Historic England

Northamptonshire

Building Stones of England

The Building Stones of England

England's rich architectural heritage owes much to the great variety of stones used in buildings and other structures. The building stones commonly reflect the local geology, imparting local distinctiveness to historic towns, villages and rural landscapes.

Historic England and the British Geological Survey (BGS), working with local geologists and historic buildings experts, have compiled the Building Stones Database for England to identify important building stones, where they came from and potential alternative sources for repairs and new construction.

Drawing on this research, plus BGS publications and fieldwork, guides like this one have been produced for each English county. The guides are aimed at mineral planners, building conservation advisers, architects and surveyors, and those assessing townscapes and countryside character. The guides will also be of interest if you want to find out more about local buildings, natural history, and landscapes.

This guide is based on original research and text by Geckoella Ltd.

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Front cover: Market Place, Oundle. Oundle Stone and other local building stones. © James Osmond / Alamy Stock Photo.

How to Use this Guide

Each guide describes the local building stones in their geological timescale order, starting with the oldest layers through to the youngest. The guide ends with examples of other notable building stones from other parts of England and further afield.

Geological time periods, groups, formations and building stones

Each building stone is listed under the relevant geological timescale, group and formation. A formation may be divided into members and where relevant these are referenced in individual building stone sections.

Middle Jurassic
↑— geological time period

Inferior Oolite Group, Lincolnshire Limestone Formation
↑— geological group ↑— geological formation

Lincolnshire Limestone
↑— building stone (alternative or local name)

Bedrock geology map and stratigraphic table

To help you with the geology of the area, there is a bedrock geology map and a stratigraphic table which shows the layers of rocks and the associated building stones in this geological timescale, group, formation order.

Page numbers for each building stone are included in the stratigraphic table for ease of reference. The page numbers are inverted to correspond with the geological age order.

Contents list

If you click on the page number for a building stone in the Contents list, you will go straight to the relevant section in the guide.

Building stone sources and building examples

A companion spreadsheet to this guide provides:

- More examples of buildings. Information is included on building type, date, architectural style, building stone source, and listed/ scheduled status
- A list of known (active and ceased) building stone sources such as quarries, mines, pits and delphs
- Additional information on building stones including lithology, grain size, sedimentary structures, key identification features, and notes on failure/weathering, and use.

The Building Stone GIS map allows you to search the Building Stones Database for England for:

- A building stone type in an area
- Details on individual mapped buildings or stone sources
- Potential sources of building stone sources within a given proximity of a stone building or area
- Buildings or stone sources in individual mineral planning authority area.

Further Reading, Online Resources and Contacts

The guide includes geological and building stone references for the area. A separate guide is provided on general Further Reading, Online Resources and Contacts.

Glossary

The guides include many geological terms. A separate Glossary explaining these terms is provided to be used alongside the guides.

The guides use the BGS lexicon of named rock units.

Mineral and local planning authorities

This guide covers the mineral planning and the unitary authority areas of West Northamptonshire and North Northamptonshire.

Contents

1 Introduction

With the exception of the superficial cover of Quaternary deposits, all the rocks that occur at the surface in Northamptonshire are marine sediments of Jurassic age. They consist of a variety of sandstones, ironstones, limestones, clays and mudstones. Although rocks suitable for building are limited to a part of this succession, there is a considerable diversity of building stones present and many local varieties, especially among the Middle Jurassic pale or yellow-coloured limestones and sandstones belonging to the Northampton Sand Formation and the Lincolnshire Limestone Formation. These provide sources of rubblestone, freestone that is suitable for ashlar and mouldings, roofing slates and paving.

The county can be divided into four broad areas that reflect variations in the geology and, consequently, in the building stones locally quarried and used.

The western margin of Northamptonshire contains escarpments and benches in the upper Nene and Cherwell river valleys. These are mainly formed in the Marlstone Rock Formation and they are the source of various different hues of ironstone used for rubblestone, ashlar and other dressed freestones.

The plateaus and valleys of central and northern Northamptonshire are where the Northampton Sand Formation consists of richly coloured ironstones and sandstones, with some sandy limestones (called Pendle) that show marked lateral variation from south-west to north-east. They provide a variety of characteristic and locally used rubblestones, ashlars and freestones.

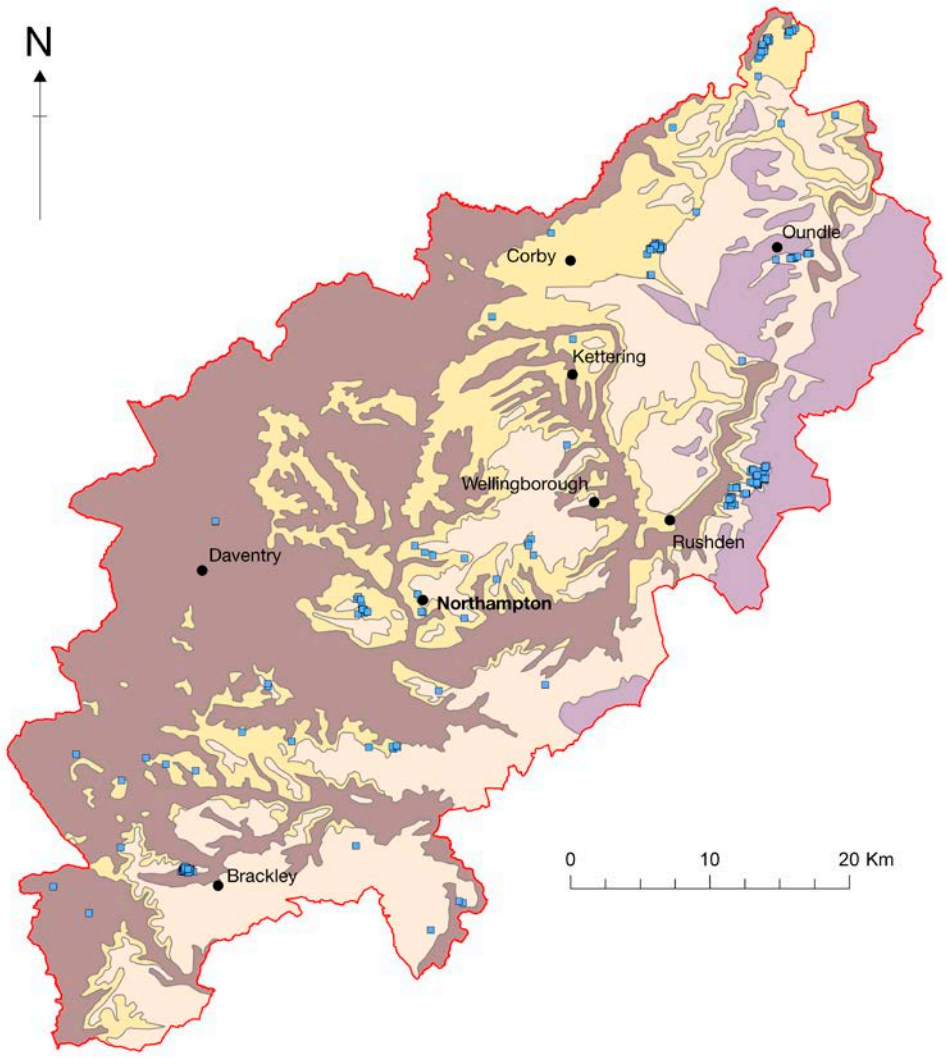
In north-east Northamptonshire, the Lincolnshire Limestone Formation is thinly developed. It then progressively thickens towards Rutland and Lincolnshire. It consists of ooidal, shelly or sandy limestones, commonly creamy or buff in colour, which have been used for rubblestone, ashlar and freestone. The lowermost unit of the formation is the source of the Collyweston Stone slates, which were employed extensively in the past for roofing.

