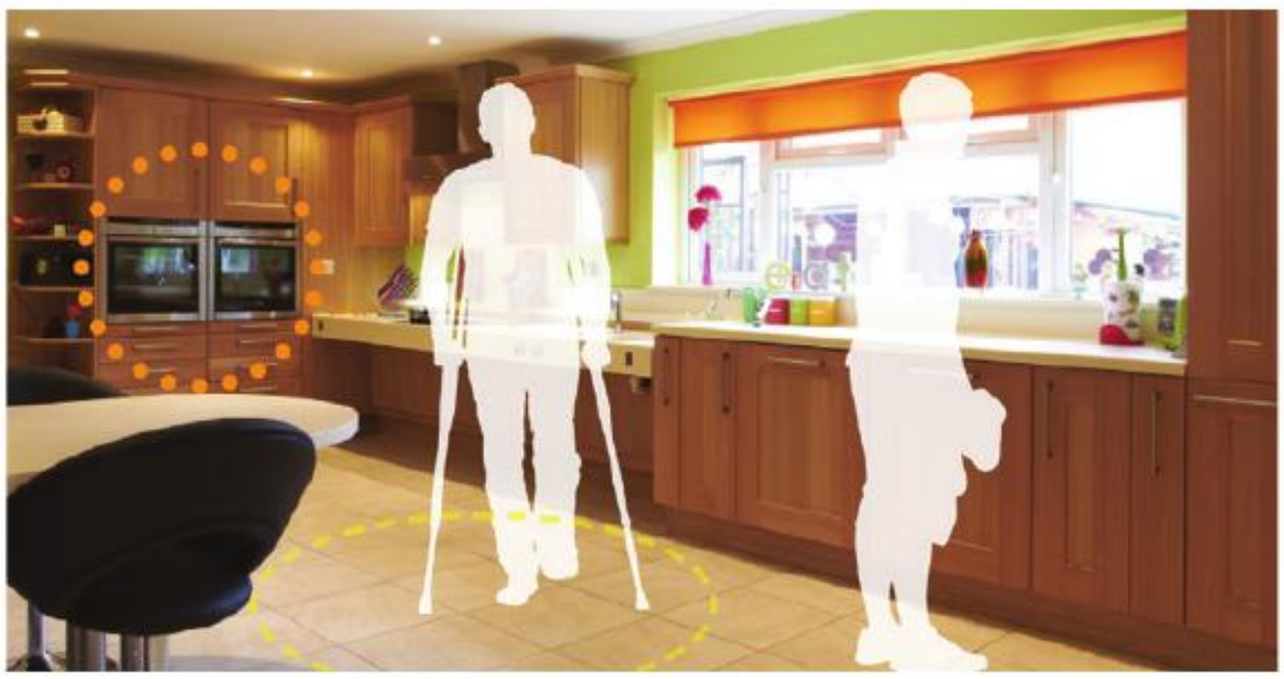
These homes are built to be future proof, able to cope with changing circumstances (for example, when we are older or disabled be that temporarily due to illness, an accident, or because of a long term illness) and all the while continue looking good and feeling good to live in. Then we turn our attention to specific measures to stylishly design your flexible and fit-for-purpose home in a very personal, rather than technological, sense.

Universal Design (UD)

It takes a lot of mental effort when you are fit and healthy to imagine a time when you won't be. It's a bit like making a Will, we seem to feel that doing so somehow brings the possibility of needing it closer. It is a false equation and you are likely to regret not planning ahead at a time when it is easy and far more cost effective. Building Regulations have already addressed some issues such as switches reachable by wheelchair users, wider doorways and level access to outside as well as a downstairs wc. Whilst these are a step in the right direction, UD goes much further by looking at a home in its entirety as well as its location and setting. UD also makes the important point that these homes should be of architectural merit both inside and out.

Good design works around who will be living in the house – it clearly needs to function for those who will use it most – but it should also take into consideration who will be visiting it, including family and friends. As mentioned above, building a house using UD principles and guidance doesn't have to mean it's going to be a featureless, soulless box that functions as a 'living space' with railings and ramps everywhere, as opposed to a 'home'. UD encourages beautiful and elegant design and nowhere is this more important than the places where people live.

The UD approach is people centred with an aim to create homes that work regardless of the occupants' circumstances – meaning it suits anyone who may use the building. A tall order perhaps, but this ambitious approach yields benefits that will be felt and enjoyed by everyone. It also, arguably, makes these homes more saleable as they suit a wider section of the market and are future proofed, thus reducing the potential for costs at a later stage. Finally, building and moving house are two of life's more stressful experiences. Even if you can stay in your own home, imagine yourself coping with say the trauma of an accident to yourself or a loved one and then organising building work which is likely to mean moving out for a period, as well as then managing the project. By incorporating as many as the following into your design now you can do much to minimise future stress and anxiety. Whilst aimed at new builds, there is much that is applicable to extensions and renovations.



An 'L' shaped plan kitchen and dining area. Note the lower level ovens and toe space under the cupboards.

UD home design quality features

These and the checklist following have been developed by the Centre for Excellence in Universal Design (CEUD)

Location and approach: well integrated into the neighbourhood with clear, safe routes from bike, car or public transport to the entrance. Space should be available for accessible car parking with

a drop off space for an adult carrying a child or shopping, someone on crutches or in a wheelchair, an older person and someone with visual difficulties.

Entering and moving about: level thresholds at doorways for simple, easy movement, cleaning and maintenance. Wide front and internal doors, for example, 'Cat and Kitten'. This describes a door with two parts, one large the other small. The former is for everyday use but if you need a wider space both can be opened at the same time.[3] Spacious entrances and hallways for multipurpose use and circulation.

Living spaces: flexible or open plan layouts with some 'soft spots' such as moveable internal walls (e.g. timber stud walls) allowing the expansion or contraction of the floor space according to family or personal need and allowing sufficient space for social interaction. Reinforced ceilings (e.g. doubling up on floor joists) or 'hard spots' (e.g concrete block walls or doubling up on timber stud walls) around the wc, shower and bath to support the easy future installation of handrails and drop down handrail supports as required.

Space should be allowed in a bedroom for easy manoeuvring and access to an adjacent bathroom. Being able to see the location of the bathroom from a bed is a very important piece of future proofing, especially when a person gets older. Kitchens easily adapted for different layouts, similarly a wet room (that is, tanked with a floor drain) wc at entrance floor level which can become a shower room and finally, space for integrating laundry, storage and refuse.

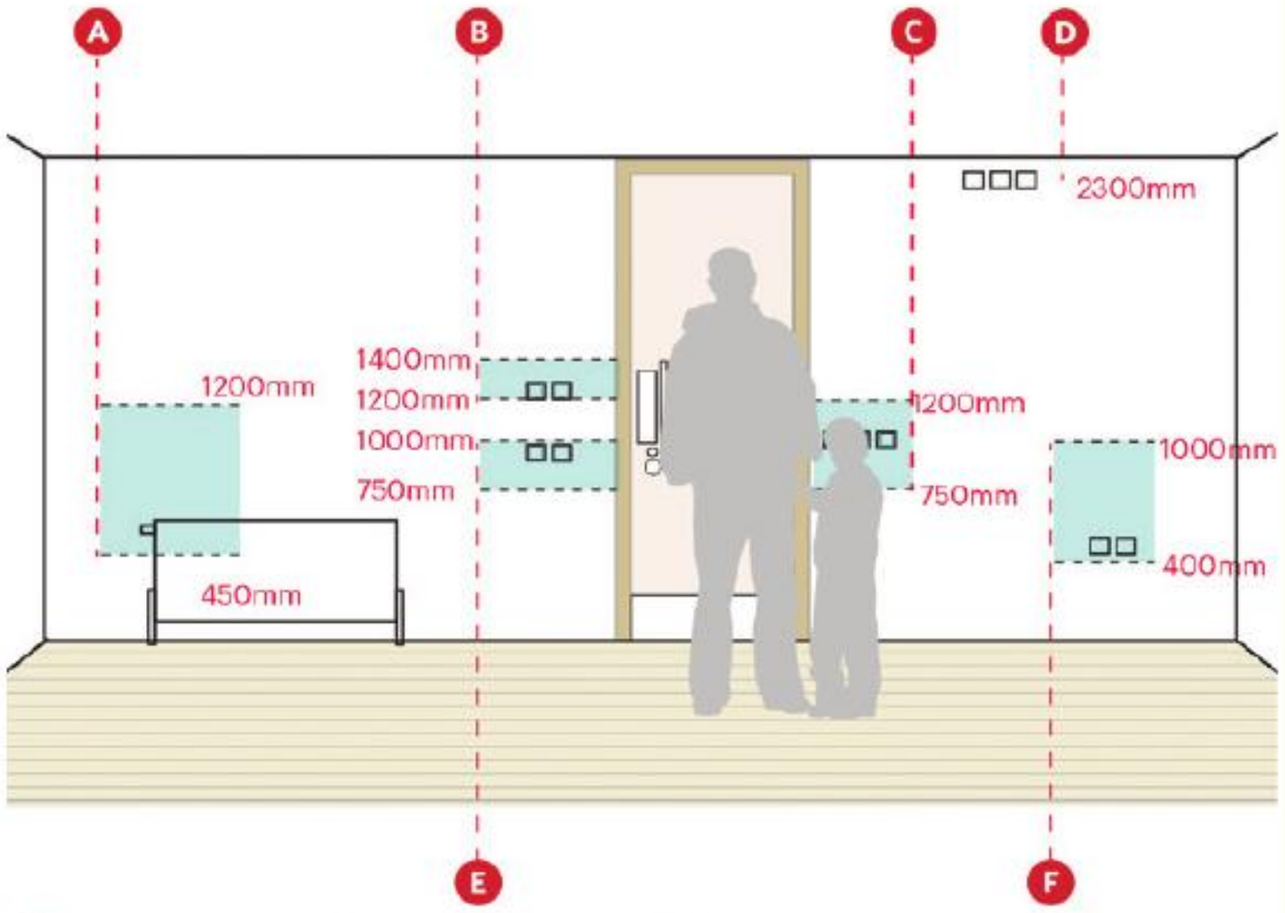
Elements and systems: sockets, light switches and window sills at levels that are within easy reach of everyone. Details such as lever door handles and taps that are easy to use for everyone, especially young children. Controls and Building Management Systems to be simple and clear with systems having the ability to integrate for smart entertainment, energy efficiency, security systems and assistive technologies. There should be a choice of materials and colours with fittings and finishes that are easy to use, maintain and are attractively and smartly designed. Optimise the use of natural light, ventilation and energy efficiency.

Basic Universal Design checklist

- Permeable paving that is firm, non-slip, non-reflective, and suitable for all weathers.
- Easy to use pedestrian gate circa 900mm (3ft) wide.
- Easily accessible bin storage area near entrance to utility and kitchen.
- Paved area of circa 1m80 (6ft) across full width of house.
- Enclosed terrace as a winter garden.
- Level or gently sloping external landing outside each entry point of circa 1m50 × 1m50 (5ftx5ft).
- Circa 300mm (1ft) clear space on the leading edge of doors.
- Circa 1m80 (6ft) wide entrance hall with storage and natural light, rear door entry also provides cloak store.
- Entry level wc of circa 1m50 (5ft) × 1m80 (6ft) with side transfer space and outward opening door.

Technical Sketch

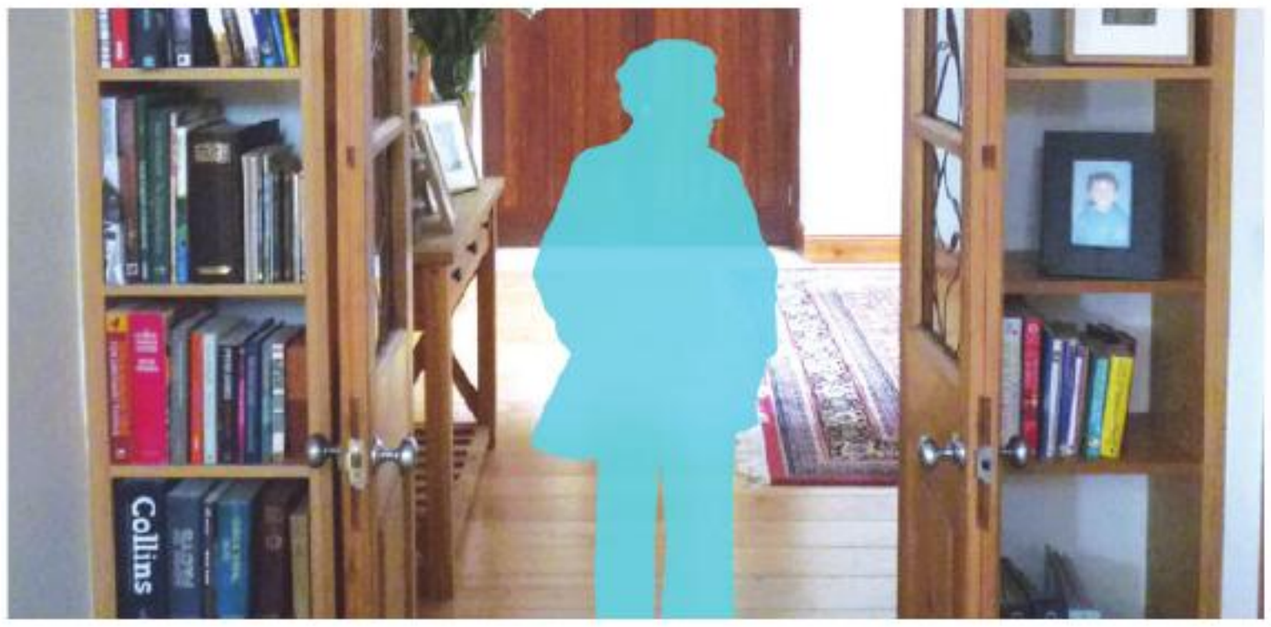
Recommended heights of electrical fittings and controls



- **A** Thermostatic radiator valves 450–1200mm.
- **B** Electricity and gas meters 1200–1400mm.
- **C** Light switches and permanently wired switches 750–1200mm.
- **D** Assisted living technologies outlet points for power and data @ 2300mm.
- **E** Switches and controls for intercom, ventilation, heating 750–1000mm.
- **F** Electrical sockets, TV and telephone outlets 400–1000mm.

- Easily adaptable kitchen with space for occasional eating. Adjustable height worktops and sinks, the latter with flexible waste pipe, or a mix of fixed worktops at various heights. Oven and microwave fitted at a height accessible for all users.
- Large enough circulation spaces in kitchen for ease of movement and convenient opening of appliances, e.g. allow a minimum of 1m20(4ft) (1m80(6ft) is optimal) between opposing work surfaces.
- Bathroom (with wet room tanking and a capped shower drain outlet set into the floor) of circa 2m10 × 2m50 (7x8ft) that can be easily converted at a later date into a level entry shower room.
- Straight and simple flights of stairs with no winders. ►

A glazed panel beside the door gives daylight to the hallway and views in and out.



Double doors set within a bookcase between a living area and entrance hall; this prevents the doors from jutting out.

• Utility room with raised space for washer and dryer for ease of access and accessible storage adjacent to kitchen.

Special considerations when extending and renovating with UD

Building from new is ideal, but what if you have a house and don't want to move so are thinking of extending or renovating? According to the suppliers of equipment for people who need extra assistance, the biggest difficulty people face is with the circulation space. For decades the trend was to build homes with as many rooms as possible, but large in number didn't equate to large in size and the result was lots of small spaces which are unsuitable for wheelchair users and awkward for people to pass in, especially if they are less able and use a mobility aid.

Bathrooms: put in a shower with level access and either tank the floor to create a wet room shower or put in a tray level with the floor surface and which is a minimum of 1.2sqm, making it suitable for people with mobility difficulties and for wheelchair use. Install a wc with a high level seat (there is no good reason, other than fashion, for the current, low level designs), which can be used by all ages. To make these changes retrospectively will cost around €8,000/£5,800 including destructive building works, and if you require a self-cleaning automatic wc that washes and dries the user that is a further €3,000/£2,175. These have three programmable settings available enabling three individuals to use the same facility. Installation requires an electric spur (the power supply can be fitted and brought into use when the situation demands) and the wc should be fed directly from the mains.

Stairs: A stair lift for a straight handrail costs around €2,000/£1,450 but this increases to €6,000/£4,350 if the rail is curved. For this you should include an electric spur at the foot of the stairs to provide power.

Bedroom: An electric spur in the ceiling to enable the fitting of a hoist in the future to assist with getting in and out of bed.

Technology: When a home is able to be adapted for modern technology it can make the difference between having to move and staying put. So much can be done on behalf of those living in the house, from switching heating and hot water on and off to running the lighting to more critical areas. Known as tele medicine (or tele health/tele care), it is now possible to monitor at home everything from your blood pressure to your heart, with the information sent directly to a hospital or clinic. These developments make it possible for people to continue to live in their own homes for much longer, safely and comfortably. ■

Gillian Corry and Neil Murphy MRIAI, Senior Built Environment Advisor, Centre for Excellence in Universal Design at the National Disability Authority, 25 Clyde Road, Dublin 4
tel. 01 608 0400 www.universaldesign.ie
All images courtesy of CEUD

Additional information

For more information on the design of homes from a UD approach:
'Universal Design Guidelines for Homes in Ireland' and 'Universal Design Guidelines for People Living with Dementia, their Families and Carers' are free to download as accessible pdfs from www.universaldesign.ie/Built-Environment/Housing/
Disability Needs Belfast 9074 5333 and Dublin 01 452 3602 www.disabilityneeds.com
Sisk Healthcare (UK) Ltd. (Phillips Medical) Belfast 9066 9000 and Dublin 01 830 7499 www.siskhealthcare.ie
Irwin Mitchell Solicitors (specialist in personal injury claims) offices throughout the UK London tel. 0207 404 3600 www.irwinmitchell.com

1 www.ageuk.org.uk
2 www.ageaction.ie
3 http://universaldesign.ie/Built-Environment/Housing/ PG 55 & PG 87 show examples

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Life change

Someone who has had first hand experience of suddenly finding the need to adapt to a life without the use of limbs is Fiona Watson of Co Down.

At the time of her illness, Fiona and her husband Graeme were converting a bungalow into a two storey house, work which they had almost finished. If the UD Guidelines had been available to follow at the outset when the couple's plans were being drawn up, these would have saved Fiona and Graeme a great deal of additional expense and effort.

Instead, Fiona and Graeme found themselves looking at the design from a completely new perspective and, as Fiona says, re-thinking everything. "Some areas were easy like making doors a bit wider for my chair, but the ground floor was a major problem as it had to be completely reconfigured to make it more open, and that involved extending the original footprint which of course brought with it the need for planning permission. We also added a balcony off the main bedroom and a lift."

Whilst gaining permission for these didn't prove a difficulty, Fiona says that her experience was one of going around in circles a lot of the time as she and her husband searched for the products that would enable Fiona to do the types of things the rest of us take for granted. "I like a modern style," she continued, "but the aids available from the NHS (National Health Service) were invariably white and clunky and looked awful, particularly for the bathroom. We'd originally planned for it to have a wood finish with carpet, but the NHS dictate what you must have – for example a non-slip surface – and that really means choosing from their range."

"Having just completed a very long stay in hospital, as you can imagine, the last thing I wanted was to be reminded of it but the floor tiles I had to have were just like the ones I'd been looking at for the past six months. Similarly the white melamine everywhere, but finding alternatives with a little bit of a nod to design was incredibly time consuming, very often we ended up ordering from places like the USA and not just for the range, the prices were a fraction of anything in the UK."

"For someone like me, being able to get out is terribly important and as a sun worshipper I of course love the beach, but a standard chair is no good for the sand. My beach chair is a classic example of what I mean about having to literally search the world for what you need as the one available in the UK cost £4,000, but we then found an assemble-yourself version in the States for £1,200!"

"Some areas were easy like making doors a bit wider for my chair, but the ground floor was a major problem as it had to be completely reconfigured..."

In all, Fiona estimates that it took them at least five years to reach the point where they had the new house organised and finished to a workable level. "Overall, in my experience, the additional cost of getting anything that is non standard is huge, it's not just doubled, it's often far more and if you then add on the structural and internal alterations it's a major financial outlay at a time when just getting through each day is a challenge." ■

Gillian Corry

Looking from the basement up
Thermonex Ltd

Home and dry

Basements are a convenient way to add space when extending above ground isn't possible. There are two critical areas which we address in this article: resistance to moisture and water resistance to make sure your project is a success.

All elements of basement construction are specialist work and therefore are not really activities that should be undertaken directly by a self-builder. The information outlined here is given to assist you in understanding the procedures. The general principle is to assess the risk of water reaching the structure and the nature of the structural options with respect to water resistance, and then to select a waterproofing system to provide the internal environment required.

Waterproofing of basements is covered by BS 8102 'Code of Practice for protection of below-ground structures against water from the ground', which is referred to in the Technical Documents of the ROI Regulations but not specifically cited in the NI Regulations although it is likely to be commonly adopted, and it is intended for designers and construction companies.

Site assessment

Before starting any design or construction work, a site investigation, including a desk study, should be made to establish the ground conditions (including the type of subsoil), the level of the water table (including the provision for natural drainage), the potential for future variations in the water table level, and the location of any existing drains or other services. Assessment should also be made for the presence of contaminants and whether there is a risk from radon.

Internal environments

There are three environmental grades (1-3), which essentially define how dry a space must be for a given usage. Habitable space is defined as grade 3 where no water penetration is acceptable,

and heating/ventilation is necessary to prevent condensation. Grade 2 also has no water penetration but omits heating, and condensation related dampness is therefore tolerable. Grade 2 is the minimum required for garages, and as no water penetration is acceptable this allows future flexibility in converting to habitable space (Grade 3).

The methodology

Figure 1 outlines the principle factors and stages that need to be addressed in order to produce a robust waterproofing design for a basement. The directional arrows indicate that some matters are interrelated, and that there may be a need to repeat the process in order to also address suitability, buildability and reparability. It is worth emphasising that, at design stage, the team should anticipate defects in the system, some groundwater pressure, and how leakage could be remedied if unacceptable, something that is often given very little consideration.

The main points to developing a robust design are:

- The position of the water table, the drainage characteristics of the soil and other site-specific properties and the implications of constructing a basement on the likely groundwater characteristics. The type of soil can greatly influence the quantity of water reaching the basement wall. Free-draining soils not subject to variability in water tables generally present fewer problems than clays (which tend to be impermeable), but can still become saturated in prolonged and heavy rainfall. It is important, therefore, to determine the soil type and, in particular, its drainage characteristics.

  The ground characteristics give rise to three general levels of risk:
  High: where the water table or perched water table is assessed to be permanently above the underside of the base slab.
  Low: where the water table or perched water table is assessed to be permanently below the underside of the base slab. This only applies to free draining soil.
  Variable: where the water table fluctuates.

  In certain ground conditions, external drainage can be used to convert the 'high' and 'variable' water tables to the 'low' condition, but these involve maintainable sub-ground drainage.

  Regardless of the ground conditions, it should be anticipated that water pressure will come to bear some of the time during the structure's life, because soils (even well drained ones) become saturated during persistent rainfall.
- The need for continuity in waterproofing protection, taking into account the proposed type of foundations (although technically there can be conditions where discontinuity of waterproofing could be permitted, other factors such as the effects of radon or other ground gases, will typically require waterproofing to be fully continuous).
- The appropriate type of waterproofing protection, i.e. Type A, B or C (see Table 1 for descriptions of each of these three Types of protection). Enhancement measures to reduce risk include the use of combined systems providing more than one form of protection, e.g. Type A and Type B or one of these combined with a Type C water management system. Further measures to reduce risk include using fully bonded membranes and external maintainable drainage.

