A photograph of a modern loft interior. The ceiling is white with several large, rectangular skylights that provide natural light. The floor is made of dark wood planks. The walls are a light, neutral color. The overall atmosphere is bright and airy.

LOFT

CONVERSIONS

second edition

JOHN COUTTS

Loft Conversions

SECOND EDITION

John Coutts

MA (Oxon)



 **WILEY-BLACKWELL**

A John Wiley & Sons, Ltd., Publication

This edition first published 2013
© 2006 John Coutts
© 2013 John Coutts

Blackwell Publishing was acquired by John Wiley & Sons in February 2007. Blackwell's publishing program has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley-Blackwell.

Registered Office

John Wiley & Sons, Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial Offices

9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
2121 State Avenue, Ames, Iowa 50014-8300, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell.

The right of the author to be identified as the author of this work has been asserted in accordance with the UK Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book. This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold on the understanding that the publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Library of Congress Cataloging-in-Publication Data

Coutts, John, 1965–
Loft conversions / John Coutts. – 2nd ed.
p. cm.
Includes bibliographical references and index.
ISBN 978-1-118-40004-3 (pbk. : alk. paper) 1. Lofts–Remodeling for other use. I. Title.
TH3000.L63C68 2012
728'.314–dc23

2012009293

A catalogue record for this book is available from the British Library.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Cover image courtesy of FreshPaint/www.Bigstock.com
Cover design by Meaden Creative

Set in 10/12.5pt Minion by SPi Publisher Services, Pondicherry, India
Printed and bound in Malaysia by Vivar Printing Sdn Bhd

Contents

<i>Preface</i>	xiii
<i>Acknowledgements</i>	xiv
1 Planning and legal considerations	1
Permitted development	1
Permitted development law	1
Commentary on permitted development provisions – England	4
Permitted development restrictions	10
Curtilage: raising party walls	10
Conservation areas	10
Article IV directions	11
Planning conditions affecting permitted development	11
Listed buildings	11
Other conditions affecting development	12
Restrictive covenants	12
Mortgage lenders	12
Buildings and contents insurance	12
Tree preservation orders	12
Bats	12
Lawful Development Certificate	13
Planning permission	13
Planning applications	13
Sources of planning guidance	15
Supplementary planning guidance	16
Supplementary planning documents	16
Design guides	16
Design codes	16
Local Development Framework	16
Unitary Development Plan	16
The Party Wall etc. Act 1996	16
Procedure	17
Disputes	18
2 The Building Regulations and building control	19
The Building Act 1984	19
The Building Regulations	19
Approved Document guidance	20
Compliance guides	21
Relationship between the Building Regulations and the Approved Documents	21

Building control	21
Local authority building control	22
Full plans	22
Building notice	24
Notification and inspection of work	25
Resolving Building Regulations disputes	26
Electronic building control applications	28
Approved inspector building control	28
3 External forms	30
Primary influences on form	30
Planning considerations	30
Pitch, plan and headroom	31
Stair access	31
Shallow-pitched roofs	31
Existing roof type	31
Conversion forms	33
Roof space only conversion	33
Box dormer conversion	33
Front box dormer conversion	34
Hip-to-gable conversion	34
Side dormer conversion	35
Full-width dormer with masonry flanks	35
Mansard conversion	36
Lean-to conversion	38
Half dormer	38
Existing attic rooms	38
Galleries and platforms	39
Traditional dormer forms	39
Gabled dormer	40
Hipped dormer	40
Flat dormer (small)	40
Cat slide dormer	42
Recessed dormer	42
Eyebrow dormer	42
Arched dormer	42
Segmental dormer	42
Pedimented dormer	42
Canted bay dormer	43
Design considerations	43
Fenestration	43
Roof detail	43
Vertical cladding and roofing materials	44
Chimney positions	45
Drainage	45

