



Barn conversions: What you need to know

Converting barns to residential use is a popular way to create spacious, highly individual homes that are packed with a lot of character. Many old agricultural buildings have no practical use for modern farming, so providing them with a new, viable use is beneficial to both conservation and sustainability.

Getting this kind of project right, however, is far from straightforward. Without sufficient understanding, care and attention during the design and construction, you may not get the result you're expecting. Here's what you need to bear in mind before you start your scheme.

Establishing the living space

A classic challenge when converting a barn is finding a way to create the subdivisions and private zones needed to establish a useable home. You'll be working with a building that was used for storage or similar purposes, so it essentially comprises large areas of undivided space.

For a conversion to be successful, the finished house must still have the feel of a barn whilst being comfortable and practical for living in. This means achieving a balance between the large, open and often double-height spaces this kind of structure offers and the smaller, more intimate rooms we all need in our homes. Good interaction and flow between the zones is key to success.

Conversion projects can fail to deliver at both ends of the spectrum when trying to achieve this balance. Too

Tackling this kind of project could give you a home with real wow factor – but there will be challenges along the way. Alan Tierney explains the essential considerations

much subdivision into domestic-sized rooms compromises the fundamental open nature of the barn. On the other hand, cramming all the private rooms into a small part of the building (leaving the remainder as a huge, near-empty open space) results in neither element being comfortable or enjoyable. In fact, this is likely to be a very inefficient use of the available floorplan.

If you want to maximise the opportunities a barn can offer, then it's important to work with an architect or designer who really understands how these buildings work. Explore their previous projects and, if possible, visit some of the conversions they've completed and speak to the owners about how they've found living in the space.

Retaining character

The history and charm of barns and old farm buildings are major attractions in the desire to convert them to residential use. Their much-loved character lies in the materials and methods of construction, along with the techniques and details of how they are put together. But

Above: This conversion designed by David Nossiter Architects has been kept as open-plan as possible to preserve the original barn's cathedral-like proportions. Oversized birch-faced plywood furniture is strategically placed to act as partitions, providing privacy for bathrooms and sleeping areas



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Above: This cosy conversion by Yiangou Architects allows the charm of the building's original stone walls and roof timbers to shine through

it's surprisingly easy to lose much of that when consumed by the drive to achieve contemporary living standards. Many barns have been left largely untouched over the years, so they retain a lot of their historic fabric. A successful conversion will express this in the finished result. The design should aim to enhance the features of the building and maintain their visibility.



Above left: Past alterations can affect the structure of an old barn, and will need proper investigation prior to starting a project. Above right: Careful, conservative repair of the structure can help to retain character and historic fabric

Much of the character will relate to the agricultural use of the structure. As a result the details are functional rather than aesthetic and they can often be simple and utilitarian. Failing to follow the lead of the building in this sense – for instance by introducing details that are too domestic or polite – is a frequent cause of unsatisfactory projects.

It is difficult to find the balance between maximising visibility of the structure and delivering the requirements of a modern house. Achieving sufficient airtightness and insulation can make it particularly complicated to keep wall surfaces on show internally, for example.

It's often much easier to make a feature of the roof structure, which will be fundamental to the look and feel of the completed conversion. Barns tend to have large roofs, incorporating lots of historic timber, and they often display fine carpentry and engineering. Failure to make the most of this opportunity is a surprisingly common mistake in poorly designed conversions.

Fabric performance

Inevitably, making the change to residential use will have a dramatic impact on the building fabric. Barns that make

the most attractive prospects for conversion are almost exclusively of what's known as 'traditional construction'. So they are built from permeable, breathable materials that rely on ventilation and drying by evaporation to avoid them becoming damp and suffering decay.

Potential problems won't only be due to the physical changes involved in the conversion itself. Once your family moves in, the barn will be subject to major new environmental stresses, such as the large amounts of water vapour generated by occupants (eg when breathing) along with changes in airtightness, heat flow and ventilation, and the impact of artificial heating.

The choice of materials is critical to enabling the fabric to continue to operate in a breathable fashion and prevent it from becoming damp. Natural products such as lime, clay, hemp, woodfibre and sheepswool maintain breathability and have the ability to buffer humidity and temperature. Materials incorporating Portland cement, vapour barriers and sealants should be avoided because they will tend to trap moisture in the fabric.