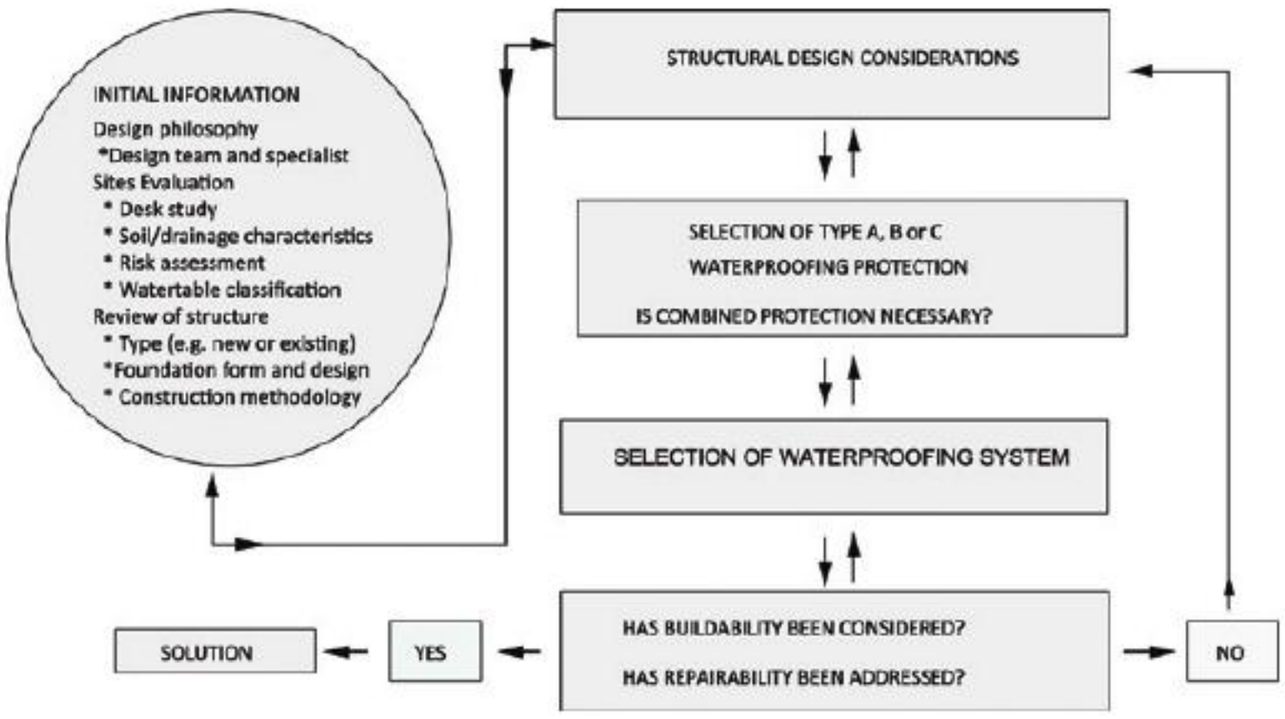
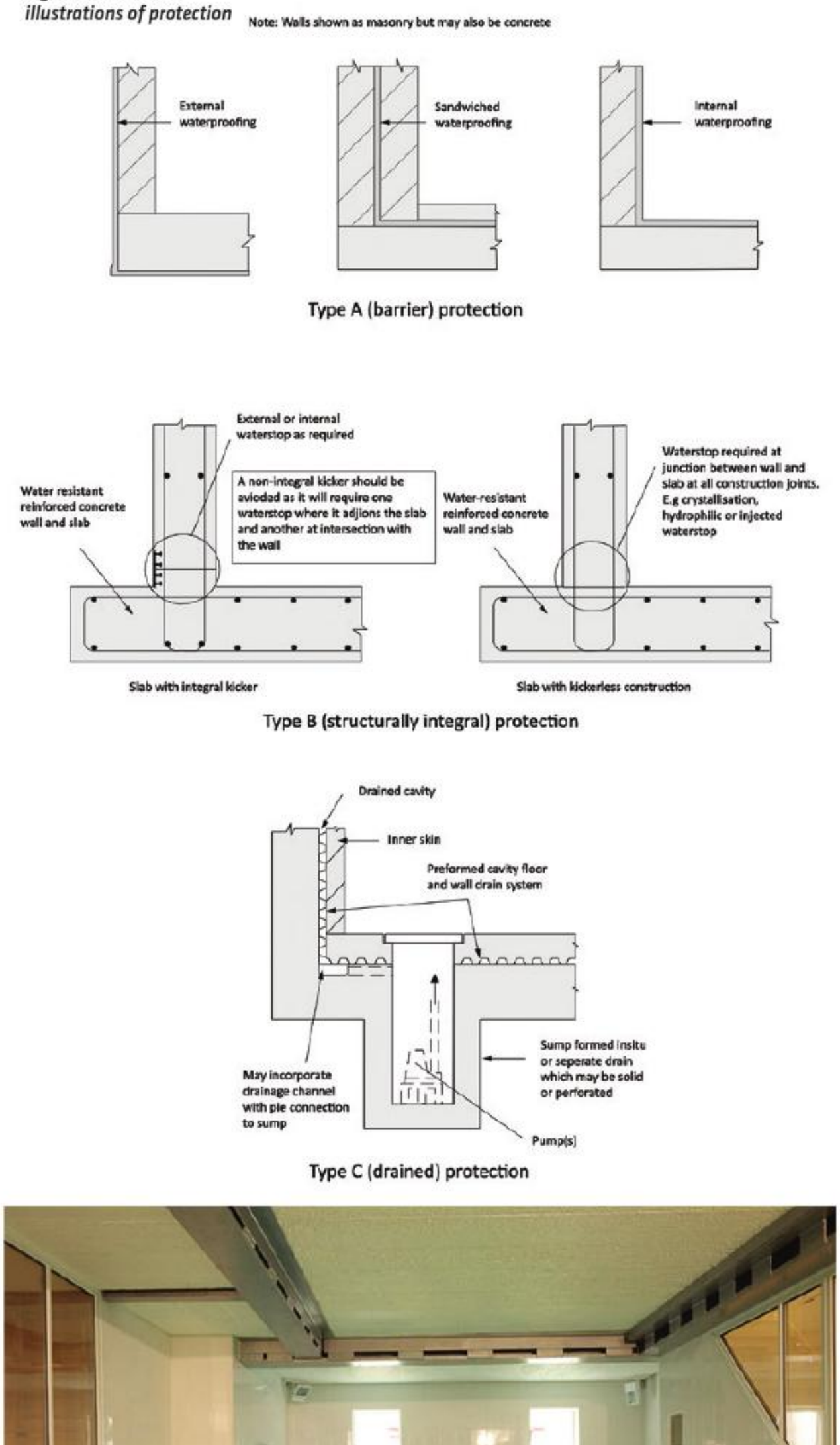


Figure 1 Waterproofing design flowchart

- The appropriate type of primary waterproofing system that needs to take account of both the water and any aggressive materials in the soil and/or ground water, and predicted cracking (in accordance with structural design codes) from the structure, which is why the water-proofing (barrier materials) and the form of structure need to be considered together. The typical range of barrier materials and cavity drain membranes is given in BS 8102, ▶

Glass floor looking down into converted basement (above left)
Therm onex Ltd

Figure 2 Schematic illustrations of protection



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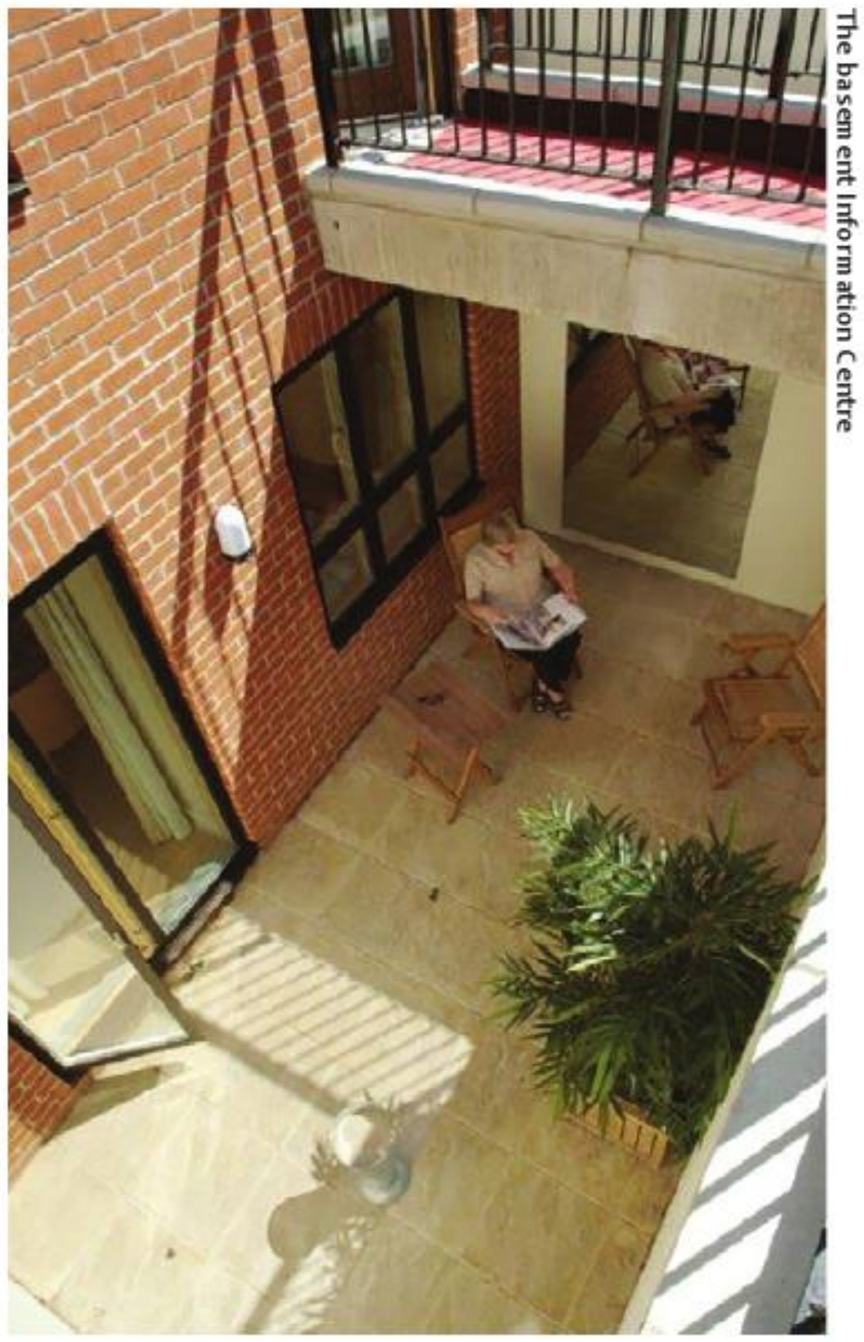

The basement Information Centre

which separates them into seven distinct categories according to product type, form and application (see Table 2). (**Note:** the older method of clear drained cavity walls combined with floor drainage tiles, typically made from clay or concrete, or no-fines concrete floor layer have largely been replaced by cavity drain membranes.)

- The type of foundation and its suitability for providing continuity of waterproofing.
- The need to ensure that adequate waterproofing details are provided for the system in general (e.g. wall base details, laps in membrane, etc.) and at changes in the level of the slab at the head of the wall where it adjoins the superstructure, and at window openings that go below ground level. A three dimensional review of structure should also be undertaken so as to identify any complex geometries.
- The structural, building services. Note: drainage services are best pumped up and over the basement walls rather than directly discharging to a sewer in order avoid the complexities of passing services through the basement walls as well as problems with backflow.
- The overall building weatherproofing design and basement waterproofing designs, which should be considered together, as they will normally interact.

The wide range of materials and other factors previously mentioned is why specialist advice should be sought in order to produce a robust design. This is a fundamental change introduced into BS 8102.

Existing basements

An analysis, through visual inspection, inspection of drawings (where available), and potentially intrusive investigation, i.e. trial hole formation, should be undertaken so that a thorough understanding of the structure and how it is constructed, is obtained. The effects of any structural discontinuity as may typically occur in an existing structure must also be assessed. This is vitally important prior to any construction or waterproofing taking place where the height is to be increased or where a basement is to be installed in an existing house as such analysis and the methodology of structural alteration will be required in order to minimise effects on adjoining or adjacent properties. There is a legal requirement of the Party Wall Act in England and Wales to deal with such situations but there is no such requirement in NI. However, the general principles are logical for all such properties and your Building Control Officer may offer some advice or you could consult an engineer or surveyor.

Many of the considerations for new build apply to waterproofing existing basements, e.g. site assessment, the environmental grades (1-3) and the general methodology. However, there are too many variations due to the individual nature of each existing basement to provide comprehensive guidance in this article but Tables 2 and 3 provide comments for a few of the more specific aspects of waterproofing existing basements. ▶

Risk associated with water table	Water table classification	Types of water-resisting construction		
		Type A	Type B	Type C
Low ↕ High	Low	Acceptable	Acceptable	Acceptable
	Variable	Acceptable if "variable" classification is due to surface water. The manufacturer's advice should be sought.	Acceptable	Acceptable
	High	Acceptable where: a) an appropriate cementitious multi-coat render or cementitious coatings is used, or b) the wall is of concrete to BS EN 1992.	Acceptable	Acceptable

Type A (barrier) protection relies primarily on the membrane where the structure is permeable, and defects in the membrane pose more of a problem above a low risk, which is why there are conditions on its use with variable and high risk situations.

Type B (structural) protection avails of the water-resistance of reinforced concrete (built to BS EN 1992) or piled walls and floor. Because the structure is designed to be non-permeable, defects such as cracking can be pressure grouted.

Type C (drained) protection controls ingress by the provision of an internal drained cavity system, which relies on float activated pumps (generally one or two mains operated and a battery backup pump) to discharge any water finding its way through the external structural wall or floor. This system requires a maintenance procedure for the pumps.

Measures to reduce risk include:

- Combined protection.
- Incorporate appropriately designed sub-surface drainage and ensure that this is maintained.
- Use a fully bonded waterproofing barrier.
- Lower the permeability of the main structural wall.
- Use concrete with a waterproofing admixture, e.g. to BS EN 934.
- Ensure that discharge systems, e.g. pumps, are maintained so that the system remains effective.

Table 1 Use of different protection types based on water table classification

Type of membrane	Description	Application[3]
Bonded sheet membranes	Bitumen-based, sheet membranes can be either: a) cold-applied (self-adhesive); or b) hot applied ("torch-on" or bonded using a hot melt bitumen adhesive). Composite sheet membranes.	Considered as a waterproofing barrier material[2] and can be applied externally or to sandwiched construction (Figure 2(A)).
Liquid applied membranes	There are many types of liquid applied membranes, which include one or two part systems.	
Geosynthetic (bentonite) clay liners	These contain bentonite with a single or dual 'carrier' material, typically of geotextile or high-density polyethylene. There are two principal forms: dry bentonite and pre-hydrated bentonite.	
Mastic asphalt membranes	These are applied in three coats as a hot liquid.	
Cementitious crystallisation slurries and powders	These are applied as coatings to surfaces of concrete walls and slabs or as a solution or powder that is added to concrete.	Considered as a waterproofing barrier material[2] and can be applied internally or externally to new build construction, or internally to existing construction (see Figure 2(A)) and Table 3).
Cementitious multi-coat renders, toppings and coatings	These are generally applied in multi-coats or slurries and are resistant to liquid water but allow some water vapour penetration.	
Cavity drain membrane	Dimpled, flexible, high-density polymer sheet, which can be placed against the internal face of a structure after construction.	Considered as system designed to intercept water penetrating[3] the structure of new build or existing construction and direct it to a drainage system discharging externally (Figure 2(C)).

1. See Figure 2 – A, B, C.
2. These systems give rise to structural issues as the waterproof barrier causes increased water pressure to be applied to the walls and floor.
3. These systems do not change the loadings due to water on an existing structure, other than where remedial measures are taken to control (reduce) water ingress.

Note: "tanking" refers to the application of an appropriate waterproofing barrier to the walls, the base slab and, where relevant, the roof of a below ground structure, such that the entire envelope of the structure below ground is protected against water ingress. Under this description a cavity drain membrane is not considered to constitute tanking, but a water management system.

Table 2 Categories of barrier materials and membranes

Further information

Basements: Waterproofing - General guidance to BS8102:2009 (TBIC/005) published by The Basement Information Centre, www.tbic.org.uk. This 44 page publication (available in hard and soft copies) gives further information and is illustrated with a number of Waterproofing Details. This guide is primarily aimed at new build but there is a short section on waterproofing existing structures. The National Housebuilding Council (www.nhbc.co.uk) has recently issued a new Standards Chapter to reduce basement claims, and which typically adopts the more enhanced measures for waterproofing of basements (e.g. Combined construction).

A condensed guide to waterproofing of basements is also given in the new *TBIC Guidance Document – Basements for dwellings*, which also provides information on other matters related to

Table 3 Key features to waterproofing existing basements

Topic	Existing basement	Existing basement increased in height or the addition of a basement in an existing property
Internal membranes	The suitability of applying a waterproofing membrane internally depends on the nature of the wall's surface. Friable, loose, dusty or painted surfaces will need to be properly examined to see if they can be stabilised or treated with a bonding layer prior to an application of a suitable membrane (see Table 2).	Walls and floors lowered by specialist underpinning technique gives rise to the use of different materials of varying ages and in consequence the potential for differential movement between the new and existing elements of construction. Also the existing walls may have an irregular surface, be contaminated due to previous contact with the ground, or have been previously painted (decorative or an attempt at waterproofing - e.g. bituminous paint) making it difficult to apply additional water-proofing. For these reason they tend, generally, just to be suitable for the use of Type C protection (drained) protection.
Aspects of waterproofing	The floor will likely be ground bearing and just butted to the existing walls. This gives rise to a joint (discontinuity) between the floor and the wall which may require special measures (an expansive mastic sealant) to cater for temperature or moisture movements at such junctions. This situation may also occur at junctions between internal and external walls.	The floor will likely be ground bearing and just butted to the existing walls and although this gives rise to a joint (discontinuity) between the floor the provision of a Type C protection will cater for normal wall and floor movements.
Extent of waterproofing	Internal barriers and cavity membranes generally need to be applied to all external and internal walls. The reason for this is that if the water proofing to the internal surface of the external walls is stopped at a junction of internally abutting wall there is a bridge that can allow water ingress. There is a similar bridge at the junction between a waterproofed floor and internal walls. Also the waterproofing may need to be applied to the full height of the walls as the barrier created by a partial height waterproofing may simply cause any retained water to rise up and over the lower level waterproofing.	

Richmond Building Products

Building Regulations such as structural design, thermal insulation, fire resistance and other parts to be met for a dwelling with a basement. This again relates specifically to Building Regulations for England and Wales, but much of the information may be of use in NI and ROI. ■

Alan Tovey, The Basement Information Centre
www.tbic.org.uk

info The companies listed below provide products & services relating to this article.

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It is possible to knock through most walls; the first step therefore shouldn't be about whether it is. As with all good design you should think the project through – in this case consider if you have chosen the right location to knock through. What impact will this opening have on existing and future layouts of furniture within both rooms, what door type is most appropriate e.g. standard or glazed door, sliding door, pocket or concertina door, and are the two spaces that you are knocking through really best suited to each other in use, e.g. bedroom located off a kitchen, bathroom located off a living space, etc.

Staying on the topic of internal openings, the work is often carried out to remedy a layout that currently does not suit the homeowner's way of life. The typical scenario of opening up an existing living space to an underused dining room should provide guidance as this can often lead to losing points of ingress, e.g. closing off the existing access from the hallway to retain wall space.

Apart from the potential inconvenience know that if you create an 'inner room', that is, one that is accessed through another and not directly connected to the hallway (unless a utility room or bathroom), and you have added doors within the internal opening, then you will most likely have to provide a fire escape window or door from that inner room to the outside, to satisfy current building regulations in NI and ROI.

Also make sure you do not place the opening too close to the corner of the room. Apart from structural issues, you will not be able to install full width architraves and skirting boards to all sides of the doorway, and nothing looks worse!

With an external opening, the common scenario is that it is desired because the house relates poorly to the outside or that existing windows are too small and do not make the most of their aspect. Before you widen the openings or make new ones, consider a few points: you may gain a view but will that mean you lose wall space for furniture? What will you see

from the window or door and at what height should it be set?

For example, if it is a new window within a lounge you will want to be able to look out of it while seated. If it is a panoramic or feature window, think about how you are going to break it up as this has a significant bearing on the cost, i.e. one large pane of glass, positioning and height of opening windows, impact of crossbars, (mullions and transoms) on your view.

Planning Permission and Building Control

Unless you live in a listed building, you do not require planning permission to create new doorways or windows internally. Similarly, small or singular external openings often do not either if they are to the rear or side of the property, but as every house is different and has differing relationships to boundaries, proximity to neighbours etc., the best advice is to contact your local planning department and query it with them directly. Larger openings or openings to the front elevation should always be discussed with an architect or your local planning department.

In NI you always require building control approval to create new window and door openings. Depending on their size, the department may request a structural calculation or certification for the lintel or steel beam over. This generally is only if beyond a standard 1-2m opening. A way around this is to use an approved off-the-shelf lintel from a supplier who can provide you with a calculation for building control. Always confirm the support you are using with building control in advance of carrying out any work.

In ROI you do not currently require building control approval to create a new internal opening within a dwelling. For an external opening it will be if a planning application is involved and this entails notifying the local authority with a commencement notice (without documentation). However the onus is always on the home owner and builder to conform to current building control standards.

If the opening is larger than 2m, then it is always recommended to involve a structural engineer regardless of location. A design professional, or in the case of NI, building control, will also consider what knock-on effects might result from your actions, e.g. the fire escape may have been compromised by inadvertently blocking it up.

Knock-knock

With the aid of steel and concrete lintels, most walls can be opened up without much issue. A lintel is a load bearing support that spans the width of the opening to support the weight above. On standard single and double door openings, this is typically achieved using a pre-stressed concrete lintel, which is relatively inexpensive, but make sure there are at least three courses of blockwork over it as this gives the concrete lintels added strength.

Once you exceed the standard widths for concrete lintels e.g. typically over 2.5-2.8m, then you will require a steel lintel over the opening to span the greater distance, e.g. a proprietary insulated lintel or standard sized steel beam from your local steelwork supplier. Steelwork lintels are typically more expensive and require 100mm reinforced concrete load bearing pads, 250mm minimum under the steel beams.

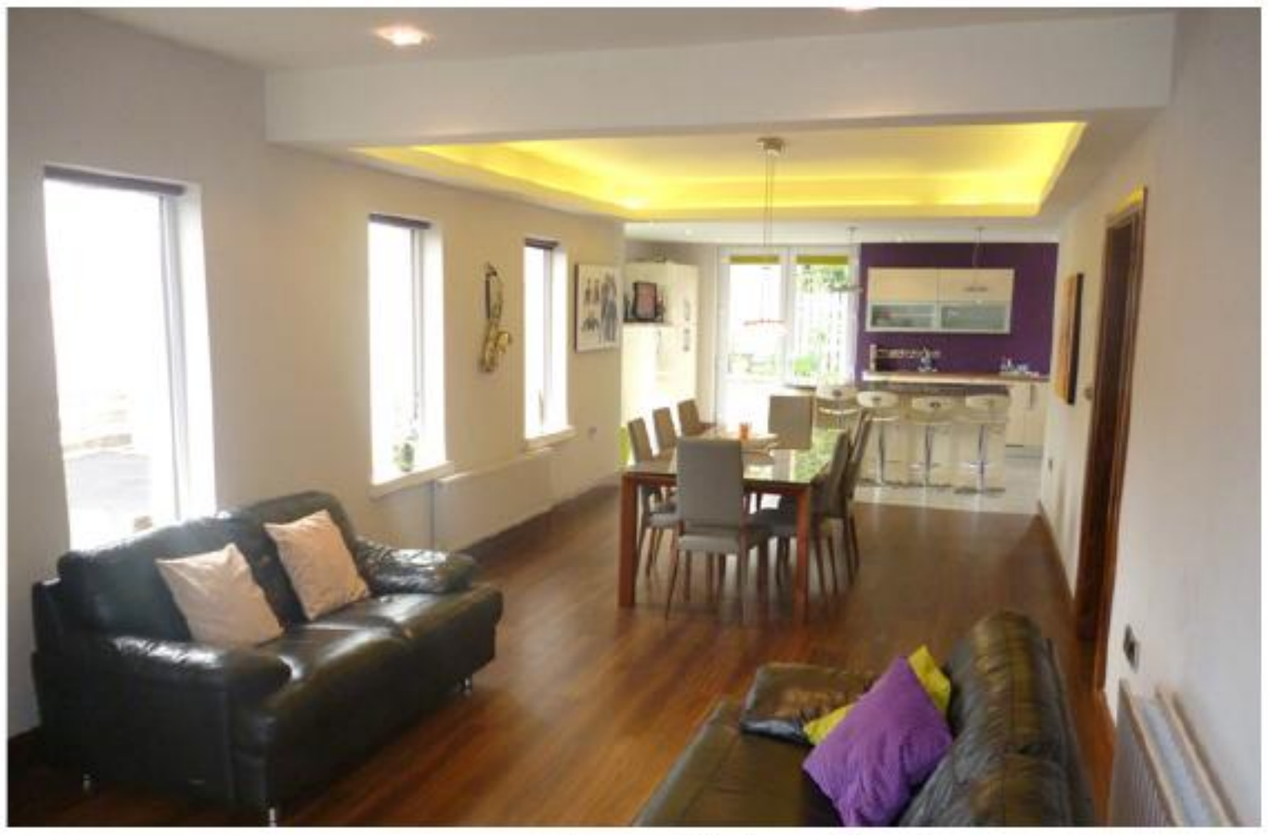
An example of extending a window into a door

The big question for both windows and doors is how to tell what is and isn't load bearing. You may think that if the wall is timber studwork it's non load-bearing, but that's not true! In many older properties, some of the internal studwork walls could be carrying load either from floor joists above or from the roof. New build timber frame homes can also have load bearing internal and external timber framed walls.

A good rule of thumb is to follow the wall from the ground up to see where it goes and what lies above it. Follow it into the floor space and see if it lines up with walls above that might take support from it below. Also look in the roof space and see if it stops at the ceiling joist level or whether it carries on up to support heavy roof timbers or rafters. Also have a look at the floor covering, if it's timber the joists are going the opposite way. If in any doubt, seek professional guidance from an architect, structural engineer or contractor.

Electrics and plumbing

It is vitally important that you cut off the electricity and you should also check on the location of the mains stop cock before starting work on a wall. A ▶



Opening made at the steel juncture; lowered ceiling provides separation and hides the beam.

scanner is a useful piece of equipment to detect copper pipework and electrics, even water filled plastic heating pipes can now be found with the correct meter. If you have any obvious wires, plugs or plumbing within the wall in question, always consult an electrician or plumber to have these isolated before work commences.

Another problem encountered on site, especially in semidetached houses, is that there almost always seems to be a radiator in the way of the proposed new opening! In that case a new location has to be provided for it at an extra cost.

Finishes

Tempting though it may be to get stuck in with a sledge hammer, think about the smaller details first. Are you going to re-plaster the whole wall or are you confident in your or your contractor's abilities to patch in the disturbed plasterwork.

If you are opening up an external wall, there will be disturbance to, for example, stonework, plaster, timber cladding, etc. Don't forget either about skirting boards, the floor finish that exists and how easy it will be to extend it into the opening afterwards

I can't stress this enough; the difficult part is putting back the finishes. This apparently relatively simple job often requires the expertise of several skilled trades, namely a joiner, a plasterer and finally a painter / decorator.

In my experience I would suggest that with careful planning and a clear understanding of the different components, dimensions of doors and door liners and a good level of skill in regard to working with wood, then everything with the exception of plastering could be tackled by the self-builder.

Finally and most importantly, ensure you have set up dust sheets and protection for the floor (plywood sheets, etc.) before you start. A little time and thought spent in preparation and sealing off the affected room prior to knocking through, can save you a lot of time clearing up afterwards.

DI-why

If the wall is studwork and you are satisfied it is non-load bearing, cutting through it to create a new opening is well within the realm of an experienced DIY enthusiast. Masonry walls on the other hand require the use of heavy duty masonry saws that are not for the faint hearted. Only attempt this if you have prior experience and are confident in their use. If not, another option is to drill 10mm holes at intervals of about 50mm with a vacuum attachment to cut down on the dust. In all cases always wear dust and ear protection or you will regret it afterwards!

Generally all masonry walls should be regarded as load bearing and therefore must be suitably propped above the future opening. If you are asking "What is a prop?", then get a contractor in; it should only be attempted by someone experienced in this type of work.

Most work on external openings will involve supporting two independent skins, and dealing with insulation within the cavities and external finishes. This is best done by a contractor and only really falls into the realms of DIY if you were retaining the width of an existing window but dropping its height. In other words, only if you're retaining the supporting structural lintels over the window but removing the wall below it, which would be non-load bearing.

Heat leaks

A thermal bridge, also referred to as a cold bridge, is typically found where different surfaces and components within a building meet, for example, junctions between floors and walls, windows and doors and the surrounding window heads, jambs and cills. The PassivHaus Institut defines a thermal bridge as a localised area of the building envelope where the heat flow is different (usually increased) in comparison with adjacent areas (if there is a difference in temperature between inside and outside).

Careful thought and detailing is required to minimise, or preferably, eliminate the potential for a thermal or cold bridge occurring as these can often lead to cold spots, reduce the energy efficiency of the room and ultimately result in condensation and mould growth.

It is therefore vitally important that the current standards for insulation, damp proof coursing and air tightness are followed. While you can download typical details from the large suppliers of insulation, unless you understand it and the process involved in ▶

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Clockwise from above left: New internal opening with steel lintel above, internal glass door in hallway, street-facing door converted into a 'shutter window'

achieving it, then it is usually better to leave this to the professionals. Returning to the topic of lintels, to prevent thermal bridging at this juncture consider a prefabricated insulated galvanised steel lintel.

