Historic England

Lancashire

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 J S Geldard, J McNeal, S J Rhodes, A Wiggett and J K Williams.

First published by English Heritage December 2011 and republished by Historic England in 2017. This edition published by Historic England May 2023.

Front cover: Holmes Mill, Clitheroe. Carboniferous limestone random rubble and Reef Knoll Limestone. © Historic England Archive.

Please refer to this guide as:

Historic England 2023 *Lancashire. Building Stones of England*. Swindon. Historic England.

https://historicengland.org.uk/advice/technical-advice

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 Lancashire County Council, Blackpool, and Blackburn with Darwen mineral planning authority areas; and the planning authority areas of the City of Lancaster, Wyre, Fylde, the City of Preston, Ribble Valley, South Ribble, Hyndburn, Burnley, Pendle, West Lancashire, Chorley and Rossendale and the two unitary authorities, Blackpool, and Blackburn with Darwen.

Contents

1 Introduction

The bedrock geology of Lancashire is dominated by fine to very coarse-grained sandstones of Carboniferous and, to a lesser extent, Permo-Triassic age. There are, in addition, locally important outcrops of limestone. The Carboniferous rocks occupy a broad swathe of the east of the county, wrapping around a Triassic core in the lowlands of the west, which is largely buried under thick accumulations of glacial till (Quaternary).

The competence of the Carboniferous sandstones is reflected in the rugged moorland of east Lancashire, which, in turn, is reflected in the sturdy character of the built landscape. The limestones present in northern Lancashire and around Clitheroe bring a lighter openness to the villages of these areas. Lowland Lancashire, meanwhile, is primarily brick country, with the exception of some Triassic sandstone pockets around Ormskirk and Heysham.

The widespread availability of durable building stone led to the development of quarrying throughout central and eastern Lancashire, with Rossendale exporting vast amounts of building stone from the 1870s onwards to other areas of the UK and also abroad. Only a small number of quarries produce building stone today, with most of the industry now focusing on the supply of crushed stone products.

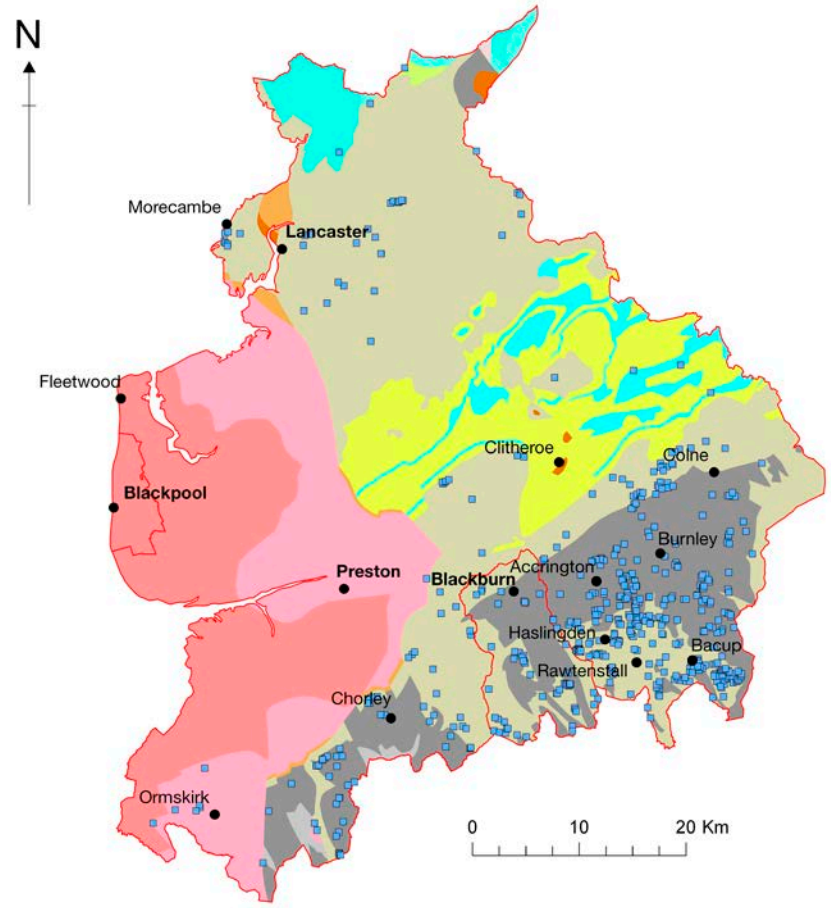
More than 40 different geological horizons occurring within the county have been exploited for building stone. Most of these beds have been used only locally, however.

The development of major building stone quarries was made possible by the growth of the railway network in the 19th century. On the back of this, a far more restricted set of beds, mainly from the Millstone Grit Group, was targeted.

Figure 1: Downham. Bowland High Group Limestone.

Figure 2: Trowborrow Quarry geological Site of Special Scientific Interest and Local Nature Reserve, Silverdale. Urswick Limestone.

