

CHAPTER 8

ALTERATIONS TO LISTED BUILDINGS - INTERNAL

CHANGES TO PLAN FORM – HISTORIC DEVELOPMENT OF THE BUILDING

- 8.1 The plan form of any building is the layout of rooms, arrangement of partitions, and reflects how the spaces have developed and changed over the years. The original plan and layout of a building can provide understanding about how old the building is, how the spaces were used, if the owner had servants, the division of the public and private spaces, etc. The historic development of a building over time tells the story of the building and how it was used. This story is significant and contributes to the special architectural and historic interest of the building. Proposals to alter the historic plan form may affect the special interest and should be carefully considered.
- 8.2 Before proposing alterations to the historic plan form of a Listed Building, it is important to have an understanding of the historic development of the building. This research can include measured survey drawings, involvement of an architectural historian, reviewing old plans, etc.
- 8.3 Some degree of research is required such as visiting the Cambridgeshire Collection at Cambridge Central Library and speaking to the local village history group or local residents. Alternatively, an architectural historian can be engaged to research the building. Information on the plan form and historic development, also contributes towards the Heritage Statement required with a Listed Building application.
- 8.4 Once the development of the plan form has been established, it is then possible to analyse the current plan form and identify what spaces might be suitable to accommodate the desired changes without causing harm or significant loss of historic fabric.
- 8.5 While alterations may include the existing habitable space, they can in some instances also include bringing previously uninhabited space into use. However, this may raise other issues such as means of escape, fire protection, and the need for light and ventilation, all of which may impact on the historic significance of the building.

FIXTURES AND FITTINGS

- 8.6 Historic fixtures such as panelling, cupboards, fireplaces, staircases, carvings and mouldings contribute to the character of the Listed Building. There is a presumption that these original historic features will be retained. The replacement or removal of recent or modern fixtures and fittings may not require Listed Building Consent; however, contact the Council to discuss such changes in advance of carrying out **any** work.

WALLS AND PARTITIONS

- 8.7 South Cambridgeshire has a variety of historic walling materials. These range from clunch, brick and clay bat to timber frame with lath and plaster, wattle and daub or timber boarding. Any alteration proposed to an original or historic partition that results in a loss of historic fabric will need to be clearly justified. There is a presumption that original or historic partitions will be retained.
- 8.8 The construction method and materials of new partitions should be considered, depending on the proposal and location. It may be possible for new partitions to be constructed from modern materials such as softwood timber and drywall plasterboard. However, in certain circumstances, it may be more appropriate for a new wall to be constructed from lath and plaster, or other traditional materials.

FLOORS

- 8.9 Flooring in Listed Buildings can vary and include brick or clay pammets, timber boarding, stone, historic screed or 20th century concrete. The presumption is that existing historic floors will remain, although in some circumstances, it may be possible to lift and relay a less significant or sensitive floor in order to carry out maintenance or install services.
- 8.10 Settling of timber floors is common in historic buildings and does not necessarily indicate a structural problem with the building. In extreme cases, it may be possible to install a floating plywood floor over the existing floorboards in order to provide a level surface on which to lay a new floor provided the original is not of significance or the change would otherwise negatively affect the character of the Listed Building. However, raising levels may lead to problems with existing skirting boards, thresholds, door heights, etc; contact the Council to discuss options before considering works.
- 8.11 New flooring should be sympathetic to the age and type of building. Fashions change over time, for example in recent years, it has become fashionable to install slate, or stone flagged floors. However, in South Cambridgeshire there is no historic tradition for such materials and their installation in historic parts of Listed Buildings are unlikely to be supported.

FIREPLACES AND FLUE LINERS

- 8.12 Any alterations to an existing hearth are likely to require Listed Building Consent although the installation of a wood burning stove itself would not. Lining the flue may require consent. There are many types of flue liners including flexible stainless steel and in situ cast concrete, however, the Council will normally only support applications for flexible stainless steel liners as they are reversible and can be installed with minimal damage to the historic fabric. If the proposal is only to install a flexible stainless steel flue liner, without any bird guards or caps, then the

alteration may be dealt with via an exchange of letters, including full specifications. However, contact the Council to confirm.

- 8.13 The removal of a modern fireplace surround to either replace it or investigate the original historic opening may be supported. Evidence and justification for its replacement should be discussed with the Council *before* investigation and proposals are developed. Advice from a qualified architect or structural engineer may be required. Listed Building Consent will be required.

INTERNAL LIGHTING

- 8.14 Listed Building Consent is not generally required to install replacement light fittings. There is a presumption against any new lighting being cut into original lath and plaster ceilings – Listed Building Consent will be required.