Air tightness is also critical. All junctions should be secured down to the seal between plasterwork and window cills and surrounds. If air can move freely around and between surfaces and voids, then heat transfer is increased and energy is lost. Good workmanship, supported by a wide variety of specialist airtight tapes for window surrounds and sealants for all minor junctions, for example cill boards abutting window frames, is key.

What door or window system should I choose?

The choice of windows and doors is endless! There is a system for everybody's budget and style. For doors the selection is from a single door, double or patio doors, bi-fold doors (ability to open up a whole wall to the garden or terrace) or sliding doors. Internally there are pocket doors which can slide into the thickness of a standard stud wall. Windows depend upon whether the system is a casement window, tilt and turn or sliding sash. You can get specialised bi-fold and sliding window systems, but these tend to be more expensive.

Patio/French doors remain our door of choice throughout Ireland, and again with careful detailing, that is 180 degree hinges added to enable the doors to open right back, can achieve a similar effect to sliding and bifold for less cost. In all cases make sure you choose a low threshold to avoid trip hazards.

In terms of finishes uPVC is very cost effective and offers a wide range of colours and styles. Timber tends to be initially slightly more expensive (painted or stained; I'd recommend staining internally and painting externally as this option tends to require the least maintenance), followed by midrange all-aluminium systems. Some of these and composite timber and aluminium (alu-clad) tend to occupy the more expensive end of the market.

Two relative new comers on the scene in Ireland, and ones to watch out for in the future are the high end uPVC-aluminium composite systems, which offer a new look in internal foil finishes, and the very stable and robust chemically modified woods, which are much less prone to movement when subjected to heat, moisture or water. The wooden sections of the windows frames are jointed together at 350mm intervals to further prevent them from warping and twisting. These are either stained or painted as with regular wood.

For front and back doors, the same options exist but you could also opt for a foam or timber filled composite, or at the high end, engineered timber and aluminium doors. Timber, uPVC and aluminium doors will all move when heated and cooled.

A key consideration with doors is their colour if they are south or west facing. The darker the door, the more it will heat up and therefore the greater potential for movement. This has implications for paint finishes in particular which can flake and crack over time so consider using a natural oil based stain or a paint finish that minimises these effects.

Indoors, your choice will depend on if the room is 'public' or private and that will determine whether it should be glazed or solid, for example, a living room can have a glazed door. If you want a good level of sound resistance choose a fire door as these will always be at least 44mm thick and will generally have better sound resistance than most of the 35mm thick doors available. These are usually composite doors made from a chipboard core with a wood or painted veneer over and will typically be around a third more expensive than a regular door. However if you are only buying one or two doors, this may only equate to around £40 - 50/€55 - 70 or £55 - 70/ €75 - 100 extra per door, which is not significant when taken against the rest of the building work involved.

Glazing, draught sealing and ironmongery

Within 10 years triple glazing (more energy efficient and sound absorbent than double) will become the standard for all new houses but at present you can expect to pay around 5-10 per cent more than a standard window system or 10-15 per cent more for larger more specialised windows and doors. In terms of cost bear in mind the larger panes of glass are heavy and may require special lifting equipment.

If you want minimal sight lines or frames to your

doors and windows, you will probably have to compromise slightly on energy efficiency. If cost is not critical there are products that give both to a high level, however, a general rule of thumb is that highly energy efficient triple glazed windows and doors tend to be chunkier than double glazed. With careful measuring it's possible to reduce the appearance of the frame size from the outside by hiding it behind the window reveal but watch out for opening sections that may get caught on the plaster.

Also pay careful attention to the specification of the window and door furniture. There are few options at the budget level, but as you move higher up the price bracket the choice widens. By the coast, think yachts and highly polished 316 (marine grade) stainless steel and anodised aluminium which have very good corrosion resistance; don't forget to pay attention to the quality of the internal latches, hinges and fixings too.

Draught sealing is also very important, retrofitting is always a second best option. Consider the quality of the systems you are shown and query whether there are one or more draught seals to the system to reduce wind movement within the frame, which ultimately improves energy efficiency. Also a means by which any rainwater that has penetrated can run off to the outside.

Four to six point locking systems or dead bolts come as standard with most doors nowadays. Since insurers have started insisting on locks to windows, now most companies provide this option at the lower and higher end of the market. Sliding folding doors usually come with shot bolts at the head and cill of the door to make them arguably as secure as the other door systems. (See Spring 2015 magazine for a detailed article on locks.) ■

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All images courtesy of the author

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Chemically modified wood: Accoya, www.accoya.com
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Populating your pond

In the second part of our series on adding a pond to your garden we look at choosing the right plants and wildlife

The type of pond you have will naturally guide your choices; each plant will serve a purpose. In the case of an informal, fish or wildlife pond, then plants may be selected for oxygenating, for cover, for food value and for dressing the scene.

Horticulturally speaking, pond plants require a low-nutrient environment while the plants that surround it, such as bog plants, prefer plenty of nutrients and lots of organic matter. While a pond and a bog garden (or marginals, see below) fit naturally in a visual sense, they are very different habitats which need their own demands met. If this is too much, go for a formal style as it will look cluttered if plants are added to the mix. Size matters too: fewer plants in smaller ponds will leave more reflection space.

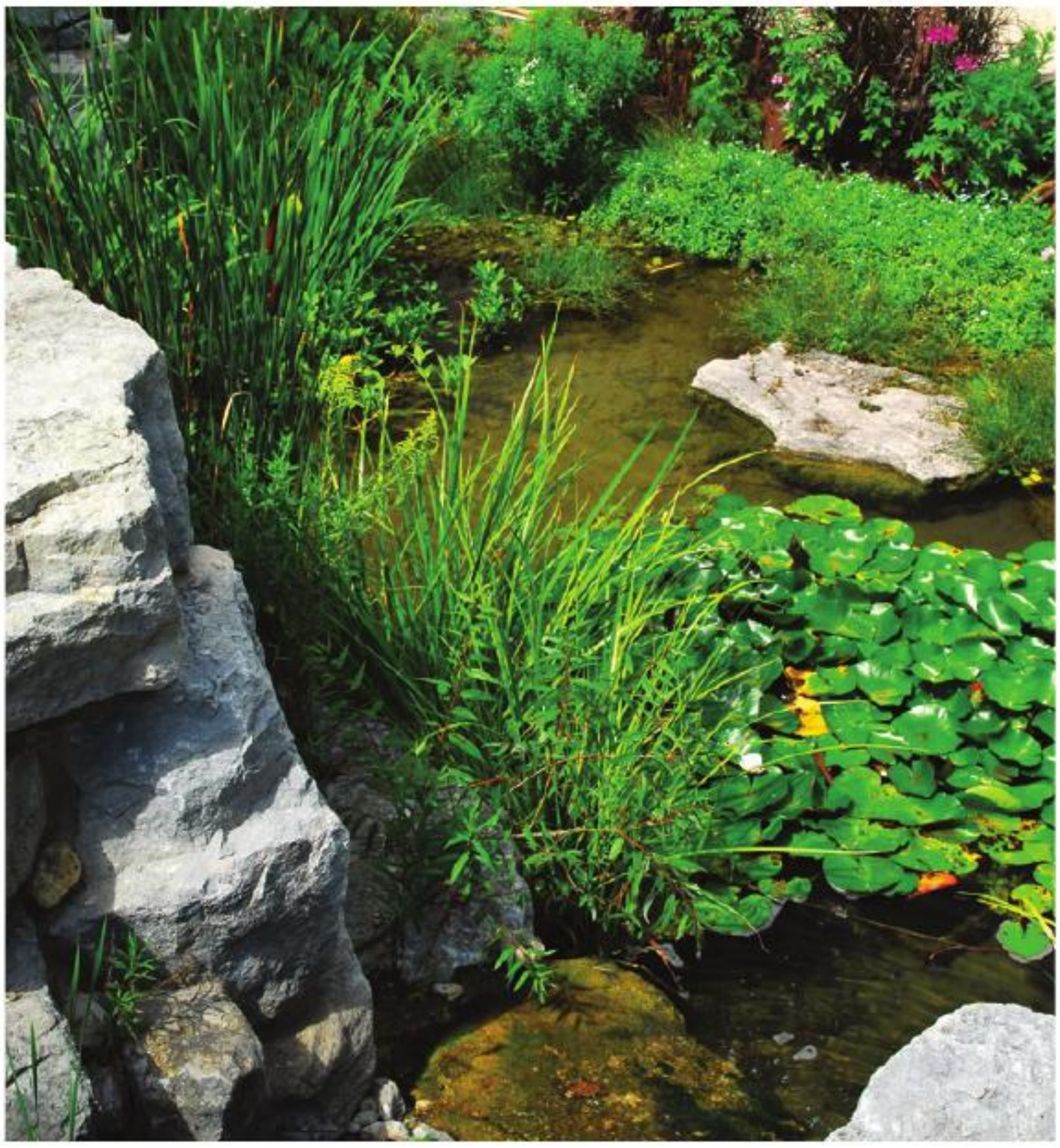
Aquatic plants

Pond plants are usually sold in aquatic baskets that allow water, air and gaseous movement. The baskets can be settled easily onto the shelves and base of your pond or you may raise them up on bricks until they've grown enough for foliage to hit the surface; then lower them a bit deeper after a season or two. Occasionally plants come wrapped in a fine mesh or hessian fabric and these may need to be planted between some stones or weighed down until they establish an anchoring root system. It's a good idea to mulch aquatics with a thin layer of grit or gravel to prevent fish and wildlife inhabiting the pond from disturbing the roots or stirring up soil.

Monet's water lily paintings and indeed his garden at Giverny, France, to this day exult the Nymphaea family, but looking beyond water lilies there are other rooting plants that display surface floating leaves. Particularly attractive are water crowfoot (Ranunculus aquatilis) but it can crowd small ponds quickly, Amphibious bistort (Polygonum amphibium) and broad-leaved pond weed (Potamogeton natans).

Not every plant grows out of the base of your pond, there are some that are fully submerged and thrive underwater and there are floaters with no roots down into the bottom strata (soil, stones, grit) of your pond.

Submerged aquatics or 'Oxygenating plants' often come sold in bound bunches with a lead or metal weight. I am not a fan of lead which is poisonous to wildlife, so I usually plant these up in a basket of stones. Plants such as Water starwort (Callitriche Spp), Curled pondweed (Potamogeton crispus) and Spiked water milfoil (Myriophyllum spicatum) work well.



Water brings to a garden the finesse of reflection, the dynamics of movement and the experience of sound

Floating plants are simply allowed to sit upon the water's surface, and when buying it's preferable to do so from a garden centre than from an aquarium shop (the species sold may not be particularly hardy and may be invasive to Irish watercourses).

Marginals are those plants that edge your pond, sometimes on a shallow shelf, other times spreading into the bog garden or planted spaces beside the water feature. I make the distinction between aquatic marginal and terrestrial marginal, a distinction not always made in garden centres and garden magazines. Some water loving plants may extend roots into the banks of your pond and establish a partial footing on land which is great as it blurs the boundaries and looks fantastically natural, but they may die off if planted into a moist atmosphere that sporadically dries out and so are best kept in water from the get go. Shelf marginals (those happy in water depths down to 150mm ▶

Paul Lindsay
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deep or less), include Yellow iris (Iris pseudacorus), Water forget-me-not (Myosotis scorpioides), Water mint (Mentha aquatic), Lesser spearwort (Ranunculus flammula) and Cuchulainn's favourite Brooklime (Veronica beccabunga – it's mentioned in the Tain as medicine and food).

Other plants that tolerate wet conditions will thrive in the land margins of your pond and if you construct an adjoining bog garden they will thoroughly enjoy it there, but they need soil not water for nutrition and their roots must be allowed to breathe; those guys will perish if plonked into a pond. But if you create a marshy area or bog garden adjacent to the pond they will thrive and be a great attraction to butterflies, damson flies and dragonflies.

Marshy area and bog garden plants are great beside a pond, they can blur right up to the edge, but I like a barrier between my wetland and my pond. Extra pond liner, rocks and planting help to prevent the run-off of boggy soil nutrients from entering the pond and not just muddying the waters, but encouraging algae and blanket weed. Suitable plants for this area include Purple loosestrife (Lythrum salicaria), Meadowsweet (Filipendula ulmaria), Marsh marigold (Caltha palustris), Marsh woundwort (Stachys palustris), and Creeping jenny (Lysimahia nummularia).

Additional wildlife. The addition of Bugle (Ajuga reptans), Meadow buttercup (Ranunculus acris), Ragged robin (Lychnis flos-cuculi) and Salad burnet (Sanguisorba minor) to your marshy area introduces more nectar for bees and butterflies but also larval food plants for some butterfly species. As your marsh area fades out into drier borders you can happily plant away as many nectar plants as you desire, add cover for birds and insect hotels – this will make your pond a watering hole and facilitate a whole range of garden wildlife. Bees drink, butterflies drink, birds drink but so too do cats, dogs and foxes.

> "...sticking with natives is not just to prevent potential colonisation but to support local wildlife that after all is native too."

Stream and riverside. If your property has a water course or you are diverting some of it to create your pond, plant selection is key. Do avoid any invasive species that may find their way downstream and become a problem by displacing native flora and fauna. Native reeds and native flowering marginal species such as Purple-loosestrife or Yellow flag irises are acceptable choices ecologically and stunning contributions horticulturally. If you create an artificial and closed loop stream on your property with no fear of moving plant material into natural watercourses elsewhere, then any marginal will enhance. But I will say that sticking with natives is not just to prevent potential colonisation but to support local wildlife that after all is native too.

Extra pond liner, rocks and planting help to prevent the run-off of boggy soil nutrients from entering the pond

Paul Lindsay
www.scenicireland.com

What swims within

A formal or informal style pond will happily host goldfish or koi carp; with them though comes the need for UV and oxygenating pond filters with ▶

True wildlife ponds will find a harmony between frogs and insects

Image courtesy of
Nahid Sultana
www.journeyaroundtheglobe.com

pump to help keep the water clean and fish healthy. Plants can be used to further oxygenate the water and as cover or shelter.

But be warned: there's a big difference between a fish pond and a wildlife one and you can't have both at once. Let me explain. People often say 'I'd love a garden with birds and butterflies' so they fill it with loads of nectar plants, make butterfly habitats and put up a couple of bird boxes. The butterflies come and lay some eggs and the birds come and nest and it's all wonderful - until the birds eat all the caterpillars and soon the only wings are feathered. Nature will always find a balance and so it is with ponds. True wildlife ponds will find a harmony between frogs and insects, but if you add ornamental fish they will eat everything that swims within it. If your pond doesn't manage to attract frogs it may get overrun with insects and not all will be damson flies and sipping butterflies – some may be nuisance flies and gnats – to which frogs or malaria nets are the only good answer.

It ain't easy being green

I love frogs; they are green slug-munching machines, allowing me to be more sustainably 'green' in my horticultural practices. The common Frog (Rana temporaria) is the only species native to, or at least naturalised in, Ireland. It is not always Kermit-green as they have a slight camouflage tendency and can change colour to match their environment. Males tend to be slightly smaller and somewhat darker than females, and can further be distinguished by their dark bluish-black swellings (nuptial pads) on their first fingers.

We think of them as pond life but that's only when young; adults become terrestrial and hunt actively during daylight and even more keenly at night, feasting on several garden pests, notably denting slug and fly

populations.

For the most part, frogs return to the bodies of water where they were born, but some simply select a nearby pond, which may be the one in the local park or the one in your garden. If you build a pond they may well come, but if a friend has a pond with returned frogs then you can get a bucket or container full of tadpoles in March/April for yours and the mature adults will return there in future.

Land loving adults will require a damp corner or a marginal bog garden near your pond to make it their permanent home; in winter they hibernate ▶


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Koi are difficult to look after and they tend to eat the majority of aquatic plants

beneath compost heaps, log piles, under stones or buried in the muddy bottom of the pond.

Koi about it

The two most popular ornamental fish to have in a garden pond are Koi (Cyprinus carpio) and Goldfish (Carasius auratus). Koi are the more difficult to look after and they tend to eat the majority of aquatic plants that are commonly used to pretty or help oxygenate your pond.

Some Koi may need a heated system or to be brought indoors over winter; the best option is to allow for sufficient pond depth. It doesn't have to be the whole volume but if the pond has a deep end then your fish can descend to it during severe weather or hide there from heron and other predators.

The deeper the pond the larger the fish will grow. Gold fish stay small in smaller spaces and koi enthusiasts prefer ponds that hold not less than 1,000 gallons of water; the deeper and larger volume the better – some large pond koi can reach one metre in length.

There are some guidelines based on surface area alone that can help you to work out the potential of your pond population. For every 3-4 square feet of surface area you may add a single goldfish while a single koi requires 10 square feet. The stocking level is important as too many fish decrease oxygen levels and contribute to ammonia and nitrite build-up. Apart from space to grow and depth to survive winter and hiding cover spaces, (slate shelves and plants where suitable), the big part of keeping fish alive is feeding.

There are three essentials to correct feeding; the right food (not bread and kitchen scraps which cause 'algal bloom' and are often indigestible), the right amount and how often. The trick to discovering the perfect amount to administer is the five minute rule – if five minutes after feeding some is still bobbing about then feed less next time. As for how often, that really depends on the water temperature as it affects fish metabolism, it's why on warm days fish often come to the surface and almost beg for food. In spring you may feed every couple of days and in summer daily, slacking off in autumn and barely in winter as the cold inhibits the digestion of store-bought food but they can survive on pond algae.

That's it. Now you can enjoy the fruits of your labours. No matter the shape of your pond, your garden is now more rounded, more complete. Satisfaction and ongoing gratification guaranteed! ■

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Connection between existing house and new extension with a lightbox located at the junction of the two spaces drawing in natural light

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What the planners want… when you're extending

Planning permission: when do you need it and how can you obtain it? In this second article of a four part series, we look at extensions and some of the issues to consider.

Do I require planning permission for an extension to my house?

ROI: Not always. Small scale domestic extensions to houses, including conservatories, can be built without planning permission if they qualify as exempted development. Exempted development is development for which planning permission is not required. Categories of exempted development are set out in planning law. The purpose of exemption is to avoid controls on developments of a minor nature. In Ireland, extensions do not require planning permission if the extension is to the rear of the house and complies with a number of conditions. If not, you will need to apply for planning permission.

NI: There is also provision for extensions and alterations to dwellings without the need for planning permission. This is referred to as 'permitted development'. It allows some extensions and alterations to dwellings without the need to submit a planning application.

How large an exempted development / permitted development extension am I allowed?

ROI: If the house has not been extended before, the original floor area can be increased by 40 sqm. If there is a previous extension, the floor area of a proposed extension plus the floor area of any previous extension, including those for which you got planning permission, cannot exceed 40 sqm.

NI: In 2011 the Regulations were simplified to refer to the size of extensions which may be permitted. In essence, a single storey extension can normally be constructed provided it does not extend beyond the rear wall of a detached house by four metres, and three metres in any other type of house. A two storey extension should not project more than three metres beyond the rear wall. Interestingly, there is no limitation on the width of any extension, provided it is not wider than the existing house.

The DOE Guidance Booklet 'Your Home and Planning Permission' published in March 2011 and available on the DOENI website, provides useful information and examples.

What conditions apply to building an exempted development extension?

ROI: There are very specific conditions to follow, which are:

- for terraced or semi-detached houses, the floor area of any extension above ground level may not exceed 12 sqm (this includes any previous extensions carried out);
- any extension above ground floor level must be at least 2m from any boundary;
- any extension must not exceed the height of the house; and
- any extension must not reduce the area of private open space, reserved for the occupants of the house, to less than 25 sqm.

There are also rules about the height allowed. These are that:

- if the rear wall of the house does not include a gable, the height of the walls of the extension must not exceed the height of the rear wall of the house;
- if the rear wall of the existing house has a gable, the walls of the extension (excluding any gable being built as part of the extension) should not be higher than the side walls of the house; and
- in the case of a flat roofed extension, the height of the highest part of the roof may not exceed the height of the eaves or parapet. In any other case, no part of the new roof may exceed the highest part of the roof of the house.

There are also rules about the required distances between windows in extensions, the facing boundary of the adjoining property and the use of the roof of the extension. These are:

- any windows at ground floor level as part of an extension should not be less than one metre from the boundary they face;
- any windows at above ground level should be not less than 11m from the boundary they face; and
- the roof of any such extension should not be used as a balcony or roof garden.

NI: The restrictions are clearly set out in the Regulations. These include:

- the ground area covered should not extend to more than half the total area of the property;
- the extension should not exceed the height of the existing house;
- the eaves should not be higher than the existing eaves;
- the eaves should be no more than three metres in height if any part of the extension is within two metres of the boundary;
- the materials should be similar to the existing house (except for a conservatory);
- any upper floor window on a side elevation within 15m of a boundary with another house should be obscure glazed and non-opening unless the parts which can be opened are more than 1.7m above the floor of the room in which the window is installed;
- a side extension should not exceed four metres in height or be wider than half the width of the original house; ▶

In Ireland, extensions do not require planning permission if the extension is to the rear of the house and complies with a number of conditions. If not, you will need to apply for planning permission.

Connection between existing house and new extension with a lightbox located at the junction of the two spaces drawing in natural light
Wilson McMullan

- a single storey extension must not exceed 4m in height;
- no part of a single storey extension should be within 3.5m of any property boundary with a road opposite the rear wall of the house;
- no two storey extension should be within seven metres of the property boundary opposite the rear wall of the house; and
-the roof pitch should be as far as practicable the same as that of the original house.

You can demolish part of a habitable home to facilitate an exempted development domestic rear extension.

NI: Planning permission is not required to demolish a house unless it is Listed, within a Conservation Area or within an Area of Townscape Character. However it would not be wise to demolish any house until permission has been granted for its replacement.

Planning permission is not always required for small projects

Atelier www.atelierzone.com

Note that in conservation areas, areas of outstanding natural beauty, world heritage sites and national parks the rules are much stricter. Listed buildings are also different. In such cases it would be advisable to seek advice from the local Council, or an experienced architect or planning consultant.

Can I build a very modern extension onto my older house?

ROI: Yes, an exempted development extension, so long as it complies with the above rules, can be built to the design of your choice. Your design choice may however benefit from the advice of an architect.

NI: There are no design constraints upon the style of extension, provided the dimensions etc. comply with the requirements. It should however use materials which are of 'similar appearance to the existing house'.

What happens if I demolish my house and rebuild it?

ROI: Planning permission is required to demolish a habitable house. If you do demolish your house, it does not automatically follow that you will get permission to build a replacement. A planning application to demolish 'and' re-build should be made at the same time to ensure a new house will be allowed.

Do I need planning permission to convert my garage to a bedroom?

ROI: The conversion for use as part of a dwelling house (e.g. as a living room or bedroom) of a garage, store, shed, etc. attached to the rear or side of a house is normally exempted development, subject to the 40m^2 limit and conditions as set out above. You should contact your planning authority if you are unsure of any of the above conditions in relation to any proposed extension.

NI: The use of a garage for purposes ancillary to the enjoyment of a dwelling does not normally require planning permission. A garage can therefore be used for keeping vehicles, or for a games room, or for living or sleeping accommodation. This is provided there are no conditions on the original planning approval which prohibit certain uses; and that any external changes do not have a material impact upon the appearance of the property.

Can I build a garage?

ROI: You can build a garage or shed without planning permission as long as it does not extend in front of the building line of the house and does not exceed 4m in height (if it has a tiled or slated pitched roof) or 3m (if it has any other roof type). The floor area limitation for exempted development is 25m^2. The structure may not be lived in, used for commercial purposes or for keeping pigs, poultry,

pigeons, ponies or horses, unless you apply for planning permission and it is granted. Garages, sheds etc. to the side of the house must match the finish of the house. Remember that you cannot reduce the open private space, reserved exclusively for the use of the occupants of the house, at the side or rear of the house below 25 sqm.

NI: Garages and outbuildings can also be built without the need for planning permission. There is no restriction on floor area, provided the building and any other buildings (excluding the original house), do not cover more than half the total area of the property. The garage must also not be to the front or side of the dwelling if it faces onto a road. It should have a maximum height of four metres. Eaves height can only be 2.5m if within two metres of the property boundary. Unlike ROI, there is no requirement to preserve a specific amount of amenity space.

Garden sheds can also be built without permission, subject to similar size limits to garages. However whilst there are no restrictions on the keeping of domestic animals, or even poultry or horses for your own enjoyment, specific planning consent is required for the keeping of pigeons.

Can I build a separate granny flat?

ROI: The building of a granny flat requires planning permission. 'Family' or 'Granny' flat refers to a temporary subdivision of a single dwelling for a subsidiary element, of usually singular accommodation, for use by a member of the immediate family (e.g. elderly parent) but not as a fully independent dwelling. Proposals should be justified (i.e. there should be a granny) and are normally interlinked with the primary dwelling and capable of being readily subsumed back into same when it is no longer required. You will not normally be allowed to let the granny flat or to sell it as a separate property. You should contact your planning authority for guidance as to the policy pertaining to granny flat developments.

NI: A granny flat is essentially treated in the same way as an extension. It may be possible to provide a small granny flat within the scope of the permitted development regulations (provided this is not a fully independent dwelling). It does not have to be occupied by a granny, but could also be used for older teenagers or students, or potentially for a nanny or domestic staff. However in most cases permission will be required. The planners will be keen to ensure that any granny flat will not be built or used as an entirely separate residential unit.

Can I build a porch without planning permission?

ROI: Building a front porch constitutes exempted development so long as it does not exceed two square meters in area and is more than two metres from a public road or footpath. If the porch has a tiled or slated pitched roof, it must not exceed four metres in height or three metres for any other type of roof. The style of the porch doesn't have to match that of the house.

NI: Porches are permitted development provided they do not exceed three square metres (measured externally). No part of the porch should exceed three metres in height if the roof is flat or mono pitched, or 3.5m if dual pitched. No part of the porch should be closer than two metres to a road or footpath. Once again, finishes should be similar to the existing house.

Can I convert my stone outbuildings to separate residential use?