Stretching in a broad ribbon along the south-eastern side of Northamptonshire, the Blisworth Limestone Formation comprises pale coloured, micritic, ooidal or shelly limestones that have served as rubblestone, ashlar and freestone. It also includes coarse, well-cemented, shelly limestones that have been polished and used as internal ornamental ‘marbles’.

Locally sourced building stones have been utilised in Northamptonshire since Saxon times, when ferruginous sandstones of the Northampton Sand Formation were used in the construction of All Saints' Church at Brixworth. The Romans may have worked Collyweston Stone slate and Cosgrove Stone. Until the latter part of the 19th century, a variety of local stones were employed in the construction of many of the county's villages and towns, and these provide a strong local distinctiveness and character. Today, many former quarries are long abandoned and have been infilled.

Figure 1: Rockingham. Cottingham Stone and other stones.

Bedrock Geology Map



Key

Building stone sources

Bedrock geology

Kellaways Formation and Oxford Clay Formation (undifferentiated) — mudstone, siltstone and sandstone

Great Oolite Group — sandstone, limestone and argillaceous rocks

Inferior Oolite Group — limestone, sandstone, siltstone and mudstone

Lias Group — mudstone, siltstone, limestone and sandstone

Stratigraphic Table

Geological timescale	Groups	Formations		Building stones	Page
Middle Jurassic	Ancholme Group	Kellaways and Oxford Clay (part) formations			
	Great Oolite Group	Cornbrash Formation			
		Blisworth Clay Formation			
		Blisworth Limestone Formation		Oundle Stone Raunds Stone Cosgrove Stone Blisworth Limestone	29 29 28 26
		Taynton Limestone Formation		Helmdon Stone	25
		Rutland Formation		Wellingborough Limestone Kingsthorpe White Sandstone	25 23
	Inferior Oolite Group	Lincolnshire Limestone Formation	Upper Lincolnshire Limestone Member	King's Cliffe Stone Weldon Stone Stanion Stone	22 21 20
			Lower Lincolnshire Limestone Member	Lower Lincolnshire Limestone Collyweston Stone slate	18
		Grantham Formation			
		Northampton Sand Formation		Mears Ashby Stone Kingsthorpe Pendle Duston Pendle Eydon Stone Duston Stone Harlestone Stone Brixworth Stone Cottingham Stone (Desborough Stone, Glen Hill Stone) Finedon Stone Wellingborough Stone	17 15 14 14 13 13 12 10 9 8
Lower Jurassic	Lias Group	Whitby Mudstone Formation			
		Dyrham Formation			
		Marlstone Rock Formation		Marlstone (Marlstone Rock), Badby Stone, Byfield Stone, Staverton Stone	5
		Charmouth Mudstone Formation			

Building stones in geological order from the oldest through to the youngest layers.

2 Local Building Stones

Lower Jurassic

Lias Group, Marlstone Rock Formation

Marlstone (Marlstone Rock), Badby Stone, Byfield Stone, Staverton Stone

The Marlstone Rock Formation has been utilised as a building stone over much of the western part of Northamptonshire, where it is a characteristic and dominant building stone of many villages, including (from south-west to north-west) King's Sutton, Middleton Cheney, Chipping Warden, Byfield, Badby, Staverton, Daventry, Watford and Crick. Villages situated along the Nene Valley, such as Bugbrooke, Milton Malsor and Harpole, are also constructed from the Marlstone, often with a significant amount of other stone, especially sandstones from the Northampton Sand Formation.

The Marlstone Rock Formation is variable in composition and consists of sandy, shelly or ooidal iron-rich limestones and calcareous sandstones. These are often blue-hearted when fresh, but display a plethora of rich hues of ochreous yellow, orange and brown when weathered; some local variants may be darker. Their ferruginous nature contributes to their characteristic colours. The Marlstone often contains fossils that characteristically include belemnites, brachiopods, bivalves and crinoid ossicles. These typically occur in clusters and may only be visible in a few blocks within a structure. However, where present, they provide an important means of distinguishing between Marlstone and building stones attributed to the Northampton Sand Formation, particularly in areas where both have been used. Other textures seen in the Marlstone Rock Formation include mottling, caused by burrowing organisms, and sedimentary features, such as lamination and cross-bedding formed by sand ripples migrating across the ancient sea floor.

The Marlstone has been used predominantly as a rubblestone in villages along the outcrop, particularly for the construction of cottages and larger houses. However, it has also been employed for paving and ashlar and as dressed stone. The Marlstone used in a single wall may be surprisingly variable in its range of hues, which reflects the variability of the rock from bed to bed, as well as laterally within a single bed.

The exact sources and locations of many of the former Marlstone quarries and stone variants are now uncertain.

Badby Stone was quarried around the village of Badby during the 18th and 19th centuries. It is a hard, durable, blue-grey stone that was used for both paving and building.

In several villages, including Byfield, darker coloured Marlstone (Byfield Stone) was used as ashlar and dressed stone in the churches and in a number of houses. A further variant of Marlstone is the paler coloured Staverton Stone, which may be fossiliferous or may show clear evidence of burrows. It has been used for ashlar and as a dressed stone in buildings in and around Staverton and Daventry.

Figure 2: Cottage, Church Hill, Badby. Badby Stone.

Figure 3: Manor House, Byfield. Byfield Stone.

Inferior Oolite Group, Northampton Sand Formation

Although heavily exploited as a source of iron ore during the 20th century, the Northampton Sand Formation and both its main constituent facies (ironstones in the Corby Ironstone Member and ferruginous sandstones in the Duston Member) were historically used widely as building stones in Northamptonshire. The outcrop extends from north of Lincoln, southwards into Leicestershire, and then into Northamptonshire. Here, a broad outcrop is present through the central part of the county, extending from the north-east to the south-west.

