PURPOSE:

This Guidance Note is for the benefit of local architects, builders and the general public. Its purpose is to provide information, promote good practice and encourage consistency of interpretation for all. It is purely advisory in nature and does not cover every aspect of the topic concerned, but tries to cover the main, commonly encountered points. If more details are required then the relevant Approved Documents, British Standards or manufacturers’ instructions should be consulted. The Guidance Note is not intended to outline the only way of carrying out the type of work referred to. If in doubt, please contact your local Building Control Authority.

This document should not be submitted as part of any Building Control application.

The Council offers a complete Building Control service, from pre application advice on technical aspects and how to make an application, through to plan checking and an inspection regime to ensure a safe and compliant building. We also offer an Energy Performance Assessment service which uses SAP methodology to produce Energy Performance Certificates (EPC) in respect of both new and existing dwellings. Please contact Building Control for any further information:

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Further information can be obtained from The Building Regulations 2010 or from the Council’s Building Control Service on request. The views expressed in this document are those of Charnwood Borough Council and do not necessarily represent a guaranteed methodology for compliance with the requirements of the Building Regulations 2010. Charnwood Borough Council accepts no liability for any claim that may arise in relation to reliance on the information contained in this document.
I INTRODUCTION

1.1 This guidance note considers the extension of a typical 2 storey dwelling into a 3 storey unit, by the addition of a ‘loft conversion’ within the existing roof space. It is not possible, nor is it intended that this information leaflet should cover every aspect of the design. Primarily, its purpose is to highlight the basic design considerations which need to be addressed. Specific technical detail has largely been omitted due to the criteria being subject to frequent change. If the proposal involves the conversion of a loft to a bungalow, the fire safety provisions indicated in section 4 are not all applicable and the additional information at the end of that section should be referred to.

1.2 For the purposes of this guidance, it is assumed the proposed conversion will not involve raising the roof line above the existing ridge level and will not contain more than two habitable rooms on the new second storey with a maximum increase in floor area of less than 50m².

1.3 When considering a loft conversion, contact must be made with the Planning Authority to ascertain whether an application is required under the Town & Country Planning Act. Building Regulation consent will always be required.

1.4 The Party Wall Act, 1996, places certain obligations on you if you are going to carry out work which involves the party wall (that is the separating wall) if you live in a semi detached, terraced or town house property. An advice leaflet on The Party Wall Act is available at http://www.communities.gov.uk/publications/planningandbuilding/partywall.

2 DESIGN CONSIDERATIONS

2.1 The leaflet will examine what we consider to be the most important areas of the design, and those, which through experience, have caused problems during both the design and construction stages. When applying for Building Regulation consent we would always recommend that you use an Architect and submit a Building Regulation Full Plans Application rather than a Building Notice for this type of work.

2.2 The following numbered sections are the areas of construction that are discussed in this leaflet,

3. Structural Stability
4. Fire Safety
5. Ventilation
6. Staircase
7. Thermal Insulation
8. Sound insulation.
3  STRUCTURAL STABILITY (refer to Approved Document A)

3.1 A structural engineer should ideally check the condition of the existing structure and design the new or altered structural members. This can result in a more economic design rather than relying on rule of thumb sizing of members. The Building Control Surveyor checking the plan or works may require calculations to show that the new structure is adequate, or that the work will not adversely affect the stability of the building.

3.2 In some cases it may be necessary to expose and inspect the existing foundations to show that they are adequate to carry the new loadings. Underpinning of the foundation may be required to carry the new loadings safely.

3.3 In the majority of cases the existing ceiling joists will be inadequate for the imposed loads from the new floor construction. A commonly used solution is to provide new floor joists fixed alongside the existing ceiling joist, spanning from load-bearing supports such as load-bearing walls, or new floor beams. Where ceiling binders are removed the new floor joists should be capable of supporting the existing ceiling joists. Flexible straps fixing the ceiling to the new floor joists should be used to avoid deflection in the members cracking the ceiling.

3.4 Beams to support floor joists can be made of solid timber, Glu-lam timber, steel or a combination of timber and steel (a flitch beam). The exact size will depend on the loading and the span. It is advisable to consult a structural engineer for the most economic solution.

3.5 Conversions in trussed rafter roofs, (used since the 1960’s) will require additional structural considerations, and our advice to the homeowners would be to consult a Structural Engineer early in the design process.

3.6 With regard to the roof, it is clearly advisable to construct the loft conversion with the minimum disruption to the existing structure. The position of the purlins, if present, is a prime factor in determining the extent of the internal area, which can be achieved in the conversion. The existence of load-bearing walls at first floor level is an advantage in conversion work, in providing support to load-bearing elements transferred from the roof, partitions and the new floor. However, where previous alterations have been carried out to remove load-bearing walls, existing beams or lintels at ground and first floor level may need to be checked to confirm that they are suitable for the new loads imposed.

3.7 In a traditional roof design, the rafters are prevented from spreading by the ceiling joists or collars being securely tied to the rafters, and purlins acting as beams. If these are to be cut or removed (for example, when installing a dormer), then a ridge beam or other structural solution may be required, and if so, a structural engineer should be consulted.