4 Fire safety	47
Regulatory framework	47
Main changes to Approved Document B (2006)	47
Fire resistance: basic requirements	49
Warning and escape	50
Floor height rules	51
Storey and floor numbering rules	51
Fire safety: common configurations – floor not more than 4.5 m above lowest ground level	52
Means of warning	52
Means of escape	52
One floor more than 4.5 m above ground level	54
Means of warning	54
First floor fire resistance	54
New floor (conversion)	54
Escape windows	54
Means of escape	55
More than one floor over 4.5 m above ground level	59
Galleries	59
Elements and terminology	62
Access room	62
AFD	62
Air circulation systems	62
Alternative escape route	62
Automatic self-closing devices (self closers)	63
Balconies and flat roofs	63
Cavity barriers	63
Doors – glazing in final exit	63
Emergency egress (escape) windows and external doors	64
Escape route	64
Final exit	64
Fire curtains	65
Fire detection and fire alarm systems	65
Fire doors	67
Fire stopping and the protection of openings	67
Habitable room	69
Inner room	69
Inner inner room	69
Loft conversion	69
Modified 30-minute protection	69
Open plan layouts	70
Passenger lifts	71
Sprinkler systems	71
Storey exit	71
Storey height measurement	71
Fire safety in context	72

5	Conversion survey	73
	Survey procedure	73
	Outline of survey elements	74
	Survey elements in detail	76
	Age of the building	76
	Headroom and floor-to-ceiling height	76
	External relationships	77
	Internal layout	77
	Roof form	77
	Roof structure	77
	Roof condition	79
	Walls	80
	Foundations	82
	Internal walls and partitions	83
	Floor and ceiling structure	84
	Strength of existing timber elements	85
	Water tanks	85
	Drainage and services	86
	Chimneys	87
6	Beams and primary structure	88
	Approved Document guidance	88
	Beam position relative to existing structure	88
	Beam characteristics	89
	Common structural steel sections	89
	Engineered timber beams	91
	Fire resistance of beams	94
	Beam bearings	94
	Mild steel bearing plates	95
	Padstones	96
	Beam penetration	98
	Beam splices	98
	Flange and web plate splice	98
	End plate beam splices	99
	Splice box	99
	Inline box	99
	PFC bearing	100
	Beam-to-beam connections	101
	Bolted connections	101
	Grade 4.6 bolts	103
	Grade 8.8 'high-strength' bolts	103
	HSFG bolt assemblies	104
	Toothed plate connectors	105
	Timber to masonry connections	105
	Tension straps	105

Expansion bolts	105
Chemical anchoring	107
Disproportionate collapse	107
7 Floor structure	109
Role of the conversion floor	109
Elements of loft conversion floor design	110
Room height in the conversion (headroom)	111
Methods of support for floors	111
Beam-supported floors	112
Wall-supported floors	115
Floor joist selection	117
Joist spacing	117
Timber supplies	118
Machined (regularised) joist sections	118
Holes and notches in joists	119
Binders	119
New floor joist/existing ceiling clearance	122
Strutting	122
Trimming	123
Lateral support by floors	125
Floor fire resistance	128
Conversion floor (fire and sound resistance)	128
Floor materials and fixing	129
Conditioning	130
Staggered joints	130
Moisture and sound resistance	130
Fixing	131
T&G floor panels	131
Timber floorboards	131
Stairs	131
Headroom	131
Landings	132
Stair configuration	132
Structural implications	136
Stair provision: practical aspects	136
8 Wall structure	138
External stud walls	138
Stud arrangement and spacing	138
Elements of stud wall construction	141
Terminology	141
Openings	146
Supporting structural steel in stud walls	146
Vertical cladding	146
Fire resistance of dormer stud walls	148

Masonry walls (external)	149
Hip-to-gable conversion	150
Safety considerations during construction	151
Lateral restraint of flank gable walls	151
Brick selection and size	151
Solid blockwork	153
Mortar and brickwork	154
Parapet walls in loft conversions	155
Integrating new and old	155
Chimney cowls	159
Compartment (party) walls	159
Internal partitions	160
Window and door safety	160
Windows	161
Juliet balconies and balustrades	161
Glazing requirements for doors	162
Cleaning	162
Replacement windows	162
9 Roof structure	163
Roof types	163
The cut roof (common to about 1950)	163
The TDA roof truss (common 1947–1980)	163
Trussed rafter roofs (1965 to present)	165
Cut roof: structural forms	165
Single roofs	165
Double roofs	166
Cut roof: structural elements	167
Purlin	167
Ridge and rafters	170
Wall plates	172
Ceiling joists and collars	172
Cut roof: common conversion alterations	172
Modification of the roof structure	172
Reasons to remove a purlin	174
Replacement support for purlins	174
Rafters	176
Trimming	176
Sizing and loading of rafters	183
Hip-to-gable conversion	183
Notches and holes	184
Lateral support for gables	184
Replacement roof coverings	185
Flat roof: basic structure	186
Flat roof – warm deck (unventilated)	188
Flat roof – cold deck (ventilated)	189
Flat roof – hybrid warm roof (unventilated)	189