Bedrock Geology Map



Key

Building stone sources

Bedrock geology

- Triassic Rocks — mudstone, siltstone and sandstone
- Triassic Rocks — sandstone and conglomerate, interbedded
- Permian Rocks — mudstone, siltstone and sandstone
- Permian Rocks — sandstone and conglomerate, interbedded
- Pennine Coal Measures Group — mudstone, siltstone, sandstone, coal, ironstone and ferricrete
- Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation
- Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation
- Millstone Grit Group — mudstone, siltstone and sandstone
- Yoredale Group — limestone with subordinate sandstone and argillaceous rocks
- Yoredale Group — limestone, sandstone, siltstone and mudstone
- Dinantian Rocks — limestone with subordinate sandstone and argillaceous rocks
- Bowland High Group and Craven Group — limestone
- Bowland High Group and Craven Group — mudstone, siltstone and sandstone
- Wenlock Rocks — sandstone and conglomerate, interbedded

Stratigraphic Table

Geological timescale	Group	Formation	Building stone	Page
Quaternary (Pleistocene)	various	various	Cobbles	28
Triassic	Sherwood Sandstone Group	various	Ormskirk Sandstone	26
			Sherwood Sandstone	25
Carboniferous	Pennine Coal Measures Group	Pennine Lower Coal Measures Formation	Harrock Hill Grit and local sandstones	24
			Dandy Rock, Tim Bobbin Rock	24
			Old Lawrence Rock	23
			Dyneley Knoll Flags	22
			Crutchman Sandstone (Milnrow Sandstone, Flag, Stone Rock), Warmden Sandstone (Helpet Edge Rock)	22
			Woodhead Hill Rock, Darwen Flags	21
			Ousel Nest Grit	21
	Millstone Grit Group	Rossendale Formation	Rough Rock	19
			Haslingden Flags (Upper and Lower Haslingden Flags), Lonkey sandstones	17
		Marsden Formation	Holcombe Brook Grit	17
			Brooksbottom Grit	16
			Hazel Greave Grit	16
			Helmshore Grit	16
			Fletcher Bank Grit (Gorpley Grit, Midgley Grit, Revidge Grit)	15
		Hebden Formation	Knott Copy Grit, Haysham Harbour Sandstone	15
			Eldroth Grit	15
			Kinderscout Grit	14
			Todmorden Grit	14
		Samlesbury Formation	Ellel Crag Sandstone	13
		Silsden Formation	Dure Clough Sandstone, Cocklett Scar Sandstone, Moorcock Sandstone	13
			Ward's Stone Sandstone	13
		Pendleton Formation	Warley Wise Grit, Brennand Grit	12
			Birkett Stone (Red Fell Stone)	11
			Copster Green Sandstone	11
			Pendle Grit Sandstone (Longridge Stone, Lancaster Stone, Lancaster Freestone)	9
	Craven Group	Bowland Shale Formation	Pendleside Sandstone	7
	Great Scar Limestone Group	Urswick Limestone Formation	Urswick Limestone	7
	Bowland High Group	Chatburn Limestone Formation and Clitheroe Limestone Formation	Bowland High Group Limestones	6
			Reef Knoll Limestone	
Silurian	Coniston Group			

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

2 Local Building Stones

Silurian

Coniston Group

A limited outcrop of Silurian strata (in the order of 2km^2) is found within Lancashire, occurring in the valley of the Leck Beck, north-east of Leck village. The outcrop is triangular in shape, with the apex adjacent to Leck Fell Road and the base along the county boundary on the north-western flank of the valley. It is part of a much larger outcrop underlying the fell country to the north within Cumbria. Geologically, the beds are assigned to the Coniston Group, which mostly comprises greywackes, mudstones, siltstones and sandstones.

The outcrop appears to be tectonically bounded by the North Craven Fault and the Dent Fault. The strata are exposed in the bed of the Leck Beck for a distance of about 1km, and also on the western flank of the valley around Fell End crag. The area is remote, and it appears that there is only one building lying within the outcrop. There are no obvious signs of extraction, but the stone may have had limited local use for field boundary walls and such like. The Silurian strata are not an important source of building stone in Lancashire.

Carboniferous

Carboniferous Limestone Supergroup

The supergroup limestones present are the oldest of the Carboniferous rocks in Lancashire, although they have a limited outcrop. The supergroup as a whole consists of beds of limestone, shale and occasionally sandstone. These beds have never been a major commercial source of building stone, and they have only been used for local building on and near the outcrop. However, the limestones have been commercially important for the production of lime and, more recently, for cement and aggregate, resulting in numerous quarries across the outcrop area. There are two geologically and lithologically distinct limestone areas in Lancashire: the Craven Basin and North Lancashire.

Bowland High Group, Chatburn Limestone Formation, Clitheroe Limestone Formation

Bowland High Group Limestone, Reef Knoll Limestone

In the Craven Basin, around Clitheroe and the Hodder Valley, the Lower Carboniferous sequence is of basin type and comprises alternating beds of limestone, shale, mudstone, siltstone and occasionally sandstone. The limestones are assigned to the Chatburn Limestone Formation and the Clitheroe Limestone Formation, which together make up the Bowland High Group. These limestones are generally well bedded, dark grey in colour and fine to medium grained, with occasional macrofossils. They occur only in the cores of the Clitheroe and Slaidburn anticlines, and within the Sykes and Brennand inliers. The limestone is used in buildings either roughly dressed into blocks or as random rubble, often rendered over. Examples of villages using this stone are Chatburn and Downham.