Such development would require planning permission in both ROI and NI. Where it is hoped to use the stone outbuildings as a separate residential dwelling, this would effectively constitute a planning application for a new dwelling and would require the subdivision of the property into two properties. In rural areas this presents issues around wastewater treatment, access and, where a well serves the existing dwelling, water. In urban areas, such a proposal would require a large property whose subdivision is possible while retaining vehicular access to both properties, rear gardens for both, etc. ■

ROI: Brendan Buck, BPS Planning consultants, Dalkey, Co. Dublin, Tel: 087 2615871.
www.buckplanning.ie
NI: David Donaldson, Donaldson Planning, Hollywood, Co. Down BT18 9AE. Tel: 9042 3320
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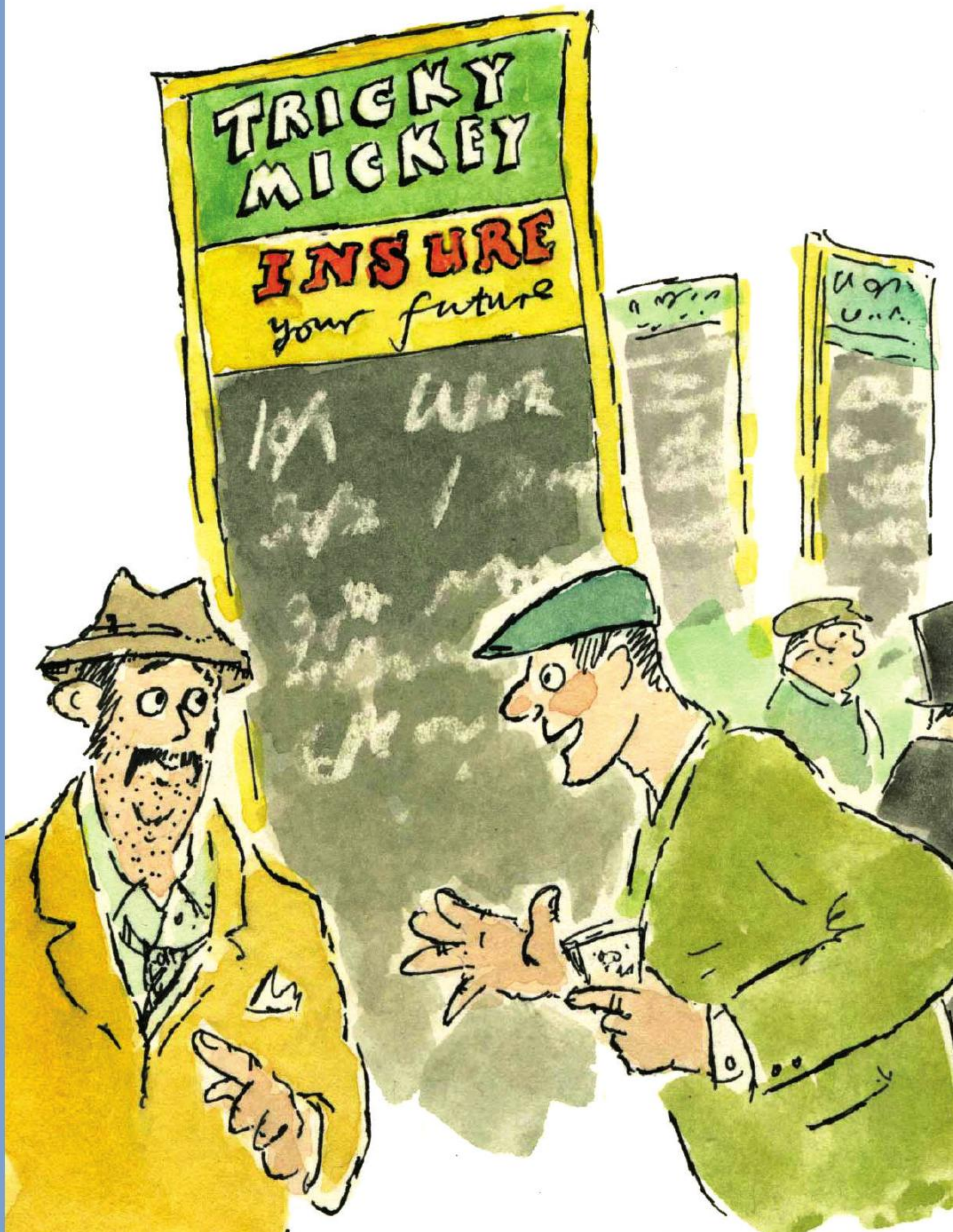
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Not only are certain types of insurance cover necessary to secure a mortgage, they'll also help you hedge the risks which might affect you during building work.

Without the necessary financial investment no self-build, extension or renovation project will reach a successful conclusion. And with investment comes risk, as we've been made acutely aware in the past few years. Unfortunately there are no insurance policies which cover you for a potential devaluation of your home: if the finished product has lost value due to prevailing market conditions, that's a burden you'll have to shoulder. But in most other instances you should be able to find adequate means to cover your property with insurance and warranties during and after construction, which should cost you anywhere up to 2% of your overall budget.

Insurance

From a moral and ethical perspective insurance should never be seen as an alternative to common sense or best practice methods of construction. Regardless of the duties imposed by statutory requirements there will always be a responsibility upon those 'with influence' to ensure that site safety is to the fore. The controlled use of plant, tools and equipment; the safe use of ladders and scaffold; awareness of existing or temporary utility cables, ducts or pipework as well as the habitual wearing of personal protection equipment (PPE) will all serve to reduce the risk of on-site injuries.

Beyond these physical risks there are the potential financial risks as a result of claims made against you by injured parties or due to natural calamity or theft. This is where insurance can help even the most conscientious of self-builders.

The combination and value of insurance cover you will require will depend on whether you are financing your home via a mortgage provider, bank or other lending institution. For those fortunate enough not to require any funding, insurance is still an important risk management tool. It is always best to investigate your insurance requirements well in advance of starting work on your project as most policies cannot be initiated after you have started the physical building work. There are some self-build insurance policies that can be taken out after work commences but it does depend on what stage the work has reached.

Many insurance policies which are specifically tailored toward self-build projects can only be used where you intend to live in the property once completed. If you are considering building as an investment for rental or sale then you must declare this when applying for your insurance. There are still self-build style policies to accommodate such circumstances.

Like many specialised fields, the terminology within the insurance business is varied; it is important not to confuse product names with generic terms, or vice versa. The same professional respect afforded to architects, engineers and quantity surveyors must be imparted to those within the insurance industry. They understand the products, the conditions, the limits and levels and above all else, the risks and liabilities. You have too much to lose if you are not adequately protected from risk.

Insurance products differ depending upon jurisdiction and the current economic climate means that the terms, conditions and acceptability of some policies are constantly evolving. The internet can be a great tool for gathering general information to allow you to ask the correct questions, but it does not replace the advice of an insurance professional. The following types of insurance may all be relevant to your individual project at some time. ►

The combination and value of insurance cover you will require will depend on whether you are financing your home via a mortgage provider, bank or other lending institution

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Public Liability Insurance

As the name suggests this covers you in respect of your liability to members of the public, which in the main refers to people who are not employed by you. This will include visitors to your site for whatever purpose, regardless of whether they are there with your consent or not, including trespassers. Your liability will extend not just to personal injury but also damage to property whether incurred within the curtilage of your site or as a direct result of the existence of your site, e.g. your scaffold falls over or mud from your site results in a road accident. Public Liability insurance is often regarded as the most important policy you can buy as the potential claims made against you can be huge due to the fact that both compensation and legal costs will be involved. The cost of such a policy can be quite small depending on whether you have a clear site or a substantial range of existing buildings.

Employer's Liability Insurance

A building contractor, who has employees, is required by law to have an Employer's Liability policy. If this is your build route choice then it is important to visually check your builder's policy to ensure it is current and that it has suitable cover limits; a cover in the region of £10 million or €10 million is not unusual. Those who are registered with a trade organisation are likely to have their policies verified but it's important to get confirmation. If their policies are due for renewal during your build, make sure that they have been renewed.

If you are project managing the build yourself then from an insurance perspective you are deemed to be an employer. Employer's Liability insurance will cover you in the event that a person deemed to be an employee of yours or a subcontractor has an accident on your property, where such an accident may be construed to be your fault. It is not enough to rely on each subcontractor having their own insurance. Even if they do, one of their employees may sue either you or the subcontractor or both.

Site Insurance

Site Insurance is also known as Contract Works insurance and it is similar to that carried by a building contractor under the title Contractors All Risk insurance. Basically this covers your works for losses caused by fire, flood, theft, vandalism, delivery vehicles, etc., and can be extended to include cover for plant and tools, (either owned or hired in), as well as storage containers, offices and their contents. More importantly it will provide for the cost of rebuilding the structure should any of the aforementioned calamities befall your project. This insurance will cover your build at every stage and not just upon completion. The value of materials will also be covered as soon as they become yours, whether stored on or off site. As there are many choices to be made when taking out such insurance it is important to fully understand the value of the cover provided, as well as the excess amounts to be borne by you in the event of a claim. If you are using a building contractor then again it is important to check that his insurance is current and that the maximum contract value stipulated on his policy is large enough to cover the value of your works. Remember, the cost of replacing say a structurally damaged building will have to include the cost of removing the damaged building, all necessary additional under-building, the replacement construction costs as well as potential additional professional fees. This can mean substantial costs over and above the actual replacement building costs, so your insurance must accommodate this potential upper limit of required cover. Similarly if using a builder then the maximum contract value stated on his policy must be the full potential replacement costs.

Always note in your site diary the renewal dates for any insurance policies carried by your builder or subcontractors and check that they have been renewed as appropriate.

Perhaps one of the most important things to understand is that site insurance will provide you with cover for a new building (or portion of additional structure to an existing building), but will not include any cover for the existing structure. The insurance required to cover existing buildings would be part of your existing building's insurance or a new and separate policy if you have just purchased the building to be converted, renovated or extended. If the existing building is of very low value but is required to be in existence to validate your planning approval then the level of insurance cover attained must reflect the risk of losing the right to proceed should something happen to the existing structure.

> In Ireland, extensions do not require planning permission if the extension is to the rear of the house and complies with a number of conditions. If not, you will need to apply for planning permission.

If you are extending or renovating an existing building it is very important to inform your home insurance provider of the work you are undertaking. Most insurance policies may be extended to provide additional cover depending upon your project, but may be subject to limits and conditions. Any work which can affect the level of risk to your existing property may incur additional premiums to be paid. This extra cost will be insignificant in comparison to the losses incurred by your insurance provider repudiating a subsequent claim. If using a building contractor then discuss the possibility of having his insurance extended if need be. It is best to clearly define the limit of each party's liability and ensure that any additional cover required falls under an additional policy, which may be issued in joint names.

Some lenders may require you to have site insurance and may also have an input as to what level of cover should be obtained. ▶

Self-build Insurance

Basically this is a package which covers your project for all the major constituents of Public Liability, Employer's Liability and Site Insurance. Although this comprehensive insurance may be cheaper than individual policies, the old maxim 'cheap is not always best' may still apply. Always check the values, excess amounts and conditions to be sure you have more than sufficient cover for each individual requirement. Separate policies with higher premiums may provide more control and choice over what cover you receive. One potential advantage of self-build policies is where insurance companies allow you to convert your package into Building Insurance if your project is completed prior to the date the policy is to expire.

JCT Clause 21.2.1. Insurance

JCT 21.2.1 Insurance covers you for any expense, liability, loss, claims or proceedings as a result of damage to surrounding property due to work undertaken by you or your builder where such work has been carried out correctly. The bottom line is that any work undertaken within your site must not affect neighbouring properties. Such damage occurring due to negligence or accident will be covered under your Public Liability insurance. However, any work which has been undertaken correctly can still have an adverse effect on neighbouring property. Examples include damage caused by excavation, piling, demolition or underpinning such as subsidence, vibration or weakening of support structures, or a raising of the water table. The geology and landscape of your site as well as your proximity to other properties will all have a bearing on the level of risk you may face. A structural engineer, surveyor or architect will advise you as to any requirement for this type of insurance. Any policy issued should be in both your name and the name of the contractor to ensure all parties are protected.

Whole life policies will provide for the investment of a portion of your premium payment although the potential returns will depend on the market conditions during the period of investment.

Third Party Insurance

Third party contractors, such as those connecting drainage or utilities, may require you to have short-term insurance to cover their visit.

Home Insurance

This is the type of insurance you require once you have completed the construction of your house. It should be applied for immediately upon completion, prior to moving in so that you do not have a gap in your insurance cover. There are a number of variations depending upon what you need. Some mortgage companies provide insurance policies that cover the building structure (Buildings Insurance) as they require you to have it in order to release your mortgage monies (it may also be an opportunity for them to generate additional business). This leaves the homeowner to obtain insurance for the contents only. Fixtures and fittings such as kitchens and the like are considered to be part of the building fabric and are covered under the Buildings Insurance. Other policies cover both buildings and contents.

Tenants in a rented property would normally only require Contents Insurance as the building itself is usually insured by the property owner. The tenancy agreement will normally show if you are responsible for insuring, or paying the cost, of the building insurance.

As mentioned earlier, some self-build policies may allow you to convert your insurance into Home Insurance after construction has ended. Whatever the combination of insurance you retain during and after the construction, it will be important for you to fully understand what your insurance covers and the period for which it is covered. Insurance periods are normally measured in yearly increments, with provisions for early cancellation – although possibly with a financial penalty. Insurance provided specifically with the self-builder in mind can be more accommodating, e.g. two year periods with the possibility of extensions.

There has always been an unwritten advisory that you should over-insure your property to allow for inflation and other such considerations. It is certainly worth taking into account the value of your property as well as the potential cost of replacing it when deciding on the level of cover you require. When completing the annual renewal of the policy remember to review these values. It is always a good idea to include accidental damage on your policy if this is a discretionary addition.

Life Assurance

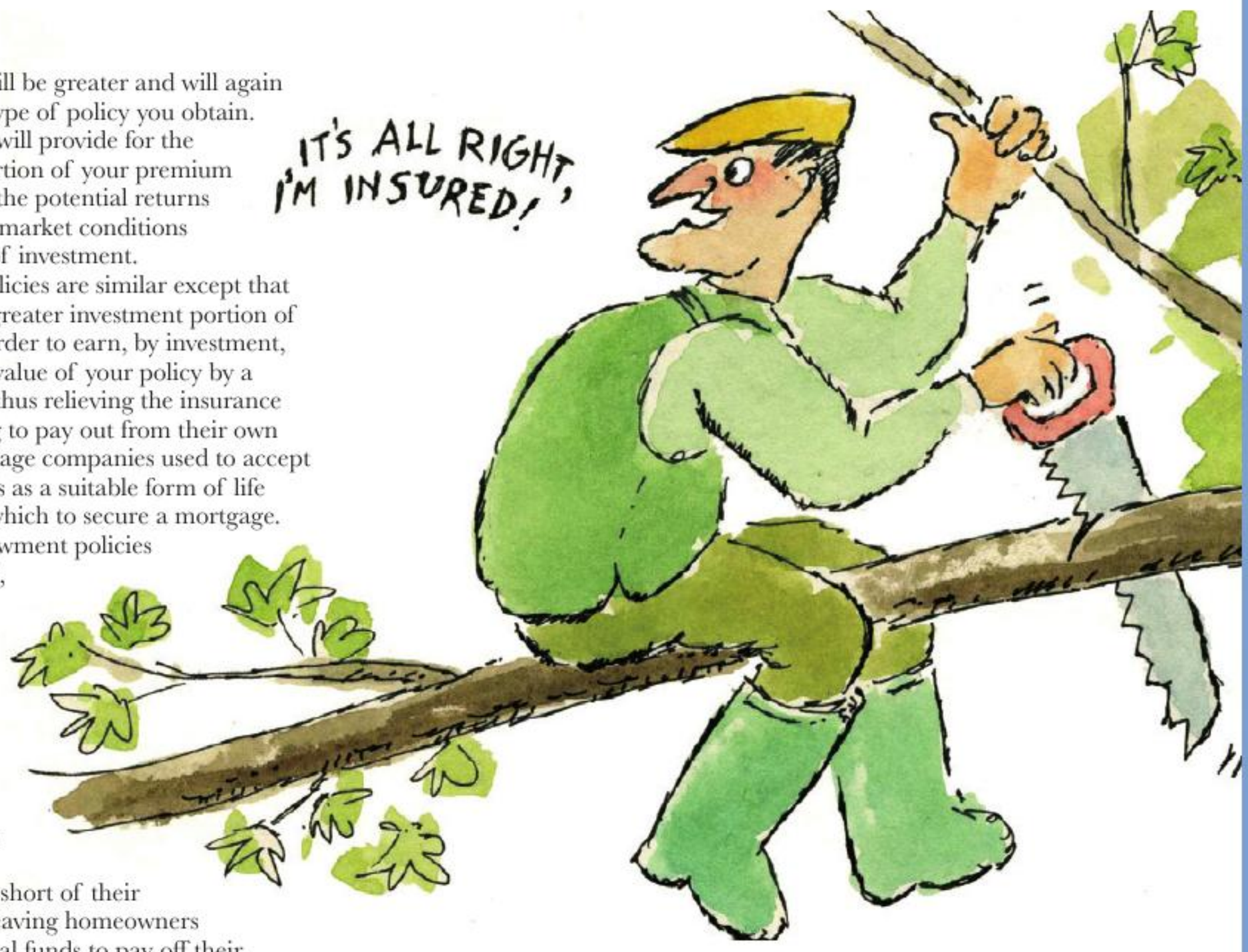
The term 'assurance' often confuses but in reality it is just another type of insurance. 'Insurance' will cover you against an event that might happen and 'assurance' will cover you against an event that will happen, provided it happens during the term of the policy.

A life assurance policy covers you for a set period of time. If the policy holder dies during the policy period then the insurance company will pay the agreed sum to the beneficiary assuming there are no complications affecting the validity of the policy. There will therefore only be a monetary value to the policy if the policy holder dies. Most mortgage companies require you to have life assurance prior to releasing your mortgage monies. Where the policy period is only for the term of the mortgage then this is referred to a 'term' life assurance. When the mortgage is fully paid back the assurance stops and that's the end of the financial arrangement.

If you require some kind of financial investment portion to your life assurance then the

policy premiums will be greater and will again depend on which type of policy you obtain. Whole life policies will provide for the investment of a portion of your premium payment although the potential returns will depend on the market conditions during the period of investment.

Endowment policies are similar except that they provide for a greater investment portion of your premium in order to earn, by investment, the agreed payout value of your policy by a much earlier date, thus relieving the insurance company of having to pay out from their own funds. Many mortgage companies used to accept endowment policies as a suitable form of life assurance against which to secure a mortgage. Theoretically endowment policies aim to have earned, by investment, at least enough to pay your mortgage with the possibility of additional funds to spare. Current market conditions however mean that many endowment policies have fallen short of their earning potential leaving homeowners to find the additional funds to pay off their mortgage, if their mortgage term is finished. Other endowment policy holders have had to dramatically increase their premium instalments in an effort to correct the underachieving investment history with greater investment levels in the future. For this reason most, if not all, lenders will no longer accept endowment policies as suitable mortgage compliant life assurance.



Income Protection Insurance

The reality for most people is that they borrow to build and to do so, they must have a secure income. Income Protection Insurance provides cover for the possibility of losing your income through illness or injury and in some cases redundancy. Again there are various choices within the scope of this insurance. Most policies will be renewable annually although the period covered may go up to the normal retirement age. The level of payment will vary; some will agree to an amount perhaps based on your mortgage or loan repayments while others will provide a replacement income. With any insurance policy it is important to know both the levels and limits of the cover, but with health-related policies it is essential to understand any preconditions relating to the type of illness or injury and how it is determined by a medical professional. Remember it is possible that a claim paid under another insurance policy may affect your right to claim under an Income Protection policy if the first monies you receive are deemed to relieve your insurer of their obligations. ■

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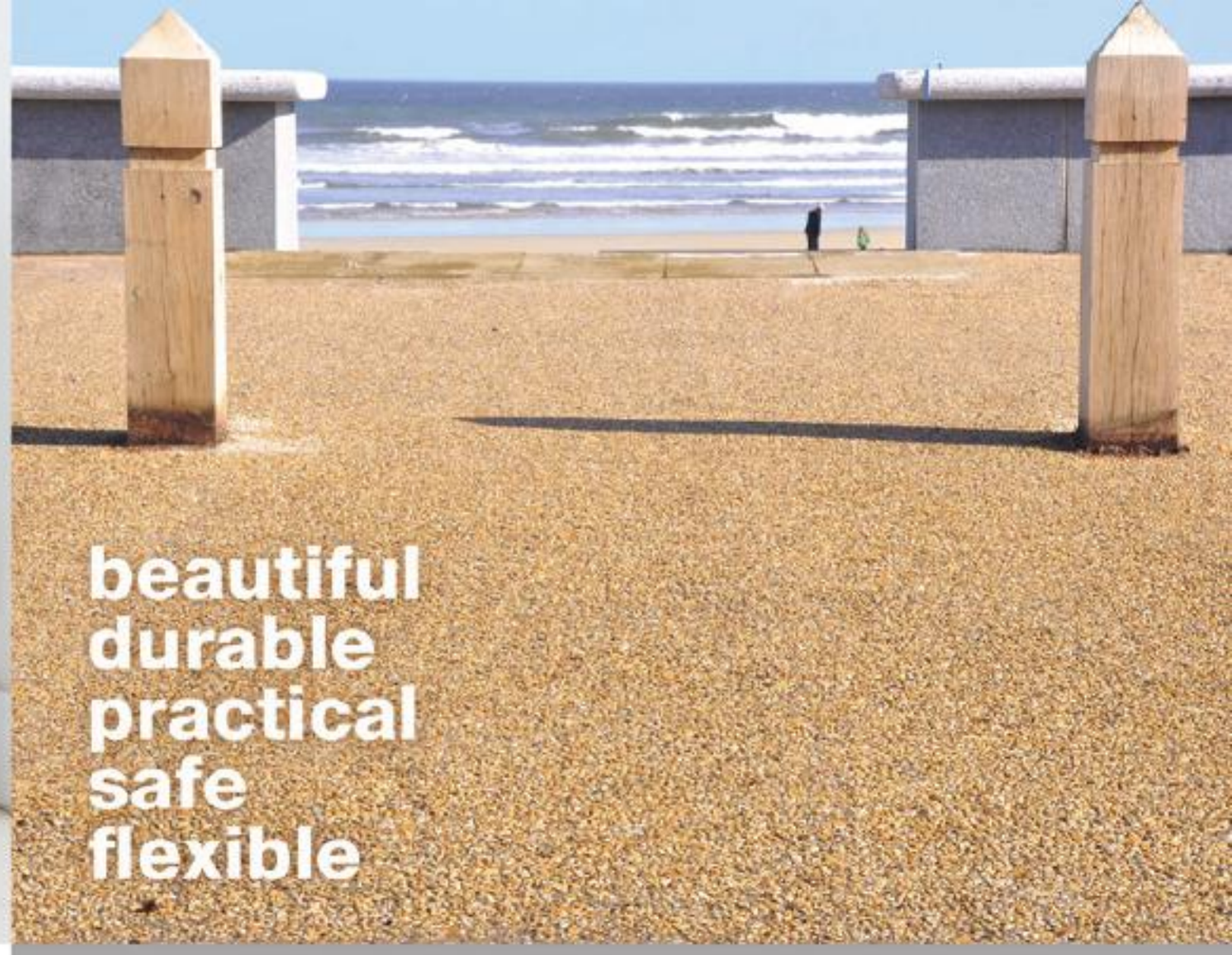

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The high life

Now that you've decided to convert your roof space, how will you make it look the part?

Roof space conversions, as well as providing much needed extra space, are also the most cost effective way to add value to your home, being typically less expensive to build than extensions. Maximising and increasing the space you have, done properly, saves the many hidden costs of moving.

However, not all roof spaces are suitable for conversion; work carried out to create 'habitable' space needs to meet the relevant Building Regulations and as an alteration or extension to the roof may require Planning Permission, it would be wise to talk with the authorities or consult an expert prior to carrying out any work. See Autumn 2014 issue of *SelfBuild & Improve Your Home* for more on the pitfalls of attic conversions.

Your room or mine

The requirements for more space are many and varied: growing children, friends to stay, noise and toys; a burgeoning business making a home office more attractive than the kitchen table; extended family coming to stay; the desire for a bolthole or man cave, home gym or spa.

Also, with an increasingly mobile workforce and a growing enthusiasm for real travel experiences, there is a demand for short-term lodgings – be that a weekend away in a new city, a holiday in a 'real' home, or a Monday to Friday home-away-from-home. This is all good news if you have a roof space converted to a bedroom suite and want to make a return on investment through short-term lettings.

If you're still debating what to use the space for, bear in mind that an additional room, especially a bedroom or preferably a bedroom with en suite, could significantly increase your potential profit when selling; an option well worth considering if you are thinking of moving home in the next four or five years. Alternatively, if this is your 'forever' house, a converted roof space may well provide the perfect workshop and showcase for your model railway or car track.

Also consider the fact that the roof space offers a natural degree of separation from the main house ▶

Roof space offers a natural degree of separation from the main house and with the trend for open plan living space.
www.velux.co.uk

"The roof space often has the best view and light, advantages you can exploit through the imaginative use of glazing."

White ceilings punctuated with skylights and fitted with down lighters will increase the sense of height and space in small areas.
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and with the trend for open plan living still very much in vogue, it can be easy to overlook the joy of a hideaway; be it for adults, teens or children. Adults can escape from the tumult of the world below, teenagers will get the privacy or study room they crave and for children, themed roof spaces can be designed around J.M Barrie's 'Peter Pan' or C.S Lewis' 'The Lion the Witch and the Wardrobe'. Not to mention toy storage and the potential for building with Lego, pitching tents and hanging swings.

Therefore when deciding on the use of your attic space conversion it is important that both your short and long term plans are taken into account. The design should maximise the space available and be flexible.

Look out

The roof space often has the best view and light, advantages you can exploit through the imaginative use of glazing. When installing roof lights it is important they are fitted with integrated blinds and that both blind and window can be operated remotely to allow maximum control over light and ventilation.

Venetian blinds or others with a louvre component can filter light to your exact requirements if required. Balcony windows, extending to the floor, cleverly provide a degree of outdoor space within the perimeter of the room.

Height is the biggest issue in roof space conversions and generally pendant lights are not used for this reason. White ceilings punctuated with skylights and fitted with down lighters will increase the sense of height and space in small areas. When space is tight, wall lights and sconces should be used as alternatives to floor and standard lamps. Interesting modern designs are available for both down lighters and wall lights.

Most ceiling lights can be bought with a dimmable function, a feature worth considering as it adds atmosphere. For a sense of drama, light up exposed beams and architectural features. Finally, strip or LED lighting can be recessed in shelving to create a floating effect while mirrors, cleverly positioned, not only reflect light but can greatly increase the sense of space.

For the hobbyist, bright evenly distributed light provides the best environment for working and is a necessity for displaying model railways. Overhead track incandescent lighting that is dimmable will provide the most versatility, allowing the hobbyist to both position the light (for work or effect) and control lighting levels for the simulation of evening or night time scenes when required.

Within these four walls

A roof structure revealed to expose rafters, beams and purlins adds beauty, character and interest to a converted space. While this may not always be possible, an exposed timber roof can create a traditional 'cosy' look or, when treated correctly, complement the clean lines and simple finishes of a modern interior.