The formation provides some of the most important and distinctive stones within Northamptonshire, and these are employed for a variety of building purposes, from rubblestone to dressed stone. The range of rich yellow, ochre and brown colours and the variations in lithology have produced a diversity of stones that create much character and distinctiveness in local villages and towns.

The ironstones were originally oolites in which the ooids were composed of berthierine (a form of iron silicate) and siderite (iron carbonate). Weathering of the siderite resulted in its oxidation to the mineral limonite, and it is this process that contributes much of the ferruginous colour to the stone. Secondary carbonate cement filled the pore spaces between the remaining ooids, thereby increasing the strength and durability of the stone. Where replacement by limonite has been extensive, individual stone blocks often show a characteristic concentrically layered ‘boxstone’ weathered texture.

There are many local variants of ironstone that exhibit subtly different colours or textures. The ironstones are best developed in central and north-eastern Northamptonshire. Their quality is quite variable depending upon which ferruginous cements are developed during weathering. Consequent on this, the stone may be suitable as a rubblestone, an ashlar or a freestone. Although in some cases the stone can be intricately carved, as seen in the west doorway of Holy Trinity Church at Rothwell, for example, these stones may not weather well.

The sandstones are composed mainly of quartz grains cemented together in a matrix of limonite. The sandstones often exhibit a range of sedimentary structures, including parallel and ripple lamination and cross-bedding, as well as mottling and disrupted laminations caused by burrowing organisms.

Considerable quantities of limestone occur within the Northampton Sand Formation, especially in the central part of the outcrop and in the extreme south-west of the county. These include oolites and calcareous sandstones, often strongly cross-bedded. The more fissile limestone and calcareous sandstones were commonly referred to by quarrymen as ‘Pendle’. Some of this could be split into sufficiently thin slabs to be used for roofing and others for paving (for example, Wittering Pendle).

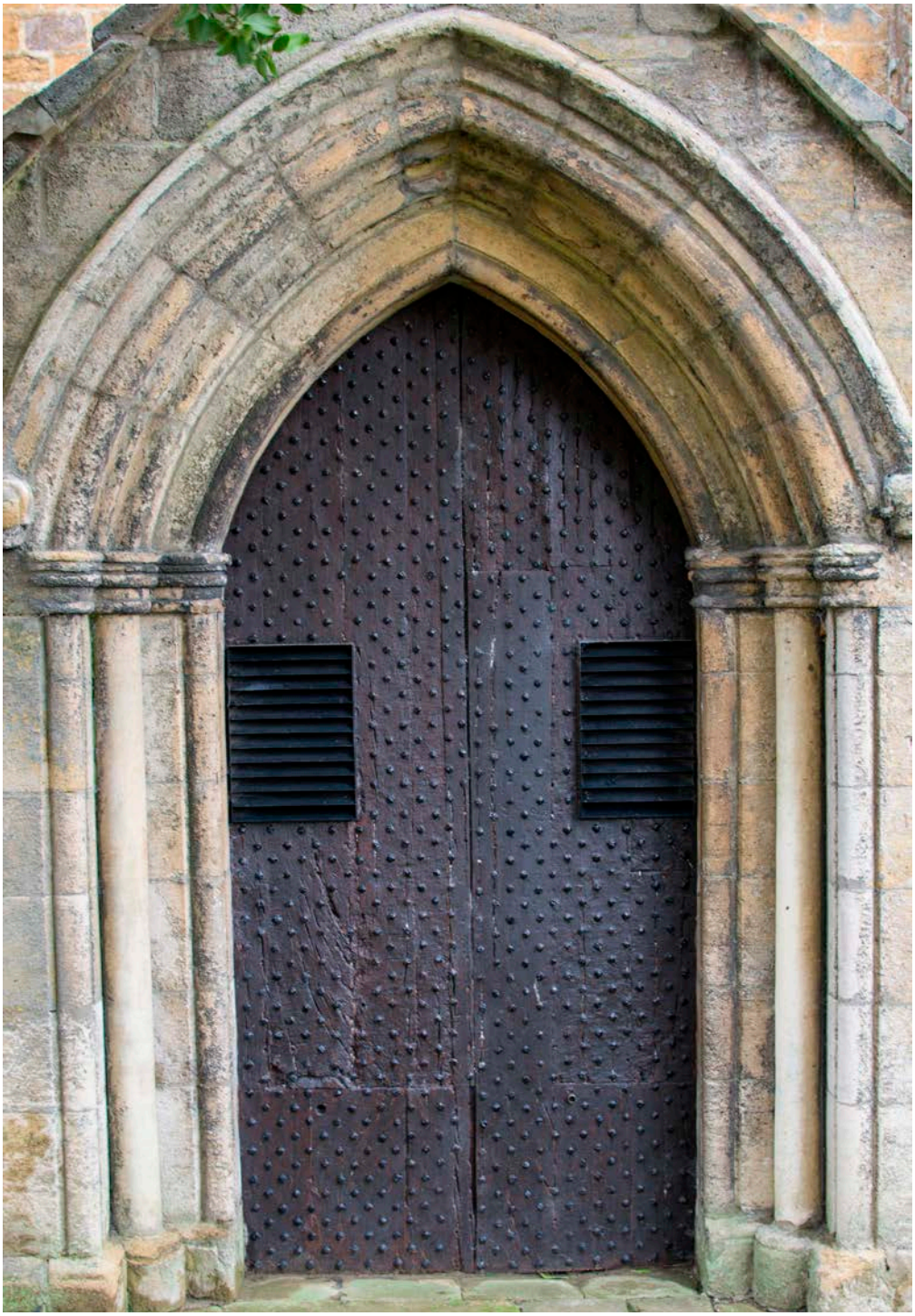


Figure 4: Holy Trinity Church, Rothwell. Northampton Sand Formation ironstone.

Wellingborough Stone

Wellingborough Stone was used in the area around Wellingborough, and although many of the older buildings in the town were lost in the Great Fire of 1738, a few survived. They include the Old Grammar School and the Hind Hotel. Later ironstone buildings include the 19th-century Church of All Saints and the 20th-century Church of St Mary the Virgin, the latter designed by Sir Ninian Comper, as well as the United Reformed Church on the High Street. The Church of All Saints is an example of the use of Lincolnshire Limestone and ironstone in a polychrome fabric, where the ironstone has been carved for the windows. The walls and tower of St Mary's consist of local ironstone, whereas the windows and doors are constructed from Weldon Stone (Lincolnshire Limestone Formation). Much of the ironstone

for the buildings in Wellingborough was obtained from the outcrop of the Northampton Sand in the immediate vicinity of the town. The expansion of Wellingborough during the 20th century resulted in the disappearance of the small quarries that supplied this stone. The use of the ironstone may also be seen, often in combination with Lincolnshire Limestone, in the villages surrounding Wellingborough, as well as further afield in east and south-east Northamptonshire.