INTRODUCTION OF NEW SERVICES

- 8.15 Most Listed Buildings have already been fitted with modernised services such as electricity, heating, lighting and drainage. However, installing new or upgrading existing services can be a challenge when dealing with historic fabric. While the installation of services does not normally require consent, it is best to consult the Council prior to implementing works. Any works should be undertaken sympathetically and sensitively to the Listed Building in order to minimise the damage the historic fabric. It may be preferable to provide new service functions in an existing or new ancillary building or within the modern section of an existing Listed Building. For instance, locating a new kitchen or utility room within the modern section of a Listed Building or within an ancillary modern building would minimise the loss of historic fabric and impact on the Listed Building.
- 8.16 The consideration of moisture, ventilation or air conditioning, condensation and humidity should be included in any proposal for new heating services in a historic building. When introducing services into a building for the first time, it is critical to understand the potential impact these could have on the historic fabric of the building. Any changes in moisture and humidity can affect not only the fabric of the building, but it could promote fungal growth, mildew, mould, and may affect the occupant's health and wellbeing.
- 8.17 Particular care is required where new services are to be introduced in rooms with cornices and historic wall coverings. Existing voids such as redundant chimneys or floors could be used to house servicing if the particular circumstances warrant. New services should run *between* the floor joists, not *across*, keeping the loss of historic fabric to a minimum.
- 8.18 The installation of air conditioning, or other plant, is likely to require Listed Building Consent as it has the potential to disturb the historic fabric and can be spatially intrusive. The location and configuration of the units and routing of ductwork will need to be considered on an individual basis.

- 8.19 Any introduction of a toilet, sink, or bath will require additional drainage. The location of this drainage is a consideration when planning the layout of the space within the Listed Building. The Council will resist applications that require the installation of new drainage systems on the front elevation and, in some instances, consideration will need to be given to using a macerator that will enable the waste to be run in a small diameter pipe (possibly between floor joists) to link to an existing soil stack. The impact of any drainage system should generally be kept to a minimum.

TIMBER TREATMENT AND INSECT INFESTATION

- 8.20 Evidence of insect infestation can be found in most historic and traditional buildings, but generally much of this is no longer active. Several species of insects feed on either the sapwood (external soft layer around the tree) or the heartwood (centre of the tree, which is quite hard). Infestation is only apparent when the insect migrates out from the timber, through small exit holes. The shape and size of these flight holes, the type of timber and the colour of the dust around the opening can indicate which insect has caused the damage. The Furniture Beetle, Death Watch Beetle, Powder Post Beetle, Carpet Beetles and the House Longhorn Beetle can all be found in historic buildings.
- 8.21 Lifecycles vary, but it can take several years for larvae to reach adult stage. Emergence holes may be identifiable, but they are not necessarily indicative of active infestation. It can take a year or two for an area of active infestation to die out and emergence to stop; emergence holes are usually evidence of past infestation.
- 8.22 The Council believes in a conservative approach to dealing with infestation and treatment, but recommend seeking advice from a timber or infestation specialist. Once infestation has been discovered consider the extent of decay and if the structural integrity has been compromised then assess any existing and active infestation and minimise risk of further decay.
- 8.23 Treatment can be a challenge as there are usually a number of issues; however, one method of dealing with any insects is to encourage their natural predator, the spider.
- 8.24 If specific environmental conditions are present (such as moisture, damp, humidity and lack of ventilation) which encourage infestation, then resolving these problems will alleviate the situation. Moisture promotes fungal decay, which creates the perfect conditions for any infestation to occur. Attics and lofts and other hidden spaces can be vulnerable. Dead animals, bird's nests, dust and dirt can also encourage infestation. If routine maintenance and repairs are carried out and the environmental conditions improve, further infestation is unlikely to take place. Monitoring systems can be installed to control any difficult areas so that a humidity level of 65% or lower and a moisture content of 16 -18% or lower is achieved.

- 8.25 Surface spraying or timber treatments are conventional solutions but there is insufficient evidence to show that they address the causes of the infestation and successfully eliminate the problem. As a result, any surface treatment may not reach the insect until significant damage has already occurred and the treatment is only effective in killing the adult beetle and preventing them from laying fresh eggs. It may not kill the larvae. Beetles lay their eggs in cracks, crevices or old flight holes in timber. The larvae can live within the timber for a number of years until they reach adulthood and emerge.
- 8.26 In addition to surface treatments, chemical injections, smoke bombs and fluids are used. These may not get to the problem areas, can be toxic, harmful to pets and bats, add more moisture to the timber and they may only have a limited success.