However, irregular ceilings and the junction of different shapes and surfaces can make a room appear smaller; painting walls and ceilings (and/or exposed rafters and beams) the same colour will counteract this.

Apart from its association with modern minimalism, white can be used equally well with 'shabby chic' and in providing the perfect backdrop for personal touches, allows objects that express your style to sing. It also creates a feeling of space, hides blemishes and softens architectural quirks.

A wallpaper with a small print, used on walls and ceilings (or between rafters and beams) will create a cosy, vintage feel and smooth out any awkward junctions in the room. Overall, using pale colours and subtle patterns will maximise light levels and increase the feeling of space in small or awkwardly shaped areas. Soft blue or green hues are particularly useful for achieving this.

While bold wallpaper and vivid colours can be overwhelming, in small measured doses they add interest. Used to create a feature wall, or in place of a bedhead, pattern and colour will make a room stand out – in a good way! Many embossed wallpapers are now available that can add texture, colour and pattern in the guise of a variety of materials: leather, suede, riveted metal or wood.

White floors, whether painted floorboards, carpet or tiles, when combined with white walls and ceilings will further enhance the feeling of space and light. Note though, that along with black, it can be difficult to keep looking clean.

An advantage of using carpet and underlay, over wooden floor boards, is the better sound insulation that it affords. If noise transmission is a concern, insulate for this (acoustic mineral wool is the most common; look for a minimum 45kg/m^3 density) and thereafter try to use materials with a noise reduction rating where possible.

Continuation of the house style from lower floors to the new space is most appropriate when it is to be used by adults as a master bedroom and en suite, additional living space, home cinema or office. If the primary use of the space is as a children's bedroom or dedicated play area, then it should be designed accordingly.

Playroom

"'Why are you sitting in a box?'
'Because it's not a box.'"

'Not a box' by Antoinette Portis

In a child's mind a box can be anything. And so décor for the perfect children's room should first and foremost spark their imagination.

Children establish a connection to the world around them by experiencing it through sensory play; shapes, colour, pattern and texture are key. The children's fantastic attic should therefore be designed with multiple senses in mind; instruments for playing and hearing music, multiple fabrics and materials for touching as well as art for visual stimulation.

While there are all the colours of the rainbow to choose from, a multicolour room can look cluttered and chaotic, even when tidy. Choosing a main palette of two or three colours will create a sense of organisation and have a calming influence, especially if the room is small or has a low ceiling.

Décor for the perfect children's room will first and foremost spark their imagination.
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Start with a fun and brightly coloured rug in the centre of the play area then surround it with furnishings, such as a bean bag and toy storage; you can add or change elements easily, providing you stay in the same colour family. Bright, cheerful and creative décor should change as children grow.

Details such as a fairy door positioned in the skirting adds dimension to a child's world while wall stencils can be used to create a forest or a circus. ▶

A home office should be an efficient, comfortable and inviting place to work, tailored to your work requirements.

All surfaces should be washable, which means proprietary paint is usually the best solution. So while you might want to consider a novel feature wallpaper, it must be of good quality to withstand knocks and sticky hands. You could also install a funky white board wallpaper to draw on; chalk paint is another interactive alternative.

Install a sleeping platform or add a mezzanine floor on the gable wall to take full advantage of ceiling height here and double up on the available sleeping space. Underneath you could create a study area with a built-in desk. Children will enjoy clambering up the ladder, while the separate levels will allow them more privacy. It's also perfect for sleepovers but make sure there is a good barrier and a fixed ladder for safety.

Last but not least, while the small space under the eaves provides great low level storage for toys consider whether it might not be better suited to a children's lounging area with cubby holes.

Partitions

Partitions are useful not only for dividing and defining a space but for providing an additional wall for storage and/or artwork. From eaves to eaves, a central partition can act as a built-in bedhead incorporating night stands and lighting on the one side and shelving for the en suite or walk-in wardrobe on the other.

Equally, a partition running parallel with the eaves can create a valuable corridor. The ceiling height being tallest at the gable end, this will be the most suitable location for wardrobe space or a shower. For the home office it can act as a filing room.

Also don't forget the space surrounding the entrance door, which is normally positioned where the ceiling height is greatest or directly beneath the apex of the roof. Often neglected, this valuable wall space may be used for shelving storage also. Accessing the highest levels will necessitate the assistance of a library ladder, which when painted a bright colour can become a feature of the room.

Furniture and storage

Ideally the design of the new space will not have any awkward 'leftover' spaces. Bespoke or made to measure cabinetry, (for wardrobes, window seats, cupboards and shelving) is the way forward; particularly when working with sloping ceilings, dormer windows and skylights. Bedroom built-ins and wall-hung furniture will make a small room feel bigger.

Under the eaves is ideal for storage, and unsightly plumbing and structural elements can be disguised by building out in front of them and at the same time create useful areas for shelving. In small spaces, cantilevered or wall hung furniture keeps the floor free and will make the room appear larger.

Regarding the position of the bed, it will vary depending on the space available. Locating it in the eaves will take up the least amount of room and bedside cabinets with a recessed ledge above can be built-in on either side for a sleek, streamlined look. Alternatively, the bed may be positioned centrally on the gable wall which can be 'studded out' to maximise storage space while providing a bedhead with recessed shelving and bedside cabinets.

The space under the bed can also be used for storage; drawers at the end can house bulky items such as Christmas tree decorations, pillows and extra duvets, whilst drawers to the head can be kept free for putting books and magazines in when it's lights-out. A sofa bed is an alternative when it is necessary for the bedroom to double up as a living area or if the space is particularly small. Again, located in the eaves a daybed will occupy minimal space.

Window seats can add a great deal of charm to

a room, creating a focal point while providing extra seating with a view. Their design makes them good for storage and in general, most built-in furniture has stowing away potential.

Bathroom and en suite

Providing that the floor joists have been inspected to ensure they can support the new use of the space, it is the available ceiling height and the headroom required by the sanitary ware that will dictate the layout of the bathroom. If vertical space remains an issue, the addition of dormers may be an answer.

The shower will need to be positioned where the ceiling height is highest, whereas a bathtub may be located in the eaves. In tight spaces, the judicious use of glass can make a small space look and feel larger and bring in light. Wall hung sanitaryware will free up floor space and will also make a bathroom seem bigger than it is.

Plumbing is expensive and where possible the bathroom should be located over an existing one or a kitchen/utility on the floor below. Ideally, all bathrooms should be tanked to avoid future leaks. To safeguard against this you could install a fully enclosed (pod style) shower which is a self-contained unit including, tray, walls and shower.

Home office

A home office provides a mental as well as a physical break from domesticity, somewhere you can keep equipment and papers without running the risk of disturbance. As working from home gathers momentum it may be worth considering planning an office space for two.

The awkward, often redundant areas under the roof space eaves can be kitted out efficiently with a pair of desks and two chairs and if there is a window in the ceiling, positioning the desk beneath would be a good idea to avail of natural light while working. If little or no daylight is possible, a combination of general and task lighting will be required. A high quality task light will be essential for cloudy days and late nights; daylight replicating lights that provide energy efficient full spectrum lighting may be worth considering.

A well planned office where 'there is a place for everything and everything in its place' is essential for productivity. Filing drawers, open shelving, recessed under mounted lights, and convenient power outlets can all be part of the grand plan for your customised or built-in office space. Evaluate how you work: from left to right? Does your paper trail have a distinct flow? This is important when planning storage and being able to retrieve files quickly and efficiently.

If installing a new computer network, WiFi is usually the better option because cabling an Ethernet connection will require intrusive work. The most important thing is for the signal from your modem to reach the attic but this shouldn't be a problem, especially if it's located on the floor below. If the signal is weak, you can get a booster. Being wireless, WiFi affords you the flexibility to work on your laptop from your desk, your chair or a table, and at both standing and sitting heights.

When buying furniture consider ergonomics; significant improvements in adjustability and comfort have been made in the design of office chairs, an investment you may be thankful for in years to come if spending a lot of time at your desk.

Depending on the space available, partitions can be used to divide it into designated areas for meeting, working and filing or storage, if required. Ultimately, a home office should be an efficient, comfortable and inviting place to work, tailored to your requirements.

Living room or home cinema

A converted roof space is an ideal extra living space where you can kick back and watch your favourite sitcom while everyone else is glued to the football match on the floor below.

Alternatively, the space can double as a living room with a home theatre taking centre stage for family viewing and entertaining friends; with wall-to-wall seating, high-tech equipment and sofa beds to allow for sleepovers after late night screenings.

Locating the entertainment system on the gable wall takes advantage of the extra height and space available here and allows for the provision of additional storage for equipment should it be required. A converted roof space, well designed, not only adds value to a property but provides built-in flexibility to meet life's changing demands. ■

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Planning information:

www.planningportal.gov.uk/permission/commonprojects/loftconversion/
www.environ.ie/en/DevelopmentHousing/BuildingStandards/PublicationsDocuments/FileDownLoad,1657,en.pdf

Converting your garage

If you have a garage, chances are the last thing stored in it is your car! That's why it's often the first place to look at converting if you need to extend your home to gain valuable space. A well designed conversion also adds significant value but a poorly executed one could ultimately devalue your property.

After

Before

The garage was converted into an office

The first question to ask yourself is 'what am I going to convert the space into and does that use fit easily and logically with the existing layout of the house?' If you can access the garage from the main hallway, then most uses will be appropriate, e.g. bedroom, living space, utility room, playroom, etc. However if you have to go through the utility room, or through the kitchen, to get to it then you will have to consider its use more carefully.

If the existing layout is awkward, simply converting the garage may not be enough to make it work. Think about how you may need to change the spaces adjoining the proposed conversion: if the garage is turned into a bedroom, and the garage door leads directly into the kitchen, a change of use will be on the cards. The rooms adjacent to the space that accesses the garage may also need a rethink.

At the same time, think about what the garage is currently being used for and what is going to happen when that space has gone. Is it a case of finding or creating a new shelter for the car, making a new storage area in the house (flooring the roof space?) or building a shed for gardening equipment?

One answer is a partial conversion. You could for example divide the space horizontally in two, leaving the garage door in place to provide access to a reorganised storage space. The remaining floor area can then be converted. Alternatively you could incorporate some storage space as a part of the design.

Planning permission

Having decided to go ahead with the conversion, you will need to check if there are any statutory applications required. Whilst many conversions do not need planning permission it all depends on the size of the garage, its proposed use and whether you are going to add any new openings to the existing external walls.

If you live in a conservation area, within a listed

Extension with garage conversion; above: before, below: after

building or are converting an existing detached garage to be a separate and self-contained unit, planning permission for a change of use will be required.

In NI if the attached garage is to become connected to the house, it will be treated as an extension, as will converting an existing attached garage, and therefore it will need to comply with the restrictions and limitations as set out in the permitted development rights for a dwelling (see P68). If in doubt, talk to the planning department, or ask a planning consultant or architect.

In ROI small rear garage extensions, attached or detached from the house, of no more than 25sqm are permitted under certain conditions. Any attached or detached garage to the side of the house, a garage that exceeds 25sqm or one that steps forward of the house, will require planning permission.

If the reason for the conversion is to run a business, e.g. a bed-sit or for 'bed and breakfast' accommodation, personal office, providing a child minding service, hairdressing, dressmaking or music teaching, the key test is: is it still mainly a home or has it become business premises? Currently in ROI and NI it is advised to contact your planning authority as the criteria for exemption is very subjective and relies heavily on not disturbing your neighbours, adding to traffic volume on the street and not changing the character or use of the street or neighbourhood. The last thing you want is a planning enforcement notice issued.

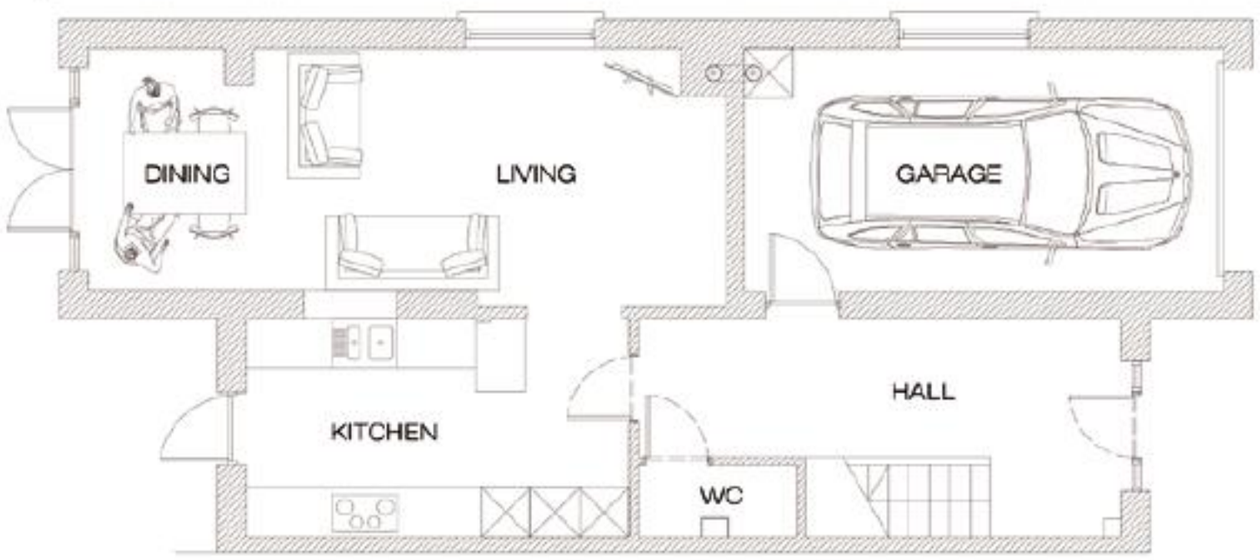
Building Control

In ROI and NI, building control approval will be required for almost all conversion work.

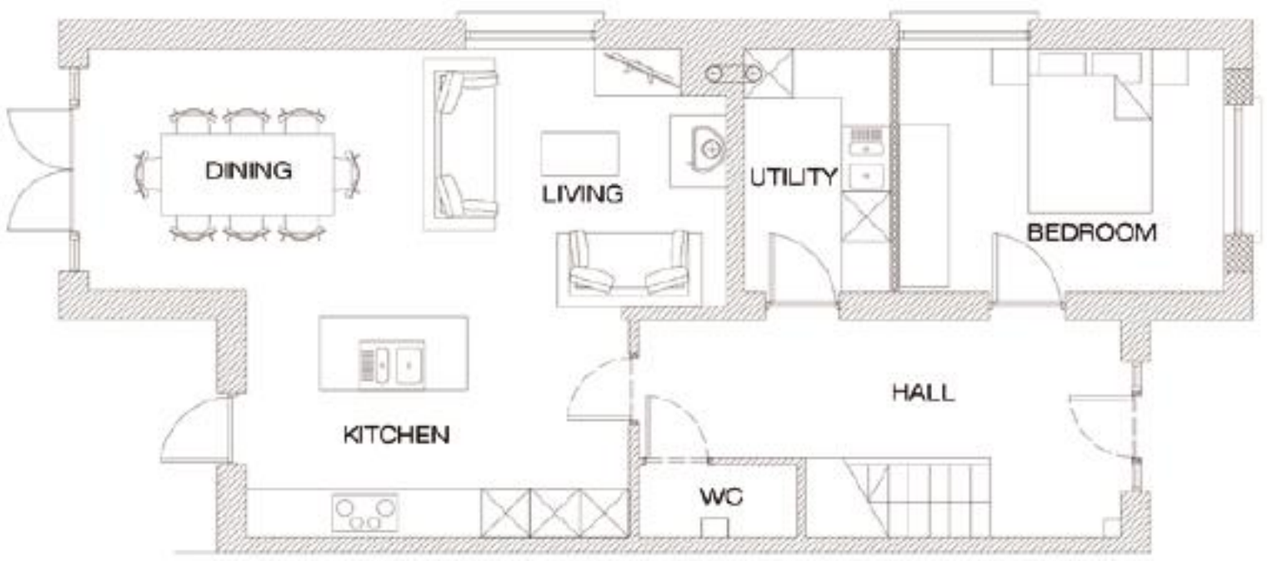
In NI, unless the conversion is under 10sqm, it will require a full plans submission with U-values for all thermal elements identified. Under 10sqm you can avail of the building notice option, i.e. you inform building control and pay a fee but are not ▶

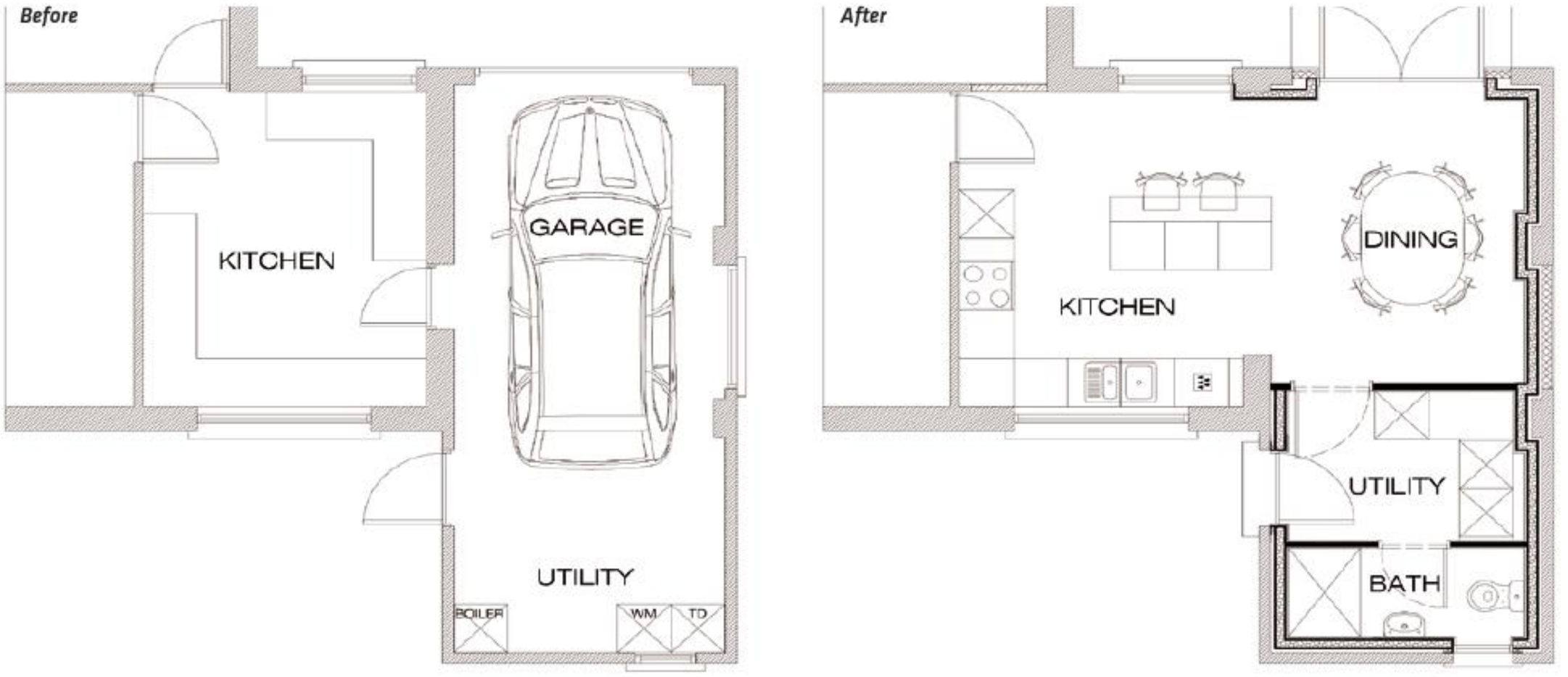
Garage converted into a bed-room and utility

Before



After





A conversion in which the utility was retained and garage opened up to the house

required to submit drawings. The building notice can be provided by an architect or competent architectural technician.

In ROI you will need an assigned certifier if the garage (plus any previous extensions) is 40sqm or above. If under 40sqm but requiring planning permission, then you would lodge a commencement notice without documentation, i.e. you would not require an assigned certifier or full drawings.

Two storey conversions

If you have a two storey garage that you wish to convert or you feel there is enough head height within the existing single storey garage to convert it into two floors, then it is always wise, regardless of the size, to discuss the project with an architect or assigned certifier (ROI) first. The reason is that there are a lot more potential pitfalls in converting and connecting a two storey space with the existing house, e.g. fire escape and fire protection, electrics and servicing, head height, structural suitability, the fact that the roof structure could impact on available space, to name a few. This type of conversion will almost always require building control approval. A few key points to consider are:

• Head height: 2.4m downstairs (minimum 2.2m), upstairs requires a minimum 1 metre clear path down the centre of the roof space of at least 2-2.2m after upgrading the existing floor and installing insulation within the pitch of the roof – you usually lose about 4 inches/100mm of head height through conversion as a minimum, so factor this into your calculations.

• Check if there are large services passing through the roof space which may be difficult or expensive to relocate, e.g. plumbing pipework installations, electrics, etc.

• Check if there is sufficient space to locate a suitable fixed stair on the floor level below to access the roof space conversion and that it can arrive within the roof space centrally to have the minimum 2m head height.

• Remember ceiling joists are unlikely to be of a sufficient depth and width to be usable as a structural floor, these will most likely need to be upgraded. A normal floor joist is usually between 175-225mm in height (ceiling joists are often 100-150mm in height).

If it is just an roof space for general storage of boxes and light weight household goods, then ceiling joists with a chipboard or plywood floor, are often sufficient. It is important not to overload these ceilings though, as this can cause cracking of the finish and ultimately end in failure of the ceiling.

Who can do the work and what is it likely to cost?

A garage conversion is likely to be less expensive than most straightforward extensions. This is simply because the majority of the structural work has been done already, i.e. a waterproof roof, external walls and a concrete floor. This makes it an ideal project for the knowledgeable intermediate self-builder who can cut back on costs by managing the conversion themselves. However a clear understanding of the basics of conversion and the need to comply with current building standards, are a must.

The cost depends on what you are trying to fit into the space, e.g. one large bedroom will cost less than two spaces or creating bathrooms or ensuites. Typically a small single garage can be comfortably converted from around £10,000-12,000 + VAT or €16,000. Obviously the more elaborate the design, the larger the garage and the higher the specification the more the project will cost.

Design integration or independence

Do not overlook the principles of good design and how the garage will blend in with, or stand out from, the existing house. You can match it by using similar materials that complement and relate to the existing house or go for something completely different with modern materials such as timber cladding etc., to create a clear break and a more contemporary appearance. New openings can be introduced

or existing ones enlarged to create a completely different feel to the space and a alternative aesthetic to the exterior. Bear in mind however, that if you use materials which do not feature on the existing house, you will require planning approval in NI (check with the planners in ROI).

Understanding the basics of conversion

Do as much preparatory work as you can and be realistic about the amount of work involved, especially if you will be doing some or all of it. To a new self-builder a small garage conversion looks very manageable but without careful planning and attention to a few key areas it will quickly become too much to handle.

Existing garage floor

A garage floor is unlikely to be insulated and if it is more than 10-15 years old, will probably need an additional damp proof layer. Because building regulations require attached garages to be set between 100-150mm below the finished floor level of the house, that depth is available for the insertion of a screeded sand and cement floor, insulation layer and damp proof membrane. This typically is made up by 75mm of screed and 75mm of high density PIR insulation on a 1200 or 2000 gauge DPM. The existing garage floor is then used as the structural base or subfloor. If space is at a premium there are specialist insulations and thinner liquid applied screeds that will fit in more restricted heights.

If you want the option to possibly reverse the conversion back into a garage or store at a later stage, it may be possible for you to use a timber floor construction in place of the concrete screed. The goal in the end is to provide a level floor finish between house and home.

Walls

Most garage external walls are single skin and need to be brought up to standard both thermally and for moisture control to pass current building regulations. This can be achieved by building a new internal insulated stud wall set on two rows of brick or block (depending on available height) and a properly formed damp proof course. If you see a series of piers in your garage at 2-3m intervals, then this is usually an indicator that it is single skin construction.

If it is a cavity wall, you can fill the cavity with pumped insulation and mechanically fix an insulated plasterboard lining internally, e.g. 75mm pumped cavity with a 62.5mm thick insulated plasterboard is common.

Ceiling or roof

If you have a sound watertight roof, then you can treat the lowered ceiling (if one exists) as the insulation layer. Mineral wool can be laid between the joists with an insulated plasterboard below the ceiling joists, e.g. 150mm x 50mm ceiling joists ▶

A conversion in which the garage opened up to the house

Before

After

with 150mm mineral wool between joists and 72.5mm insulated plasterboard below. This when appropriately taped up at the joints, will provide a warm and air tight construction for the garage ceiling.

With insulation comes the need for ventilation. Soffit ventilation at low level and in-line slate ventilators higher up the roof for a good change of air within the void space above the garage ceiling are both acceptable ways of ensuring this. You will also need to ventilate the living space beneath the ceiling; if the building is very well insulated and airtight this may mean mechanical ventilation, e.g. mechanical ventilation with heat recovery (MVHR) systems.

Separate mechanical ventilation (inline fans are usually enough) will be required to all bathrooms and utility rooms to pass building regulations in ROI and NI.

Electrics and heating

Usually the existing electrics within the garage will be suitable for adaptation or extension for domestic use. Indeed, the existing mains wired sockets can be extended to provide additional sockets and lighting can be extended to provide additional spots and the like within the space.

Similarly with heating as normally the boiler can cope with an additional radiator or two taken off the circuit. However if this is not possible, or there is a problem with laying a new pipe run, you have the option of using electric panel radiators, oil filled radiators or an electric underfloor heating system or mats. Generally out of these options the electric underfloor heating system is the most expensive to install and run. The main disadvantage of an oil filled radiator is that it takes longer to heat up while an electric panel or convection heater, warms more quickly and is more responsive. Both these types of radiators are now available in a much wider choice with built in programmers and thermostats to give optimal control. Long term they will cost more to run, but the lower capital cost may suit your budget and purpose.

Electric based UFH (in the form of mats) is better suited for smaller spaces such as bathrooms. They are not generally economical to run in large areas unless you have PV panels installed on your roof. You could also decide to supplement the heating requirements of the space with a wood burning, multifuel or gas stove. If you want to install a stove, the main consideration is whether you can vent it through the roof or wall, whether you have enough available height for the flue to create an effective draw of air and whether the stove is within a room with an existing extractor fan or cooker hood, i.e. extending an existing kitchen space. If an extractor fan exists within the room, this will usually require the fire to be a 'room sealed appliance' and have its own direct feed of fresh air entering from either the rear or beneath the fire. Ask your local stove supplier to carry out a site visit before committing to a new fire or stove.