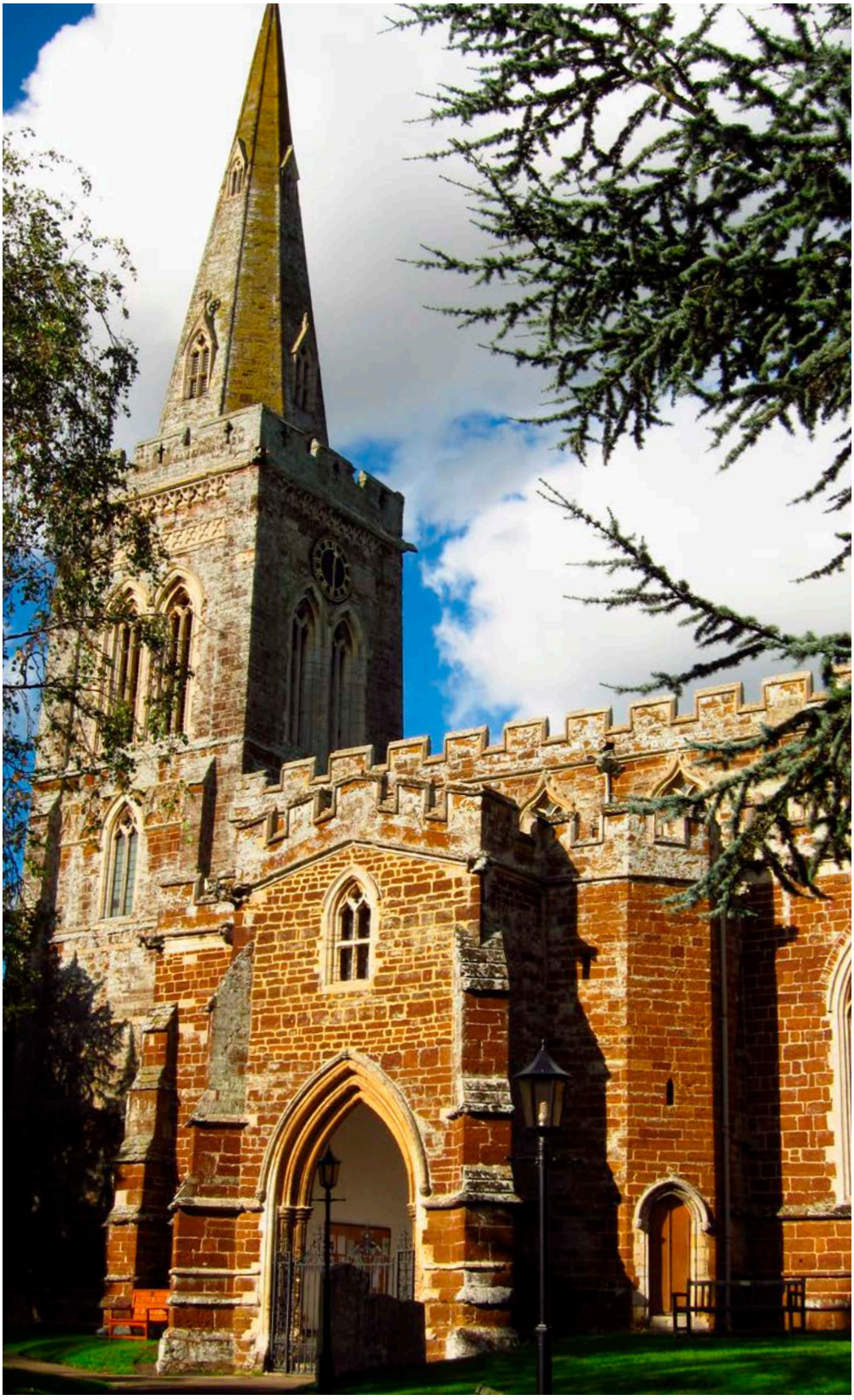
Figure 5: Hind Hotel, Sheep Street, Wellingborough. Wellingborough Stone and Weldon Stone.

Finedon Stone

The ironstone from the Northampton Sand Formation was also used as a building stone at Finedon. For example, Abbingdon Cottage is built of bright ochreous Finedon Stone ashlar, with Weldon Stone (Lincolnshire Limestone Formation) used for mullions, window frames and decorative tracery. The 14th-century Church of St Mary the Virgin provides a fine example of local oolitic Finedon Stone, with dressings of Weldon Stone.

Figure 6: Abbingdon Cottage, Finedon. Finedon Stone and Weldon Stone.

Figure 7: Church of St Mary the Virgin, Finedon. Finedon Stone with Weldon Stone dressings.



Cottingham Stone (Desborough Stone, Glen Hill Stone)

Although there is plenty of ironstone in the areas to the north and west of Kettering, most was extracted for steel making. The sandstones of the Northampton Sand Formation that were used for buildings in this area were extracted from below the ironstone, mainly from a unit of calcareous ironstone, a sideritic, sandy limestone. This stone has been variously referred to as Cottingham Stone, Desborough Stone or Glen Hill

Stone. When unweathered, it is greenish-grey or bluish-grey in colour, but when seen in buildings, the edges of individual stones are of a medium light brown colour and the cores may be purple or grey. Fossil bivalves, brachiopods and ammonites occur, but these differ from the forms seen in the Marlstone Rock. The stone is sometimes soft and crumbly, especially when old (as seen in Holy Trinity Church at Rothwell), but it has been used for centuries in religious buildings, such as the Church of St Giles at Desborough, the Church of St Michael and All Angels at Loddington and the Church of All Saints at Thorpe Malsor.

In these and other villages, the stone was also used for dwellings, farms and walls. The stable buildings of Rushton Hall consist of large ashlar blocks of this stone, combined with dressings of paler Weldon Stone. With the exception of a site south-west of Geddington, Cottingham Stone is no longer worked. However, it was probably extracted in small local pits for rubblestone, and there are records of large stone pits near Desborough, Rothwell and Faxton.

To the north of Corby, along the southern side of the Welland Valley, ferruginous sandstone from the Northampton Sand Formation has been used in a number of villages, including East Carlton, Middleton, Cottingham and Gretton. However, it is best exemplified by the main street in the village of Rockingham in northern Northamptonshire, where houses are built of local calcareous and sandy ironstone, with Cottingham Stone from the Northampton Sand Formation. Roofs are varied and include Collyweston Stone slate and thatch. In this area, the Cottingham Stone is accompanied by a particularly ochreous, rust-coloured, sandy ironstone. Although large pits were recorded during the 19th century in the vicinity of Uppingham (Rutland) and Cottingham, no quarries working this stone remain today.

Figure 8: Cottages, Rockingham. Cottingham Stone.