Numerous limestone reef knolls occur within this group, in a belt from Clitheroe north-eastwards to Rimington, and between Dunsop Bridge and Slaidburn. The limestone from the knolls is paler in colour than the bedded limestone, and it is often fossiliferous, weathering to a pale grey to white colour. This is extensively used in the settlements around the knolls, including Clitheroe, Worston and Newton.

Figure 3: Newton village. Reef Knoll Limestone.

Figure 4: Cottage, Bolton-by-Bowland. Bowland High Group Limestone.

Great Scar Limestone Group, Urswick Limestone Formation

Urswick Limestone

The North Lancashire limestones are of shelf type, and the major limestone unit in this area is the Urswick Limestone Formation, quarried near Nether Kellet and around Yealand Redmayne and Warton. The other limestones of the group have seen little use as building stones and were used only in villages near to the quarries. The reef knoll limestones are absent in the north.

Craven Group, Bowland Shale Formation

Pendleside Sandstone

Overlying the Bowland High Group is a considerable thickness of shale-dominated strata: the Craven Group, formerly referred to as the Worston and Bowland Shales. Within the Craven Group are a number of named limestone and sandstone units. Craven Group limestone is used for building and walling only very locally to its quarry source. The most important building stone obtained from the Craven Group, however, is actually sandstone.

The Pendleside Sandstone Member includes some of the more important workable sandstone beds, and it became significant locally because the limestones within the succession are far more difficult to dress and use for building purposes. The rock is a grey to brown, fine to medium-grained, micaceous sandstone that weathers to a darker grey-brown colour. In the Ribble Valley, the Pendleside Sandstone crops out on the western side of Pendle Hill, between Whalley and Rimington, and also along the southern edge of the Bowland Fells between Chipping and Bolton-by-Bowland.

Figure 5: Cottages, Chipping. Pendleside Sandstone.

Figure 6: St Bartholomew's Church, Chipping. Pendleside Sandstone.

Millstone Grit Group, Pendleton Formation

Pendle Grit Sandstone (Longridge Stone, Lancaster Stone, Lancaster Freestone)

Sandstones from this unit are probably the second most widely used building stone in Lancashire, surpassed only by the sandstones of the Haslingden Flags. Pendle Grit is typically an even-coloured, pale buff, medium to coarse-grained, feldspathic sandstone, with interbedded siltstone and mudstone. It is commonly developed as massive beds of up to 4.5m in thickness, with little, if any, visible internal structure (no cross-bedding, for example). There is little lithological variation across the outcrop area.

Pendle Grit sandstone is extensively developed in the Craven Basin, and it is found in the Lancaster, Settle, Garstang and Clitheroe areas. There were major quarries at Longridge and Lancaster, where it was known as Longridge Stone and Lancaster Freestone, respectively. The sandstone was very widely used in all manner of civic, ecclesiastical, commercial, industrial, domestic and agricultural buildings over a wide area of Lancashire, especially in towns and villages close to the outcrop. It was exported to larger towns in the mid-19th century.

The sandstone seems to have been the stone of choice for many of the considerable number of churches that were constructed during the Victorian building boom. Lancaster itself has many important Pendle Grit Sandstone Stone buildings, including the castle, the Priory Church of St Mary, the City Museum (old Town Hall), Custom House, St George's Quay, the Judges' Lodgings, the Lune Aqueduct and Skerton Bridge as outstanding examples.

In contrast, Preston is primarily a town of brick buildings. However, Longridge Stone is used in many of its prestigious buildings, including the Church of St John the Divine and the Harris Museum. Most of the 19th-century stone buildings in the town centre and the Victorian churches on

Figure 7: The City Museum (old Town Hall), Lancaster. Lancaster Stone.

the fringes and in the suburbs were constructed of the sandstone, while the better quality Victorian and Edwardian terraces and houses used Longridge Stone decoratively. The stone was also employed in similarly prestigious buildings in many other Lancashire towns, including the town hall in Bolton. Furthermore, it is thought that the Longridge Stone was extensively used in Lancashire's railway architecture.

The quarry at Waddington Fell (north-west of Clitheroe), lying within a Pendle Grit outcrop formerly mapped as Warley Wise Grit, was reopened in about 1960 primarily for aggregate production. More recently, though, it has begun to produce blockstone for sawing into building stone on site, and this is now widely distributed across Lancashire and beyond for both new-build and conservation purposes.

Figure 8: Lancaster Maritime Museum (Customs House), Lancaster. Lancaster Stone.

Figure 9: Judges' Lodgings, Lancaster. Lancaster Stone.

