The Chilterns Conservation Board



Chilterns Buildings Design Guide

Chilterns Flint

Supplementary Technical Note

Acknowledgements5

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Sir John Johnson
Chairman Chilterns Conservation Board

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Foreword5

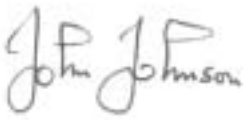
This technical note on the use of flint augments the Chilterns Buildings Design Guide which has been adopted by many planning authorities in the area. Its aim is to inform and help all those involved in the development process by providing additional, more detailed guidance.

The glory of the English countryside lies in its diversity. Travel for only a few hours and you marvel at the subtle changes in landscape and in building design and materials. In the Chilterns the use of flint as a building material is a distinctive ffeature and was for centuries a basic building material, creating buildings which people like to see. Today it is still valued and can greatlt add appeal to new buildings.



Sadly this special character is often lost due to the increasing use by builders and devolopers of standard designs and non-local materials. Even when flint is used, poor execution and minimal materials often detract from the appearance of the finished building.

Within the Chilterns there are numerous examples of how our forebears were able to build in such great harmony with the landscape. That harmony is what this supplementary guidance is meant to achieve.



Sir John Johnson
Chairman,
Chilterns Conservation Board
May 2003

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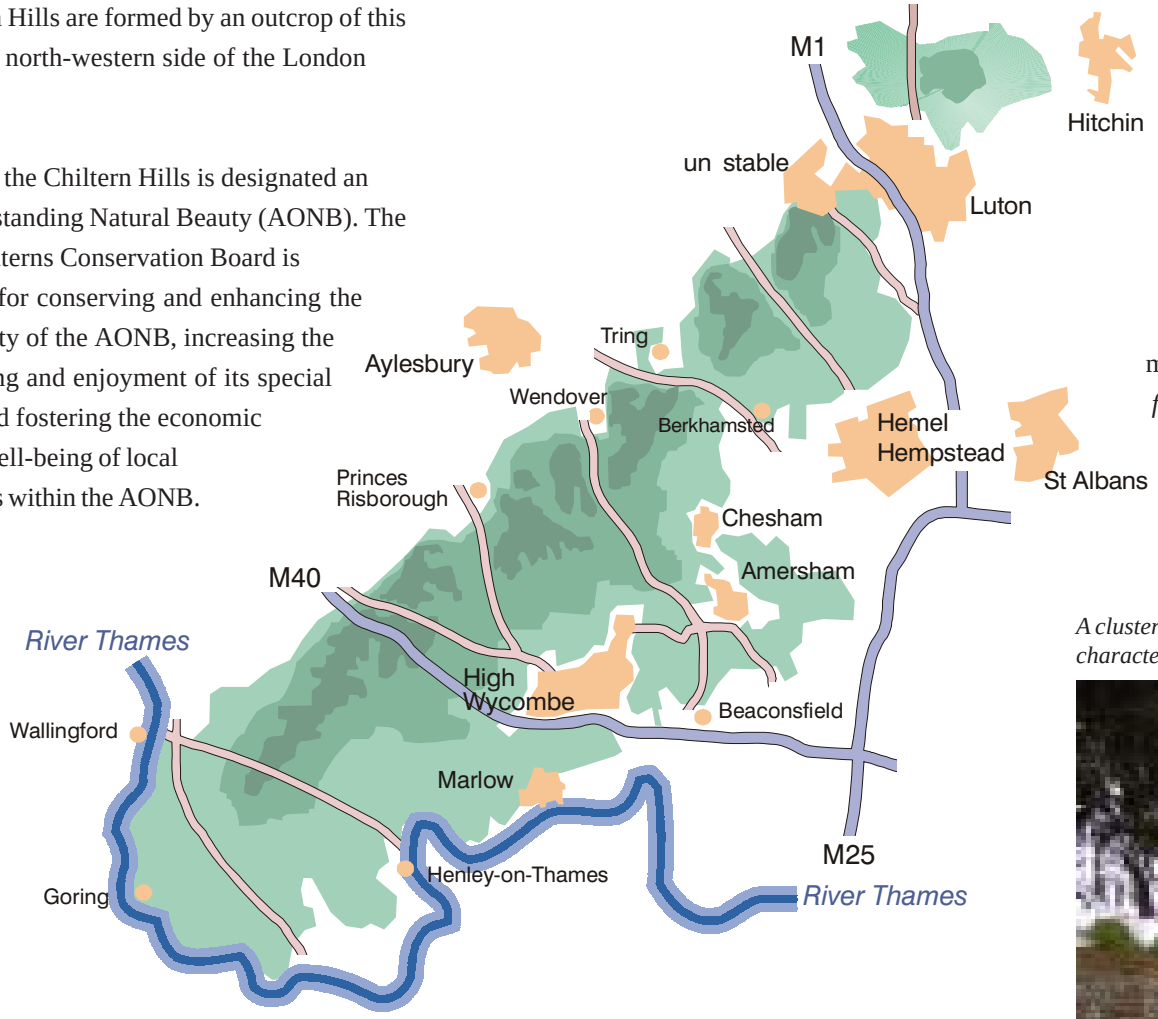
Chapter 15

Introduction5

1.1 Flint is associated with the chalk band stretching across South-eastern England from East Anglia to Dorset and the South Downs. The Chiltern Hills are formed by an outcrop of this chalk on the north-western side of the London basin.

1.2 Much of the Chiltern Hills is designated an Area of Outstanding Natural Beauty (AONB). The shadow Chilterns Conservation Board is responsible for conserving and enhancing the natural beauty of the AONB, increasing the understanding and enjoyment of its special qualities, and fostering the economic and social well-being of local communities within the AONB.

It may offer assistance to local authorities with the aim of ensuring their policies and practices are co-ordinated and consistent with guidance that has been adopted.



1.3 To this end, the Chilterns Buildings Design Guide was published in 1999 to provide guidance on how to achieve high quality design in new developments. The Guide provides a framework for protecting and enhancing the identity of the traditional built character of the Chilterns, which has been steadily eroded by the use of standardised designs and non-local materials. This Technical Note is one of a series that are intended to supplement the Chilterns Buildings Design Guide by providing additional guidance on the appropriate use of locally available materials. *(see the Chilterns AONB website for details of other Technical Notes).*

A cluster of flint buildings with distinctive and traditional character (Hambleden)



1.4 The Objectives of the guidance are to:

- Raise awareness of the quality of the traditional built character of the Chilterns AONB by highlighting the importance of flint, its characteristics, functions and uses
- Foster an interest in and create respect for the historical diversity of flint buildings in the region
- Re-establish traditional character in areas of the AONB where it has been damaged or eroded
- Protect the distinctive character of the built environment by encouraging good repair practices
- Encourage the sustainable use of a local, natural resource
- Promote the appropriate use of flint in new developments so as to create respect for the traditional built character of the AONB
- Encourage flint workmanship of the highest standards to inspire high quality design in new developments

1.5 The note covers all types of new buildings, extensions and conversions where flint is



The Pavilion (Wormsley)

intended to be used, and also gives guidance on repair of existing flintwork. It is not a comprehensive historical and design statement. Nor is it meant to imply that all new designs must utilise *only* flint and slavishly copy buildings from previous eras. It illustrates a potential for excellence, diversity and flexibility in new design whilst still respecting the distinctive qualities of the area.

1.6 This guidance is intended to be used by all involved in the development process: owners; architects; designers; developers; builders; planning authorities; parish councils and any organisation or individual with an interest in the built environment of the Chilterns AONB.

1.7 The note is not a statutory document, but will contribute to decision-making on planning applications. Local planning authorities will be invited to adopt it as Supplementary Planning Guidance to the relevant development plans so as to ensure consistency across the 15 local planning authorities within which the AONB lies. Once adopted the local planning authorities will expect all relevant planning applications in the AONB to demonstrate how these guidelines have been taken into account. Adherence to the guidelines does not mean that development proposals will necessarily be approved because other planning policies in development plans will apply. Specific design and planning guidance is also likely to apply to buildings which have been listed or are situated in conservation areas. The local planning authority should be contacted for details.



Garden shelter (Chipperfield)

1.8 This note was the subject of public consultation prior to adoption. The views of consultees were taken into account and in some cases changes were made. A copy of all representations made during the consultation period and the Conservation Board's response is available from the Chilterns AONB office.

1.9 Flint is one of a small group of favoured local building materials, but it is still seen as difficult to acquire, difficult to convert, and difficult and expensive to build with. ***This note is intended to redress the balance.***

New Church Hall (Chipperfield)



Chapter 25

Background5

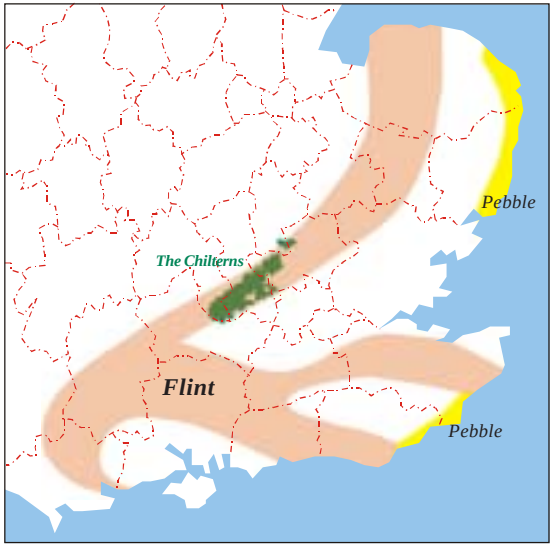
The Material5

2.1 Flint is found in most of the chalkland regions of England and is one of the most widely available, naturally occurring stones found in southern Britain. Its mineral content, composed of crystalline silica (quartz) and hydrated silica (opal) gives its core a smooth, often jet black texture with an almost vitreous lustre.

2.2 Flint is thought to be the remains of sponges that grew on the floor of the Chalk seas, filtering the water around them for food particles. When a sponge died, it literally dissolved away and the ooze left behind would be trapped in the chalk and slowly harden into flint. Often, flints contain the fossils of other sea-creatures.