Roof ventilation	189
Continuity of airflow around roof windows	191
Ventilation – possible exemptions from the requirement	191
Approved Document guidance	192
Attic trusses	192
10 Energy performance	195
Methods of compliance	195
The reference method (elemental approach)	195
Area-weighted U-value method (optional approach)	196
Whole dwelling calculation method (optional approach)	197
Walls and roofs – performance requirements	197
U-values for new thermal elements	198
U-values for retained thermal elements	198
Standards for replacement thermal elements in an existing dwelling	199
Standards for renovation of thermal elements	199
Energy conservation – practical approaches	200
Insulation materials	200
Fixing internal insulation	201
Airtightness	203
Thermal bridging	204
Insulation for wall and roof elements	204
Existing (retained) solid brick masonry walls	204
New solid brick masonry walls	205
New solid blockwork walls	205
Existing (retained) cavity masonry walls	206
New cavity masonry walls	207
New tile hung stud walls	208
Existing (retained) or new pitched roof	208
New flat warm roof	209
New flat cold deck	210
Windows and other openings	210
Area of windows	213
Risks associated with insulation	213
Surface condensation	213
Interstitial condensation – all elements	214
Spalling risk – masonry walls	214
Electric lighting	214
Practical implications	214
Heating and hot water systems	215
Providing information about energy efficiency	216
Loft insulation when a loft is not converted	216
Ventilation for occupants	216
Background ventilation	217
Purge (rapid) ventilation	217
Extract ventilation	218

Ventilation – practical measures	218
All rooms	218
Habitable room (with external wall)	219
Habitable room (with <i>no</i> external wall)	219
Bathroom (with external wall)	219
Bathroom (with <i>no</i> external wall)	219
WC (with external wall)	220
WC (with <i>no</i> external wall)	220
Providing information about ventilation	220
11 Lofts in context	221
Why convert?	221
Loft conversion statistics	222
Underlying trends	222
The nature of the housing stock	222
Practical sustainability	223
Renewable energy	223
Reducing solar gain	224
Green roofs	225
Water conservation	225
Reducing construction waste and re-using materials	226
Energy Performance Certificates (EPCs) and insulating to a higher standard	227
Towards zero carbon	228
The Zero Carbon Loft	229
Appendix A Specification	233
Appendix B The Building Regulations: appeals and determinations	239
Appendix C Planning and curtilage	249
<i>Glossary</i>	252
<i>Bibliography and useful contacts</i>	260
<i>Index</i>	264

A colour plate section falls between pages 162 and 163

Preface

The purpose of this book is to provide technical, regulatory and practical guidance on loft conversions in single-family dwellings. It is the most comprehensive book of its sort and is the result of extensive research and consultation with regulatory bodies and practitioners.

Since the publication of the first edition in 2006, *Loft conversions* has become established as the definitive source of guidance for architects, builders, surveyors and others professionally involved in the process of loft conversions.

This extensively-updated second edition takes into account significant changes to Building Regulations and planning law that have taken place since the first edition was published. It also contains a new section on sustainability and zero carbon approaches to loft conversions.

John Coutts
October 2012

Acknowledgements

I would like to thank the following organisations and businesses for their invaluable co-operation and assistance in the preparation of this book: the Building Research Establishment (BRE), British Woodworking Federation (BWF), British Standards Institution (BSI), Cooper & Turner Ltd, Coopers Fire Ltd, Department for Communities and Local Government (DCLG), Denmay Steel, Economic and Social Data Service (ESDS), Energy Saving Trust (EST), English Heritage, Euroform Products Ltd, Federation of Master Builders (FMB), Green Structures, Local Authority Building Control (LABC), Polytank Group Ltd, South London Lofts Ltd, TRADA Technology Ltd, Trussed Rafter Association (TRA) and the Welsh Assembly Government.