Windows

To conform to building regulations, these will need to be double glazed. You will also need an alternative means of escape if the converted garage does not open directly into the existing hallway or there is not a separate door to escape from within the room. A fire escape window or door will be required to pass building regulations.

The garage door

This is often the most complicated element to deal with as many people do not want to keep the same size of opening. Often no foundation will exist under the garage door threshold and therefore a new foundation and cavity wall is usually required to close up the space. Using the full opening means you can leave the structural concrete or steel beam or lintel in place. Often the opening suits the insertion of a large set of sliding doors or patio doors but bear in mind the existing outdoor space and its outlook onto the driveway or hard landscaping. ■

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All images courtesy of the author

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Planning information: NI refer to Section 1: Building an Extension of Your Home and Planning Permission (A guide for householders in Northern Ireland) on www.planningni.gov.uk; ROI refer to Planning and Development Regulations 2001, www.environ.ie

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In good health Part 2

In the first article we looked at giving our septic tank system a health check, and what to do if minor repairs or a whole new system were needed. Now we turn our attention to site specific solutions.

Newly Planted Reed Bed System

The main points to remember from the previous issue are that your tank needs to be checked at least annually and de-sludged when necessary depending on its size and the number of people in the house. You will also need to carry out upgrades if your tank is inspected and deemed to require these (grants are available but in ROI only if your tank fails an inspection and you cannot request one at present). Upgrades and repairs are usually more cost effective and have a lower carbon footprint than replacing the unit.

Before putting in a new system a fresh site assessment must be carried out and planning permission obtained. This is also required for green field sites where the sewage treatment system will be an integral part of your overall planning application.

Site assessment

The site assessment is the first stage in the decision making process, determining size, shape, topography, soil and subsoil permeability and depth to bedrock or groundwater. These factors will determine whether or not you will be able to get planning permission for a standard system.

The site assessor in ROI may be from the council, on a list of pre-approved assessors or simply a qualified engineer – accreditation is recommended but not strictly necessary. In NI the householder can carry out the BS6297:2007 percolation test and present the results to the authorities (NIEA) but there is a warning in the application form that if any results are presented in an untruthful manner the applicant can face a £20,000 fine.

Said assessor will carry out percolation tests and dig a trial hole to investigate the site characteristics. If the site assessor also sells a particular product, be aware of a possible bias in the recommendations proposed and always explore alternatives before purchasing.

If the soil is heavy and full of clay, a standard approach may not be suitable. In NI your options include waterless toilets or cesspools.

Dry toilet positioned over collection chamber

Waterless toilets are either self-contained, with an inbuilt composting chamber, or are emptied to an outside compost area or chamber when full. These are dry units that greatly reduce the overall environmental impact insofar as they eliminate toilet water use, recycle humanure biomass to the soil, recycle nutrients for plant growth and reduce sewage contamination of groundwater or surface waters. Dry toilets generally require more direct maintenance as you must compost the humanure on an ongoing basis and this must be done correctly to ensure the pathogens have been dealt with, but on the plus side there is no septic tank to empty every year.

Note that a **cesspool,** (an underground storage tank that is periodically emptied and brought in for municipal treatment), is not allowed in ROI (or Scotland); in fact the Environmental Protection Agency Code of Practice (ROI) deals only with discharges to ground which means other systems are more difficult to get planning permission for. However, local authorities in ROI may allow for a zero discharge system on a greenfield site but it depends how open that particular local authority is to this option. Generally if the site is unsuitable for infiltration to ground, then it is deemed unsuitable for development. A pragmatic approach may be adopted for an existing dwelling. There are a number of distinct stages in sewage treatment, namely preliminary settlement or primary treatment; secondary treatment; tertiary treatment and finally, disposal.

Primary treatment

Primary treatment is the settlement stage whereby the kitchen and toilet solids are separated from the liquid fraction. This is usually in a septic tank, or the initial stage of a mechanical treatment system.

This level of treatment is only ever a preliminary process, so a standard septic tank and percolation arrangement relies upon the percolation area for the actual treatment to occur. Microbes in the soil do the work of treating the effluent to a certain standard before it reaches the groundwater.

After sewer connections, this is the next most common disposal method for domestic sewage, and for good reason: if the soil conditions are good and the system designed correctly it's a very effective and economical treatment method.

Disposal to water courses is generally not permitted for primary treated effluents. Neither may septic tank effluent be discharged in soils that are too shallow (the groundwater being too close to the surface or the bedrock is high), or where the permeability is either too rapid or too slow because the treatment afforded by percolation will be compromised in such situations.

Site improvements may be carried out to provide additional depth to groundwater or bedrock if percolation conditions are otherwise suitable. In this case, a raised mound percolation area may be built, and is typically pump-fed unless a gravity fall to the raised area is still possible. Where gravels make infiltration through the soil too rapid, then secondary or tertiary treatment is needed.

Secondary and tertiary treatment

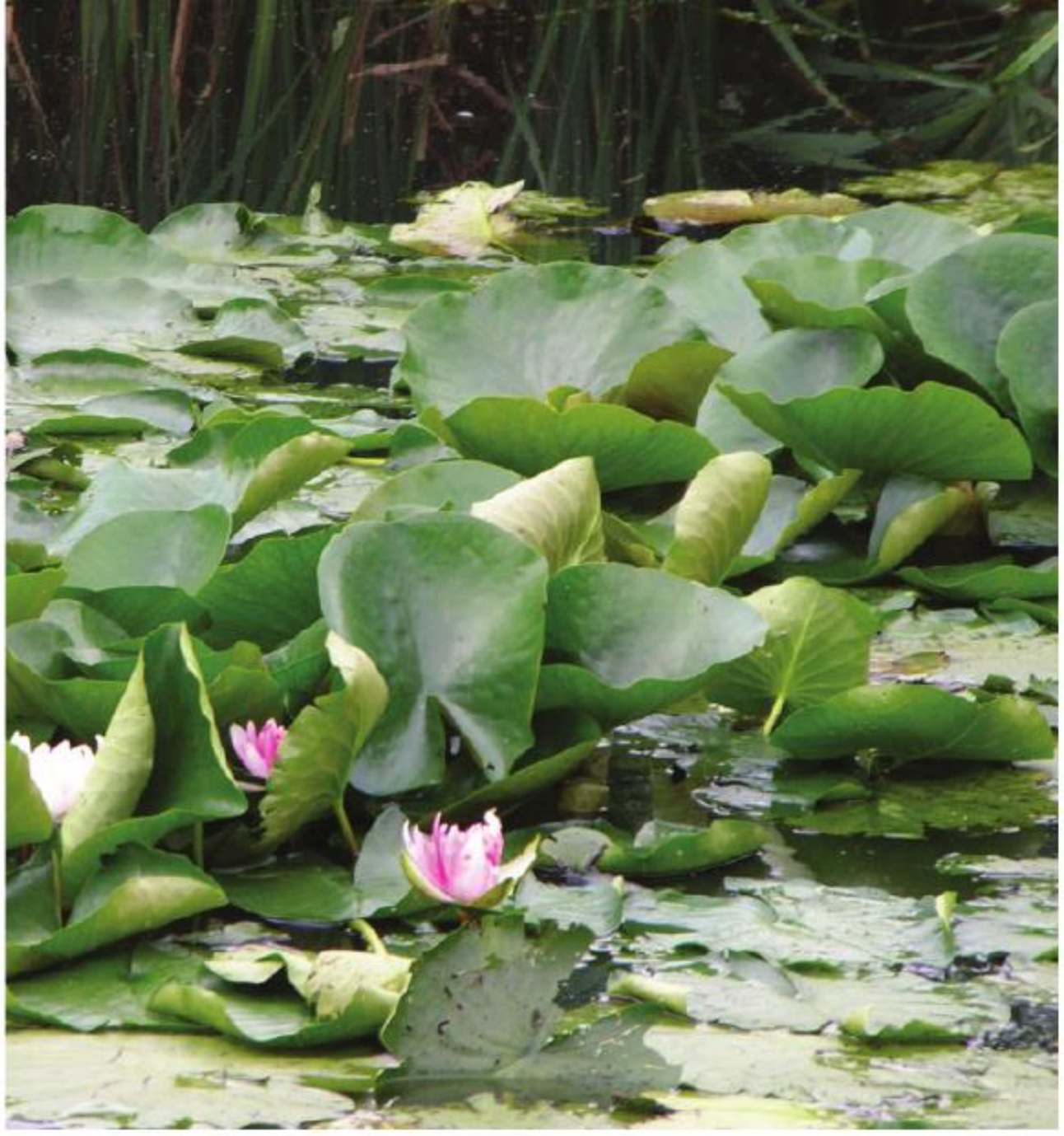
Secondary treatment involves the aeration of the effluent so that the overall biochemical oxygen demand (BOD – the food value to microorganisms), and suspended solids concentrations are reduced by about 90%. This lowers the pollution potential of the effluent. If extra treatment of this type is required, the common routes are pump or gravity fed **filter media** units (e.g. peat), **mechanical aeration** (usually in the form of packaged systems) or treatment wetlands.

Whilst good at achieving BOD and suspended solids reductions within a small footprint, there are ongoing electricity costs to consider and carbon footprint implications.

Tertiary treatment is an extra treatment stage. Typically nitrate and/or phosphate concentrations are lowered, in addition to further reductions of BOD and suspended solids. Where a gravel soil makes infiltration too rapid, tertiary treatment may be used to make disposal to ground legally acceptable.

In ROI, tertiary treatment may in principle be used prior to discharge to a watercourse, however in practice, although this is permitted in the EPA Code of Practice, the local authorities have a policy of not granting discharge licences to watercourses for domestic dwellings. In NI direct discharge to a watercourse may be permitted under licence after secondary or tertiary treatment.

Tertiary treatment system types include treatment wetlands, willow filters, soil or sand polishing filters or packaged tertiary treatment units. ▶



Lilies on constructed wetland pond

Treatment wetlands is a general category that includes a number of different planted system types, generally divided into gravel and soil based systems. These can be used for either secondary or tertiary treatment depending on the design and application. Gravel reed beds are further subdivided into horizontal (sub surface) flow systems where effluent enters at one end, flows through the planted gravel bed and discharges at the far end; and vertical flow systems which are pump-fed at top surface level and effluent is allowed to trickle down through the planted gravel medium before gathering at the base for collection and discharge. Soil based constructed wetlands are shallow planted marsh-type systems. Integrated Constructed Wetlands are essentially a type of soil based constructed wetland, described in separate government guidance in ROI. With careful design and construction, treatment wetlands provide the right physical, chemical and biological conditions for secondary or tertiary treatment with no electricity consumption.

Two year old willow growth

Willows are listed in the EPA Code of Practice as an add-on to treatment wetlands. Purpose-built willow percolation areas provide enhanced uptake of nitrates and phosphates. Proper design is needed to prevent willow roots filling the distribution pipes and blocking them.

Soil and sand polishing filters are typically pump-fed to provide an even distribution of secondary treated effluent across the filter surface. These function in the same way as a standard percolation area, where aerobic microbial activity within the soil or sand provides treatment of the effluent before it reaches the groundwater. Care is needed to ensure that the correct grades of soil or sand are used. These systems can be used for effluent disposal and as tertiary treatment.

Packaged tertiary treatment systems include packaged media filter units of sand, peat, textile or other media; packaged reed beds (typically considerably smaller than tailored systems); ozone or UV sterilisation systems for killing pathogenic microorganisms in the effluent; membrane filtration units for pathogen and suspended solids removal; and nutrient removal systems that typically target phosphates.

Following contained tertiary treatment such as a treatment wetland or packaged system, effluent disposal by infiltration can be carried out in a smaller area than would be required for a percolation area or soil/sand polishing filter.

Zero discharge options

As seen above, in ROI if your site fails the percolation test it is deemed unsuitable for an onsite wastewater treatment system. It's only with non-Code of Practice systems like integrated constructed wetlands, which have their own guidance document issued by the ROI Department of Environment, and zero discharge willow facilities, which rely upon Danish EPA guidance, where you can begin to find legal options for failed sites. That is, some councils may accept these as viable alternatives; there also has been a precedent for An Bord Pleanála to overturn a refusal.

Integrated constructed wetlands provide zero surface discharge, and due to the very clean nature of the effluent in the final stages of the system, infiltration into even poor soils can be a significant disposal pathway in combination with evapotranspiration through the wetland plants. Zero discharge willow facilities are for soils which have no percolation to speak of or where zero pollution impact is required. When carefully designed and built, the very high growth rate of biomass willow cultivars provides sufficient liquid uptake to dispose of 100% of the effluent by evapotranspiration. See case study and Q&A following.

Both options require primary treatment (septic tank). Bear in mind that as with any

sewage treatment, all 'natural' systems, e.g. reed beds, willow systems, etc. require site specific calculations and design in order to work effectively.

Source separation

An alternative to treatment in the conventional sense is to separate the constituent parts of the sewage for recycling back to the soil. Urine diversion toilets remove urine within the toilet bowl and pipe it separately for storage and removal for use as an agricultural fertiliser. Waterless urinals may be used by pubs and restaurants as a source separation method, and in sensitive environments this reduces nitrate and phosphate loadings.

Scandinavian faecal separator units, meanwhile, can be fitted within the sewer pipe network to separate solids from liquids. This reduces the overall pollution load to the percolation area or treatment system and allows biosolids to be recycled to agriculture, offering the benefits of a compost toilet with the ease of use of a conventional wc.

Think about it for a moment, if we continue to strip biomass from our soil without ever replenishing it does not make for a sustainable society. Separation technologies have the additional advantage of removing pharmaceuticals (medicine) which are excreted from the body. Typically these are flushed to sewage treatment where only about half are removed, and the rest end up in our groundwater and rivers and ultimately in many of our drinking water supplies.

Phosphorus is another issue. In sewage effluent it contaminates our waterways causing eutrophication of rivers, lakes and streams. In agriculture it is a valuable nutrient which is sourced chiefly from imported mined rock phosphate. Current projections suggest that phosphate production may peak in coming decades, leaving us with significantly reduced growing power. Unless of course we join these dots and separate out phosphate-rich urine and humanure for returning to agriculture. By harvesting phosphate before it gets into our waterways we cut down on water pollution and build up our soils and our economies. The infrastructure is relatively commonplace in some Scandinavian countries already and has been used in municipal and one-off house projects with no significant change to the appearance of the wc or bathroom.

The whole point of installing a wastewater system is to treat your sewage to an acceptable standard before reintroducing the effluent to the groundwater. Not returning any effluent and recouping nutrients and biomass for soil building is the ideal solution and therefore the most effective system is the dry compost or source separation system. Thermophilic composting kills all common pathogens, which is something that none of the other standard sewage treatment systems can boast. Given that our groundwater ultimately ends up back in our taps again (or the taps downstream of ▶

Capital and maintenance costs

	Cost	Incl. install	Electricity cost per year (family of five)	Septic tank desludging***
Septic tank with percolation	€1,000-3,000/ £750-2,200	Yes	Nil if gravity fed	€150-300/ £110-220
Mechanical unit	Aeration unit €2,000-9,000/ £1,500-6,600 + percolation	No	€70-275/£51-202	€150-300/ £110-220
Pump-fed filter media units	€3,500-5,000/£2,600/3,750	No	€20/£15****	€150-300/ £110-220
Constructed wetlands and reed beds*	€1,000-4,000/£750-3,000 + cost of septic tank and percolation	Yes	Nil if gravity fed	€150-300/ £110-220
Zero discharge willow facilities*	€15,000-20,000/£11,000-15,000 + septic tank and pump sump in case of new builds	Yes	€20/£15*****	€150-300/ £110-220
Waterless toilets**	€50-2,000/£37-1,500	No	n/a	n/a
Urine diversion toilet	€700/£515	No	n/a	n/a
Waterless urinal	€175-300/£130-220	No	n/a	n/a
Faecal separator	€700/£515	No	n/a	n/a
Faecal separator with specialist compost chamber components	€6,000/£4,500	No	n/a	n/a

* All costs will vary according to site conditions but this is especially the case with planted treatment systems.
** The cost is not necessarily a function of quality or effectiveness. There is a large range of types, and it is important that this area is investigated fully before deciding upon a particular option. They are the most eco-friendly system available due to having no water use, and recycling all biomass and nutrients back to the soil safely and effectively.
***The frequency of desludging will depend on the amount of chemicals used in the home, and on the size of the population served and the tank size.
**** Electricity is only used when the liquid volume from the house activates the pump to the filter bed. Also factor in the cost of media filter replacement.
***** Additional costs include annual willow coppicing and spreading-line flushing, but you can do this yourself. If you use a wood-chip boiler or a log stove you can dry the willows and recoup some or all of these costs in fuel value.

When considering costs, remember both treatment and disposal elements. Because the area of percolation needed depends upon the site characteristics it is difficult to state how much the disposal area will cost without being site specific, but it may be in the region of €1,000-10,000/£750-7,500.

Where both secondary and tertiary treatment are required allow approximately 50% additional expense to cover both systems. Due to the wide variety of secondary and tertiary treatment options this indicative figure will need to be examined more closely in your budget when you have decided upon your final treatment set-up.

Also factor in inspection and maintenance fees, pump replacement etc. into the above costs.

There are generally no maintenance fees for percolation areas, wetlands or reed beds, unless they become heavily sludged themselves and need replacement. Poor septic tank maintenance is the most common cause of this problem and is easily avoided. Some gravel reed bed designers include two septic tanks to limit sludge loading to the reed bed.

Newly planted constructed wetland

us), the cleaner our sewage the safer our drinking water.

Certainly we can use chlorine to sterilise our water, but trihalomethane concentrations (a toxic breakdown product of chlorine dosing in drinking water) already exceed the recommended limits in many ROI drinking water supplies, so it's best to keep our surroundings as clean as possible in the first instance. In Denmark, the utility companies are not permitted to sterilise the water supply with chlorine, so they need to ensure that the reservoirs are kept well protected in the first instance. This pride in water quality has led to an annual competition where different parts of Denmark vie with one another for the best tasting water in the country.

Therefore for homeowners who want the best performing system, discharging the cleanest and least polluting water, then a zero discharge willow facility (for nutrient recycling to biomass) or a source separation or dry system (for nutrient recycling to agriculture or the garden) is certainly the way to go.

Carbon footprint

Another consideration is the carbon footprint of your system. In terms of embodied energy (cumulative energy used in the manufacture and transport of a product), the less concrete and steel you have in your system, the lower your carbon footprint. The less electricity you use, the lower your ongoing impact will be on a day to day basis. Durability is also important because if you have to replace components, then the long term carbon footprint increases.

Zero discharge willow facilities also have a carbon footprint both in construction and for the pump (needed to get a good spread of effluent across the full length of the system). However, if you harvest the willow and use it as a biomass fuel to offset oil or electricity, then your carbon footprint will be negative. Over 20 years, a willow facility will soak up almost as much atmospheric carbon as a standard mechanical treatment system will emit in electricity used. However, this is only of climate value if the willow biomass generated is used to offset heating oil within the house.

With this in mind, it may be worth considering the future of our energy supplies. Climate science suggests that we need to get our atmospheric carbon dioxide levels down from the current levels of 400ppm to at least 350ppm in order to make human life on this planet tenable. If we select sewage treatment systems that can work well without any electricity inputs, then this will ensure that our sewage continues to receive good treatment even if electricity is rationed or is taxed to the point where running costs become too high. Human ingenuity is such that we can certainly find solutions, but given the current lack of easy alternatives to electricity generation then surely the prudent measure is to select one of the many systems that do not need it at all, or at least – as in the case of willows – that pay back more in biomass fuel than is consumed in electricity. ■

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www.wetlandsystems.ie
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References and more information related to this article are available on our website **www.selfbuild.ie**

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Zero regrets

What do you do when your site fails the percolation test in ROI? The only option for Owen Pullen of Co Wexford was to invest in a zero discharge willow bed system.

The land provided no percolation to speak of and we were miles away from mains waste removal

We found a beautiful site in Co Wexford and decided to build our dream home on it," recalls Owen. "There was just one problem: the land provided no percolation to speak of and we were miles away from mains waste removal."

The site had gained planning permission before Owen bought it and had been secured on the condition that the Environmental Protection Agency would grant a discharge license. "When we approached the EPA they told us there was no way we'd get a license to discharge into the waterway, so we contacted Wexford County Council and they put us in touch with Trinity College Dublin which was carrying out trials for zero discharge systems for them. That's how we signed up to be a test site."

Design

The council funded the university to specify zero discharge systems for 10 one-off houses and to monitor them for five years, including measuring rainfall, ambient conditions, water levels and water quality. Zero discharge systems rely on evapotranspiration which is when the plants fully 'digest' the effluent within the wetland.

"Initially we wondered if this could really work – no one would give us a guarantee!" recalls Owen. "But we still went ahead with it, we felt confident enough as this is a common system in Denmark, which has a similar climate to ours. Also, if we wanted to build on this site we had little choice!"

"Initially we wondered if this could really work – no one would give us a guarantee!" recalls Owen. "But we still went ahead with it, we felt confident enough as this is a common system in Denmark..."

"Professor Gill and a postgraduate student designed the system for us," adds Owen. "They crunched the numbers and did the siting, all of which was sent on to the environmental division of Wexford County Council to vet that it really was zero discharge. They were the ones to give planning consent."

Owen didn't want to have a large single block of wetlands, instead he chose to make the willows become a part of the landscaping. "I didn't like the idea of one big chunk so to keep the scale down we went with two narrow beds, one on each side of the house, 32m by 8m each."

"The cost, I admit, was fiendish. We spent €28,000 on the system, and I believe over half of that was due to the liner – we had to get acres of the stuff!" First a layer of geotextile membrane was laid to protect the liner, then the liner, and finally another layer of geotextile was added. ▶

TCD has monitored the site for the past four years

"The rest of the cost is labour and hiring a digger. I oversaw the project but TCD came on site to make sure it was done correctly too. There were some plastic pipes to lay, installing and then connecting the septic tank to the bottom of the wetlands, and that was it."

Monitoring

TCD has monitored the site for the past four years and Professor Gill says that this particular willow test site has not been performing as well as some of the others. This is thought partly to be due to the time of year in which the system was installed. "The system was constructed relatively late in the year and so we did not plant the willows until late April – ideally they should be in the ground by about mid-February or early March. Also, we didn't put in a weed barrier at the same time and the weeds hampered the growth rate of the trees for the first couple of years," he explains.

"As a result there hasn't been as much evapotranspiration happening on Owen's site when compared with some of the other, more developed systems around the county. Nevertheless, it's still acting as an excellent on-site passive treatment system."

Owen is certainly enthusiastic. "It really is an ideal solution – it's clean, never smells and we get amazing wildlife; frogs, bees, butterflies, you name it. But there is upkeep," he admits. "It's like having your own little forest that you have to weed!"

"I'd say for each unit of wastewater we add there must be about 20 times the volume of rainwater and so the ground is very marshy, especially in the winter months. I've tested the water that pools at the base of the willow trees and compared it to samples I took from the stream that runs through our site. The river water has more pathogens in it, despite it looking clean."

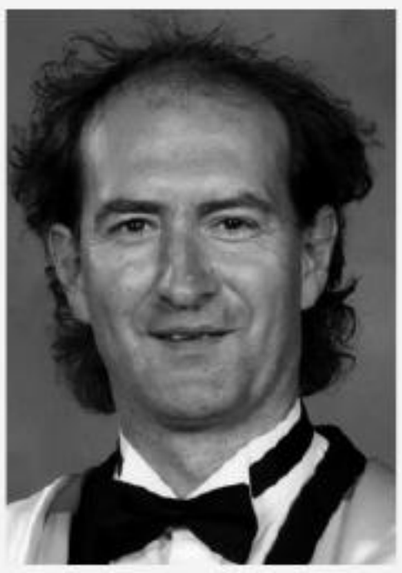
"The trick is not to be daunted by the upkeep," he adds. "The willow is cut when it's dormant, February time, and I do it myself with a chainsaw. We cut a third every three years and that's enough fuel for us to feed the stove in the winter; it's actually quite nice cutting up the wood you use for your fire."

The heating system is oil based with stand-alone stoves; hot water is solar with oil for backup. ■

Astrid Madsen

Zero Discharge Q&A

Dr Laurence Gill of TCD has been leading the research team tasked to produce draft Guidelines for evapotranspiration systems in ROI; the document has yet to be vetted by the Environmental Protection Agency or Department of Environment due to ongoing discussion as to whether these systems truly are 'zero discharge', and if not whether they would then require a discharge licence.



Dr Laurence Gill of TCD

Why is there a debate about whether the system is zero discharge?

The results from monitoring 13 systems around the country have shown that none managed to achieve zero discharge in any year; most remained at maximum level for much of the winter months and did so periodically at other times of the year, indicating some loss of water at the surface.

This was partly attributed to the fact that the low permeability clay filled soil that had been dug out of the ground to form the basin was then used to backfill the systems. The costs would be prohibitive to import more appropriate soil to fill a basin of such a size.

In addition, the typical high humidity that occurs in Ireland all year round means that evapotranspiration levels are less than might be expected. However, despite this, the systems can be designed to evapotranspire a volume more than equivalent to the volume of effluent that is being discharged into them during a year, it's the additional rainfall onto them that is causing some discharge.

Do all zero discharge willow systems require a septic tank?

The short answer is yes; any willow or reed bed system will require at least primary treatment. You could use either a septic tank or a mechanical system but the beauty of the wetlands is that there is no electrical input so if possible it's recommended to go for a septic tank and use gravity to feed the willows. Regular de-sludging of the tank will have to occur as with all septic tanks.

How big does the system have to be?

On the basis of our monitoring the performance of all the systems over the last few years to produce the draft guidelines, we are recommending an optimum surface area of roughly 125sqm per person so 500sqm for four people or 600sqm for six. The recommended depth is 1.8m.

Considering that a large amount of the cost is due to the lining, if there is no percolation happening anyway why does the system have to be lined?

In clayey soils, oftentimes the water table is very shallow and so without a liner the basin would not empty out in summer to provide storage volume for the effluent over the winter as the trees would be effectively evapotranspiring groundwater.

In addition, it is difficult to guarantee that a soil over such a large area would not contain local areas of more freely draining material (such as sandy lenses) which would then act as a pollutant threat to groundwater.

What kind of liner is required?

We recommend an impermeable membrane with specific minimum properties in the draft Guidelines (such as minimum 0.5 mm thick). So this could be a rubber liner or EPDM for example.

When should the willows be planted and how long do they take to establish?

Planting season should ideally be around mid-February. A weed proof barrier is also essential when planting the willow cuttings to give them the best chance of getting established. You have to let the willows grow for a year before discharging effluent into it.

Coppice the willows in the first year and they will grow back vigorously the following year. Then in subsequent years you coppice the willows on a three year cycle – so one third of the willows are coppiced every year.

Does the area have to be fenced off and can any pathogens come up to the surface?