Quarried chalk flints





2.3 Flints are found embedded within the Upper Chalk, and in the top strata of the Middle Chalk immediately below. They take many forms, though they most commonly occur as random, separate nodules up to 60cm (2ft) across. Typically they are sinuous, amorphous lumps, often with knobbly protuberances and sometimes perforated.

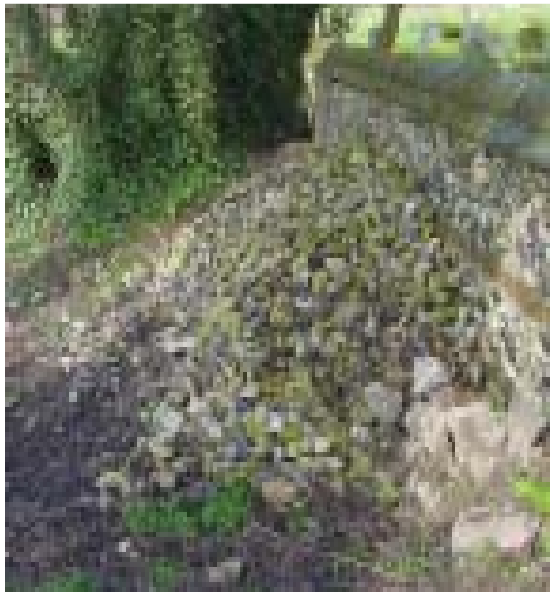
2.4 Although all flint originated in the chalk, erosion over millions of years has freed nodules from this initial setting. Glacial drift has left clay-with-flint deposits overlaying much of the Chilterns. These processes inevitably have tended to change the stone's appearance, hence 'derived' field flints found in the Chilterns tend to be stained brown and often possess their original, eccentric contorted shapes, or they may be fractured by exposure to frost, sun, and agricultural machinery.

2.5 A notable characteristic of buildings in the AONB is the consistent use of flints from both the chalk strata and the overlying clay with flints. Flint appears in buildings in its natural form as smooth, amorphous nodules, but also as bruised boulders, fractured fragments, smooth cobbles, and split or knapped pieces.

Cortication

2.6 A newly quarried chalk flint**,** known as 'virgin' or 'raw' flint has an opaque white outer crust known as the cortex or 'rind', where the flint has become porous. When split, cortication affects the newly exposed surface which initially may show as a transparent milky film over the core, eventually darkening on exposure to produce shades of beautiful blue-grey.

Field flints



Patination

2.7 Some corticated flints are characterized by a waxy sheen, typically yellowish-white; the patina is acquired through the assimilation by the surface pores of the cortex of new silica derived from soil water, a process that ceases naturally once a surface film has closed the pores. Patination is a very slow process and implies great antiquity.

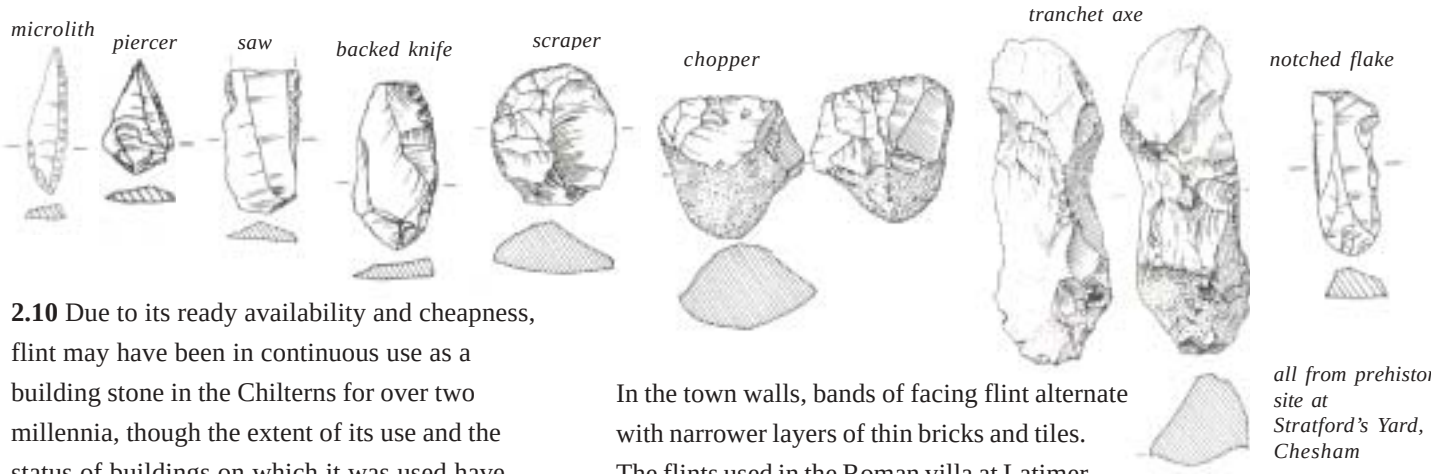
Secondary Coloration

2.8 In both forms, flint is liable to secondary coloration into shades of brown, amber, yellow or grey through the percolation of its pores by iron oxides or other chemicals from the surrounding clays; such coloration of the core is much slower than the staining of the cortex.

Historical Use of Flint in the Chilterns

2.9 Flint is a very resilient stone. It can be struck against metal to produce sparks (hence 'flintlock') or used as an ideal subsurface for making roads. Flint also fractures easily to produce flakes which can be fashioned into axes, arrowheads and scrapers, or it can be used to make flintglass.

Flint was used for a variety of purposes



all from prehistoric site at Stratford's Yard, Chesham

Records of Buckinghamshire Volume 31 1989

2.10 Due to its ready availability and cheapness, flint may have been in continuous use as a building stone in the Chilterns for over two millennia, though the extent of its use and the status of buildings on which it was used have fluctuated over time.

2.11 Archaeological evidence for the early use of flint in the area is surprisingly sparse. Remains of possible Neolithic flint mines exist at High Wycombe and Dunsden; depressions on Pitstone Hill are now thought to be the legacy of medieval and later chalk extraction. Later workings possibly survive at West Wycombe, Medmenham and Emmer Green; but for general building purposes flint has mostly been a by-product of quarried chalk or picked up from the fields.

2.12 Where early examples survive, such as the theatre at Verulamium, flint walls have two parallel leaves bonded at intervals with long flints but with a central void mostly filled with flint rubble. In the town walls, bands of facing flint alternate with narrower layers of thin bricks and tiles. The flints used in the Roman villa at Latimer (C2nd-C4th) were probably collected from the surrounding ploughed fields.

The walls of Verulamium - an early example of the use of flint





Early medieval rendered flint walls (Fingest Church)

2.13 Any church in the Chilterns with surviving medieval fabric utilises flint. Some incorporate re-used Roman bricks, as at St Albans Abbey. At Berkhamsted Castle, only the flint infilling survives to what would have been even more massive walls, the outer leaves of smarter stonework having been robbed over the years and re-used elsewhere in the town. Anglo-Saxon (parts of St Mary's Northchurch and Little Missenden are thought to be pre-Conquest) and Norman walls show a predominance of mortar with fragments of brick and stone rubble, together with unfractured nodules of flint, scattered haphazardly or roughly coursed in the face of the walls. By the C11th, ashlar quoins and dressings began to appear (brick was little used for dressing flint before the mid C16th). Totternhoe stone was particularly favoured and is found in many Chiltern churches. By the early C13th, proportionately less mortar was being used and after c. 1250, flints began to be laid in more regular courses.

2.14 In the early medieval period, flint walls were commonly limewashed or rendered externally (as are parts of Little Missenden and Fingest Church). Probably for this reason, examples are found incorporating a random mix of materials, some re-used. As this practice ceased, the quality and appearance of flintwork became more important. At the same time, chalk was being quarried for agriculture and building, yielding virgin flint suited to splitting, so by the C14th walls were being faced with irregular knapped flint. (i.e. where the flint nodules have been split to expose a flat surface). More decorative work began to emerge in the middle of the C14th and by the C15th flintwork was generally more carefully selected, graded and coursed, often with fully knapped faces (i.e. squared so that they fitted together rather like bricks).

Chequerwork with knapped flint (Luton)





Domestic example of chequerwork (Flamstead)

2.15 By the C16th, as church building declined, flint began to be used more widely in domestic buildings. Chequerwork, used on churches in the C15th percolated down into domestic buildings; in timber-frame buildings, flint continued to be used in plinths (as seen in medieval barns for example) but also for a short phase was popular in early chimney stacks. Small ancillary buildings of flint may once have been more common, but none survives from this period.



Old ManorHouse, c.1602 (Hambleden)



Burrow Farm, c.1605 (Hambleden)

2.16 As timber-frame construction steadily went out of fashion, brick rather than flint became the favoured material in the Chilterns. The region can still boast some fine examples of late C16th and



Lodge Farm (Bockmer End)

C17th flintwork. The Old Manor House at Hambleden was rebuilt in 1602 in flint with narrow brick dressings. Within a few years, nearby Burrow Farm had an imposing flint and brick extension of two storeys and an attic added to the timber-framed farmhouse

2.17 Increasingly, flint and brick were being used to encase former timber-framed buildings, and rear service wing extensions of brick and flint also begin to appear. Early dated examples of complete flint-walled houses can be seen at Lodge Farm, Bockmer and Mapledurham, the latter dated 1691. Brick however, predominated; when the two are found together, there was often a tendency to hide the side and rear walls of flint behind a brick façade.



House dated 1691 (Mapledurham)

Early C19th brick front, flint side walls (Chinnor)





Folly (West Wycombe)

2.18 In the eighteenth century, as church or chapel building tended to opt for brick, secular landowners perpetuated the use of high quality flintwork, particularly in the use of knapped and squared flints. This rarely applied to their country houses but instead was increasingly employed for estate buildings and structures in landscape garden designs – inspired no doubt by the particularly ebullient designs which mushroomed at West Wycombe Park. Gothick cottages, gazebos, grottos and follies often appear as exotic, romantic counterpoints to the formal design of the classical house. Examples of decorative flintwork on quoins is a local adaptation of the more common rock faced stone features in Classical buildings elsewhere.