Brixworth Stone

In an area to the north and west of Northampton, the ironstone has been used as a rubblestone at Brixworth and Mears Ashby. At Brixworth, the Brixworth Stone was of a better quality and it was employed for the stables at Brixworth Hall and the Workhouse. Ironstone from New Duston was known as the Rough Rag and it may have been used as the dressed stone seen locally in gateways, doorcases or quoins.

The sandstones of the Northampton Sand Formation played a substantial role in the buildings of Norman and medieval Northampton, supplying the stone for the city walls and castle, several churches and many of the buildings. The surviving remnants of the medieval town include the round Church of the Holy Sepulchre and the Church of St Peter. The former consists of brown sandstone, some of which was replaced by Harlestone Stone in the 19th century, whereas St Peter's is a polychrome building comprising brown sandstones, ironstones and pale Blisworth Limestone. The sources of the stone have long since disappeared, but much of it probably came from quarries that now lie below the old town. The fire of 1675 destroyed much of Northampton, and parts of the town were rebuilt partly using stone imported from beyond the county. However, for many of the buildings, a paler coloured freestone of sandstone origin, said to have come from near Northampton, was used. Only All Saints' Church and a few other buildings, such as the Judge's Lodgings, remain as examples of its use.

Figure 9: Left, The Judge's Lodgings, George Row, Northampton. Northampton Sandstone facade. Right, Sessions House, Northampton. Ketton Stone.

Later Georgian buildings constructed of Northampton Sand ironstone include Beethoven House in Market Square. It was built after the Great Fire of 1675, using local cross-bedded and ferruginous Northampton sandstone (Northampton Sand Formation) quarried from Northampton Fields close to the town.

Figure 10: Beethoven House, Market Square, Northampton. Northampton Sand Ironstone.

Harlestone Stone and Duston Stone

Stone supplied to Northampton, the parishes of Harlestone and Duston and the surrounding area came from local quarries within these parishes. Some stone is still quarried at Harlestone. Varieties of Duston Stone and Harlestone Stone from these quarries were probably used for Dallington Hall. Stone from the same sources included the richly coloured, mottled or even-textured sandstones used for ashlar, mullions and door frames seen in buildings around the Althorp estate. Some of these sandstones are susceptible to weathering, which occasionally results in the spalling of ashlar faces.

Eydon Stone

The villages west of Northampton contain many buildings where these sandstones have been used. Most characteristic of these is Eydon, where the local freestone (Eydon Stone) was employed in the construction of Wakelyn Manor and Eydon Hall and is almost ubiquitous throughout the village. This stone served for ashlar and mouldings, and has also been carved. No active quarries supplying this stone remain.

Figure 11: Home Farm farmhouse, Partridge Lane, Eydon. Eydon Stone.

Duston Pendle

Within central Northamptonshire, and particularly in an area stretching from the north and west of Northampton across to the western margins of Wellingborough, limestones are present within the Northampton Sand Formation and have been used in buildings across much of this area. The limestones typically occur between the lower and upper sandstones of the Duston Member. Around Duston, the limestones may be divided into two informal units.

The upper is the Duston Pendle. It consists of cross-bedded calcareous sandstones to sandy limestones, with ooids and shell debris, and may become an ooidal limestone. It was worked mainly in the 19th century and used in pale, brick-sized blocks in local terraced cottages and some Victorian churches, such as St Matthew's Church at Northampton.

The lower unit has similarities with the Collyweston Stone slate. It comprises cross-bedded units, which split along the laminae formed by the fore-sets to form slates. These are generally thicker and, therefore, heavier than those from Collyweston. As with Collyweston Stone slates, they require winter frosting in order to split the rock. The laminae consist of layers that are

alternately sand-rich or rich in shell debris, or ooids. This results in differing porosities in each layer, making some more susceptible to splitting after wetting and freezing.

These stone slates were worked underground, and there are references to workings at 'Slate-pitt Piece' around Harlestone in the 17th century and Duston in the 18th century.

Figure 12: St Mattews' Church, Northampton. Duston Pendle and Kingsthorpe Pendle.

Kingsthorpe Pendle

In the quarries in the vicinity of Kingsthorpe, the limestones reached 4m in thickness and provided a source of pale, sandy, cross-bedded limestone. This limestone, the Kingsthorpe Pendle, contains shell debris, including the remains of crinoids, fragments of which may be star-shaped in cross-section. Kingsthorpe Pendle was used in several late 19th-century churches for example, St Matthew's Church, Northampton. A different, strongly cross-bedded variety of Kingsthorpe Pendle was used in the construction of Cathedral House and St Andrew's Chapel in Northampton. It differs from typical Kingsthorpe Pendle in its lighter colour and relative paucity of crinoid remains.

Around the old Kingsthorpe village area, a number of other stones occur in the walls. One of these is a spotted rock, consisting of a brown sandstone with pale yellow or white blotches formed by small calcite-cemented concretions. This occurs in the lower part of the Northampton Sand Formation and may be seen along the south side of High Street, Kingsthorpe.

The ancient quarries that now form Bradlaugh Fields Local Nature Reserve may have supplied Kingston Pendle to the former parish of Abington. Abington Manor House (now Abington Museum) is one of the few remaining buildings that once comprised Abington village. Although the structure has been partially rebuilt, the original stone is a pale sandy limestone with streaks of limonite and shell debris, including crinoid fragments.

Figure 13: Thatched cottage, Church Street, Boughton. Pendle rubblestone.

The use of limestone extends through the village of Boughton, which is constructed mainly of local rubblestone (Boughton Stone, Northampton Sand Formation), often roughly dressed as ashlar or characteristic flat blocks. It was also employed in Pitsford where the cottages and church are built of a pale brown calcareous sandy stone, including Boughton Stone, that forms flat blocks of rubblestone. The parish church at Moulton was built in the 13th century from local, rough-coursed Moulton Pendle (Northampton Sand Formation).

The limestone reaches 5m in thickness in and around Pitsford, where it is currently worked for aggregate. This limestone is also seen in field walls around Overstone and Sywell, but northwards, towards Brixworth, local ironstones and sandstones become more conspicuous in buildings.