Copster Green Sandstone

The Copster Green Sandstone (crops out in an area extending from Copster Green (north-west of Blackburn) northwards towards Dinckley on the River Ribble. In this area, it forms a distinctive ridge in the landscape. The rock is a medium to coarse-grained sandstone composed of quartz and feldspar grains, with occasional larger pebbles of quartz. Among other characteristics, it differs from the usual Pendle Grit sandstones by virtue of its pale red colour. A handful of quarries worked Copster Green Sandstone around Copster Green itself, providing building stone for the surrounding area.

Copster Green Sandstone was used frequently for dressed stonework, but it was also employed as a rubblestone. Examples of buildings using Copster Green Sandstone are St Leonard's Chapel at Old Langho and many houses in Copster Green and Ribchester. In Ribchester, which is downstream from the rock outcrops at Dinckley, boulders of Copster Green Sandstone were collected and used for building.

Birkett Stone (Red Fell Stone)

Birkett Stone, sometimes referred to as Red Fell Stone, is another Pendle Grit Formation variant. Lithologically, it is a medium to coarse-grained, feldspathic sandstone, with a distinctive purple to red colour. It is not dissimilar to the sandstone currently produced at Waddington Fell Quarry.

The outcrop of the Birkett Stone is restricted to a small area between Dunsop Bridge and Newton in the Hodder Valley, and it was worked in several quarries on Birkett Fell, to the south-west of Newton. Birkett Stone appears to have been used only in the local area, and it is characteristic of older buildings in the villages of Newton, Dunsop Bridge and Slaidburn. It was used both dressed and as a rubblestone.

Figure 10: St Andrew's Church, Slaidburn. Birkett Stone.

Figure 11: Browsholme Hall, Clitheroe. Birkett Stone.

Warley Wise Grit, Brennand Grit

The Warley Wise Grit is a brownish-grey, moderately or thickly bedded, medium to coarse-grained, pebbly sandstone. It crops out in the Lancashire Pennines, south of the Craven Fault System and north of a line from Rochdale to Leeds. However, it is frequently drift covered and thus not readily accessible. Historically, the sandstone was quarried at a comparatively small number of sites and then only for local use, in the vicinity of Barley and around Foulridge, for example. Stonyhurst College near Clitheroe used Warley Wise Grit in its construction. The stone was likely quarried from the nearby Sandy Bridge Quarry at Hurst Green.

Figure 12: Stonyhurst College. Warley Wise Grit.

In the Bowland area, a sandstone known as the Brennand Grit occupies the stratigraphic position of the Warley Wise Grit. This has the same general characteristics and use as the stone occurring further south.

Millstone Grit Group, Silsden Formation

In southern Lancashire, the Silsden Formation comprises a substantial thickness of shale, referred to as the Sabden Shales. Some sandstone interbeds are present, and these have been worked on a small scale for building and walling.

In the Bowland area, the sandstones are far more widely developed, and several have been quarried in an organised fashion in the Forest of Bowland and used in buildings of greater significance.

Ward's Stone Sandstone

This sandstone is quarried around Clougha Pike and Ward's Stone Hill (immediately east of Lancaster) for building, walling, paving, roofing and millstones. At Heysham Head, it seems to be the source rock for the ancient (ruinous) priory and the parish church.

Figure 13: St Patrick's Chapel, Heysham Head. Ward's Stone Sandstone.

Dure Clough Sandstone, Cocklett Scar Sandstone, Moorcock Sandstone

Other sandstones worked for building include the Dure Clough sandstone and the Cocklett Scar sandstone (Roeburndale Member). At Claughton Moor, a locally developed sandstone, the Moorcock Sandstone (Claughton Member) has been worked to some extent for roofing and paving flags.

Millstone Grit Group, Samlesbury Formation

Ellel Crag Sandstone

Although mudstone dominated, the Samelsbury Formation includes some relatively thin sandstone beds. However, there is currently no evidence of them being worked for building stone.

The Samlesbury Formation, albeit mudstone-dominated, includes some sandstone beds. The most important of these is the Ellel Crag Sandstone, a fine to medium-grained sandstone, which shows large-scale cross-bedding. This was still being worked for aggregate and occasionally building and monumental stone, up to the end of the 20th century.

Millstone Grit Group, Hebden Formation

The Hebden Formation includes a large number of sandstones that are generally massive and coarse grained, and often conglomeratic. They are greyish-brown in colour when fresh, but darken upon weathering.

Todmorden Grit

The stratigraphically lowest sandstone of some significance is the Todmorden Grit, which crops out around Blackburn, where it is called the Parsonage Sandstone. This sandstone tends to be finer grained than the others in the formation.

Kinderscout Grit

These are the most important sandstones of the formation. They have been worked on a large scale in the eastern parts of the county, mainly to produce foundation material for industrial plants. Around Great Harwood, the beds were suitable for producing flags and some building stone. At Sabden, the sandstones have been quarried in several places on the side of Black Hill and used for building and for gateposts. Vernacular cottages in Great Harwood and the Church of St Bartholomew at Great Harwood are constructed from Kinderscout Grit.

Figure 14: Church of St Bartholomew, Great Harwood. Kinderscout Grit.