Your renovation works will also need to provide effective ventilation. This is essential to ensure that excess water vapour is removed from within the structural envelope and thus maintain a healthy environment for both the building and its occupants. The right strategy will depend on the nature of your project, including how airtight the finished house will be – in some cases, mechanical solutions may be required.

Use of inappropriate materials, inadequate ventilation and a lack of understanding of moisture movement in old structures can cause very serious problems in conversion schemes. Timber decay, damp and mould growth can

develop very quickly, putting the structure of the barn at risk and creating an unhealthy living environment.

The structure

Traditional farm buildings were intended to accommodate very specific functions – generally to provide storage or for housing animals. As a result they weren't designed or constructed to cater for the requirements of a residential conversion, such as carrying upper floor loads.

Over the (sometimes very long) lifespan of these buildings, farming needs and priorities may have changed considerably. In many cases this will have led to repeated, ad hoc alteration and adaptation. It's very common to find a fine barn, originally constructed by skilled masons and carpenters, that's been subject to a series of farmer's repairs. New openings may have been created and others closed, structural elements removed, rotten timbers braced and load paths altered.

As a result, the performance of the structure can be difficult to assess. But if this isn't fully understood before planning new interventions and loadings, there can be serious consequences – even leading to total collapse.

TOP TIPS

- Find a balance between the open space of the barn and the need for comfort and privacy in the separated spaces of a useable home.
- Aim to retain the character of the barn. In particular, your project should enable as much of the structure as possible to be visible internally.
- Understand the breathable performance of the building fabric and select appropriate compatible materials – try to use like for like, where possible.
- Assess the structure carefully before you begin, including later alterations and repairs.
- Be prepared for surprises during the course of the project and adapt your plans as necessary.
- Plan the provision and distribution of services very carefully – mistakes here can spoil a barn's charm.
- Pay close attention to wildlife that might be present. Commission surveys and take professional advice about appropriate measures.
- Ensure that rainwater runoff is managed effectively – especially from roofs and large glazed areas.

What's more, even the most careful assessment cannot identify all the issues with a complex old building at the outset. Problems will always come to light during the project that will require re-evaluation and flexibility in order to achieve the best outcome.

Too often, conversions proceed on the basis of initial assumptions only and site teams aren't able to adapt to new discoveries while the works are in progress.

Services

As with self-builds, most barn renovation schemes will start out with no services, utilities or drainage on site. A classic issue is failure to plan for their provision at the outset, which can have serious consequences for the viability of the project. Technical challenges and the impact on cost and schedule can be considerable.

With a conversion, the complexities extend beyond simply getting services to site. Incorporating pipework and cabling in a building that has never had it can be very challenging, especially where large open spaces are incorporated. Poor design or planning in this area can lead to a range of problems including lack of facilities in the finished home, unsightly visible pipe and cable runs, damage to the historic fabric or structure during installation, and perforation of airtightness and insulation measures (causing energy performance issues).

Wildlife

Old farm buildings are very likely to be home to some kind of protected wildlife – especially bats and owls. Surveys are essential at an early stage, together with well-conceived strategies for appropriate measures, to minimise delays in gaining planning consent.

If roosts or nests are unexpectedly discovered during the course of the project it will bring the schedule grinding to a halt and could threaten the entire conversion.



Rainwater

Barns typically have very large roofs that can empty high volumes of rainwater at the eaves. Quite often they won't have gutters; instead they relied on deep overhangs and very high airflow to prevent the walls from becoming too damp. This will not be adequate for the converted building so considerable thought will have to be given to the provision of new rainwater goods and drainage.

Above: Barns tend to have large roofs that incorporate fine carpentry. Leaving this visible will enhance the character of your conversion



PHILIP BIER

Incorporating large swathes of glazing – for example at gables or in place of the main barn doors – is very popular. These elements will boost natural light, but one downside is they can generate large amounts of rainwater runoff, which increases the risk of damp and decay. The design must therefore incorporate measures to limit the exposure of glazed areas and manage concentrations of runoff.

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Alan Tierney is a period property consultant and conservation specialist. He runs Picketts Historic Building Conservation (www.pickettsconservation.co.uk), which offers hands-on advice to owners of heritage homes.

Above: Dating from 1860, this former grain store has been converted into an elegant four-bedroom family home and work studio by Nicolas Tye Architects. A vast glazed entrance helps preserve the original open feel of the building, which now offers three storeys of living space

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