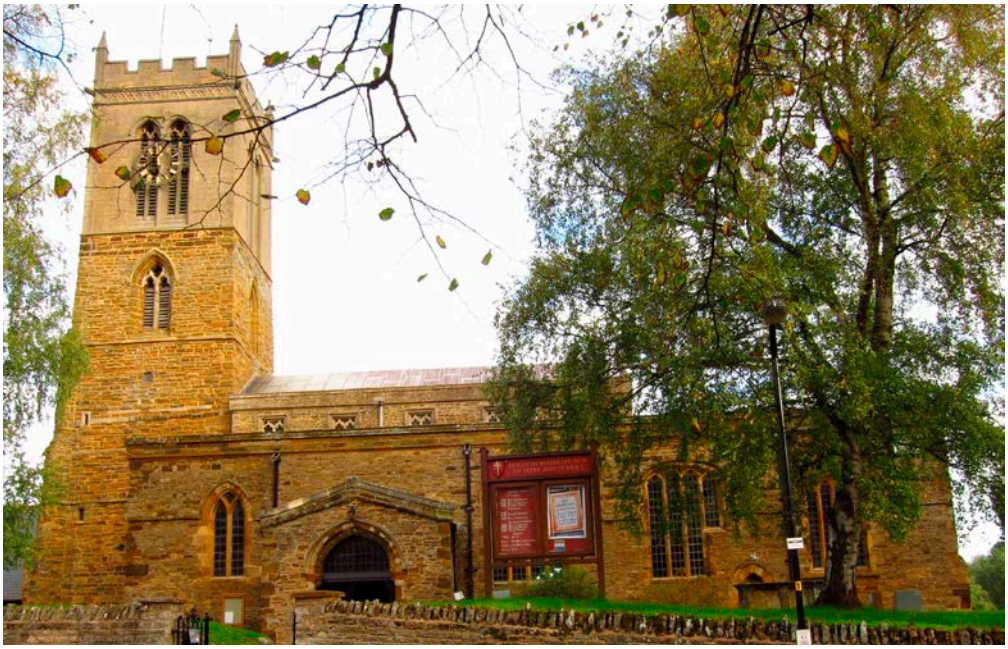


Figure 14: Moulton Parish Church, Moulton. Moulton Pendle.

Mears Ashby Stone

Although only 1m thick, the limestone at Mears Ashby (Mears Ashby Stone) forms a good freestone. Consisting of a pale yellow, cross-bedded oolite containing sand grains and some crinoid debris, as well as streaks of limonite, the Mears Ashby Stone is less flaggy and more thickly bedded than typical limestone. It is best seen in Mears Ashby Hall, where it was used in large ashlar blocks and relatively intricately carved in the porch. The stone was also employed for the Vicarage, the Manor House and the Old Farmhouse, but many of the buildings in Mears Ashby comprise rubblestones that are represented by a mixture of ironstones, limonitic sandstone and Mears Ashby Stone. Mears Ashby Stone has been used for a number of mansions in the surrounding area and it also appears further afield in the 17th-century portion of Delapré Abbey near Northampton.

Around Newbottle and Thorpe Mandeville in south-west Northamptonshire, the Northampton Sand Formation contains up to 1.5m of sandy and ooidal limestones. These were used as rubblestone in the villages of Charlton and Thorpe Mandeville.

Figure 15: Cottage, Ladies Lane, Mears Ashby. Mears Ashby Stone.

Inferior Oolite Group, Lincolnshire Limestone Formation

Although well developed in Lincolnshire (where building stones such as Ancaster Stone, Ketton Stone and Barnack Stone are well known for their use in many buildings), the Lincolnshire Limestone Formation extends into north-eastern Northamptonshire, where the outcrop thins and finally dies out at Maidwell, west of Kettering. Over much of this area, only the Lower Lincolnshire Limestone Member is present. The Upper Lincolnshire Limestone Member, from which most of the freestones originate, is far more limited in its distribution in Northamptonshire.

In many of the villages along its outcrop, the creamy coloured Lower Lincolnshire Limestone Member has been used as a rubblestone, forming tabular to brick-shaped blocks with clean edges. The stone itself is a fine-grained, sandy limestone that may contain dispersed ooids. It has been employed in combination with sandstones and ironstones from the Northampton Sand Formation, but the quoins and any dressings may consist of stone from the Upper Lincolnshire Limestone Member.

The Upper Lincolnshire Limestone Member occurs in the vicinity of Stanion, Weldon and King's Cliffe, where it is present as a massive channel system that cuts down into the Lower Lincolnshire Limestone Member and occasionally into the Northampton Sand Formation beneath.

Collyweston Stone Slate

The Lower Lincolnshire Limestone Member includes the well-known Collyweston Stone, which has been quarried from around Collyweston and Easton on the Hill since Roman times. Collyweston Stone is a cross-bedded, sandy limestone that ranges from a few centimetres to nearly a metre in thickness. As with the Duston Slate of the Northampton Sand Formation, the Collyweston Stone slate is worked by splitting along the laminae of the cross-bedded fore-sets, which are enriched in mica flakes and shell fragments. Frost is a key factor in achieving the splitting, and the earlier sources of slate were located close to the surface where frosts had already split the rock. From the 16th century onwards, the technique of frosting appears to have been used and the slates were mined via shafts that extended down into the soft sands of the underlying Grantham Formation. These sands were then mined outwards from the base of the shafts, and the overlying stone was supported with pillars of stone blocks. Once the overlying bed could be heard moving, the miner removed the pillars and withdrew, thus allowing the Collyweston Stone slate bed to give way. The released blocks (termed 'logs') were collected, kept damp and then exposed on the ground surface to frost, which caused them to split into thin layers. These layers were then shaped into a variety of different sized slates, which are seen on roofs in diminishing courses, grading in size from the smallest at the ridge to the largest at the eaves.

It is estimated that Collyweston Stone slate was employed to roof at least 1,500 buildings in northern Northamptonshire alone, and its use extends into

adjoining counties. Some 14,000 slates were employed in the construction of Rockingham Castle near Corby during the 14th century. Collyweston Stone slate is almost ubiquitously used for the roofs of all the older buildings of surrounding villages. Duddington, Easton on the Hill, Harringworth, King's Cliffe and Laxton also provide good examples. The restored roofs (2004–7) of Apethorpe Palace are of Collyweston Stone slate, as is the fine roof of the Guildhall in London.

The mining of Collyweston Stone has virtually ceased bar for a couple of companies in Lincolnshire. The stone slate is so durable that it can be re-laid on a conserved frame or recycled from other buildings, however stocks are running out.

Figure 16: Houses, Easton-on-the-Hill. Lower Lincolnshire Limestone, Collyweston Stone slate roofs, with Ketton Stone quoins and window frames.

Figure 17: Restoration work, Apethorpe Palace, Apethorpe. Collyweston Stone slate.

Stanion Stone

Stanion Stone, named after a local village, is a yellowish oolite with some shell debris, all set in a cement of sparite. Although Stanion Stone appears to have been employed fairly widely, there are no structures in which it was used exclusively. Examples of its use may be seen in the tower of the Church of St Peter at Stanion, in the aisle windows, upper tower and spire of the Saxon Church of St Andrew at Brigstock, in the Eleanor Cross at Geddington, and in the Church of St Mary and All Saints at Fotheringhay, constructed in 1434 by Richard, Duke of York. The stonework at Fotheringhay church includes Upper Lincolnshire Limestone rubblestone and Stanion-like stone for the walls and buttresses, with a paler oolitic limestone (similar to Weldon Stone) used for the windows. King's Cliffe Stone occurs as blocks in the parapet and north porch. All these lithologies are from the Lincolnshire Limestone Formation. Further afield, Stanion-like stone has been used for the dressings of Bede House at Higham Ferrers, and for the tower of St Giles' Church at Desborough.