Eldroth Grit

This sandstone was used extensively in harbour works at Glasson Dock and in Lancaster.

Knott Copy Grit, Heysham Harbour Sandstone

Other sandstones worked include the Knott Copy Grit and the Heysham Harbour Sandstone. The latter is the local equivalent of the Upper Kinderscout Grit and it occurs within the youngest part of the Millstone Grit Group succession exposed in north-western Lancashire.

Millstone Grit Group, Marsden Formation

Marsdenian rocks are distributed from Askrigg, North Yorkshire and Stainmore, Cumbria in the north, through the Central Pennines, and southwards into north Staffordshire. In Lancashire, they form a series of narrow outcrops around Heysham, along the north-eastern flank of the county between Eldroth and Tunstall, and around the periphery of the Lancashire Coalfield. More extensive developments surround Edenfield and occupy the area between Darwen and Chorley.

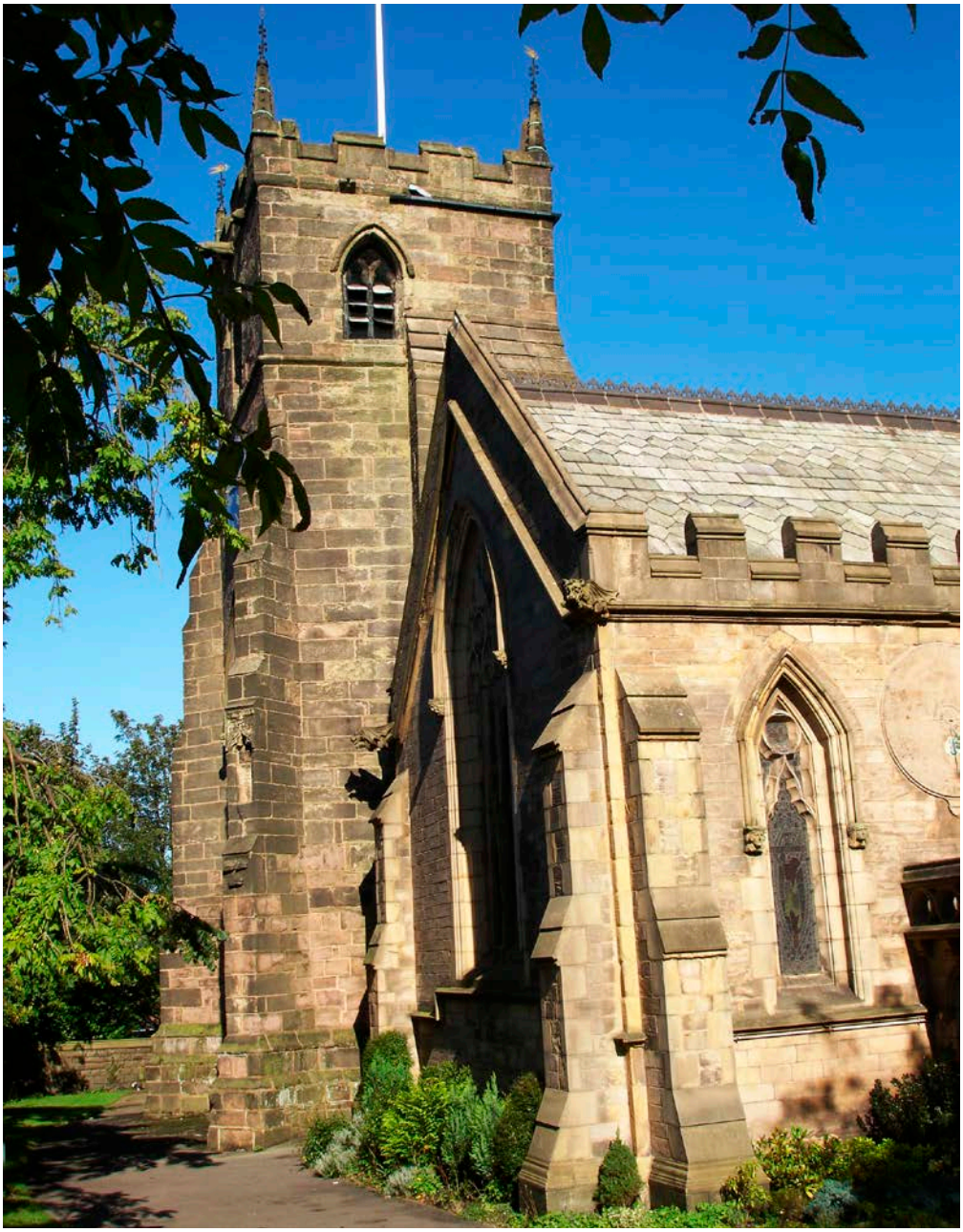
The main building stones are typically medium to very coarse-grained (sometimes pebbly) feldspathic sandstones, which were laid down in an extensive river delta system. Colour-wise, they are characteristically grey to buff, but locally have yellow or red overtones and banding. Although often massive and uniform, they may show cross-bedding.