Flint bridge (West Wycombe Park)

2.19 Though it never surpassed the numbers of pure brick buildings, the emergence of unknapped flint on more modest buildings is ironically closely tied with increasing brick production in the eighteenth and nineteenth centuries. Thick beds of flints overlying the brick earths provided a ready and abundant source of material. Often the most extensive developments of brick and flint cottages were on the brick fields themselves, as at Prestwood, Buckland Common or Lane End.

As these areas of former common-land were colonized, numerous small cottages were built of random rubble flintwork to house an increasing rural workforce. In these more 'humble' examples, the walls were constructed of flint rubble, the flints being simply bonded together using mud rather than lime mortar.

2.20 Two further reasons account for the increased use of flint in the C19th. First, farmers paid to have flints picked of their fields to make



Former house of brickyard foreman (Cadmore End)



This example of a small flint cottage at Totteridge was typical of many dotted around the commons (Courtesy Wycombe Museum)

ploughing easier. Secondly, roads (the maintenance of which remained a parish responsibility until 1888) were steadily improved. Vast quantities of flints were picked off ploughed fields for road maintenance as a means of employing those who qualified for parish relief, often women and children. Payment was 8d to 1/- for a cubic yard of flints. Stone breakers were employed to split these flints for road use, a practice which may have stimulated use of more knapped flints in buildings.



Charles Delderfield, stonebreaker, born 1843 (Aldbury)

2.21 All these factors prompted the gradual emergence of flint-with-brick as the predominant Chilterns 'style'. The C19th was perhaps the heyday for flint, a marked contrast emerging between 'polite' and 'vernacular' buildings. Many smaller houses, cottages and farm buildings were built with rubble flint facings tied to backings of brick or, occasionally, chalk. Villas, industrial and public buildings often incorporated conscious expressions of 'manufactured' flintwork. Flint was seen as particularly appropriate for Gothick buildings. It also appears in urban contexts in the Chilterns – Wycombe has nice examples at Castle Hill House, the Flint Cottage on Crendon Street (excruciatingly pointed) and the old Post Office in Easton Street.



Small cottage (Lacey Green)



An example of urban flintwork (Nos 14 & 15, Easton Street, High Wycombe)



Villa
(Castle Hill House, High Wycombe)

St Crispins, West Wycombe, a splendid Gothick residence built for the local shoemaker





A fine example of C19th flintwork (St Michaels Lodge, St Albans)

2.22 The Chilterns can boast examples of churches or other institutional buildings designed or remodelled by the majority of pre-eminent Victorian architects. Inspired by English regional Gothick precedents, they experimented with bold new uses of flintwork, elaborate brick diaper patterns and occasional polychromy. They occasionally borrowed traditions from other regions, such as knapped flushwork from E. Anglia. Quoins of imported stonework re-appeared although in the Wycombe area, the locally available Denner Hill stone was favoured. The former Brewery at Amersham used galletted flint chips (not a common tradition in the Chilterns) - variations occur on the churches at Medmenham and Boveney. Some smaller buildings displayed bottle ends set in flints. Experiments were made with colouring mortars. Early lime mortars, using local chalk, gave little or no hydraulic set; by the end of the C18th stronger hydraulic limes were becoming available, and in the C19th in particular, black mortars, using additives such as coal or brick dust, soot or ash were used to give a definite visual effect.

Use of dark mortar (Castle Hill House, High Wycombe)





Prestwood Church, 1849, part of a cluster of buildings by E.B. Lamb



Bottle ends (Coleshill)



Terraced housing (Woodside)

2.23 Small clusters of flint buildings became commonplace in the C19th. Terraces also started to appear, some of considerable length and uniformity. Many country estates used flint for cottages in villages such as Hambleden and Bradenham, perpetuating its use well into the late C19th. Estate boundary walls as at Assendon, Tring Park and Markyate Cell employed estate labour to impressive ends. Some landlords – particularly those 'rooted' in the Chilterns - embraced flint and a large estate such as at West Wycombe deliberately cultivated and experimented with idiosyncratic forms of flintwork. Other estates consciously rejected it, for example the Bedford Estate at Chenies, or the Rothschilds in Tring and the surrounding area.

Estate Cottages (Hambleden)





1947 housing, with well executed new extension of knapped flint to left (Fingest)

2.24 In the first half of the C20th, flint in the Chilterns continued to be used in church-buildings, for semi-detached houses and extensions to farmhouses. By mid-century, its use was declining, although some rural housing continued to adapt the use of flint to contemporary designs. Flint remained popular for boundary and garden walls and from the 1960s it began to re-appear in institutional buildings. An interesting experimental design dating from 1968-9 is the hall extension to St Mary's Church at Luton.



A one-off design (St Mary's, Luton, 1968-9)



Flintwork in new developments often uses traditional skills. However, there has been a recent growth in the use of pre-cast concrete blocks with flint inserts, whose use does not require traditional skills. Fortunately the regional craft traditions have not been obliterated and they should be nurtured whenever new projects are being undertaken.

Flint and brick revivals (Lacey Green)

2.25 But the major use of flint in the Chilterns has been on the Wormsley Estate where in the late 1980s a major new building project involved the construction of 2,000 sq. metres of new flintwork, a remarkable showcase of techniques and styles ranging from the most humble grade of flint to the most sophisticated.

2.26 As awareness of the loss of local character grew in the C20th, the 'traditional' flint and brick house was revived by developers and builders with varying degrees of success. Some blend extremely well into their village surroundings but too many incorporated incongruous token panels in predominately brick-built buildings – a trend which still persists in some new design work.



Chapter 35 Using Flint Today5

An Inspirational Inheritance5



Church (Flaunden)



Former School (Ellesborough)



Farmhouse (Monks Risborough)



Bus Shelter (Ewelme)

3.1 Buildings and structures of every shape and size have been constructed from flint, enriched by the many combinations of other materials it is encountered with. Conventional stonework often aims for consistency and uniformity but the characteristics of flints – their shape, colour and texture - invest them with a vibrancy quite unlike other stonework; the beauty of flintwork lies in its potential for creating a spectrum from precise blockwork using accurately knapped flints with thin joints to a more random, 'rustic' appearance using unfractured, amorphously shaped stones.

3.2 For building requirements in the Chilterns, the supply of flint is as good as infinite; it is local, reducing transport costs; it takes little effort and



Farm buildings (Lodge Farm, Bockmer End)

no fuel to convert it, it can even sometimes be free. Building in flint is undeniably expensive because of the extra time and care it calls for. As a general rule, in a standard 3-bedroom house, external walling costs fall between 10-15% of the overall building costs. This will increase if flint is used. However, this will be more than justified by the aesthetic benefits and durability of the material.



Former Workhouse & Hospital (Amersham)



War Memorial (Lilley)



Town House (Watlington)



Mausoleum (West Wycombe)



Outhouses (West Wycombe)

If the flints are already there some of the extra costs may be offset, and the ecological benefits are manifest. Moreover, flint can add value to new buildings.

3.3 Yet today, flintwork tends to be confined to 'token' or pre-cast panels, often with more cement than flint left showing. It is sometimes claimed there are few skilled practitioners; but poor specifications and designs are as much at fault for producing visually poor results. The projects on this page nevertheless illustrate how these limitations can successfully be overcome.

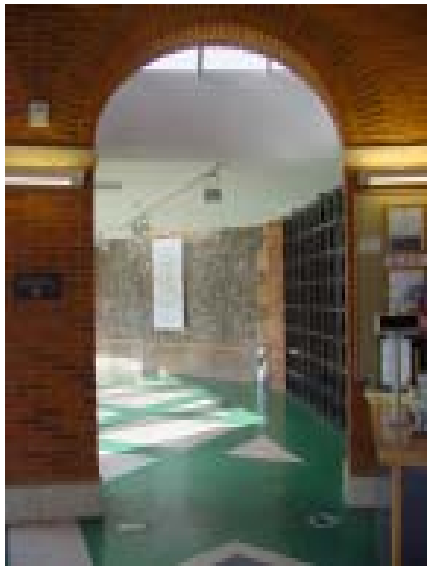


Token flint panels

3.4 Flint offers great design potential; when using it, a comprehensive project brief should:

- respect regional distinctiveness
- be based on a comprehensive local survey
- specify appropriate methods, skills and materials to achieve flintwork of the highest possible standard





Extension to Verulamium Museum (St Albans)



Sundial base of knapped and squared flint (Stoke Row)



The Library (Wormsley)



Extension to Chorleywood School



Well designed new flint buildings should dovetail into the surrounding landscape and settlement pattern (Great Kingshill)



Sensitive new housing with a balanced use of traditional materials and design (Lacey Green)



Extension to St James Church (Aldbury)



Extension to Kensworth Church

Regional Distinctiveness5

3.5 This note has already emphasised the wide historical application of flintwork in the Chilterns.



Farm buildings (Kensworth Corner)

Examples of flint construction are found throughout the AONB, although prevailing geological conditions will affect relative densities. Flint boundary walls, a defining characteristic of many Chiltern settlements, are ubiquitous and a fair number of farm buildings survive throughout the area. Barns tend to use flint for plinths, while flint and brick is found used in stables, cart sheds and pig-sties. Domestic examples tend to fade away both in the north of the area (north of the A41 gap) and in the extreme south-west of the AONB – dwelling houses and farm buildings therefore occur with greater frequency in Buckinghamshire and Oxfordshire.

3.6 Flint is by no means the most widespread of traditional walling materials in the Chilterns area, featuring in less than one third of domestic buildings. The majority date from the C19th. Some dramatic urban examples of flint buildings are found, but often its use is confined to rear and side elevations, backyard buildings and walls, or to buildings on the margins of settlements.



Flint boundary walls are found throughout the Chilterns

3.7 Within a region the size of the Chilterns, there are inevitably subtle local variations – in the south-west, examples of banded flintwork can be found; thatch and flint are more common on the western scarp; dressings of yellow 'stocks' are more often encountered in the north-east of the region; whilst in North Hertfordshire brown-coloured bricks were prevalent.