Material reproduced from the Approved Documents and other government sources is Crown copyright and is reproduced with permission of the Controller of the HMSO.

1 Planning and legal considerations

This chapter examines the influence of planning and other legal mechanisms on the loft conversion process in England. Obligations imposed by the Building Regulations are considered in Chapter 2.

The controls and mechanisms examined both here and in Chapter 2 are largely separate from each other. Planning and building control, for example, are administered independently. Approvals granted under one mechanism do not automatically confer rights under another, nor are they intended to. Building Regulations and planning law have specific and generally unrelated aims.

PERMITTED DEVELOPMENT

Most loft conversions are carried out under permitted development legislation. Where permitted development rights exist, no specific application for planning permission is required, provided that work is carried out in accordance with the legislation. Permitted development rights apply to dwellinghouses only. A loft conversion in a building containing one or more flats, or a flat contained within such a building, would require planning permission. The following section considers current permitted development legislation for England only.

Permitted development law

Permitted development legislation is set out in The Town and Country Planning (General Permitted Development) (Amendment) (No. 2) (England) Order 2008. This came into force on 1 October 2008 and represents the first major change in planning law relevant to small-scale domestic building works, such as loft conversions, since 1995.

One of the notable features of the 2008 General Permitted Development Order (GPDO 2008) is that it is rather more generous in its scope than the earlier legislation. It dispenses with the principle of a whole-dwelling volume allowance (at least as far as loft conversions are concerned) and only the volume of the roof is now considered (Fig. 1.1). A ground floor extension to a dwellinghouse, whether proposed or existing, no longer counts against a loft conversion.

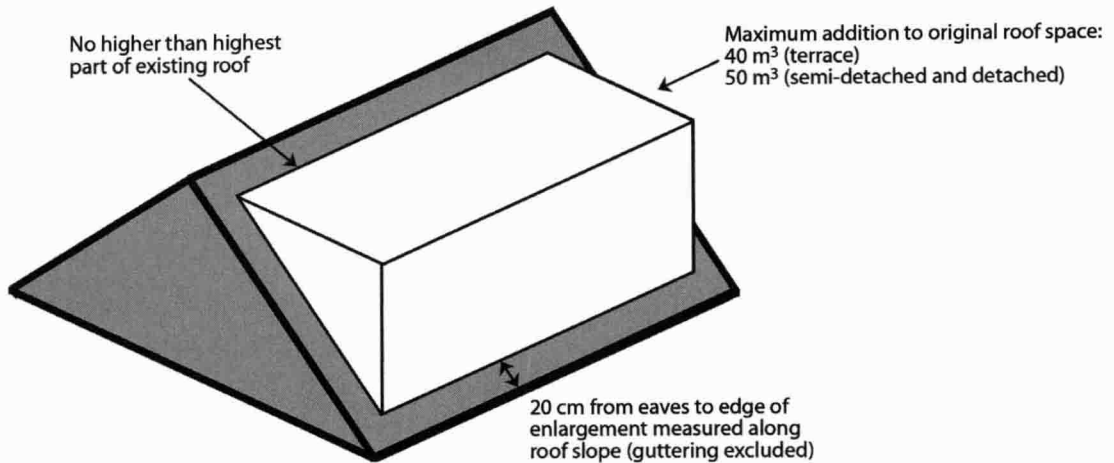


Fig. 1.1 Permitted development (England): primary constraints.

Reproduced below are three extracts from The Town and Country Planning (General Permitted Development) (Amendment) (No. 2) (England) Order 2008. All are relevant, or potentially relevant, to loft conversions. The meaning and implications of the GPDO 2008 are considered in the next section.