DAMP PROOFING

- 8.27 Historic traditionally constructed building varies considerably from modern construction. A traditional building was constructed from breathable and flexible materials, which allow the building to move and handle moisture levels; in essence the building was capable of taking care of itself.
- 8.28 The following summarises the differences between traditional and modern building construction:

Traditional mass wall construction:

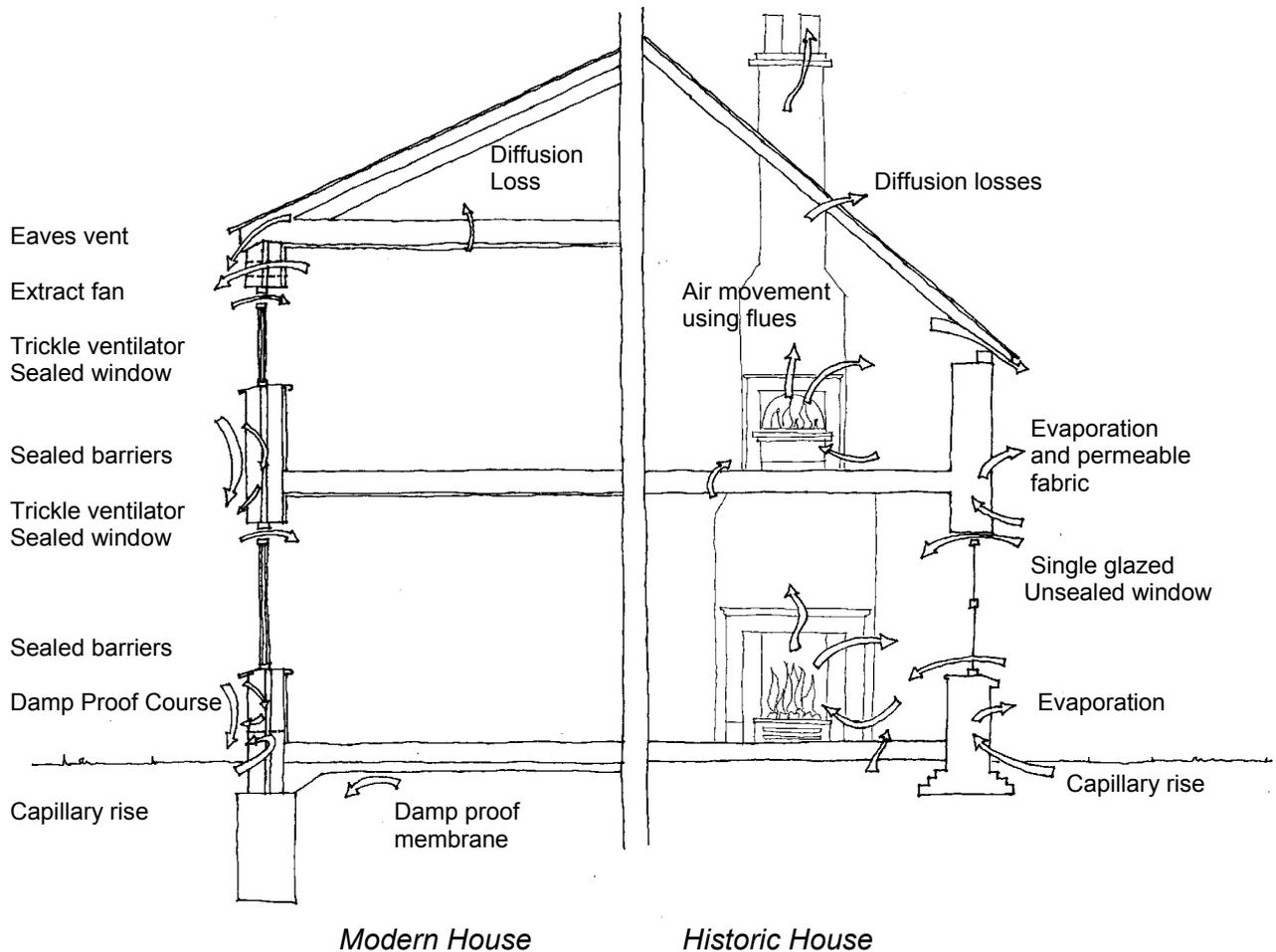
- Relies on the mass of the wall for 'weatherproofing'.
- Built with soft, porous, flexible, 'breathable' materials.
- Absorbs moisture and allows quick, natural drying.
- Relies on natural ventilation to control the internal environment and prevent condensation and mould growth etc.