The nineteenth century was the heyday for flint and brick (Wheeler End Common)



Banded flintwork is only found on the south-western fringes of the Chilterns (Benson)



Yellow bricks are sometimes encountered, particularly in the north-east of the region (Kings Langley)

3.8 In addition to these localised variations, colour, shape, coursing, technique and conscious 'borrowing' of styles helps to create a rich palette of possibilities. The principal challenge is to weave these elements into a design which respects and enhances the dominant and distinctive Chiltern style of flintwork.



The painted flintwork and thatched roof is unusual in the Chilterns (Ellesborough)



Pebbles are not commonly used in the Chilterns

Local brick, tile and flint (near Ley Hill)

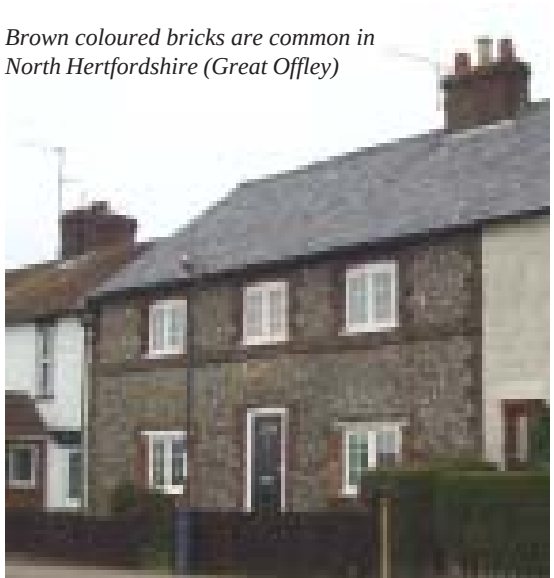


Regional Distinctiveness Checklist

- **Do** respect distinctive Chiltern traditions
- **Do** combine flint with locally-made bricks
- **Do** combine flint with clay peg-tile and natural slate roofs
- **Do** use lime-rich mortars and coarse aggregates
- **Do** experiment with appropriate, regional techniques

- **Don't** use pebbles/cobbles
- **Don't** paint, render or tar new flintwork
- **Don't** dilute local character by importing alien styles - use galletting, banded flintwork and flushwork sparingly and only if there is good local precedent

Brown coloured bricks are common in North Hertfordshire (Great Offley)





Chalk-rich mortar

Survey5

3.9 For new flintwork, the survey should take account of the following local factors:

- Immediate built environment – has flint been extensively used in the area?
- Historical development of the site and surroundings – is there evidence for flint being used on or near the site in the past?
- Geological – what types of flint are available? What types of materials can flint be combined with?
- Local techniques – what are the local forms of flintwork?



Suburban details look out of place in a rural setting



Flint may be inappropriate in developments designed with a suburban character

3.10 Decide whether flint would fit into the context of the project. In some circumstances, flint might be rejected as an unsuitable choice. For example, flint may not be appropriate for cul-de-sac or suburban developments. However, these forms of development will invariably be inappropriate in the AONB. On the other hand, it may be particularly well-suited to one-off building projects, terraces or small clusters of buildings.

3.11 Decide the extent to which flint is appropriate to the scale and nature of the project; will it be the major material or is it best suited to discrete elements? Flint was often used on secondary buildings, extensions or lean-tos, rather than appearing as the main walling material. In some cases, only the boundary walls might be constructed of flint.

3.12 Where flint is considered desirable, it will then be necessary to assess all the practical factors - availability of materials and skills, timescales, costs etc. – to determine whether it is feasible to do so. Sourcing suitable flints may require a considerable lead time.

Flint extensions were often added to earlier buildings (Binfield Heath)





Estate Lodge,1844, probably by Pugin (Danesfield)

3.13 If any consolidation to existing flintwork is required, the survey should identify the areas to be repaired and the most appropriate methods to ensure they are carried out with due regard to surviving historic fabric.

3.14 A close inspection of flintwork in existing buildings around a proposed development might well reveal subtle local characteristics that can be incorporated into new building work.
For example, proximity to chalk quarries will tend to produce unstained, unadulterated black and white flints; as these are easier to knap, more examples of knapped construction are found in these areas. Alternatively, a local estate might have exerted a considerable influence on the local style of building, which should be respected in new design work.

3.15 A thorough survey of this nature will lead to a high quality specification, ensuring that the type of construction and mortar specification is appropriate and blends well with existing flintwork in the vicinity.

Locally sourced materials bricks, tiles and flints (Turville Heath)



Survey Checklistm

- **Do** use flint in new designwork to a high specification
- **Do** respect historic diversity in flintwork
- **Do** research the availability of local sources of flint
- **Do** research techniques and styles in the immediate area and so avoid producing work that has no regard to local precedent
- **Do** consider replacing inappropriate boundary fencing with brick and flint walls
- **Don't** needlessly destroy historic fabric

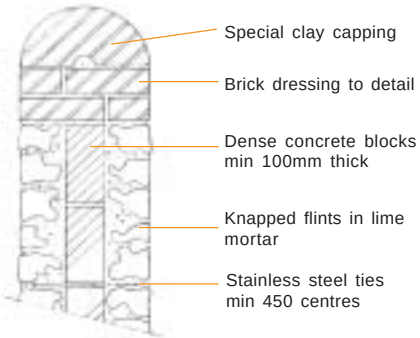
Specification and Design5

Building with flint

3.16 Masonry walls are traditionally made with building blocks bonded together with a jointing material or mortar. With flintwork, the proportion of stone used is sometimes less than 50% given the amount of mortar, rubble and other stone or brick used in the finished construction.

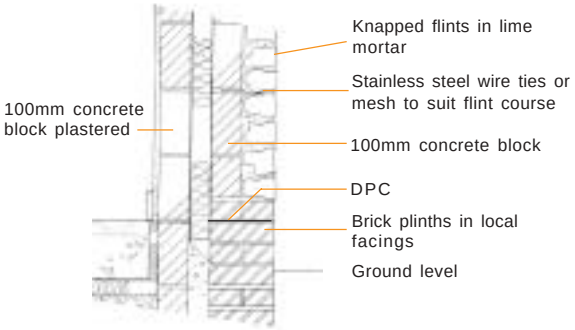
3.17 The thickness of a flint wall will vary in accordance with the size of structure; traditionally the minimum normal thickness for cottage walls would have been about 450 mm (18 in) and even boundary walls were seldom much less. Some church tower walls are as much as 1.5 m (5ft) thick.

Figure 1



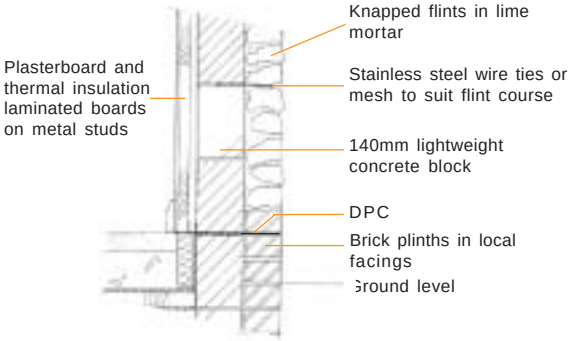
Section through solid wall with half-round coping

Figure 2



Section through cavity external wall (dwelling) (cavity ties not shown)

Figure 3



Section through solid external wall (dwelling) (cavity ties not shown)

3.18 Flint can be used in at least eight different ways:

i. used for foundations for boundary walls and small outbuildings, instead of concrete

ii. as solid masonry; if used structurally it should be 1.33 times the thickness of a brick/block wall (Building Regulations: Approved Document to PART A). The U-value of a solid 450mm flint wall with no insulation is 2.7 W/m^2K, whereas a value of 0.35 is looked for in walls to heated buildings (see v. & vi.)

iii. as solid masonry in non-structural situations, a free-standing flint wall 230mm (9") wide can be built to a height of some 1.5m (5 ft) – any higher will require a width of 330mm (13") (brick and a half or maybe more).

iv. as above but with a rubble or blockwork core – used for constructing free-standing walls. ***(Fig. 1)***

v. as a facing to an outer skin in a cavity wall. In habitable buildings, the *perceived* limitations to using flint in a cavity wall result in token panels of flint being incorporated into a brick outer skin. But it is perfectly possible to construct buildings to a high specification, meeting the required thermal values, using cavity walls with an inner skin of brick or blockwork or shuttered concrete and an outer leaf of flint on a usually 100mm (4") brick or block backing. This necessarily creates a slightly thicker wall than the conventional 340mm (13½"), with inevitable cost implications. However, as walls account for

less than 10-15% of new-build, the additional cost is negligible. ***(Fig. 2)***

vi. as a non-structural facing to some other backing material such as brick, block or shuttered concrete. ***(Fig. 3)***

vii. flint cobbles or knapped flints can be used for flooring and pathways

viii. as a decorative motif mixed with other materials such as brick or stone (e.g. knapped flints can be used to create pinnacles for parapets or gate piers.)

At an early stage in the design process contact should be made with the local Building Control Service for advice on building regulations, required u-values and structural support.



Knapped flints mixed with cobbles and setts

3.19 For facing or structural work, combination materials will be used for piers at intervals, end quoins and sometimes horizontal brick string courses to bind the flint face to the backing material or core of the wall. Metal wall ties are also often used.

Freehand flintwork



Constructing flint freehand

3.20 Flintwork can be constructed freehand or using shuttering. Freehand construction should be the favoured method wherever possible as it tends to achieve a better finish; it is essential when building coursed or rough-coursed flintwork, where the flints are laid in horizontal rows with consistent spacing between each piece. String lines are used on both sides if constructing a free-standing wall. The principal technique is to learn how to bed the flints 'flat', as if the wall was being built against a sheet of glass, using a straight edge to check that nothing projects beyond the general line of the wall face. Profiles should be used for quoins and jambs.

Shuttered flintwork

3.21 Shuttering has long been used for constructing flint walls, both for rubble-cored walls and flint facings on brick or stone backings; it can help to achieve flat planes although it is obviously difficult to gauge the finished effect.