The willows will act as a forest, providing you with an amenity and adding to your garden's biodiversity. The way that we have designed the systems is so that all of the effluent storage and natural treatment takes place in the depths of the basins and so any contaminants should not make it to the surface; we have tested the water that pools at the surface of the willows in winter in two houses that were never occupied and compared it to ponded water from the other operational willows systems and the quality was very similar.

Monitoring equipment at a developed site

Which councils have been working with you?

Wexford County Council funded most of the research sites but then the EPA provided some extra funding to build and monitor systems in County Limerick and Leitrim. More recently Louth County Council has also agreed to set up a single system as a monitoring project. We've been collecting data on some of the sites for six to seven years, the most recent ones were built three years ago.

Do you have any information on the situation in NI? Are there similar trials underway?

I'm not aware of any for single houses. There was a big EU project many years ago looking at willows for short rotation coppicing but not to treat single house effluent as such. Also, in NI in some cases they allow surface water discharges for single houses so there may not be such a driver for expensive 'zero discharge' systems such as these. ■

Astrid Madsen

"The funny thing about it is that what sold us the house was the atrium and gallery, yet that was exactly what didn't work for us!"

Behind the scenes

A reconfiguration of your living space, with a few square feet added, may seem like small change, but it can wreak as much havoc as adding a full extension! Ciara and James Rockford of Co Antrim learned this the hard way...

The only way to tell if a house performs well is to live in it. "Even though we had four big bedrooms upstairs, the house felt bottom heavy. We wanted to balance it out," explains Ciara. "The funny thing about it is that what sold us the house was the atrium and gallery, yet that was exactly what didn't work for us!"

Atrium

"The focal point of the house was the sun room in the middle, which we used as our dining room," continues Ciara. "The glazed roof with windows below acted a bit like a conservatory, it was hot in summer and cold in winter. We only got a nice temperature half the year, and even then it seemed cooler than it should have been. We also had some issues with leaks, which we'd dealt with but that too was a concern."

Upstairs, running half the length of the dining room, was a minstrel's gallery that was never used. "It wasn't a practical space, in addition to the temperature swings it got too noisy and couldn't work as a bedroom or study. Also, with young children you're always concerned about them climbing over the railings." ▶

More photographs available at **www.facebook.com/selfbuild**

The outside patio area was shielded for added comfort

At first they thought of either replacing the windows or removing the atrium altogether. "We weren't sure what to do so we decided we should seek advice from an architect. But we didn't know how to go about finding one," says Ciara. "Then we saw there was a fundraiser for the lifeboats association (RNLI) which gave us the opportunity to consult with one. We wanted to find a cost effective means of achieving what we had in mind."

Initial designs were drawn up to the delight of Ciara and James. "Above all, we didn't want a stuck-on extension, it had to blend in. The new dormer fits in so well with the existing house and the new grey windows and zinc roof all tie in really nicely," says Ciara. "It looks like it's always been that way, which is exactly what we asked for."

One wall was knocked to create an open plan kitchen, dining and living area whilst a recessed steel beam in the ceiling provides structural support for the master bedroom. Extending the gallery allowed them to add a master bedroom upstairs; an ensuite was built onto it by taking up some space from the original master bedroom.

"There was a lot of discussion among our children as to who would get our old bedroom!"

Tender time

"Planning went through no bother," relates Ciara. "The changes were all at the back of the house; also we get on with our neighbours really well, so well that they threatened to put in an objection for a laugh!"

They tendered out to five contractors and three came back with prices. "One was much higher than the other two, I think they were pricing themselves out. The two others were close in price, and we met both at the house. We talked to people who worked with them, and we decided we felt slightly more comfortable with the builder our architect had worked with before."

The contract was fixed price for the building work, but the bathroom and kitchen were sourced separately. "The builder was really helpful, we knew very little and he would advise us if there was a better way. Our architect was also on site on a regular basis. But our inexperience caught us out occasionally, one example is having to source products in time."

The windows required quite a bit of research, with the architect's guidance. "After some deliberation we chose to change all of the windows in the house so we had a large order to place. We narrowed it down to two manufacturers and went to see some jobs they did to make our decision."

"We had white uPVC double glazed units before and the grey is so much better with the brick," continues Ciara. "Also some of the windows could be hard to close and we felt they were losing a lot of heat." ▶

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The kitchen island is a firm favourite of Ciara's; the glazed doors are bi-fold and the sofa was custom made to fit in the space

Dust and dirt

"This was the first time we'd done anything like this," adds Ciara. "We'd never built a house or extended any of our previous homes." While this build was completed on budget and on schedule, and ran smoothly, it still had the hallmarks of all building projects!

"The reality of turning our house into a building site quickly sank in!" The works started in September 2013 and finished in March 2014.

"The lowest point was in January, after we returned from a Christmas break skiing. The kitchen had been taken out and due to the big window being boarded up we were living in a cave! At the height of the destruction I couldn't see how it would be put back together again. At that stage, I wished we'd never started."

Ciara and James didn't give much thought to moving out of the house during the renovation as it wasn't technically necessary. "We won't be making that mistake again! But as with all things there was a positive side and that was the fact that we were always around. It did help move things along, decisions could be made on the spot."

Ciara and James actually adapted very quickly to their new digs. "It took us a week to adjust to not having a kitchen, our neighbours were so helpful inviting us around for dinner and family and friends also lent a hand. We had the sink in one place, cutlery and kettle in another corner while the plates migrated somewhere else! We lived like that for six weeks but that was fine. What I didn't expect was the amount of dirt and dust that gets absolutely everywhere, despite the builders being really good at tidying up."

"When our architect told us we were on track and doing well, we believed him but it was hard ▶

"When our architect told us we were on track and doing well, we believed him but it was hard not to think about the lovely house I'm sure he was going home to!"

The new master bedroom was partitioned to deal with the different ceiling heights

not to think about the lovely house I'm sure he was going home to! You just get fed up after a while." Despite these feelings, Ciara couldn't be happier with the finished product. "I'm so glad we did it and am so thankful we had the right team on board. What was a challenging experience could have been a nightmare."

Master plan

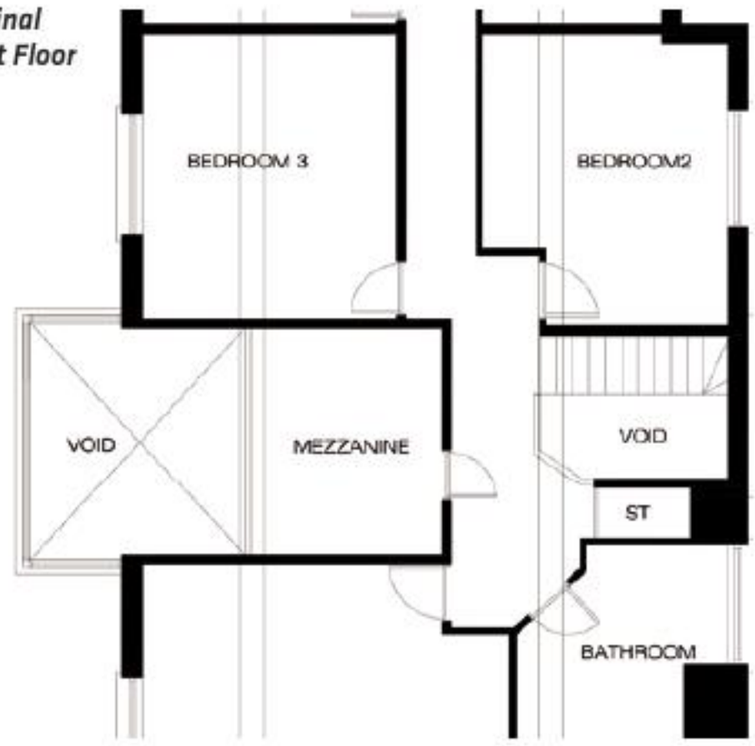
Although new to building, Ciara did get to design her kitchen before she moved in. "The house was built in 2000 but the kitchen hadn't been fitted so when we purchased our home we got to install a new one. At the time I went against my inclination, which was to go for an island, so when another opportunity arose during this refurbishment, I didn't hesitate!"

The island is in the middle of the kitchen with a hob, which Ciara says is very practical, although it did take time going round to various kitchen suppliers to find the right design. But it was all worth it as Ciara now has exactly what she wants; in fact they spend most of their time in the open plan area. "We can live communally without being on top of each other; it's the room we use the most."

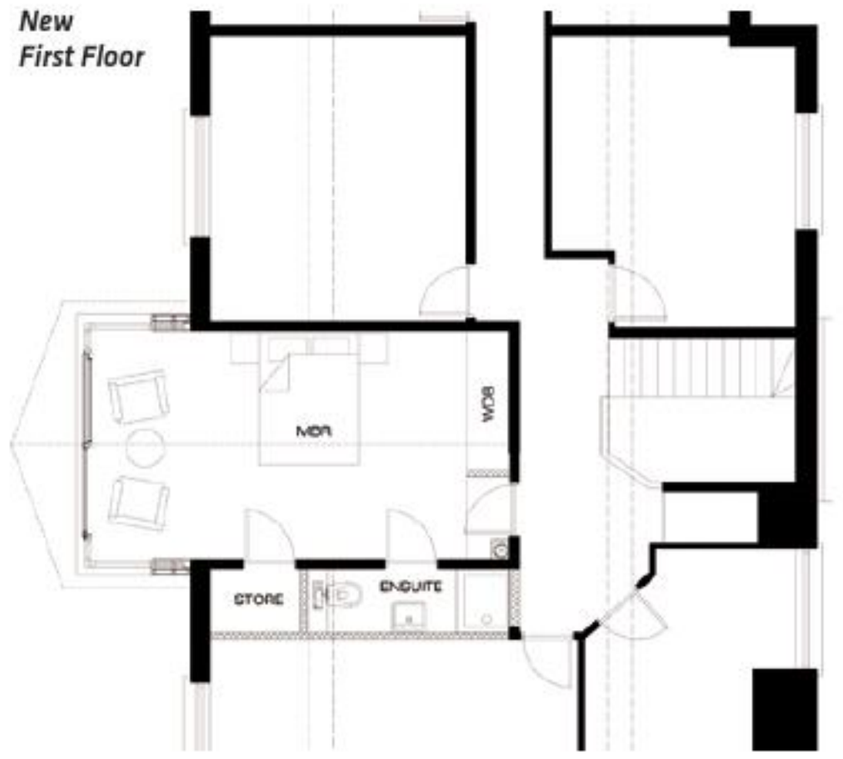
One change they undertook during the build had to do with their new bedroom. "In the master suite we hadn't realised, it was our builder who pointed it out, that the new vaulted ceiling wouldn't carry through the entire room. We hadn't appreciated how it would attach to the original flat ceiling; the two ceilings would have looked quite strange together as there would have been a big step down."

"So we started thinking of how to best use the space, to reflect how we would be living in it; the room isn't big enough to accommodate a lot of storage and I wanted to find a way to conceal the ceiling difference. Our inexperience meant we ▶

Orginal First Floor



New First Floor



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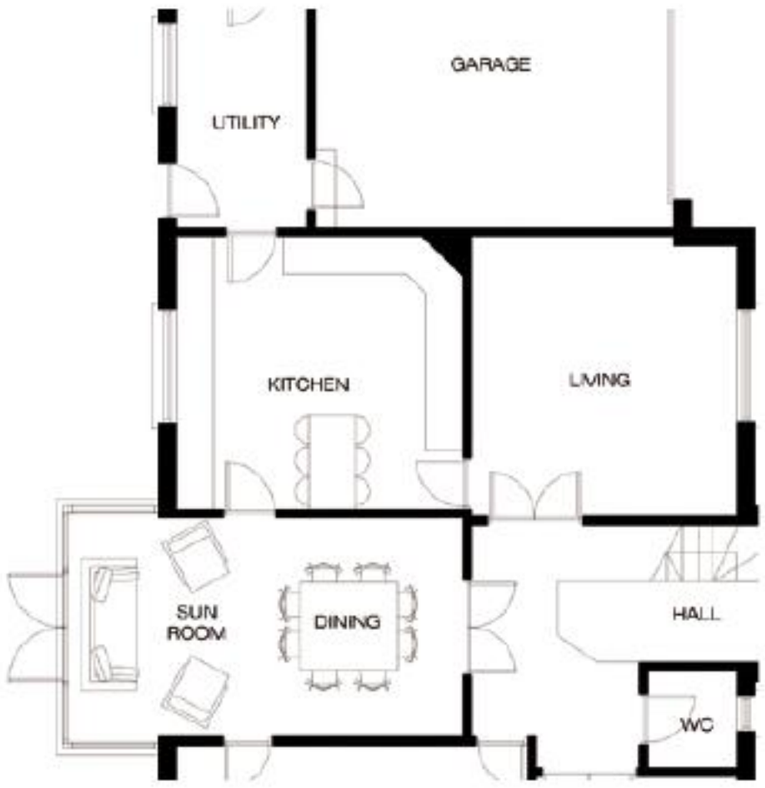
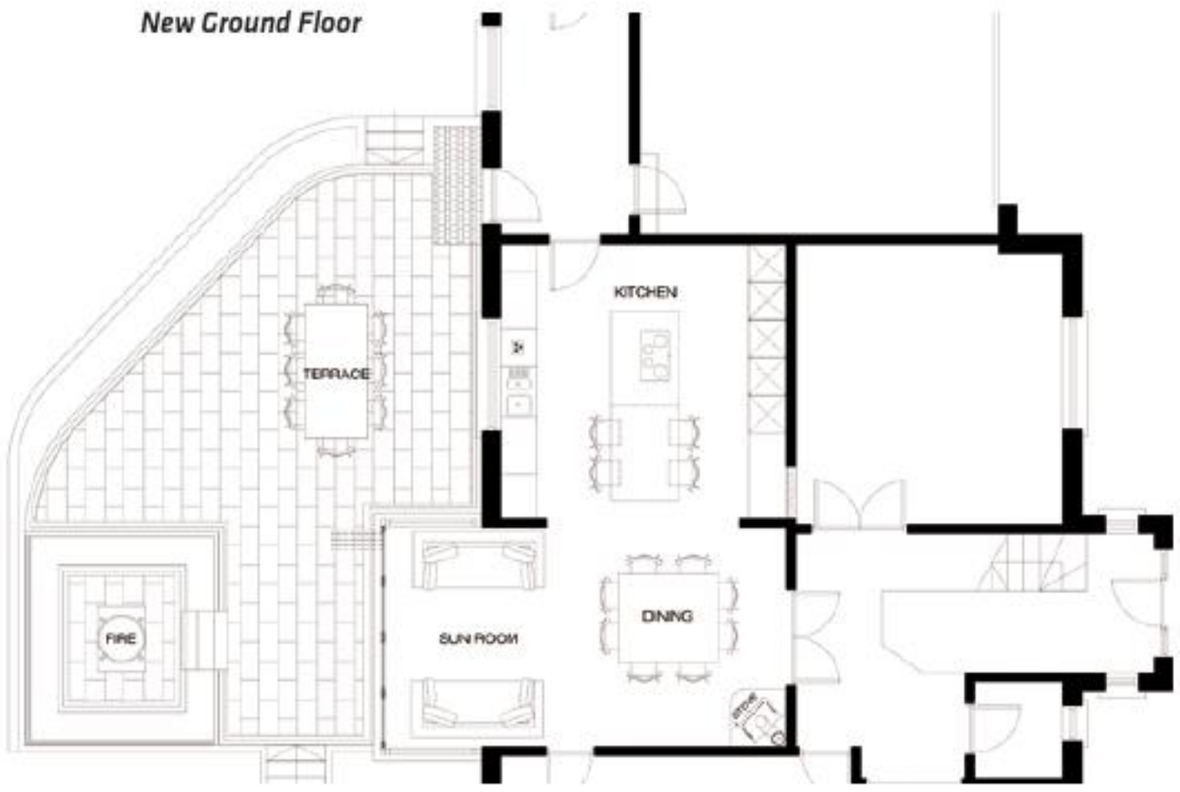


New Ground Floor



were unable to visualise it so James learned how to use Google Sketch Up to model the room and it was brilliant to see it in 3D. It became clear we could corner off a walk-in wardrobe to hide the flat ceiling," she says.

Fruits of labour

Despite the apparently minimal changes on the floor plan, the renovation made a huge difference in terms of style and comfort. "The house is definitely warmer and we are using less oil," states Ciara. "The wood burning stove makes the living area really cosy. This part of the house is warmer than the rest, or at least the rest of the house seems colder because we just don't use it as much."

The connection between old and new was an important one, and to make it seamless they decided to retile the floor. "We chose tiles that resembled what was originally in the kitchen and dining hall." The rectangular layout helped with the furniture and design but it took them time to find the sofa. "We went to so many places and couldn't find one that would fit," recalls Ciara. "We ended up getting one made to our specifications. It's U-shaped and fits perfectly. Purple in colour it gives a charge to the room, I really like it."

Connection to the garden from the new sun room is via bi-fold doors. "With boys in the house the garden consists of a football/rugby pitch! We added a patio area with BBQ to enjoy the good weather when we get it. There is a glass screen for shelter though!"

While they didn't extend by much in floor area, approximately 120 sqft (10 sqm), the transformation couldn't have been any more dramatic. So much so that it spurred them on to do more work on the house!

"We've started doing up the other rooms, and changed all of the internal doors," says Ciara. "It takes so long to get everything done the way we want it, we run out of steam every so often, take a rest, and then start again. I doubt we'll ever be finished but we're taking our time and enjoying the process."

Astrid Madsen

Plot size: 1/3 acre
House size: 3,750 sqft
Build cost: £80,000 including main building works and kitchen

Build Spec

Construction: steel beams, brickwork to match existing, zinc standing seam roof and walls, timber frame with external cement board on walls and painted smooth render.
Insulation: 60mm phenolic board insulation on walls within timber frame construction and 60mm phenolic board over studwork, roof 100mm PIR between rafters with 37.5mm insulated (PIR) plasterboard underneath, floor 100mm PIR.
U-values: floor 0.15W/sqmK, roof and walls 0.18W/sqmK
Windows: triple glazed alu-clad, U-value of units 0.79 W/sqmK; bi-fold doors 1.2W/sqmK

info The companies listed below provide products & services relating to this article.

Architect
Wilson McMullen Architects, Portrush, Co Antrim, tel. 7082 5865, mobile 07966198691, www.wilsonmcmullen.com
Builders
Gary Corrigan, Portrush, Co Antrim, mobile 07707132099
Garth Henry, Portrush, Co Antrim, mobile 07860508353
Structural Engineer
Practical Structures, Belfast, tel. 9028 3060, www.practicalstructures.co.uk
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NEPTUNE

Proof of improve

There are many reasons to undertake a home renovation project, a main one is avoiding the upheaval of a move. But as is the case for many city dwellers, for John and Janette Govan of Dublin it was instead high house prices that drove them to it.

John describes his house in those days as a typical three bed semi with garage. "We owned the house eight years before we decided to move in 2010," he relates. "But every home for sale in south county Dublin in our price range, up to €1.2m, was in the same condition as ours. We must have seen 30 or 40 homes, I think we visited every single one on the market! We even put an offer on two of them but were outbid both times. It was disheartening. After an exhaustive search we realised we would have needed quite a bit more money to get what we wanted."

"That's when we started to look at our own house in a different light," he recalls. "We considered the fact that we would essentially be getting the same house but in a different neighbourhood. And our area has a lot going for it, the children love their school and would miss their friends, our neighbours are great."

With hindsight, John realises it's often difficult to look at your home critically. "It can be hard to visualise the potential, all I can recommend is to never assume you have to move. Take time to design and redesign until it's absolutely perfect, or at least feels as right as is possible."

The reason they hadn't really considered a renovation before was due to the orientation of the house. "We spent most of our time at the back because that's where the garden is, but it's North West facing so there just wasn't enough light for us to enjoy it. We'd previously added a small extension as a temporary fix but that didn't help to bring in the sun."

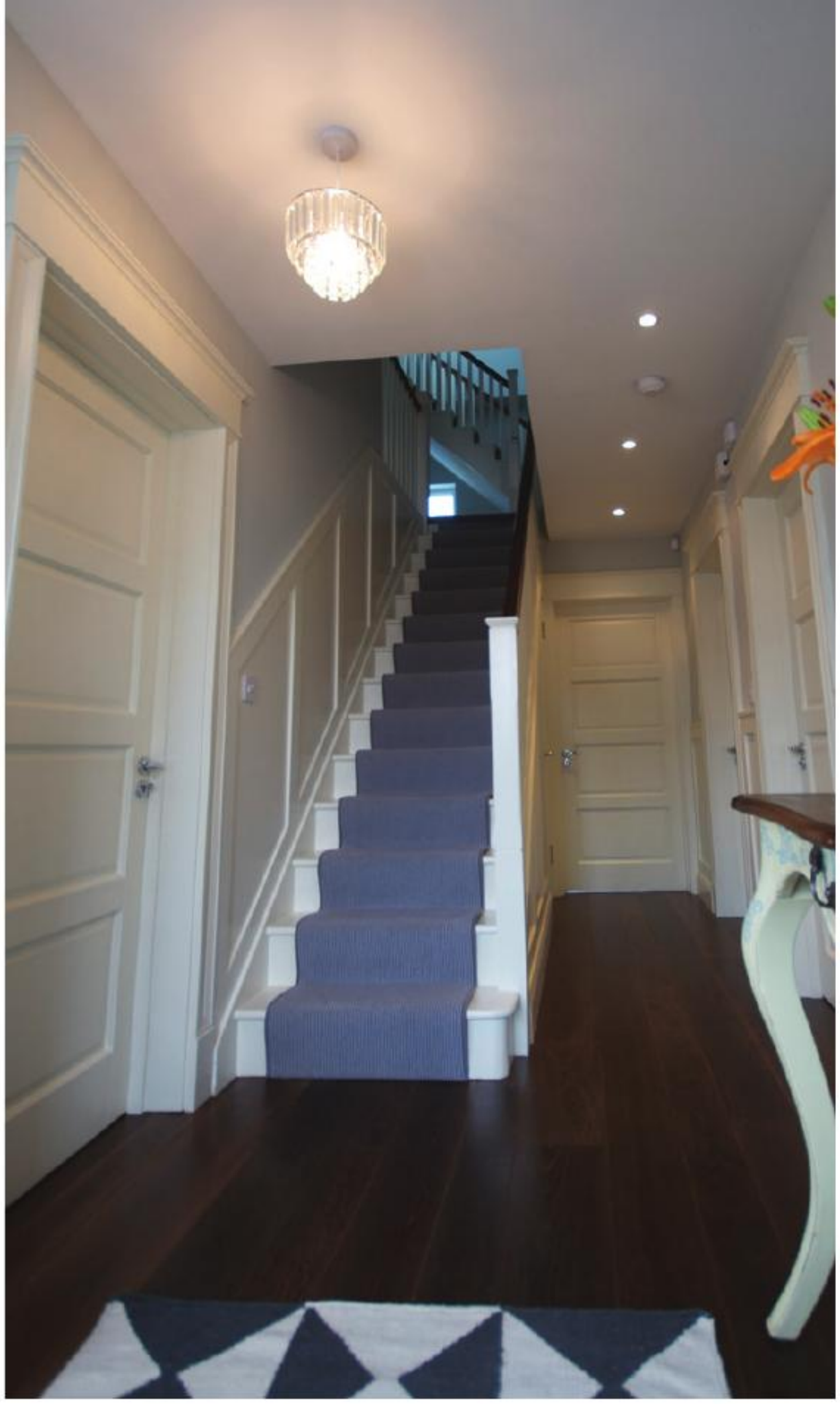
Year-long design process

And so John and Janette engaged an architectural firm to design and project manage the build. "It took us nearly a year to conceptualise the house, we were back and forth with the designer ten or twelve times, but it was eventually finalised in 2012. Despite how long it took we felt this was an essential part of the process," says John. "We were in no rush and I think that was critical. We absolutely wanted to get it right. We also saved ourselves headaches during the build – there were no changes and no hesitations."

John and Janette's requirements were many; ▶

More photographs available at **www.facebook.com/selfbuild**

"It can be hard to visualise the potential, all I can recommend is to never assume you have to move. Take time to design and redesign until it's absolutely perfect, or at least feels as right as is possible."



The North West facing side of the house is illuminated by two rectangular rooflights

they wanted to increase the floor area and reconfigure the house to make it flow better. They also required a large space to entertain guests and so a complete redesign became the only option. "All that remained was the roof, front wall and gable end, the rest was knocked down and built from scratch. We could have tried working with the existing building but there was nothing of great value to retain and in terms of upgrading the energy efficiency it would have been quite expensive anyway."

The new build allowed them to bring the porch forward, fit new energy efficient windows, rewire and replumb the whole house, put thermostats in each room and install underfloor heating downstairs. The ground floor was originally suspended timber and that was changed to concrete. "What we mostly added in floor area is the space above the garage, in terms of useable space we benefited from our choice to convert the attic into a bedroom with en suite," he adds. "In practical terms what we gained was a family ▶

bathroom and a much larger bedroom for my daughter."

The answer to their north facing living quarters was to add two window 'troughs' in the ceiling and to open up the kitchen and dining areas onto the garden via French double doors that span the length of the 1m wall, next to a bay window seat. "The rooflights are where we get all of the light from. It was the turning point of this project, they make it feel like we rotated the house 90deg." Supply and installation ran to €12,000 for triple glazing.

"It's a particularly nice feature because it doesn't feel like a sunroom yet a lot of the roof's surface area is glazed. Also the ceiling being 10ft/3m high adds to the sense of light and space. It feels airy, quite the opposite to what we used to have!" For entertainment they have a table that seats 16 and a two sided stove to divide the living room in two, allowing the children to be separate from the guests.

Planning went through relatively easily. "While there were no objections from our neighbours, there were some restrictions, for instance we wanted to bring the garage out forward and they said no. It's still big enough for my motorbike so we're ok! They also reduced the width of the dormer at the back by 2ft (600mm)."

Not surprisingly they had to move out for the seven months it took to build, and the closest they could find was a house in the next village. "It was a beautiful place, but renting actually reinforced the fact that we had made the right decision. The children were miserable being far from their friends and they missed their house," reminisces John. "Halloween was in the middle of the works and despite the house being boarded up we put up a trick or treat stall in front of the building site – that's how much the children missed their neighbourhood!"

Heated through

"The extension was built to such a high insulation and airtight standard that it's amazingly warm, Janette loves it! The heating is only on from November to January yet we get 22C every ▶

The children had a say in the design of their rooms

morning, I expect the appliances contribute one or two degrees. If there's such a thing as over insulate, I think we did it!" The new heating system is gas fired, same as they had before.

The roof space consists of a master suite, and there too it can get too warm. "I'm considering getting an air conditioner! I like it to be cool to sleep but opening the windows does the trick." John and Janette weren't sure how much space they would actually gain from the attic but as it spans the entire footprint of the house, it was quite a lot. "We thought with the new dormer that it would make the space smaller, and that it would probably end up being a children's bedroom but we kept it for ourselves."