VERSUS

Modern cavity wall construction:

- Relies on 'waterproof' materials.
- Built with hard, impervious and inflexible materials.
- Physical break (cavity) and barriers or membranes to prevent moisture transferring to the inside of building.
- Relies on mechanical extraction and physical ventilation to control the internal environment and prevent condensation and mould growth etc.

The following diagram illustrates the way a traditional building works compared to a modern building



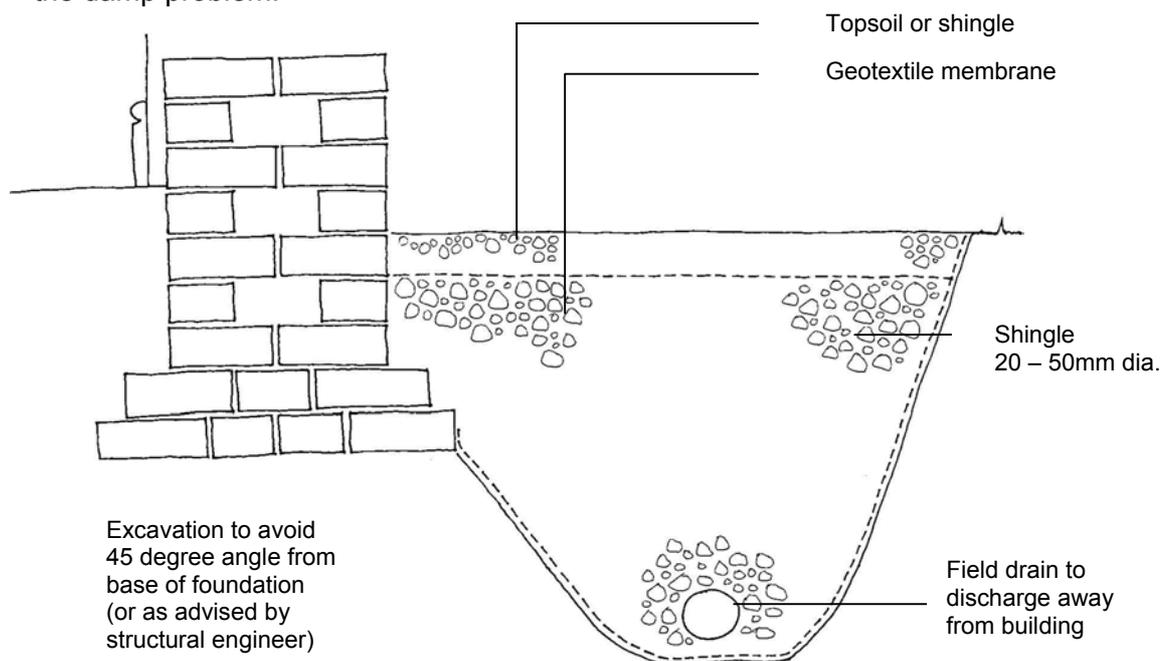
- 8.29 Uninformed advice is often given that damp problems in old solid floors can be solved by inserting a damp-proof membrane (dpm) under the existing covering. This advice is often given because standard practice in the construction of a new building is to include a dpm within the floor thickness which is linked to a horizontal damp-proof course (dpc) designed to prevent moisture rising within the thickness of walls, internally or externally. However, lifting and relaying a floor on a new dpm can cause problems as well as damage to the historic fabric. Restricting the amount of moisture, which can evaporate through the floor, is likely to increase the moisture content at the base of the walls, partitions and chimneybreasts. The insertion of a horizontal membrane will often displace and concentrate moisture, unable to evaporate over the whole area of the floor, at the edge of the membrane.
- 8.30 Installing a chemical or physical damp proofing will require Listed Building Consent and will need to be supported by an assessment and justification from a suitably qualified independent professional with experience of historic buildings taking this approach. Traditionally built buildings will generally have a certain amount of damp; this is completely normal and is managed through allowing the building to

breathe. It is important to understand *WHY* there is damp before promoting a solution, treating the cause is more beneficial than treating the symptoms as this may not solve the problem in the long term.

8.31 Blocked drains, faulty rainwater goods or high external ground levels may cause damp. The external ground level should be the same or lower than the floor level inside the building and with timber framed structures the sole plate should be above the ground level to avoid exposing the timber to excessive moisture, which will result in decay.

8.32 Within a timber framed building a physical damp proof course (dpc) may be introduced in particular circumstances where the work is felt to be appropriate or when undertaking other necessary repairs such as renewing the sole plate on a timber frame building or rebuilding the brick plinth. However, this will be reviewed on a 'case-by-case' basis and consider the potential negative impact.

8.33 The introduction of a carefully installed French drain or land drain around the exterior of a Listed Building will direct the water away from the building and ease the damp problem.