3.8 Water tanks located on the loft floor or on other spaced supports should have transverse bearers to spread the load to at least four joists or other spaced supports.

3.9 To minimise structural disruption and the need for extensive trimming arrangements it is better that any staircase enters the loft room parallel to the joists.

3.10 Where a roof window or dormer is to be inserted requiring the cutting and removal of parts of some rafters the following guidelines should be adopted,
a) If one or two adjacent rafters are to be cut then the provision of trimmers of the same section above and below with double rafters either side of the opening should suffice, and

b) If more than two consecutive rafters are to be cut then a structural assessment may be necessary.

3.11 Before any of the existing structural elements are cut or removed the existing fabric must be adequately supported by either the new supporting structure or temporary structural supports. It is difficult to rectify movement and damage of the existing structure caused by inadequate structural support during the course of the work.

4 FIRE SAFETY (refer to Approved Document B, volume 1)

4.1 The addition of a third story to a dwelling house introduces a greater risk to the occupants of that storey in the event of a fire occurring on either of the lower floors. Accordingly the Building Regulations require additional measures to ensure a safe means of escape and early warning is provided within the building.

4.2 One of the principal requirements for means of escape is the arrangement relating to the discharge of the existing staircase at ground floor level. Ideally, the staircase should lead directly to a front entrance door (final exit) within the existing hallway. (diagram a)

4.3 However it is not uncommon to find existing layouts where the staircase discharges into a living room area. In this instance, it will be necessary to provide two escape routes at ground level, each leading to final exits and separated from each other by fire resisting construction and self closing fire doors. (diagram b)
4.4 Having established a satisfactory arrangement at ground floor level, it is then necessary to consider how the route from the new third storey to the ground floor can be protected to provide safe means of escape for the occupants. This achieved by constructing/upgrading the stair enclosure to a minimum of 30 minutes fire resistance and fitting fire doors with suitable frames to all rooms entered off the protected stair enclosure, this includes any bathroom, airing cupboards and cupboards under stairs.

4.5 The floor of the new second storey should have a minimum of 30 minutes fire resistance. Where the ceiling is to be renewed this can be achieved by using Fireline boarding or similar products. Where the ceiling is to left in place the fire resistance to the new floor can be upgraded with the use of Rockwool Flexi insulation fixed on chicken wire between the joists. Intumescent paints and other products are available; your designer may be of assistance in deciding which is the most economic solution for your project is but it is advisable to check with the Building Control Section before proceeding with any upgrade. For any upgrade to work all of the manufacturers requirements/instructions must be carried out for the specific product used.

4.6 The existing floor over any rooms, cupboards etc that could compromise the means of escape to the protected stairway should also have 30 minutes fire resistance. Again this needs to be checked and upgraded where necessary.

4.7 A mains operated interlinked smoke detection system to BS5839 Part 6 should be fitted within the protected stairway where not already existing within the property. Where existing, it may be necessary to extend the system to cover the new areas and dependant upon the layout a heat detector may be required in the kitchen.

4.8 Alternative designs may be allowed in the design but additional measures may be required such as domestic sprinkler system or a full fire engineered solution designed by a specialist for your project. You would need to discuss this further with your architect/fire engineer.

4.9 Where a loft is to be converted in a bungalow a reduced level of fire protection can be used. Escape size opening lights can be fitted to each new habitable room at first floor level as an alternative to providing a protected escape route. Escape opening lights should be a minimum of 0.33m² in area and have a clear open width of 450mm in each direction. The bottom of the opening light should be positioned between 800 – 1100mm above the floor of the room, see diagram below. The floor to the new loft area would not have to be full 30 minutes fire resistance but smoke detection would still be required.
5. VENTILATION (refer to Approved Documents C & F)

5.1. Room Ventilation. The formation of a habitable room requires both ‘rapid ventilation’, (usually an opening window), and ‘background ventilation’. In addition if the conversion involves a shower, WC or bath facility, then ‘mechanical ventilation’ will also be required.

5.2. Habitable rooms, such as bedrooms and living areas, require rapid ventilation equivalent to 1/20th of the floor area of the room and background ventilation (trickle vent).

5.3. If a bathroom or shower room is proposed, then mechanical ventilation ducted to the external air is required. This should have a 15 minute overrun facility if the bathroom does not contain an opening window.

5.4. Roof ventilation. The roof void above the new room or rooms will require ventilating on the two opposite sides to promote cross ventilation and prevent the build up of excessive condensation.

5.5. Where the new ceiling follows the pitch of the roof, two important design features need to be included

a) The provision of ventilation both at the eaves level and ridge, to promote a flow of air above the insulation, and,

b) A minimum air space of 50mm between the insulation and the roof covering.

It should be noted that in older properties where no roofing felt exists, the Building Control Surveyor may waive the ventilation requirements in view of the considerable air movement that occurs in un-felted slate or tile roofs.

5.6. 50mm air gap often causes problems due to the thickness of insulation to achieve the requisite level of thermal performance, and the depth of the existing rafter member. Rafter sections will in most cases have to be enhanced to rectify this problem.