Class B

Permitted development

B. The enlargement of a dwellinghouse consisting of an addition or alteration to its roof.

Development not permitted

B.1 Development is not permitted by Class B if –

- (a) any part of the dwellinghouse would, as a result of the works, exceed the height of the highest part of the existing roof;*
- (b) any part of the dwellinghouse would, as a result of the works, extend beyond the plane of any existing roof slope which forms the principal elevation of the dwellinghouse and fronts a highway;*
- (c) the cubic content of the resulting roof space would exceed the cubic content of the original roof space by more than –
 - (i) 40 cubic metres in the case of a terrace house, or*
 - (ii) 50 cubic metres in any other case;**
- (d) it would consist of or include –
 - (i) the construction or provision of a veranda, balcony or raised platform, or*
 - (ii) the installation, alteration or replacement of a chimney, flue or soil and vent pipe; or**
- (e) the dwellinghouse is on article 1(5) land.*

Conditions

B.2 Development is permitted by Class B subject to the following conditions –

- (a) the materials used in any exterior work shall be of a similar appearance to those used in the construction of the exterior of the existing dwellinghouse;
- (b) other than in the case of a hip-to-gable enlargement, the edge of the enlargement closest to the eaves of the original roof shall, so far as practicable, be not less than 20 centimetres from the eaves of the original roof; and
- (c) any window inserted on a wall or roof slope forming a side elevation of the dwelling-house shall be –
 - (i) obscure-glazed, and
 - (ii) non-opening unless the parts of the window which can be opened are more than 1.7 metres above the floor of the room in which the window is installed.

Interpretation of Class B

B.3 For the purposes of Class B ‘resulting roof space’ means the roof space as enlarged, taking into account any enlargement to the original roof space, whether permitted by this Class or not.

Class C

Permitted development

C. Any other alteration to the roof of a dwellinghouse.

Development not permitted

C.1 Development is not permitted by Class C if –

- (a) the alteration would protrude more than 150 millimetres beyond the plane of the slope of the original roof when measured from the perpendicular with the external surface of the original roof;
- (b) it would result in the highest part of the alteration being higher than the highest part of the original roof; or
- (c) it would consist of or include –
 - (i) the installation, alteration or replacement of a chimney, flue or soil and vent pipe, or
 - (ii) the installation, alteration or replacement of solar photovoltaics or solar thermal equipment.

Conditions

C.2 Development is permitted by Class C subject to the condition that any window located on a roof slope forming a side elevation of the dwellinghouse shall be –

- (a) obscure-glazed; and
- (b) non-opening unless the parts of the window which can be opened are more than 1.7 metres above the floor of the room in which the window is installed.

Class G

Permitted development

G. The installation, alteration or replacement of a chimney, flue or soil and vent pipe on a dwellinghouse.

Development not permitted

G.1 Development is not permitted by Class G if –

- (a) the height of the chimney, flue or soil and vent pipe would exceed the highest part of the roof by 1 metre or more; or*
- (b) in the case of a dwellinghouse on article 1(5) land, the chimney, flue or soil and vent pipe would be installed on a wall or roof slope which –*
 - (i) fronts a highway, and*
 - (ii) forms either the principal elevation or a side elevation of the dwellinghouse.*

Commentary on permitted development provisions – England

A degree of caution should be exercised when exercising rights associated with permitted development. Where any doubt exists, clarification should be sought from the local planning authority and a Lawful Development Certificate obtained (see p. 13) before undertaking any work.

Permitted development rights are not universal: they do not apply to flats, for example, nor do they apply to dwellinghouses on designated land (see section on Article 1(5) land, below). It is also emphasised that development that is not permitted under one class may be permitted development under another: chimneys, soil pipes and solar panels all fall into this category.

It should also be noted that interpretation of the GPDO varies considerably between local planning authorities. Areas of inconsistency include:

- Raising a party wall (see also appeal decision letter in Appendix C)
- Providing a highway-facing roof window in a dwelling in a conservation area

There are also risks when working at the volume limits of permitted development. A local planning authority has discretionary powers to take enforcement action if, in its view, there is an unacceptable breach of planning control. In cases where any degree of doubt exists, therefore, it is prudent to consult the local planning authority before work commences.

The Department for Communities and Local Government has sought to clarify some of the 2008 provisions and has published two supporting documents. These are: *Changes to Householder Permitted Development 1 October 2008 – Informal Views from Communities and Local Government* (this document has now been superseded) and *Permitted development for householders – Technical guidance* (published August 2010). The latter document is described as ‘CLG guidance’ where it is referenced below.

The following section highlights areas that require consideration in the 2008 GPDO.