Typical detail of a French Drain

8.34 Damp can become trapped when the building has been painted, internally or externally, with non-permeable paints. Modern paints can contain acrylic, which prevents the fabric from breathing.

8.35 Modern damp proofing methods, such as chemical injection, are only appropriate in very specific circumstances. One the rare occasions where the use of a chemical injection dpc is supported, the injection should take place in the mortar joints and not the brick itself.

- 8.36 Chemical injection is not suitable for materials such as clunch, clay bat, or timber. This process relies on modern plasters with salt inhibiting solutions to 'mask' some of the symptoms of rising damp. Such works are generally not appropriate in an historic Listed Building.
- 8.37 There is a presumption against the insertion of a dpm or dpc in traditionally constructed properties, due to the potential damage to historic fabric and because the intervention is usually unnecessary. Dampness is generally related to constructional defects or interventions, which have undermined the previous breathing potential of the floor or walls. Initially, with any dampness related problem, thought should be given to some other common potential defects such as: condition of rainwater goods; external ground levels; adequacy of ventilation, condensation misread as rising damp and the use of rubber-backed wall-to-wall carpets or other floor finishes which have acted as a membrane and held damp and moisture back.
- 8.38 If dampness persists and all other solutions have been tried and failed, the decision to lift and relay the flooring on a concrete slab may be taken. If this is the case, damage to the original fabric is likely to occur.
- 8.39 Insulated, breathing lime floors are an alternative to installing concrete slabs and have been used successfully in historic buildings for a number of years. The principle is simple: a layer of loose-fill, coarse, permeable aggregate is laid on a compacted sub-base, usually simple bare earth with a layer of geo-textile on top. A slab of lime concrete, or limecrete, is laid over the loose-fill layer, using a layer of geo-textile to prevent it slumping down into the loose fill. The limecrete will allow moisture vapour to pass through it and evaporate. If underfloor heating is required, pipes can be laid in a layer of lime screed on top of the limecrete. Tiles or floor pampments can be bedded on a dry lime and sand base to create the finished surface.
- 8.40 Another common cause of damp is the use of inappropriate **impermeable materials**, such as cement render and gypsum plaster which are rigid and will not flex with the building. As a result, they can crack allowing ingress of moisture. In addition, these materials are not permeable, and will trap moisture within the fabric often forcing it to the internal face as it seeks an alternative way out, causing the render or plaster to 'blow' typically seen on the exterior of the building.

STRUCTURAL CHANGES AND STRENGTHENING

- 8.41 Historic buildings can successfully accommodate movement over time. Some buildings may require strengthening, but proposals need to be based on a full understanding of the building and potential causes of problems, such as the impact of tree roots. Proposals for structural works to improve the soundness of a Listed Building will require Listed Building Consent. As part of the consent, sufficient evidence and documentation, in the form of a report from a qualified structural engineer or chartered surveyor, experienced in working with historic buildings,

should be submitted to outline the cause of the failure, what the problem is and what impact the work would have on the Listed Building. The main aim is to address the cause of the problem and not simply fix the symptoms.

- 8.42 Historic buildings are susceptible to seasonal movement, depending on the construction materials and methods and ground conditions. However, this is not necessarily harmful as traditionally built buildings were constructed to accommodate these variations throughout the year. Nevertheless, it is important to understand the building and its situation to understand the significance of any movement. For example, what material is the building constructed from, what type of soil is located in the area, how deep are the building's foundations, etc. It may be necessary to monitor movement over a period of time.
- 8.43 Any interventions (such as those outlined above) to address structural concerns should include a report from a qualified and experienced structural engineer or chartered surveyor. This report should be carefully considered and show an understanding of the building and the nature of the problem (innovative structural interventions based on a good understanding of the historic building may be supported if they provide a low impact solution, however, tried and tested methods should normally be pursued first). Investigative works may be required to open up some areas of the building, including digging trial holes to assess foundations or soil conditions and content. It is possible that these opening up works will not require Listed Building Consent; however, it is best to contact the Council to check before carrying out any works. A proper assessment and methodology can only be derived once the building is understood. Speculative or conjectural recommendations, which appear to address the issues, may result in a reaction from other areas of the building.
- 8.44 The Council will not support applications which do not provide a clear understanding of the works proposed, the implications to the historic fabric, a full understanding of the existing structure including detailed measured survey drawings showing structure such as timber framing. The Council will need sufficient information and justification to determine any proposal. It is important to note that the extent of work may not be fully understood until further investigative works are undertaken. Minor opening up works in order to facilitate a better understanding of the existing structure may be supported by the Council, however, contact the Council of this prior to carrying out the works.