5.7. Where the existing roof is already fitted with a breathable membrane it may not be necessary to fit additional ventilation to the roof void. This will depend on the how the membrane and insulation have been fitted and will need to be checked to confirm that the manufacturer’s instructions and test certificate have been followed.

6. STAIRCASE ACCESS (refer to Approved Document K)

6.1. When a new story is proposed within a residential dwelling, a permanent access must be provided, which ideally will take the form of a traditional staircase similar to that which provides access from the ground floor.

6.2. Headroom. Where space permits, clear 2.0m headroom should be provided above the pitch line of the flight and landing. However, sometimes there is not enough space to achieve this. The headroom will be satisfactory if the height measured at the centre of the stair width is 1.9m reducing to 1.8m at the side of the stair.
6.3. Landings. A landing should be provided at the bottom and the top of the flight, with the width and length of the landing being at least the width of the flight. A door may swing across a landing at the bottom of a flight if it leaves a clear space of at least 400mm across the full width of the flight.

6.4. Handrails. A single handrail is required to a flight less than 1.0m wide, positioned at a height of between 900mm and 1000mm above the pitch line.

6.5. Guarding. All flights and landings require guarding if a drop of more than 600mm is involved. If balusters are to be specified, they should be constructed so that a 100mm sphere cannot pass through any opening in the guarding, to prevent children from being held fast. Guarding should be positioned at a minimum height of 900mm, and should not be climbable. In practice vertical balusters are generally accepted for compliance.

6.6. Alternating tread stairs, none traditional stairs. Where there is limited space it may be possible to use a special stair of steeper design. However, it is always advisable to consult the Building Control Section at the before selecting this as part of the design.

7. **THERMAL INSULATION (refer to Approved Document L1a)**

7.1 The majority of houses are insulated above the upper floor ceiling with a ventilated roof void over. Any habitable accommodation in this roof space will therefore need to be insulated between the accommodation and the roof covering/ external envelope of the building. Where the party wall abuts an unheated area it may also be necessary to insulate this area.

7.2 The various elements of the new storey will need to achieve the following ‘U’ values:

a) Roof with a flat ceiling under- no more than 0.16W/m2k.
b) Roof with a sloping ceiling under-no more than 0.18W/m2k.
c) External wall (including the sides walls between the room and the unheated roof void of a party wall) no more than 0.28W/m2k.
d) Windows and roof lights- no more than 1.6W/m2k
7.3 To achieve minimum U value standards the following construction method could be adopted although there are numerous ways of meeting the standards.

a) To achieve a U value of 0.16 W/m²k to the flat ceiling, mineral fibre insulation at least 170mm between joists with another 100mm layer covering the joist laid at right angles would be sufficient.

b) To achieve a U value of 0.18 W/m²k to the sloping ceiling, rigid urethane foam (e.g. Celotex, kingspan, etc) at least 100mm thick between the rafters and 45mm thick under the rafters will be sufficient.

c) To achieve a U value of 0.28 W/m²k for the dormer cheeks urethane insulation minimum 70mm thick with a further 12mm across the face below the plasterboard would be sufficient.

d) To achieve a U value of 0.28 W/m²k for the party wall 70mm of urethane insulation on a solid 225mm brick solid wall would be sufficient.

e) To achieve a U value of 1.6 W/m²k for the windows and roof lights, these will need to be window energy rating (WER) Band C or better. The amount of window and roof lights is limited to the equivalent of 25% of the new floor area.

f) If multifoil type insulation is used in the roof, additional insulation will be required to achieve the necessary U value.

g) Other materials may be used, but the thickness depends on its insulation value (thermal conductivity).

8 SOUND INSULATION (refer to Approved Document E)

8.1 A minimum level of sound insulation is required between the new floor and the rooms below the loft area. Walls separating habitable rooms and walls between habitable rooms and bathroom/shower rooms may also need to be sound insulated. The Party wall should also be assessed to determine if this also needs upgrading to improve to sound insulation.

8.2 The floor can be constructed with a timber or wood based board having a minimum mass per unit area of 15Kg/m² (normally 22mm thick). The ceiling should have a minimum mass per unit area of 10Kg/m² (gyproc 10 or 15mm boarding) and an absorbent layer of mineral wool (minimum 100mm thickness, minimum 10Kg/m³) should be laid in the floor cavity between the joists.

8.3 Where a partition is erected between habitable rooms or between a habitable room and a bathroom/shower room the wall should be constructed to achieve a 40 dB sound reduction:

a) Single layers of plasterboard of minimum mass per unit area 10Kg/m² each side of the partition (gyproc 10 or 15mm boarding).

b) Framework at least 75mm thick if constructed of timber and 45mm if metal frame used.

c) Cavity insulated with an absorbent layer of unfaced mineral wool batts or quilt (minimum thickness 25mm, and density of 10Kg/m²) which may be wire reinforced.

This also applies to walls separating bedrooms from halls.

Note that the wall and floor constructions should be designed to meet the provisions of Part B, Fire safety and Part E, Sound insulation.