The staircase was moved from the gable end of the house to the middle, to provide a better flow, and a family bathroom was added at that end. "My daughter has an en suite in her room and my son uses the family bathroom as Janette and I have a bathroom off our bedroom too." For ventilation they have standard vent holes in the wall. "We do spend a lot of time with the windows open!"

The finishes were also important so they decided to hire a professional to help them. "We told our interior designer that at the back we wanted a New England style. We've spent time in Martha's Vineyard and really liked the warmth of the light blue clapboard; it feels bright and warm without being overly fussy."

For a fresh start they threw out every piece of furniture they had and let themselves be guided by the designer. "The children had a say in the design of their rooms; for my daughter's bedroom our carpenter built the bed into the window with bookshelves and drawers underneath. That room has an en suite with walk-in wardrobe. My son's room is football themed and blue."

As for the bathrooms, they're all a wet room style. "The power showers may not have been a great idea with water charges!," muses John. "We have three so to make sure there would be enough water in the header tanks, we put two in." They

chose to invest in the bathrooms for the same reason they spent time choosing door handles: "It's the tactile stuff that matters, you can feel the quality of the things you use every day."

Smooth operation

The contractor was appointed through a tender process which their quantity surveyor oversaw. "We had the QS on board for the tender, we went on recommendations for the choice of four or five, and met with all of them. We chose ours in large part on the basis of liking him! He's actually still a friend, two years after we completed the build. Nothing was a problem with him, he was all over the project and on site most days."

As there were no changes to the design and the architectural firm controlled the build, John and Janette were able to continue with their normal lives. "From our own point of view, we had a site meeting every Friday, where tasks were allocated to everybody by the designers. Present were the builder, interior designer, QS and structural engineer." But the build did finish later than expected. "The only reason we were a couple of weeks behind schedule was the delivery of the windows," recalls John. "But it was fixed price contract and came in on budget. The QS paid for themselves ten times over, the interior designer I felt we underpaid considering the work he'd done. The architectural fees were well worth it too, I have to say the team we had was a pleasure to work with."

John has fond memories of this time. "For us it was a steep learning curve. But I want to do it again!" He may very well get the chance; as the house was designed to cater to their life now that they have children and living in the city, John knows that it isn't the one he'll be retiring in. "Our needs today probably won't match up to what we will want when we get older so a move may be on the cards then. We had very practical reasons to do it the way we did but in 10 years' time it'll be a different story." Delighted to not have had to move this time around, the next phase could be a very different kind of project. Out in the country perhaps? ■ ►

All of the bathrooms are of a wet room style

The back of the house is New England style

House size before: 130sqm
House size after: 225sqm
Plot size: 340sqm
Total cost including build, furniture and fees: €400,000

Build spec

Construction: airtight and cold-bridge free products used. All walls (single storey extension and two storey side and front extensions): 300mm cavity wall with inner services duct, drylined, external face covered in rain screen boarding, PIR insulation, U-value 0.17W/sqmK. Flat warm roof construction, composite urethane insulation board with a bitumen impregnated fibreboard facing, U-value 0.16W/sqmK. Ground floor concrete, PUR insulation, U-value 0.14W/sqmK. Reformed pitched roof to existing house and side / front two storey extension: cold roof construction, PIR between roof timbers and under including airtight membrane, 0.16W/sqmK.
Windows: mixture of double and triple glazed, timber frames supplied with internal paint finish, U-value of units 1.2 W/sqmK. Two 7.8m x 1.2m roof lights ('troughs') in flat roof extension: triple glazed and installed in three sections, aluminium frame, U-value 1.1 W/sqmK
Airtightness: 4.8MN/(h.MO)@50Pa.

Astrid Madsen

info The companies listed below provide products & services relating to this article.

Project design and supervision
ARC Design, Chartered Architectural Technologists Brian & Mark Davies MCIAT, Delgany, Co Wicklow, tel. 01 201 0377, www.arcdesign.ie
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Quantity surveyor
Brian Gubbins Quantity Surveyor, Greystones, Co Wicklow, mobile 086 320 4486
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Rooflights fitted win Reynaers aluminium section framing and supplied by the Folding Door Company of Ireland, www.foldingslidingdoors.ie
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In its most basic form, a mantlepiece is a flat piece of timber or material placed above a fire opening

Images courtesy of www.thomsontimber.co.uk

Make your own mantlepiece

Think of all the items you have placed upon your mantlepiece over the years. Apart from the normal things like a vase, clock, ornaments, candles and photo frames, there are also temporary residents such as cups of tea, letters, phones, keys, books, etc. As a result, the mantlepiece has to be flat, wide enough to accept everything listed above, heat resistant, decorative, low maintenance, tough and, above all, stylish...

There are many materials that mantelpieces can be made from including timber, marble, slate and brick. Each has its merits and your choice will depend on the style of the room.

The focus of this article is on timber mantlepieces; where to get them, how to install them and what would be the best material to use.

In its most basic form, a mantlepiece is a flat piece of timber or material placed above a fire opening. It usually rests upon the fire surround and is fixed to the wall in a number of different ways.

Fitting in

The first job of fitting a mantlepiece is to select timber that is going to blend in with the room. You

can find that just by keeping your eyes open: the perfect piece could be lying just about anywhere, in a saw mill, a garden centre, buried in the ground for thousands of years or on a beach!

A local saw mill is an excellent source for any type of wood you may require, you could even find a piece that's been upcycled from an old building and have it cut to size with a flat surface. Garden centres are great for supplying sleepers or edging timbers and these can look spectacular when stressed, stained and fixed in place using rugged steel.

To stress the timber, take it outside and release your anger on it! Beat it with a hammer, throw stones at it, drag it across the yard or use your imagination. The intent is to make it look bashed, it is up to you how battered you want it to be. You can then finish it to suit the layout and design of your room. For example you could stain it to match your wooden floor, paint it or use a clear sealant such as varnish or Danish oil. With an oil finish it's easy to repair any scratches or damages with a simple touch up.

Your mantelpiece will be exposed to high temperatures from your stove, range or open fire. As a result the moisture in the timber will evaporate and dry it out, during which time it may crack as the timber shrinks. To prevent this, it is a good idea to 'season' the timber beforehand.
You can do this either by getting it kiln dried (similar to putting the timber into a giant oven for a designated time and letting the controlled environment dry out the wood), or leave it to weather for at least twelve months. If using this option, although the wood should be sheltered, the aim is have as much air as possible circulating all around it allowing for gradual drying and less likelihood of cracking. It should then be brought inside for at least three months during warmer weather to dry to the same humidity as the room it will be in. It may not be quite as quick or as dry ▶

To stress the timber, take it outside and release your anger on it! Beat it with a hammer, throw stones at it, drag it across the yard or use your imagination.

Whilst the proportions of the mantelpiece will vary according to the homeowner's preference, they can be based on a golden rectangle of 1:1.618

A mantelpiece that was stressed, stained and fixed in place with rugged steel

Images courtesy of Ciaran Hegarty

Right: www.thomsontimber.co.uk

as the kiln method but that may not be necessary as all timber will eventually settle to the relative humidity of your home.

The average fireplace, the kind you would find in in a standard semi-detached house, is roughly square. Whilst the proportions of the mantelpiece will vary according to the homeowner's preference, they can be based on a golden rectangle of 1:1.618. For a wood burning stove you may not necessarily have surrounds, and in that case having the mantle be twice to 2.5 times the width of the stove can work well. You can extend the mantle the length of the wall or of the chimney breast, the possibilities are endless!

Fixing it in place

The timber surrounds have no set dimension either, there are so many different styles which can range from 100mm x 50mm (4"x2") to having two sleepers on their ends which would be 250mm x 150mm (10"x6"). The frame of the fire surround including the two uprights on either side of the fire opening and the mantlepiece can be fixed to the wall using brackets.

The fire surround can stand on its own but obviously for safety reasons and so it doesn't fall over or be pulled down by someone, it also must be fixed to the wall. There are fixing kits you can buy that come in two parts. The first part is fixed to the wall and the second to the fire surround. The bracket on the fire surround slots into the bracket on the wall.

"With an oil finish it's easy to repair any scratches or damages with a simple touch up..."

Other ways of fixing the two together are by using what's known as a keyhole slot on the back of the uprights. This consists of a hole and a smaller hole drilled just below it to form a keyhole shape. Screw a round head screw into the wall using masonry plugs and leave a bit of the head sticking out. Place the uprights over the head of the screw in the bigger of the two holes and let the upright slide down into the smaller hole so it can't come out. Keyhole plates can be bought to cover the holes and prevent the screw from pulling out.

"A local saw mill is an excellent source for any type of wood you may require, you could even find a piece that's been upcycled from an old building....."

However, the simplest way to fix the mantelpiece is to rest it on the fire surround and bond it using a heat resistant adhesive from a silicon gun. In that case the mantle needs to be roughly the same width as the surround, projecting about 50mm on either end.

The other method is to install a floating mantlepiece. This is one that looks as though it's not resting on the surround and it couldn't be simpler to do! You need to be careful in your marking out and precise in your calculations but with that done, the rest is straightforward. To make sure it extends equally on each side, measure the width of the fire opening. Then measure the width of the mantelpiece. Subtract the two and divide it by 2. This will give you the exact measurements that you can step in from both sides.

Measure in from the ends of the piece and drill a blind hole in the back of the mantle. This is a hole that doesn't go all the way through the piece. Drill in approximately 50mm (2") or deeper. Drill corresponding holes in the chimney breast to line up with the holes in the back of the mantlepiece. (Make sure the mantle is level at this stage.) The size of your mantle will determine how many holes you need. Two should suffice on a 6 foot long (1m80) piece. Inside the holes you need to insert steel rods to support the mantle. These may be threaded bar cut into lengths, coach bolts, steel rods or anything else that you feel will support the mantle on the wall. Use liquid adhesive in the holes on both the wall and the timber and set them. Shelving can also be done this way.

To hold the mantle in place as the glue dries, support it by screwing a batten onto the wall under the mantle. This batten will support the weight of the piece as the glue sets. You could also place supports under the mantle such as 4x2s (100x50mm) on their ends or place a couple of workmate benches under the piece and build up to

the underside using bricks or whatever you can get your hands on. This will hold the piece in place in case it drops on one side taking it out of level. Finally in terms of height, there seems to be no guidelines in the building regulations but the general rule of thumb is to keep the mantle at least 300mm from the top of the fire opening. Anything over this height is your choice depending on whether you have a raised hearth or want to provide a TV over the mantle and therefore can't have it too high up the wall.

That's all there is to it. As I mentioned before, if you can find a piece of timber that has special meaning or you want to give an old beam a new lease of life, cut it down and suspend it above your fireplace!

Ciaran Hegarty

Eye on Ireland

Exciting stuff is happening in ROI's home improvement sector; according to AIB and as reported by RTE, apparently over 40% of consumers are planning home renovations in the next 18 months.

To meet this demand, AIB is offering a **free Building Energy Rating (BER)** for those taking out a new home improvement personal loan.

The **Irish Green Building Council** for its part is currently buzzing with activity as it has recently launched the Irish leg of the Green Building Council's *Build Up* initiative. It's funded for two years by the EU Horizon 2020 programme and is intended to act as a **catalyst to deep renovation.**

The first stage is to map out the various stakeholders/influencers in ROI and identify where and why not much progress is being made and strive to unblock it. The other aim is to provide a web platform (wiki) incorporating information on the initiatives that are underway to avoid a duplication of efforts.

The IGBC is also involved in the EU-sponsored Qualibuild initiative which is currently very active in providing **practical, hands-on training for individual builders and contractors** (including a 'train the trainer' programme); check out qualibuild.ie. In this day and age of precision builds, it's essential for all builders to make sure their skill set matches the market requirements. The IGBC is also investing in an **Irish-specific environmental assessment methodology** (see Winter 2014 issue article *Beyond Passive House*).

For all of those involved in sustainable building, make sure to check out the **Smart Ecohub,** a cross border initiative bringing together businesses involved in energy efficiency: smartecohub.com

Moving on to the theme of **insurance,** ROI's Manicle Property Claims has warned homeowners that underinsuring their property may not necessarily result in significantly lower premiums, but would cause them to be out of pocket were something to happen. Home insurance is not related to market value but to the cost of demolishing and rebuilding the house, including all associated costs such as removal of debris and professional fees. If doing work on the house, where scaffolding and doors are removed you may pay a higher premium during the build to cover the increased risk; also bear in mind unoccupied properties may not be covered by your policy, so always check.

Turning to a much lighter topic, if you're into cooking consider **sonically seasoning** your dishes! Research sponsored by Sony suggests you should pair food with the music from the country it comes from to enhance flavour; opera for Italian food, flamenco for paella. "We taste with our senses, not our mouths – our tongues do not taste food but actually our brain gets the mouth ready for flavour experiences," experimental psychologist at Oxford University Professor Charles Spence stated.

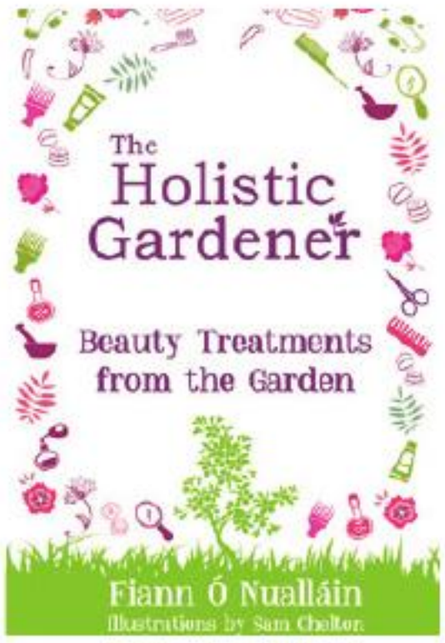
Following on from our article about Universal Design, *SelfBuild* came across research conducted by Lorcan Sirr, an academic who is currently writing up legislation in Catalonia to make **home ownership more affordable.** One method is to sell your house on a temporal basis; for the buyer it's a way of renting at a much lower cost than would be the case in current market conditions and the owner gets a lump sum, handy if the person is retiring and wants to get some cash but not let go of the house to bequeath it.

Finally, news comes from the Dublin energy agency Codema that they will be launching a **'Home Energy Saving Kit'** featuring six key tools to help you carry out a mini energy audit of your home. As SelfBuild went to print they weren't available, but the plan is to roll them out in a selection of Dublin City Public Libraries (the kits will be rented out). Inspiration comes from a scheme run by the South Australian government in the 2000s.

Astrid Madsen

Another project Codema has been involved in is the **5Cube,** an interesting take on how much oil Ireland consumes on a daily basis... A new landmark on Dublin's quays, the 5Cube is a physical interpretation of how much oil Ireland is consuming every five minutes; constructed from durable black glass it features rooftop solar photovoltaic panels which power an information screen and an LED illumination. The 5Cube also features a giant kaleidoscope on one side and a periscope on the other, both of which show the reflection of the sky as a constant reminder of our ever-changing weather which delivers renewable sources like solar and wind energy.

The Holistic Gardener



IN HIS NEW BOOK *Beauty Treatments from the Garden*, self-styled holistic gardener Fiann Ó Nualláin tells us that many of the cosmetic ingredients you need to optimise your glowing beauty can be found growing at your back door. Happily, you don't necessarily have to be much of a gardener to reap nature's benefit, as many of the beauty-enhancing plants are what we think of as common weeds; nettles, dandelions, cleavers and chickweed. Others can be bought in the greengrocers.

The introduction in this nicely bound little hardback was encouraging, with the author saying all the right things about his motivation for cultivating the busy niche of DIY natural cosmetics. A list of 'nasty' chemicals is provided to open the reader's eyes to why natural is best, along with a comprehensive equipment list made up of handy items to be found in most kitchens. There follows an explanation of how to make the different base products, like body butter, shampoo, exfoliant, infused oils, as well as a natty way to concoct your own steam-distilled floral waters.

Starting with hair and finishing with toenails, Ó'Nualláin describes how to realise your natural cosmetic aspirations under 'Garden Spa' and 'Kitchen Spa' headings, as each area of the body is dealt with. An occasional 'Top Tip' is highlighted for your attention, and little ink-sketch illustrations, mainly of plants, are a good way of breaking up the text .

Ingredients are mostly measured by the teaspoon, tablespoon and cup, setting the tone for the author's uncomplicated style. At times though, I found this generalised, brushstroke approach led to an unsatisfying lack of detail.
The essential oils, for instance, are listed as having much the same attributes, such as antiseptic, antibacterial, antifungal, with no mention of their individual virtues in specific areas of beauty care. Further, the recommendation to dispense these by the 'shake' instead of the counted drop is not an approach to encourage when using these highly concentrated and sometimes expensive products.

Similarly, boiling water should be allowed to cool a little before putting your towel-shrouded head over a basin of nearly 100degC as you could otherwise damage your complexion. When providing medical advice, I feel that it's better to say nothing than too little to be of value.

Was the suggestion to use snail slime for a face-mask, freshly applied by the creature itself, a light-hearted tongue-in-cheek moment?

The sprinkling of vague and questionable notions was an uncomfortable distraction from what is otherwise a book with many useful natural beauty recipes, both easy and economical to make, with the author's uncomplicated approach offering the reader an accessible and unintimidating route into DIY cosmetic care.

While it provides a good starting point for anyone new to this subject, for those familiar with it more precise information would have been welcome.

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The Holistic Gardener: Beauty Treatments from the Garden by Fiann Ó Nualláin, illustrations by Sam Chelton Mercier Press www.mercier.ie
Hardback, A5 black and white 290pages
ISBN978-1 78117 351-0 €11.50

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Can Natural building become mainstream in Ireland?

Climate change is in the news a lot these days. At the G7 summit in Germany in June 2015, world leaders agreed to the phasing out of fossil fuels by the end of the century. This is a monumental agreement, if put into practice. Even Pope Francis has issued an encyclical to stress the fragility of the natural world in the face of global warming and a Dutch judge has recently ruled that its government was legally obliged to protect the country, (large parts lie below sea level), against the effects of climate change.

By eliminating fossil fuels we would cut emissions of greenhouse gases and help prevent the average global temperature to rise by 2 deg C as compared to the 20th Century average[1]. At the current rate the projected average could be almost 4 deg C warmer by 2040[2]. The implications for the planet are grave: whole continents may become uninhabitable causing a massive human migration to more liveable places, which in turn may result in socioeconomic instability. Non-human species may not have the same options, potentially leading to wide-scale extinction.

Our focus on energy use has distracted us from what's important. In Ireland the Building Regulations focus on energy efficiency; however "low or no energy" construction is not necessarily 'sustainable'. By sustainable I mean a way of building that addresses the ecological, social and economic issues by considering reduced resource consumption, reuse and recyclability of resources, protection of nature, the elimination of toxins, life cycle assessment and quality[3]. Ireland's building regulations don't address the majority of these criteria, nor does the design of the majority of buildings.

The focus on the energy use of buildings has distracted us from the task at hand, which, at a very macro level, is to prevent catastrophic changes to the planet. Materials that are derived from fossil fuels directly, such as plastics, foams and pvc, or that require a large amount of energy to process and produce, like concrete and steel, not only contribute to climate change but also impact on our immediate health and wellbeing through local pollution such as VOCs in the home, resource depletion and ecological decline.

From a construction point of view the answer seems to be the uptake of natural building materials (NBMs). Research into their performance has been carried out in the UK by many third level institutions and research organisations including the Universities of Bath, Cardiff and Plymouth, the Centre for Alternative Technology and the Building Research Establishment, all of which have studied hemp-lime, straw bale, hemp and clay blocks, monolithic hemp walls, wood fibre, recycled and other low impact materials and processes.

In Ireland, the Cork Centre for Architecture Education undertook research to identify a selection of best practice products and services and initiated six pilot case studies in Ireland. It is now known that apart from their low environmental impact, NBMs also perform exceptionally well in regulating moisture and temperature, breathability, hygroscopicity (the ability to pull moisture from the air), thermal insulation, durability and acoustic attenuation, when installed correctly.

What is holding us back from using NBMs? The first reason is our **sceptical approach** to them. Unfamiliar and unconventional, NBMs are not tried and tested like mainstream building materials and builders and homeowners aren't generally very concerned about the provenance and lifecycle of the materials used. There's also little knowledge or skill of how to specify and use NBMs, discouraging negative experiences, perceived non-durability and complexity in using NBMs are also at play.

The second element is **cost** as NBMs are often imported and not readily available. The government gives no support, financial or otherwise; business incentives are non-existent and most mortgage providers will not extend a loan.

Finally, **building standards.** The Building Regulations inhibit the use of NBMs, promoting instead standard building practices that fulfil baseline requirements. Many NBMs do not have CE product certification and most insurance companies will not provide cover for houses built with these.

Solutions include improving societal awareness of buildings in the context of climate change, up-skilling the construction workforce, training building professionals in specifying and constructing buildings made of NBMs, some of which is already happening.

But the most influential action would be the creation of a **new large-scale industry making prefabricated natural buildings** in collaboration with the agricultural sector and the timber frame industry as most NBMs avail of wood to act as the structural support. A UK company[4] has been making prefabricated straw bale buildings for several years using waste straw from the local[5] grain industry and a Canadian company also developed a successful prefabrication method using straw bale; others[6] in the UK are producing industrial scale buildings in prefabricated hemp-lime with locally grown hemp.

The potential for these and other NBM industries (natural wood fibre, solid massive timber from construction waste and clay block among others), is very tangible. All that's needed now is a forward thinking environmentally progressive government and an equally engaged public as well as supportive investors, lenders and insurers, to make it happen. ■

1 University Corporation for Atmospheric Research, 2015. What is the Average Global Temperature Now? url. https://www2.ucar.edu/news/what-average-global-temperature-now (accessed 18.06.2015)
2 Kevin Anderson, climate scientist at the Tyndall Centre for Climate Centre, Real Clothes for the Emperor: Facing the Challenge of Climate Change, 2012.
3 Kibert,C.J., 2008.Sustainable Construction: Green Building Design and Delivery. John Wiley & Sons.
4 Modcell
5 Naturebuild
6 Greencoreand Hemcore

Caelan Bristow
Researcher into the barriers to using NBMs in Ireland and is based at the University of Bath.

If you are interested in participating in a survey about natural building materials in Ireland (NI and ROI) go to http://goo.gl/forms/opmGtJhswO or contact Caelan at cb759@bath.ac.uk

Blazing a trail

EVEN IF YOU'RE NOT A FAN of Laurence Llewelyn-Bowen's vibrant interiors, we all love colour somewhere in our homes. Outside, colour usually means plants which are fragile and subject to frosts, pests and diseases. Until now. Wouldn't it be lovely to have a colourful garden all year round with no maintenance and no chance of it dying off due to no fault of yours! The solution is the new **RockinColour** gravel range from quarry product suppliers **CES**. Ideal for paths and also on beds as a mulch instead of tree bark, the stone is coloured with a non toxic, colour fast, UV tested coating and guaranteed for five years. Available are Plum red, Oak gold, Azure blue, Chestnut brown and Midnight black. Additional colours are due to be added to the range next year. The 20cm stones, for those who prefer a traditional looking walkway, can also be found in the company's **Decorative Gravel** range of natural stone finishes. Both may be viewed in garden centres across NI or at

the Moneyreagh and Saintfield yards in Co Down.

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Eye spy

A NEW WEBSITE might not at first sight appear to be particularly newsworthy, but in the era of the world wide web it's like opening a showroom – to the world! What's more, the products on offer have universal appeal to everyone who's thinking of building in a rural area. **Kingspan Environmental** have just launched **www.kingspanenviro.com/ie** covering their entire portfolio of sustainable products for self-builders which includes wastewater treatment, rainwater harvesting, solar thermal hot water (both tubes and flat plates), and 3kW and 6kW output wind turbines.

Under the **Kingspan Klargester** brand the company have a range of mechanical packaged wastewater treatment systems for domestic use, including the BioDisc and newly launched BioFicient; both of which are economical to run. The cost of water is something we are all becoming painfully aware of and the company also has easy to install rainwater harvesting systems. If you have a site then these are two areas you can begin on immediately. The company's technical representative can be booked for a free site visit to determine, in particular, the siting and installation of the wastewater treatment which, on a prepared site, takes three to five hours, or, where more work is required, one to two days.

Overall the website contains useful advice on necessities such as regulatory and compliance issues covering both ROI and NI, case studies from all of the products featured and, for the technically minded, installation documents and data sheets.

Go to www.kingspanenviro.com/ie or contact Kingspan Environmental, 180 Gilford Road, Portadown, Co Armagh BT63 5LF tel. 3836 4448

ROI calling NI: prefix with 048 **NI calling ROI:** prefix with 00353(0)

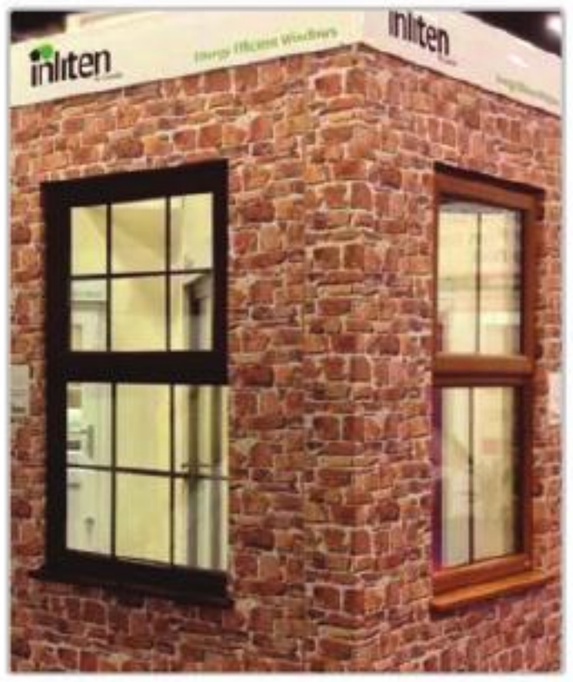
Selfbuild IRELAND

inliten Windows & Doors

Camden had the opportunity to showcase their innovative range of products and profile system at last year's **SelfBuild & Improve Your Home Show**. A vast range of products were on display including Vertical Sliders, Triple Glazed Tilt & Turns, Composite Doors and their brand new PVCu Stable Door.

Inliten boasts a range of unique and exclusive benefits:

- Designed to meet the sustainability demands of the current climate
- Enhanced security locking fitted as standard; keeping your home safe & secure
- Superior thermal performance with Triple Glazed U-values of only 0.8 w/m²K
- Reduced home heating bills; up to 40% savings with Inliten windows & doors
- Available in a range of colour finishes, including spray-painted RAL colours
- All Inliten products are backed by a 15 year product performance guarantee



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