The most recent record of the extraction of this stone was in 1725, and old quarries were present on the north side of the old road from Stanion to Brigstock.

Figure 18: Church of St Mary and All Saints, Fotheringay. Upper Lincolnshire Limestone with Stanion-like Stone walls and buttresses. King's Cliffe Stone in the parapet and north porch.

Weldon Stone

Within the village of Weldon near Corby, grassed-over and wooded hills and hollows reflect the existence of a stone industry that may date back to the 11th century. The supply of Weldon Stone, quarried around the village, was largely exhausted by the mid-1980s. Weldon Stone is a pale ooidal limestone that has been used as a freestone for both ashlar and carving. It is pale cream when fresh, weathers to a light grey and may show cross-bedding with a few fossil shell fragments. Weldon Stone is quite porous and remarkably weather resistant. It has been widely used beyond Northamptonshire, probably in the earlier 11th century at St Paul's Cathedral, London, and certainly for King's College Chapel, Cambridge.

Within Northamptonshire, Weldon Stone has been employed in a variety of buildings, at least since the 13th century. It was used in a number of churches for window tracery, and in several church towers such as at the Church of St Mary the Virgin at Titchmarsh. A Weldon-like stone was also used for the windows of the Church of St Mary and All Saints at Fotheringhay. The capacity of Weldon Stone to take intricate carving is demonstrated by the 13th-century Eleanor Cross erected by Edward I in Geddington. Several high-status houses also made much use of the stone, and it was employed for quoins and gables on the exterior of the Elizabethan Kirby Hall, now a partial ruin.

Dressed Weldon Stone can be seen in two buildings built by Sir Thomas Tresham in the late 16th century. Both the extraordinary Triangular Lodge near Rushton and the incomplete Lyveden New Bield outside Oundle used dressed Weldon Stone for the windows, quoins and gables. The 17th-century Lamport Hall, near Brixworth, and its 18th-century additions were constructed almost entirely of Weldon Stone. The stone is also much in evidence in Oundle, where it can be seen in the west door and porch of the Church of St Peter, and at the Talbot Inn, which was built in 1626 entirely of Weldon Stone ashlar with some tracery and finials. The village of Weldon itself contains many cottages built of Weldon rubblestone and ashlar, and the 17th-century Haunt Hill House, by the master mason Humphrey Frisby, is built entirely of Weldon Stone, with a roof of Collyweston Stone slate.

Figure 19: Kirby Hall, Gretton. Weldon Stone quoins and gables.

Figure 20: Talbot Inn, New Street, Oundle. Weldon Stone with Lincolnshire Limestone tracery and finials.

King's Cliffe Stone

This stone is very similar to Weldon Stone, but it may be distinguished by its warm golden colour. It consists of cross-bedded oolite, containing some laminae that are rich in shell fragments and a little cement, and as a result has a high porosity. Stone exposed in the old quarries forming the 'hills and holes' of the former park at King's Cliffe also comprises a very fine-grained porous oolite and a coarse, shelly, sparite-cemented rock containing sea urchin spines and gastropod shells, with small fragments of limestone. Although King's Cliffe Stone was quarried to supply the Cambridge colleges in the 15th and 16th centuries, and for Burghley House during the 16th century, many of the buildings in the village of King's Cliffe consist almost entirely of the local stone, probably sourced from the old quarries at Cliffe Park. Here, it has been used for rubblestone and ashlar, and as a dressed stone for windows. The 17th-century shop and houses along Park Street are built mainly of local King's Cliffe Stone.

King's Cliffe Stone has also been used in nearby villages such as Apethorpe, where the tower of the Church of St Leonard is built of large ashlar blocks. In addition, it has been recognised in the parapet and as blocks in the north porch of the Church of St Mary and All Saints at Fotheringhay.

Figure 21: Houses, Park Street, King's Cliffe. King's Cliffe Stone.

Great Oolite Group, Rutland Formation

The Rutland Formation extends from Lincolnshire through Rutland into Northamptonshire, and southwards towards the Oxfordshire border. It consists largely of clays and mudstones, although thin limestones occur in the upper part and these have been used for building purposes.

Kingsthorpe White Sandstone

In the area around Kingsthorpe, on the north-western side of Northampton, pale grey or whitish fine-grained sandstones are developed within the Stamford Member of the Rutland Formation. This rock, known as the Kingsthorpe White Sandstone, is a fine-grained, gritty, coarse sand component, which may show wisps of clay and, occasionally, traces of carbonaceous vertical rootlets on the surfaces of the ashlar blocks, indicating the swampy conditions in which the sediments were deposited. Although soft when quarried, the sandstone hardens rapidly when exposed to air.

Kingsthorpe White Sandstone was worked in a quarry on the north side of Kingsthorpe from the late 18th to the early 19th century. Stone from this quarry was used for a number of prestigious buildings in Northampton, including the infirmary (Northampton General Hospital) and the cavalry barracks. However, very little evidence of its use remains in the centre of Northampton today, as buildings have either been lost or much modified. In Kingsthorpe, the stone is still seen in the obelisk erected by William Wentworth of Boughton Hall. At 30m in height and built sometime after 1764, it was constructed of locally quarried Kingsthorpe White Sandstone.

Kingsthorpe Hall in Kingsthorpe Park provides a fine example of its use, and a single cottage in a terrace on the Harborough Road is also built of Kingsthorpe White Sandstone. Beyond Kingsthorpe, the Church of St Nicholas at Overstone is constructed of Kingsthorpe White Sandstone, although this once celebrated stone has now become a rarity.

Figure 22: Obelisk, Boughton Hall. Kingthorpe White Sandstone.

Wellingborough Limestone

Occurring in the middle part of the Rutland Formation, the Wellingborough Limestone Member consists of a massive, clayey, sandy limestone containing shell fragments, sometimes with rubbly, oyster-rich limestones. In south-western Northamptonshire, the Wellingborough Limestone grades into the Taynton Limestone Formation, which comprises cross-bedded ooidal limestones with some shell debris.

Wellingborough Limestone has been used as a rubblestone in buildings and walls, as seen in the Church of All Saints at Earls Barton. The Church of St Peter at Isham contains flat blocks of rubblestone up to a metre in length. Further west, the limestone has been used in rubblestone walling in the Church of St Giles at Dallington and the Church of St Luke at Duston, whereas other buildings in the villages of Dallington and Tiffield may consist of a mix of Wellingborough Limestone and Northampton Sand sandstones in alternating tiers. The tower at St Michael and All Angels' Church at Bugbrooke, south of the River Nene, is similarly banded, and houses with rubblestone walls of Wellingborough Limestone and quoins and dressings of brown Northampton Sand sandstones may be seen in the village of Gayton.