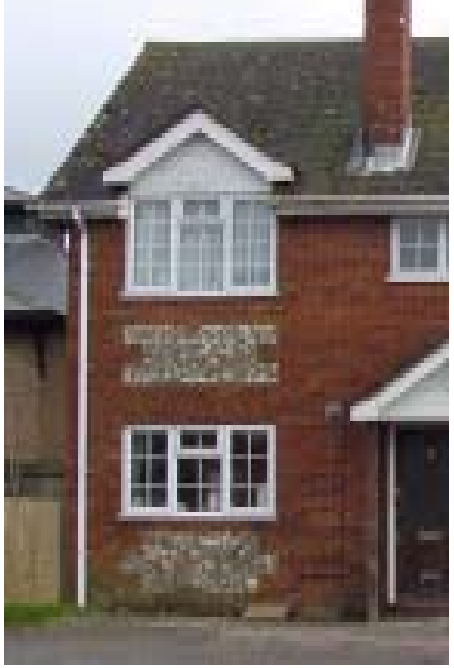


Shuttered flintwork

3.22 Before erecting shuttering, any toothed quoins or piers, dressings, plinths and backings should be built to a minimum height of 225mm (i.e. the average height of a board laid horizontally). Layers of flint are added within the shuttering made of boards firmly secured on either one or both sides of the wall. Selecting the flints primarily for their external face, they are laid like headers

with one end set firmly against the shutter and the other pointing into the wall; also slightly downwards and outwards to direct any water away from the core of the wall.

3.23 When bedded comfortably in the mortar no two stones touch, but should be set as close together as possible to avoid excessive areas of mortar. Long bonding flints should be built in at regular intervals, with any voids being filled with brick and tile rubble, but care is needed to ensure that every crevice is filled, especially in the toothing of the piers. Smaller flints will be required to level off each rise to avoid excessive thicknesses of mortar which distort the overall appearance and are vulnerable to frost. This giv ffect, thus avoiding a banded which is not typical of the Chilterns. Shuttering to each rise is normally removed the following day; the process being repeated until the required height is achieved.



The token panels of flint do nothing to enhance the appearance of this poorly designed building



Even with careful pointing the appearance of the banding effect of manufactured blocks is difficult to disguise

Construction Checklistm

- **Do** specify flint rather than concrete for foundation work for boundary walls and outbuildings
- **Do** ensure cappings properly protect flintwork
- **Do** specify use of large flints at the base of a ‘rise’, and use small flints to level off at the top
- **Do** specify use of traditional and locally distinctive methods of design and construction
- **Do** use flints from the Chilterns

- **Don’t** specify random token panels of flint as a design feature in otherwise brick-walled buildings
- **Don’t** use imported flints of inappropriate size and texture

Imported flints change the visual character of buildings



Designing with Flint5

Type of flint

3.24 Good quality work uses chalk flints, although where they are predominant, the effect can be 'over-busy'. Field flints tended to be used in 'humble' domestic buildings, boundary walls etc. Pleasing results can be achieved by mixing the two types of flints.



Chalk flints

3.25 Flint walls can be smooth textured, rough faced, or knapped into precise blocks. Ways of laying flint are nearly as varied as the material itself. Different methods of coursing, close or wide spacing and the consistency and appearance of the mortar all contribute to this diversity. Other materials can be combined with flint in almost limitless ways, from the wholly random to the methodically planned.



Field flints



Mixed field and chalk flints

Choice of individual flints - knapped, whole, random or mixed

3.26 Flints were either used whole, fractured or 'knapped' to provide a shaped, smooth surface. Knapped flints can be split so that irregular but 'flat' faces are exposed. Flint often breaks in handling, sometimes in a remarkably sheer plane, causing it to resemble a 'knapped' surface. A skilled knapper can split flint with very little force, being able to judge its condition and quality by the sound of the hammer blow. Chalk flints are more workable – three strikes will produce a good face, while field flints often only allow one hit before they fracture. Chiltern walls often incorporate whole, random and 'fractured' flints. In some cases, one area of wall may use knapped flints, another random.



Flint knapping: before (above) & after



Interesting combination of rinded chalk and knapped flints



Left: whole flints *Centre: random flints* *Right: knapped flint*

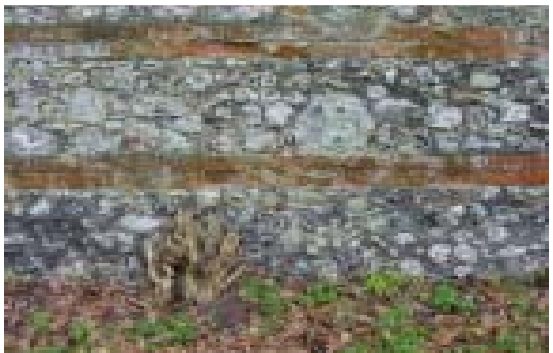
Front wall of knapped flints, side wall of random unknapped flints



Type of finish – squared/graded/random

3.27 Flints can be selected and graded on size, they can be used randomly, or can be made into squared or rectangular flint blocks (usually measuring about 100mm (4") by 75mm (3")).





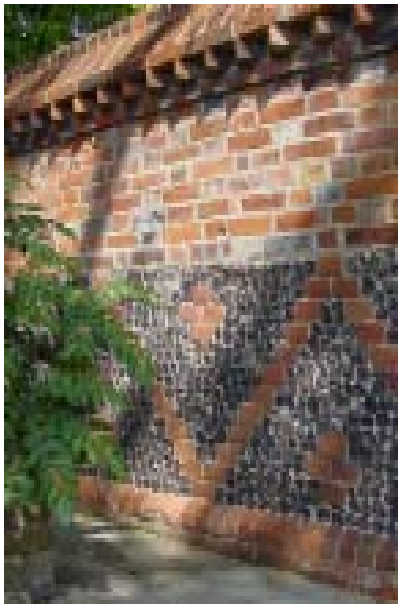


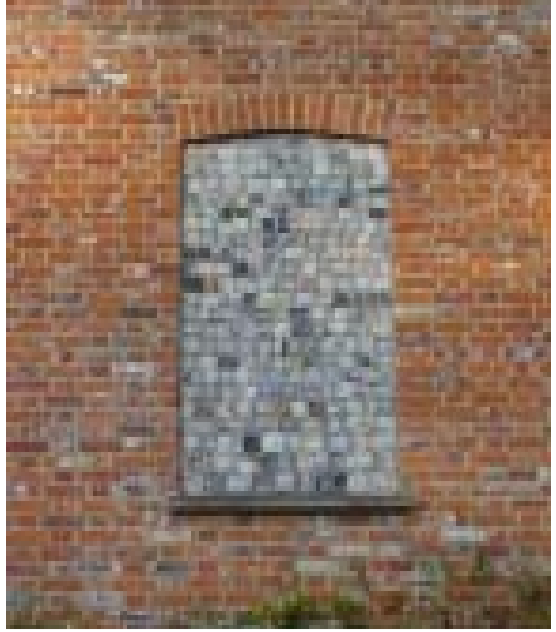
Squared and knapped flint



Use of large knapped flints

Use of small knapped flints





Coursed knapped flint

Coursed or uncoursed

3.28 Whether knapped or not, flints can be built coursed or uncoursed. Further visual effects can be achieved by laying each piece at an angle or slant; when alternated course by course, a herringbone effect is produced.

Herringbone flintwork





Coursed unknapped flint

Banding

3.29 By mixing types of flintwork, or flint with other materials, banded visual effects can be created.



Banded flintwork

Curved walls

3.30 Where appropriate, the sometimes harsh effect of massed flint can be softened by rounding edges or building in curved designs.



Curved flint walling

Recessed/expressed panels

3.31 Wall surfaces can be broken up by recessing or expressing panels.

Use of recessed and expressed panels

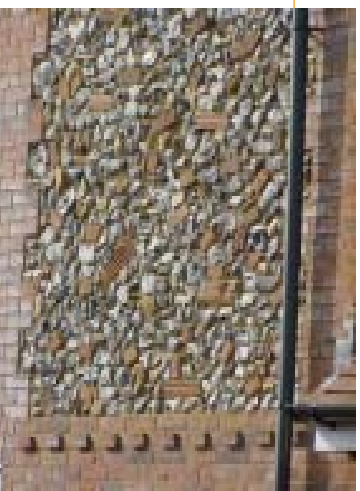


Design Checklist

- **Do** specify a type, size and finish for the flint which is appropriate to the scale of the design
- **Do** consider using combinations of smooth, fractured and knapped flints to achieve variety in texture
- **Do** employ techniques which help to soften the effect of massed flint walling
- **Do** use random, field flints on 'vernacular' buildings
- **Do** use knapped chalk quarry flints for higher status buildings
- **Do** use other quoin materials - imported stone, tiles etc – on higher status buildings

- **Don't** over-embellish flintwork with unnecessary detail

Flintwork cluttered with detail



Design and The Choice of Mortar

3.32 Building in flint is a slow process. The large quantities of mortar required must be allowed to dry out slowly to achieve a firm set. Around 600mm in height is the maximum rise under typical conditions. Winter working is inadvisable and will limit the work.



Wall under construction using lime mortar

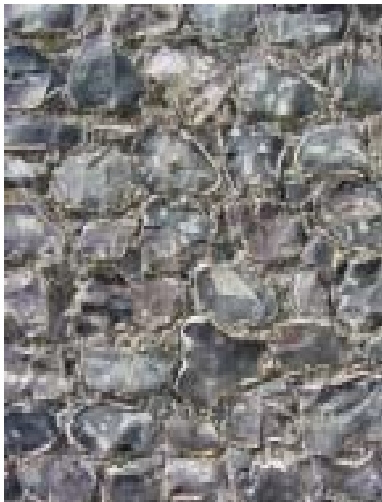
3.33 As flint is such a hard, impervious material, water absorption from mortar is minimal. A strong cement based mortar is therefore quite inappropriate; shrinkage cracking around the flints will allow water ingress, with possible damage to the mortar core or backing, particularly in frosty conditions. The flints themselves can even split in extreme conditions.