Fletcher Bank Grit (Gorpley Grit, Midgley Grit or Revidge Grit)

The most important building stone of this area was intensively quarried in Edenfield and around Chorley. Holcombe Road Viaduct, Haslingden, includes Fletcher Bank Grit and Rough Rock in its construction.

Figure 15: Holcombe Road Viaduct, Haslingden. Fletcher Bank Grit and Rough Rock.

Figure 16: Brindle St James' Church, Brindle. Fletcher Bank Grit.



Helmshore Grit

The Helmshore Grit was worked locally along its outcrop for building stone. It was used frequently in combination with Haslingden Flags, and its softer, more uniform texture made it suitable for dressings and mouldings. Marsden Formation gritstones are evident in individual buildings, such as Hoghton Tower and the adjacent railway viaduct, and in Rivington, Chorley and Brindle.

Hazel Greave Grit

This locally quarried sandstone is notably finer grained and more flaggy in its lower part.

Brooksbottom Grit

This coarsening upwards sandstone unit has been quarried for building stone around Heskin and Belmont.

Holcombe Brook Grit

Also coarsening upwards, this sandstone has been quarried for local building stone along much of its outcrop.

Millstone Grit Group, Rossendale Formation

Haslingden Flags (Upper and Lower Haslingden Flags), Lonkey sandstones

The Upper and Lower Haslingden Flags, including the Lonkey sandstones, form the lowest beds of the Yeadonian stage. They are yellowish-brown, fine-grained, silica-rich siltstones and very fine-grained sandstones, which weather to darker shades of brown. They frequently have ripple marks associated with fine cross-bedding, and characteristically split into thin, uniform beds that are often separated by mica partings. Distributed among the flaggy sandstones are the Lonkey beds (in particular, a 3.5m-thick bed at the base of the sequence), which are much harder, pale, massive, quartzitic sandstones.

The Haslingden Flags were most extensively worked in the Rossendale Valley, but also between Great Harwood and Blackburn, and in an arc from Darwen round to Chorley. The quarry at Rawtenstall is reputed to have been one of the UK's most sizeable quarries in the late 1800s.

Initially, the main Haslingden Flag beds were used primarily for roofing, but as quarrying methods improved, paving and building stone became more important products. These were employed throughout much of urban east Lancashire. A wider demand for stone products developed, and they were exported throughout northern England and also taken south to Birmingham and London (notably in Trafalgar Square). Hard sandstone from the Lonkey beds has been widely used for quoins and decorative features on buildings, as well as for setts, which was the major road surfacing material of 19th-century Lancashire.

Figure 17: Higher Mill, Helmshore. Haslingden Flags.

The use of Haslingden Flags is widespread throughout eastern Lancashire (both in main elevations and as a roofing material), especially in Haslingden itself, but also in Wheelton, Chorley and Edgworth, for example. Haslingden Flags were used in the weavers' cottages in Fallbarn Road, Rawtenstall, and Higher Mill, Haslingden.

Figure 18: Weavers' cottages, Rawtenstall. Haslingden Flags.

Figure 19: Dingle Farmhouse, Edgworth. Haslingden Flags.

Rough Rock

The Rough Rock is the youngest and most extensively developed unit of the Rossendale Formation. It is a coarse-grained, pebbly, feldspathic sandstone, which was deposited rapidly in massive, relatively uniform beds. The Rough Rock tends to cap the higher moors of Rossendale and the West Pennines, although locally it has been down-faulted to much lower levels, such as at Euxton near Chorley. In buildings such as Gillibrand Hall Barn (Chorley), it can be seen stained red due to the overlying presence, at outcrop, of Sherwood Sandstone. Rough Rock sandstone has often been used where large, load-bearing blocks were required: the best example of this is the foundations of the Eiffel Tower, Paris, where two dozen 8-tonne blocks were employed. Locally, Rough Rock was often used in the construction of moorland farm buildings and associated drystone walls, together with many structures on the Lever Park estate and the tower on Rivington Pike.

Figure 20: Tower, Rivington Pike. Rough Rock.

Pennine Coal Measures Group, Pennine Lower Coal Measures Formation

The general pattern of sedimentation continued, but the depositional cycles increasingly involved protracted periods during which the ground surface was colonised by swamp vegetation, which subsequently formed the thin coals now prominent in the succession. A typical depositional cycle consists of interbedded mudstone, siltstone and sandstone, with subordinate seatearth and developments of coal. The sandstones can be thin and laterally impersistent, but some are more extensive and extend basin-wide. In contrast to the sandstones of the Millstone Grit Group, the Pennine Lower Coal Measures sandstones are predominantly medium grained. Generally grey when fresh, they usually weather to a yellowish-brown colour. Sedimentary structures, including cross-bedding, lamination and bioturbation, together with plant remains, are commonly observed. In Lancashire, the Pennine Lower Coal Measures strata are found around the Burnley Coalfield and along the northern edge of the Wigan Coalfield.

The Burnley Coalfield occupies much of the relatively low-lying ground to the north of the Rossendale Anticline and stretches from Blackburn through Burnley to Colne, with southwards extensions around Darwen and Bacup. The youngest of several sandstone beds occurring within this coalfield sequence is known as the Doghole Rock.