Taynton Limestone Formation

Further south-west, the Wellingborough Limestone becomes thicker and passes into the Taynton Limestone Formation, which includes Helmdon Stone.

Helmdon Stone

This stone is a cross-bedded, sandy limestone that contains much broken shell, including oyster debris and sea urchin spines. Helmdon Stone was formerly obtained from quarries around Helmdon, which supplied rubblestone for the local village church and buildings. However, its use was more widespread, and Easton Neston House near Towcester, built in 1702 by Nicholas Hawksmoor, is faced with ashlar from Helmdon and its Corinthian pilasters are also constructed from the stone. During the early 18th century, Helmdon Stone contributed to other structures, such as Blenheim Palace in Oxfordshire. The town hall in Brackley (built from large ashlar blocks) and the conversions (possibly later additions) to Canons Ashby House also date from this period. Furthermore, evidence of the use of Helmdon Stone in the 13th century can be seen at Canons Ashby, where the church, a remnant of an Augustinian Priory, has blank arcading on the west face, carved in a Helmdon-like stone. The Eleanor Cross, close to Delapré Abbey in Northampton, is also constructed of Helmdon Stone (with the exception of the statues) and is an example of the ability of the stone to take a fine and intricate carving.

Figure 23: The Eleanor Cross, Northampton. Helmdon Stone.

Blisworth Limestone Formation

This formation crops out from north-eastern to south-western Northamptonshire, mainly along the valley sides of the Rivers Nene and Tove and their tributaries. Some Blisworth Limestone also occurs further north in faulted outliers such as Church Stowe. Within Northamptonshire, there are at least 80 villages and two small towns that lie on or close to the Blisworth Limestone outcrop. Many of these settlements are built partly or largely of this limestone and each had their associated stone pits and quarries. The variation in the composition and fabric of the rock is reflected in many of their buildings.

Blisworth Limestone consists of a variety of rock types, including very fine-grained, micritic limestones lacking shelly material; cross-bedded limestones with poorly sorted, closely packed shell debris (the majority of which may be coated with micrite, making the fragments look superficially like ooids); cross-bedded limestones with small shell fragments and micritic pellets; and shelly limestones with a well-developed sparite cement.

Blisworth Limestone

At Blisworth, the oldest buildings in the village typically date from the 17th century and they are composed of a cross-bedded, cream, granular, shelly limestone, with a soft, powdery matrix that may sometimes be more sparry. The very distinctive polychrome cottages are built of Blisworth Limestone striped with courses of brown Northampton Sand ironstone. This pattern of construction may be for decorative reasons, but it may also serve to strengthen the walls. The quoins were made of local ironstone, but the mullions probably came from more workable sandstones of the Northampton Sand in the vicinity of Duston. A 17th-century cottage in the High Street at Blisworth shows attractive polychrome banding, formed of alternating layers of pale Blisworth Limestone and darker ironstone from the Northampton Sand Formation.

With the development of the Grand Union Canal at Blisworth, quarries were opened in 1821, close to the entrance of the Blisworth Tunnel. The Blisworth Stone Works was built here about 13 years later and it supplied a variety of stone used for building and lime burning. The stone products included freestone used for floorings, window sills and chimney pieces, and possibly rubblestone for some of the 19th-century buildings in the village. However, by the early 20th century, the quarry was worked almost entirely for flux for the smelting of ironstone.

The 16th-century Castle Ashby House, to the south-east of Northampton, is built largely of Blisworth Limestone rubblestone, possibly from a stone pit on the estate. Blisworth Limestone has also been used extensively in the villages along the south side of the River Nene, between Wollaston and Raunds. There are records of many local stone pits and quarries, most of which supplied rubblestone. There are, however, examples of Blisworth Limestone used as a dressed stone at the Church of St Laurence at Stanwick and the 13th-century Church of St Mary at Higham Ferrers.

Villages built largely of Blisworth Limestone stand on the edge of the high ground to the east of Kettering and in the valleys leading to the Nene. The limestone was used extensively as a rubblestone for walls and in buildings in the village of Cranford St John. The 13th-century castle at Barnwell, to the north of Thrapston, and the later cottages in the village were all constructed from limestone rubblestone. In contrast, the 17th-century Lilford Hall south of Barnwell was built of high-quality ashlar from the Blisworth Limestone, with the gables, bay windows and window cases constructed from Weldon Stone.

Figure 24: Cottage, Blisworth. Blisworth Limestone and Northampton Sand Ironstone.

Figure 25: Porch, St Mary's Church, Raunds. Blisworth Limestone with Raund Stone mouldings.

Cosgrove Stone

The Romans may have first worked the disused quarries and underground limestone workings around the village of Cosgrove, near the Buckinghamshire border. Cosgrove Stone can be seen in some of the older buildings of the village, and the Church of SS Peter and Paul has a 14th-century tower with mouldings thought to be of Cosgrove Stone. The stone is a cream-coloured, cross-bedded limestone, with granular shell debris and little matrix. Cosgrove Hall, built in the early 18th century, is faced in ashlar composed of a similar material to that of the church. The bridge built over the Grand Union Canal in 1800 at Cosgrove may also be of Cosgrove Stone.

Raunds Stone

The Church of St Mary at Raunds is built largely of Raunds Stone, used both as ashlar and for most of the mouldings. This stone is cross-bedded and shelly, and it contains some ooids and many tabular, micrite-coated shells, all set in a sparite matrix.

Oundle Stone

This stone is a close-packed shelly limestone, possessing a well-developed sparite cement, and it was worked in the many quarries in the vicinity of Oundle. The quality of the stone is such that it has been used for many of the town's buildings. Terraced cottages in the centre of Oundle are constructed of Oundle Stone rubblestone, with ashlar dressings around the windows. Although many buildings were embellished with Lincolnshire Limestone (often in the form of Weldon, Ketton or Barnack Stone), Oundle Stone rubblestone is much in evidence, too. For example, the 18th-century Copthorne Inn is faced with Oundle Stone ashlar, combined with dressings of Weldon Stone. Furthermore, the 18th-century Georgian house in the churchyard of St Peter's Church and the 'new' schoolhouse at Oundle School are also faced with Oundle Stone ashlar.

Figure 26: Cottages, West Street, Oundle. Oundle Stone.

3 Further Reading

The Further Reading, Online Resources and Contacts guide provides general references on:

- Geology, building stones and mineral planning
- Historic building conservation, architecture and landscape.

There is also a separate glossary of geological terms.

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Figures

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