Impressive use of flint marred by poorly executed mortaring

3.34 Traditional mortars are made with sand and lime, the lime being made by burning limestone or chalk. Whereas most modern buildings are made with mortars using Portland Cement, the elasticity and porosity of lime mortar allows a flint wall to breathe, moisture to evaporate and fine cracks to 'heal'. Its use is ecologically friendly, and even allows the wall to be dismantled and reconstructed in the future without loss of material.

Knapped flint with gritty lime mortar



3.35 To obtain the best performance from lime mixes it is essential that the correct sand and lime to water ratios are used. Sharp sands with angular particles including some 4-5mm grit produce the strongest mixes. A less coarse aggregate may be needed

for the finer joints of brick quoins, but the colour and texture should not be noticeably different. The choice of binder is essential. A range of limes is available; choice will depend on the strength, porosity, durability and flexibility required. A generally recommended mix is 1 part moderately hydraulic lime (NHL 3.5) to 2½ parts well-graded sharp sand. In more exposed areas (e.g. on copings) a stronger mix (1:2) may be required. For conservation repairs, it is recommended that advice is sought from producers of specialist mortars.

3.36 The mix should aim to completely integrate the sand and lime and contain as little water as possible, sufficient to make it workable, as a stiff mix will be less prone to shrinkage, particularly for pointing. The mortar should be mixed in accordance with the manufacturer's technical literature.

3.37 If porous, the backing should be thoroughly moistened and then allowed to dry just enough to give the initial suction. The new work should be protected from sudden drying by wind or warmth in the summer or frost in the winter, and from rain at any time. Polythene sheeting or damp hessian (which can be sprayed if it starts to dry out too quickly) should be hung just clear of the wall. Conversely dry hessian and insulation/tarpaulins will be needed to keep it protected from frost in the winter - even heated blankets may be required in extremely cold conditions. As lime mortars will not set at low temperatures, and frost can cause severe damage to work that has not completely cured, it is advisable to plan to carry out new flintwork when there is not a serious risk of frost. Where shuttering has been used, it should be removed to allow the mortar to dry after one or two days.

3.38 The first layer of excess mortar is removed using a trowel. On no account should cloth or sacking be used as it will smear the face of the flint. One of the arts of flintwork is knowing the correct time to complete the finished joint effect required. When the initial set has taken place, the face may be finished with a stiff-bristled brush to reveal the aggregate in the mortar. The wall should not be brushed so much as beaten, banging the surface with the tips of the bristles. A churn brush is the traditional tool although nylon brushes can sometimes be as effective. A churn brush may also be used to remove traces of mortar from brickwork.

3.39 When specifying flintwork, the following design considerations for mortar should be taken into account.



Loose open-bonded joints accentuate the mortar

Close or open-bonded

3.40 Flints can be set very close together, or in a more random, open fashion. Unknapped flints require more mortar than knapped flints. In flushwork, which has to be constructed freehand, the moisture content of the mortar should be increased due to the narrow joints, to allow the mix to be rubbed into the joints. As soon as the pointing starts to set, excess mortar is removed from the flints with a small trowel.

Close-bonded flintwork



Mix – aggregate, lime putty

3.41 Aggregates and lime mortar mixes should be carefully selected. Test panels help to arrive at the desired effect, and can assist in agreeing the intended finish with planners, conservation officers and building control officers.

Galleting

3.42 The waste flakes, pushed into the mortar joints are called gallets, a technique only very occasionally encountered in the Chilterns.



Galletting is seldom encountered in Chilterns. This rare example at Wycombe Abbey shows flint gallets pressed into the mortar of a masonary wall

Jointing and finish

3.43 Various techniques can be used to change the finished appearance of the mortar, although jointing should never be the dominant factor in flintwork. Flat steel trowel jointing, weather struck pointing, beak pointing, raised strap pointing and other modern finishes exaggerate the joint and distract attention from the flint itself. In most situations the joint or pointing should be consistently flush or slightly recessed behind the front face of the flint.

3.44 In walls using random field flints a rough joint can be found 'buttered' or spread (but not smeared) over the edge of the flint. Sometimes it is difficult to establish if this was an original technique, as the feathered edges to these 'buttered' joints tend to fall away over time, revealing more of the flint face – which may now appear rather more pleasing than the 'workmanlike' original. The surface texture of the joint or pointing was always fairly rough with sharp sand/coarse aggregate and small lumps of unburnt lime or chalk often exposed on the surface. This can be achieved by rubbing over the joint with a stick or by stippling (not dragging) a coarse brush onto the hardening surface.



Ribbon pointing swamping original flintwork



Good mortar finish



Poor mortar finish

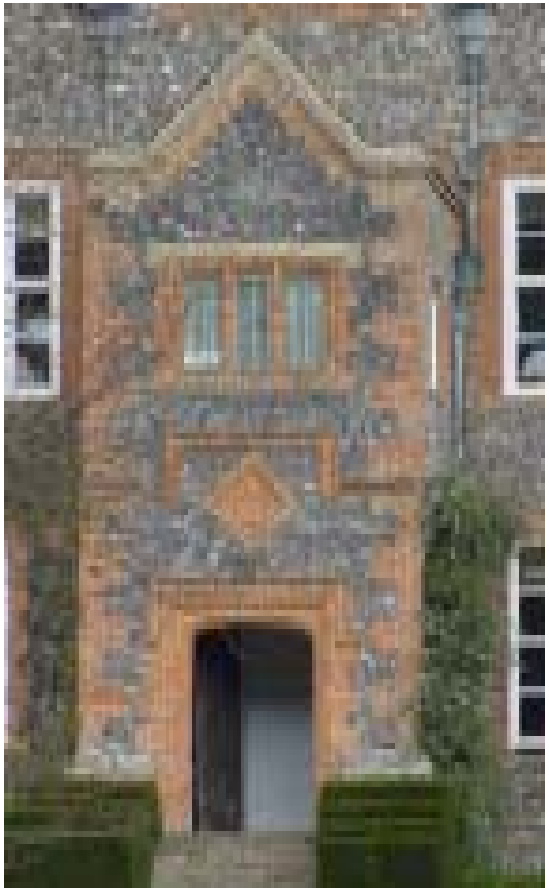
Mortar Checklist

- **Do** point so that the joint is very slightly recessed behind the front face of the flint
- **Do** consider using appropriately textured mortars
- **Do** use appropriate lime mortars

- **Don't** clutter or obscure flintwork with inappropriate pointing
- **Don't** use soft yellow 'builder's sand' or inappropriate aggregates for mortars
- **Don't** use acid washes to eat back mortar on shuttered walls
- **Don't** use flat steel trowel jointing, weather struck pointing, beak pointing or raised strap pointing

Material Combinations

3.45 Because flint is somewhat intractable, 'softer' or more workable materials are usually used in conjunction with flint for cappings, piers, quoins, banding (horizontal and vertical), string courses,



Brick and flint combination

window and door openings. The presence of good brick earth means that flint, in the absence of other good building stones, is often combined with brick, both in the walls of older buildings and in boundary walls around estates, farmsteads and gardens. The clay is also used to make clay peg-tiles, the most common roof covering of vernacular buildings in the Chilterns. The use of brick, flint and tiles provide a direct link between the special character of the region's landscape and the distinctive quality of its traditional built environment.

3.46 A particular choice of combination materials is often dictated by local geological conditions. Brick textures vary according to the type of clay used. Proximity to certain quarries produce pockets of localised use of stones.

Brick

3.47 Chiltern brickyards produce bricks in colours ranging from orange through brown and red to rich purple, almost to blue. Newly-burnt bricks need to be soaked in water before use because of their absorbency – otherwise the mortar would dry and lose its adhesion.

Brick and flint column





Random brick in flintwork

3.48 Brick is sometimes mixed randomly into flintwork. More elaborate patterns ('diaper work') were produced in imposing buildings, mixing knapped flint with dressed brick.

3.49 Imported bricks such as yellow 'stocks' are encountered in the Chilterns, changing the overall texture and appearance when incorporated in flint buildings.

Yellow brick and flint





Diaper work

Tile

3.50 As clay tiles were locally produced in a number of areas – it is no surprise to find them being used for quoins and lacing courses as at Penn.

Tiles used in flint and stone buttress



Stone

3.51 The alternative to clay was dressed stone, but because of its cost it was sparingly used and is more often associated with prestigious buildings such as churches or estate buildings. In the Chilterns it has mainly been derived either from quarries at Totternhoe or at Denner Hill. Other limestones and sandstones had to be imported into the region. On superior buildings, stone is combined in formal diaper and chequerboard patterns to great decorative effect. Stone, tiles and bricks can sometimes appear randomly used in flintwork.



Composite stone, brick and flint

Denner Hill stone quoins



Thatch

3.52 Thatch was once much more common on humble buildings such as cart sheds and lean-tos, although few examples survive today in the Chilterns. Thatch-and-flint domestic buildings are particularly encountered in the scarp areas, close to the arable Vale of Aylesbury.

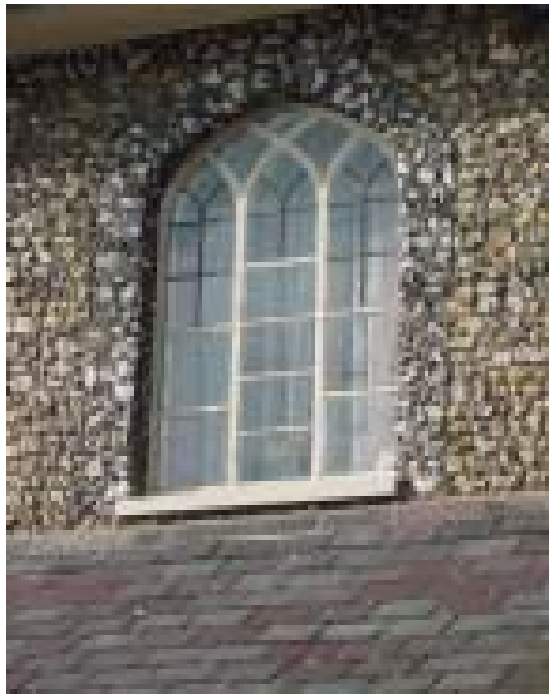


Flint and thatch

Slate

3.53 While many flint buildings are roofed with peg-tiles, slate has been used since the C19th as at Lane End, Bolter End, Lee Common or Stoke Row.