Many individual sandstones across the whole coalfield area were worked for building stone and used in towns such as Colne, Nelson and Padiham. Here, quarrying for building stone was an important local industry, although it was somewhat overshadowed by the more extensive operations in the Rossendale Valley. The local quarrying industry declined in the first half of the 20th century, however, and very few sites produced building stone after 1945.

To the south and west of the West Pennine Moors, the area takes in the northern fringes of the Wigan Coalfield. The Pennine Lower Coal Measures strata are affected by extensive faulting, which has produced four tectonic blocks: Chorley, Coppull and Adlington; Turton; the Ashurst–Billinge ridge; and the Skelmersdale Basin. Most of the coalfield is covered by till, which considerably restricts access to the sandstones. The succession is almost entirely of Pennine Lower Coal Measures age, although there are inaccessible Pennine Middle Coal Measures rocks in the extreme south.

There are more than 20 named sandstones in the Pennine Lower Coal Measures succession. Virtually all of these sandstones have been worked for building stone, drystone walls or road aggregate to some extent. A small number, in both of the named coalfields, were worked on a commercial scale.

Ousel Nest Grit

The oldest of the Pennine Lower Coal Measures building stone sources is the Ousel Nest Grit: a medium-grained, yellowish sandstone that often shows cross-bedding. It is found around Turton, Eccleston and Horwich, where there are still quarries working this stone. The main sites, such as Montcliffe, were in the Bolton area and the sandstone was widely used in Lancashire. St Peter's Church at Belmont is constructed of Ousel Nest Grit.

Figure 21: St Peter's Church, Belmont. Ousel Nest Grit.

Woodhead Hill Rock, Darwen Flags

The Woodhead Hill Rock is mainly a medium-grained, ochreous-weathering sandstone found in the east of the county. It is either parallel-bedded or (thickly) cross-bedded. The younger Darwen Flags were quarried and mined south of Darwen for their eponymous flags, which are fine-grained, micaceous and ripple-laminated sandstones.

Figure 22: Hackings Farm, Simonstone. Darwen Flags.

Crutchman Sandstone (Milnrow Sandstone, Flag, Stone Rock), Warmden Sandstone (Helpet Edge Rock) sandstones

The Crutchman Sandstone, also known as the Milnrow Sandstone or, locally, the Flag and Stone Rock, is similar to the Woodhead Hill Rock. It was worked at Crutchman's Quarry near Accrington on a significant scale, and also around the Ashurst ridge near Parbold. The Warmden Sandstone, also called Helpet Edge Rock, is similar to the Woodhead Hill Rock, but weathers to a yellow-brown colour. It was worked around Oswaldtwistle and Accrington.

Dyneley Knoll Flags

The Dyneley Knoll Flags are variably developed and sometimes absent altogether. A sandstone bed occurring at the same stratigraphic level (that is, between the Crutchman Sandstone and the Old Lawrence Rock) was worked on a considerable scale at Catlow Quarries. It is thought to be the source of most of the building stone used in the Nelson area. Small-scale extraction still takes place in part of the old quarry area. It is also reputed to have been the source of the stone used to build the Manchester Art Gallery. Supplies were apparently insufficient to complete the job, however, and alternatives from Salterforth and Leeds were used. The same sandstone was also quarried at Ashurst near Skelmersdale and on a small scale north of Hawkshaw.

Old Lawrence Rock

The most important of the Pennine Lower Coal Measures building stones is the Old Lawrence Rock. This was worked extensively around Appley Bridge and Parbold in the south of the county, and at Hapton near Accrington in the east. It is a fine to medium-grained, slightly micaceous sandstone, with a distinctly greenish-grey colour. It is parallel-bedded with ripple laminae interbedded with mudstones. Use of the stone was principally for flags and general building. Sawn stone was produced for a short period at Appley Bridge.

Flags were also produced from the nearby Upholland Flags beds, and these are reported to have been widely used in Liverpool. They were used as 'walling' for a pig pen at Rufford Old Hall: such use of large upstanding flagstones as boundary and pen walling is common in areas where the Upholland Flags and the Haslingden Flags occur.

Figure 23: House, Clayton-le-Moors. Old Lawrence Rock.

Figure 24: Pig pen walling, Rufford Old Hall, Rufford. Old Lawrence Rock.

Dandy Rock, Tim Bobbin Rock

The Dandy Rock and the Tim Bobbin Rock are both found in the Burnley and Brierfield areas. These modest sandstones were worked in local quarries, often within the towns themselves, but they are now mostly built over. At Padiham, a quarry near the gates to Gawthorpe Hall, virtually in the grounds of the mansion, worked the Tim Bobbin Rock, and this would appear to have been the source of the stone from which the hall was built. The quarry was backfilled with spoil from an adjacent colliery and is no longer visible.

Figure 25: Gawthorpe Hall, near Burnley. Tim Bobbin Rock.