Slate and flint



Design details

3.54 Although it is perfectly possible to use flints for any of the following design elements, local examples will help to provide clues as to the most appropriate combinations. These details are intended to show the range of combinations available, but they should not be applied indiscriminately. The successful design will incorporate them in proportion.

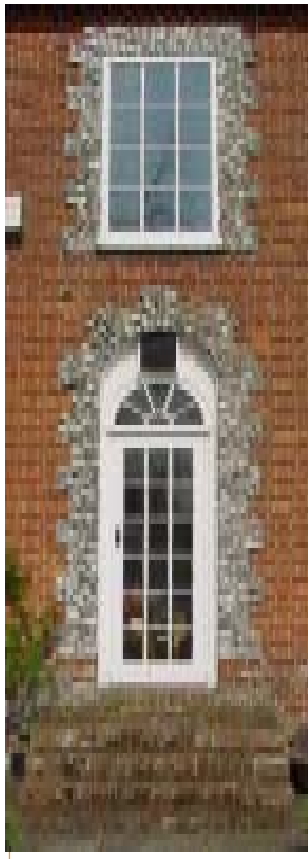
Quoins and piers

3.55 Although examples occur, it is difficult to make good, strong corners with natural flint. Brick or stone are more frequently encountered. (In one or two cases, the reverse occurs, with flint, usually in a rusticated form being used for the quoins in an otherwise brick building). Corner quoins are often three courses high though it is not uncommon to see them four, five or more courses high. In the Chilterns, however, quoins or piers often present a toothed appearance, "in" and "out" on successive courses.



Typical Chilterns 'toothed' quoins





Flints used as quoins



Window with label mould and three-course brick quoining

Arches, door and window openings

3.56 Dressings to the jambs of doorways and windows often repeat the patterns encountered on the corner quoins except that their face widths are usually less, often consisting of one brick and half a brick. Window heads develop towards shallow segmental heads.



Segmental heads to sash and casement windows



Openings without differentiated quoins



Plain panelled doors



Recessed arched doorway



Fanlight

Strings/lacing courses

3.57 Very pleasing effects have been created where the flintwork is divided up into panels by vertical and horizontal brick banding. Strings can be done as all headers, alternate headers and stretchers, or random. One course is sometimes quite sufficient, although up to four or five bricks deep occur in domestic situations at first floor level to accommodate joists; these can be enriched with cogged or dog-tooth detailing or other decorative friezes, but keeping the correct visual ratio of brick and flint. The bare minimum of brickwork almost never looks wrong. Too much brickwork usually does.



Flush brick panels



Single string course

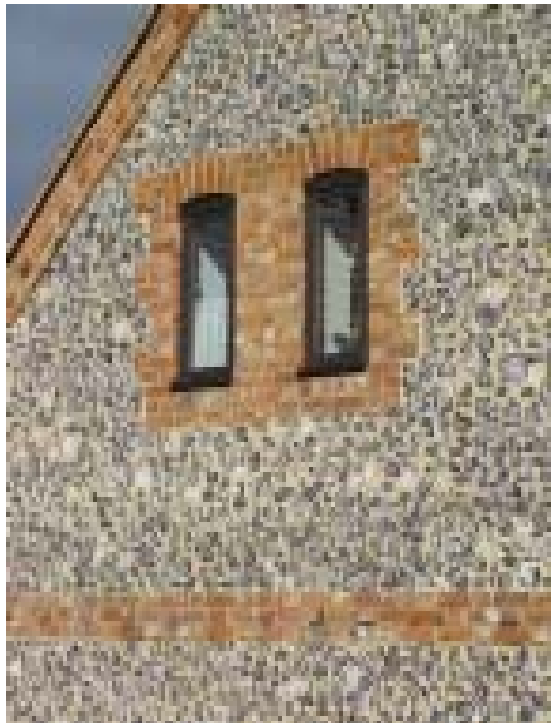


Multiple strings and courses

Eaves

3.58 Because flint is a robust material, eaves do not require a pronounced overhang. Eaves can be matched to any detailing carried out at first floor level.

Cogged eaves and plat band



Copings and cappings

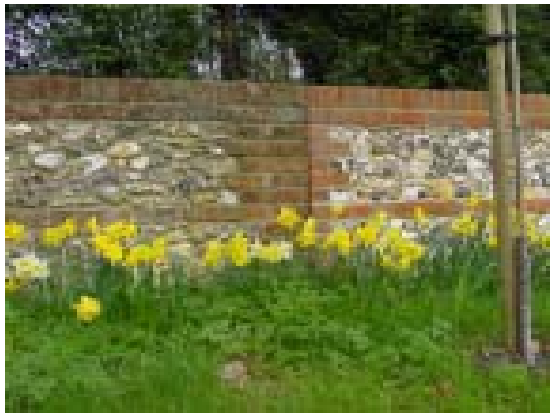


Plain flint coping

3.59 Local brickyards provide a variety of handmade special coping bricks for cappings - apex, half-round, ogee, double bullnose. A 330mm (13in.) wall for instance might top out with a course of brick, a course of plinth bricks and a coping brick. However, many variations can be found.
In the Chilterns half round bricks often associated with splayed plinth bricks and purpose made curved or angled top coping bricks or tile creasing

Typical half-round capping





Brick-on-edge capping

are much used. Brick on edge cappings became common in the C20th and require 2 or 3 brick courses below the top course as extra protection.

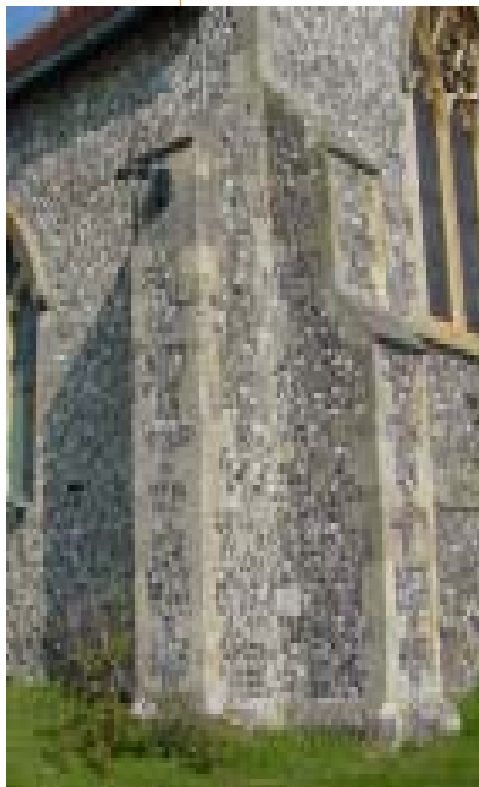
Buttresses

3.60 Flint buttresses occur but more usually they are of brick or dressed stone, sometimes incorporating small panels of flint.



Highly elaborate boundary wall

Flint and stone buttress



Material Combinations Checklist

- **Do** combine flint with other appropriate Chiltern materials, keeping the relationships between ratios, massing and openings in fine balance
- **Do** use traditional Chiltern bricks at the base and top of walls, and for intermediate bands. Incorporating some yellow stocks can also create an interesting effect
- **Do** consider using lacing tile courses for decorative effect
- **Do** experiment with decorative patterning
- **Do** use matching bricks for extensions and alterations
- **Do** use brick for piers and quoin details
- **Do** experiment with thatch for outbuildings or extensions
- **Do** consider using other walling materials for one elevation of a predominantly flint building

- **Don't** use inappropriate capping, quoin, pier or lacing materials

Designing with Existing Flint5

3.61 Extensions and conversions will involve disturbing historic flintwork. When refurbishing a property, repairs may well need to be carried out. With new build, long-term maintenance needs should be borne in mind when the design brief is being prepared.





Damaged and vandalised flint shelter (above) with a new lease of life (below)



Extensions should be carefully blended into existing flintwork

3.62 Prevention is better than cure and good maintenance will extend the life of a flint wall by:

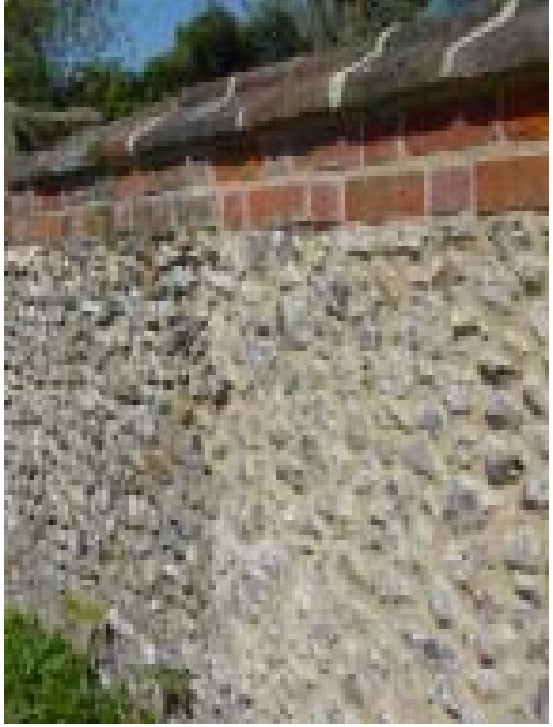
- Keeping walls clear of ivy (which will eat into the mortar and expose the soft inner core of mortar and rubble) and disturbance of foundations from tree growth
- Repairing defective roof coverings and keeping rainwater down pipes and gutters unblocked
- Monitoring (or improving) site drainage to avoid rising damp
- Regularly maintaining copings

Where remedial work has become essential, advice should be sought from suitably qualified specialists.



Flint in poor repair

3.63 Old flint walls often have shallow or non-existent foundations, ground movement will cause them to lean or crack. Roof thrust can create similar problems. Facing flintwork may become detached from its brick or stone backing. Poor bonding can also lead to rubble-cored flint walls becoming weak and unstable, or to joints with dressings and cappings opening up. Flints may have split or become dislodged due to unequal settlement or overloading, mortar erosion (in and behind the flint facing), or have 'popped' due to moisture penetration and build-up through hairline cracks in cement-rich mortars. Dressings of softer brick or stone may wear back first. The failure of the water-shedding coping of a flint boundary wall will lead to the rapid washing out of the mortar core by driving wind and rain resulting in inevitable collapse.



Even sensitively executed repairs change the appearance of flintwork



Failed chequerwork



Cracking in hard cement mortar



Deteriorating softer dressings

3.64 Bulging or leaning walls, open joints and widespread cracking should all be referred to a suitably experienced structural engineer. It is advisable to monitor the situation for six months or a year to establish whether the movement is historic or live. If the former, voids in rubble cores or cracks in the facing material may be filled with liquid mortar and ties and stitching may arrest the problem where facings or dressings have failed without recourse to major re-building.

Figure 4

Fracture repair

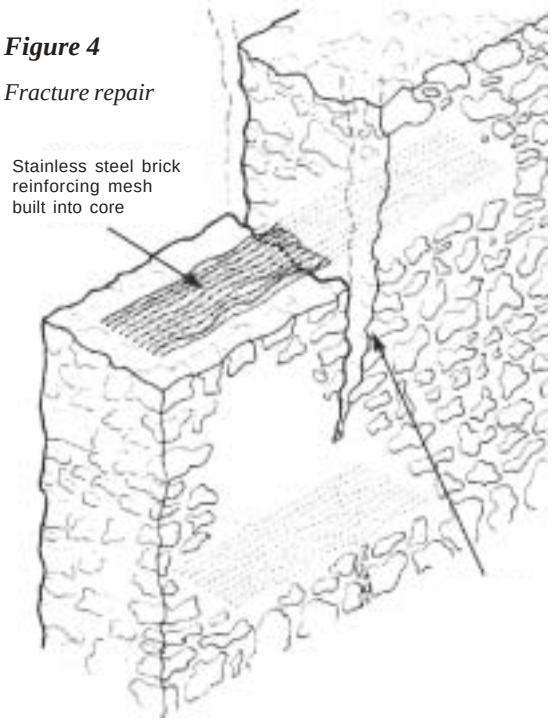
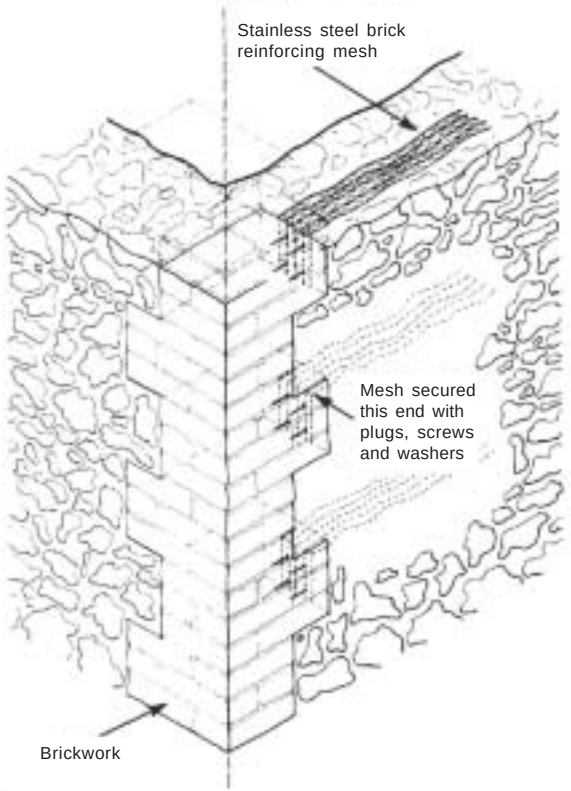


Figure 5

Reattachment of poorly bonded brick dressing

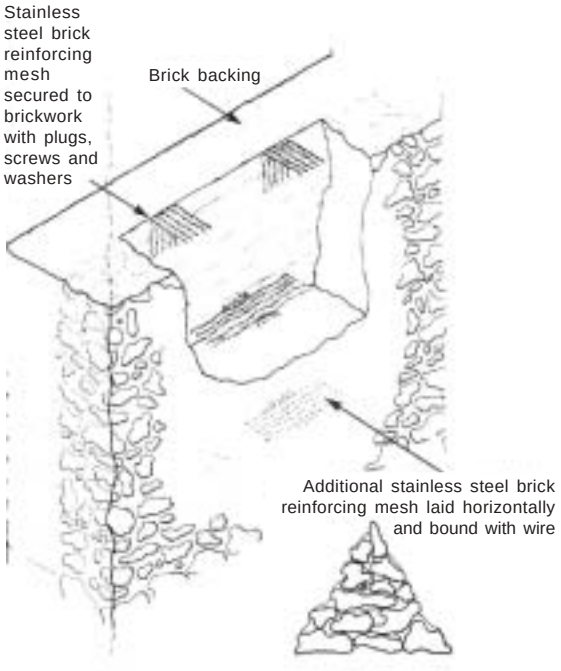


Repairing flintwork with lime mortar



Figure 6

Face rebuilding



3.65 Repointing flint and brick walls and the copings should be considered on structural need rather than appearance. A great deal of repair and repointing is poorly executed with mortar smeared crudely over the faces of the flints, using an incorrect cement rich mortar. Even good repointing will upset the visual balance of a previously well-weathered flint wall. In any repointing or repair of knapped flint walls it is essential that the flint faces are cleaned thoroughly as work progresses.

3.66 As close a match, in texture and composition as possible to the existing historic mortar present in the flint walling should be sought. This may include some quite large sized aggregate – almost small gravel and small unburnt lime chunks or chalk. Some of this mortar may be re-usable, if mixed with more lime. As the mortar needs to provide a good bond to the flints and to the old backing mortar, matching existing mortars as closely as possible will help to reduce shrinkage cracks and will match permeability to avoid trapping moisture. Sample panels (small areas of repair carried out in advance of the main work, to demonstrate that the workmanship and materials match the originals) should be used wherever possible. For suitable mixes, see SPAB Technical Pamphlet 16, 2000. pp.6-7.

3.67 Where black or coloured mortars have been used, such detail should be reproduced wherever possible, although impurities such as salts and clay in the additives can be harmful.

3.68 Close reference should be made to the existing historic finishes – look for unweathered jointing in protected areas of walls, such as under wide eaves or in hidden corners or in recesses behind buttresses or piers.

3.69 Where rebuilding is necessary, particular attention should be given to the selection of matching flints, their pattern and spacing and marrying together the new and the existing work.

Repair Checklist

- **Do** seek specialist advice for repairing flintwork
- **Don't** spoil existing flintwork with unsympathetic repairs
- **Don't** use hard cement for repairwork

Glossary5

Ashlar: Squared freestone masonry wrought to even faces

Beak pointing: Mortar raised to a V-point

Chequerwork: a pattern, usually of squares, of two materials, e.g. flint and stone, arranged in a chessboard pattern

Cobble: water-rounded flint or other stone between 75mm and 300mm in diameter

Core: The inner body of a piece of flint. It usually appears black when freshly fractured

Course: A continuous horizontal layer of bricks, stones or flints, etc. in a wall

Cortex: The white rind of a flint

Derived flint: Flint freed from its original chalk matrix and found in fields

Diaper: A pattern repeated as a criss-cross of diagonal 'lines' in one material, usually brick headers, to define a lattice of diamonds or lozenges in another material

Dressings: Stonework or brickwork forming the quoins of a building, or the jambs and heads of doorway and window openings etc.

Flushwork: Technique of setting knapped flints flush with the face of dressed stone. Used to form decorative compositions in superior work

Fractured flint: A flint broken naturally or one crudely severed to reduce it to a more convenient size. Used in walls with whole flints

Gallets: Flint chips set in wide mortar joints for decorative effect

Header: the short end of a brick seen in the face of a wall

Hoodmould: Moulding in stone or brick over an arch or lintel to throw off water

Hydraulic lime: Lime prepared from an impure limestone. At least part of its setting action could take place under water

Jambs: The straight sides of a doorway or window opening

Knapped flint: Flint that has been deliberately struck to present an approximately flush face for aesthetic purposes. For superior work, they are trimmed to regular shapes

Lacing course: Horizontal, intermittent bands of bricks or tiles used to level up and tie the front and back of a wall together without the use of modern metal wall ties

Nodular flint: Flint formed as small rounded lumps, typically measuring between 50 and 125mm

Patination: A wax-like sheen on some corticated flint, due to later assimilation of silica

Plinth: Projecting base course to a wall, buttress or pier etc.

Polychromy: Decorative schemes in several colours

Quoins: Corner stones or bricks forming the external angles of a building

Rendering: A cement or plaster coating to the surface of a wall

Rustication: Accentuation of masonry to create shadows using chamfers or square sinkings round the face edges of individual stones, emphasized joints or extravagant surface textures

Split flint: General term for fractured or knapped flint

Stretcher: The long side of a brick seen in the face of a wall

String Course: A projecting course or moulding of stone or brick running horizontally along the face of a wall

Virgin or raw flint: Flint obtained directly from the Upper and Middle divisions of the Chalk formation (cf. derived flint)

Weather-struck pointing: Mortar sloping inwards from the bed joints to cast off the rain

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Further Advice5

For any new development proposal you should initially contact a Development Control Planning Officer in the Planning Department at your local council. Additionally, if your proposal involves a listed building or is in a Conservation Area, you should contact a Conservation/Listed Buildings Officer. You may also need to contact your Local Building Control Service.

Details of all the councils that cover the Chilterns AONB can be found at the Chilterns AONB website: **www.chilternsaonb.org**

The website will also contain details of suppliers, practitioners and other useful contacts. This list may change from time to time, so it is recommended that you check it regularly if you undertake projects at different times.

For further information and advice contact the Chilterns Conservation Board at the following address:

Chilterns AONB Office
8 Summerleys Road
Princes Risborough
Bucks. HP27 9DT

Tel: 01844 271300
Email: office@chilternsaonb.org
Fax: 01844 271301

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