Harrock Hill Grit and other local sandstones

There are many localised developments of other sandstones, and these were worked over limited geographical areas. In the Parbold area, for example, the Harrock Hill Grit (sitting near the base of the formation) is a very coarse gritstone that was quarried extensively in five or six substantial workings and several more minor ones near the village. The stone is notable because it often shows pink staining and Liesegang ring markings: features attributed to the nearby presence of Triassic strata, which presumably once overlaid the older rocks. The Parbold quarries assumed particular importance because they are the nearest potential source of durable Carboniferous sandstone to the extensive lowland areas of the west.

Permo-Triassic

In Lancashire, Permo-Triassic rocks underlie the western third of the county. They are extensively covered by superficial deposits, however, and are rarely exposed. Permian strata crop out over a relatively small area, and they are exposed at only a small number of locations, and then only to a very limited extent. There are no known instances of rock from these exposures being quarried as building stone. Triassic strata, by contrast, are considerably better developed, and there are sandstones from within the Sherwood Sandstone Group, including the Ormskirk Sandstone Formation, that have been employed as building stone.

Triassic

Sherwood Sandstone Group, various formations

Sherwood Sandstone

The Sherwood Sandstone is a comparatively soft, fine-grained, sandstone-dominated, red bed succession. Despite its fairly widespread distribution in Lancashire, the group is seen at the surface in a workable condition at only two locations around Mawdesley and Ormskirk. It has been used in relatively few (mostly early) buildings, including St Mary's Church at Eccleston (partly built in the 14th century) and Mawdesley Hall, which has an 18th-century wing of Sherwood Sandstone. Mawdesley Hall is also noteworthy because it stands directly on the bedrock. Although the Sherwood Sandstone was readily accessible at Mawdesley, most of the buildings are brick built, and its three Victorian churches are constructed of Millstone Grit Group sandstone imported from elsewhere. Only two or three buildings close to the hall are of Sherwood Sandstone, its limited use being a consequence of the stone's poor durability and the availability of better building stone types nearby. At Ormskirk, for example, preference was given to the Ormskirk Sandstone.

Any red Triassic sandstone used in the construction of Victorian churches was likely to have been imported from outside the county (Cheshire, Merseyside and Cumbria), where more durable versions of the stone were worked.

Figure 26: St Mary's Church, Eccleston. Sherwood Sandstone.

Figure 27: Mawdesley Hall. Sherwood Sandstone wing.

Ormskirk Sandstone

The top of the Sherwood Sandstone Group is marked by a comparatively thin sequence of better cemented, harder and more durable sandstones. It is known as the Ormskirk Sandstone Formation, formerly the Lower Keuper Sandstone. The unit is about 200m thick in Lancashire. It comprises thickly bedded, generally pale yellow, but occasionally light red, medium to coarse-grained sandstones, which show pronounced cross-bedding. These sandstones are far more durable than the typical Sherwood Sandstone. The outcrop is limited in extent, and surface exposure is restricted to the higher ground around Ormskirk and Aughton, and also the low-lying land around Downholland and Halsall. The outcrop continues to the south-west into Merseyside, with workings reported in Maghull, Melling and Bootle. The main Lancashire source seems to have been a small quarry near Scarisbrick (Pinfold), which is now disused and partly backfilled. Other minor workings appear to have existed around Clieves Hill, Aughton, and Tower Hill, Ormskirk.

Several important churches are built of the distinctive Ormskirk Sandstone, including SS Peter and Paul's Church at Ormskirk (12th-century with later alterations, additions and restorations, as well as, virtually uniquely, both a tower and a spire) and St Cuthbert's Church at Halsall (medieval, but also much altered, added to and restored). The sandstone was also used in some older town centre buildings in Ormskirk and is reputed to have been used by the Stanley family (the Lords Derby) for the now demolished Latham House. At Tower Hill, south-east of Ormskirk, stands a splendid water tower built of a pale red and mottled form of this stone, which was probably extracted from shallow workings in the nearby Ruff Wood. There are also examples of its use in buildings outside the area, including the distinctive St John's Church and the Scarisbrick family mausoleum, both at Crossens, Southport.

Figure 28: Great Altcar railway bridge. Ormskirk Sandstone.

Figure 29: Fireplace, Rufford Old Hall, Rufford. Ormskirk Sandstone.

Figure 30: Water Tower, Tower Hill, Ormskirk. Ormskirk Sandstone.

Quaternary

Various groups, various formations

Cobbles

Most of lowland Lancashire, as already noted, is covered by superficial deposits, which are often of considerable thickness. They also extend over a significant part of the eastern upland area. Glacial till (boulder clay) predominates, with subsidiary areas of sand and/or gravel of various types. Along and inland from the coast, there are areas of peat, silts, alluvium and blown sand, and most of the higher uplands are blanketed by peat. None of these deposits has any potential as building stone, although historically the tills have been an important source of clay for brick making.

In a number of places, where suitable local sources are available, cobbles (large rounded stones) have been used for paving, walling and, occasionally, building purposes, most notably in Lytham St Annes. The usual sources of these are either river channels or the foreshore, with additional supplies coming from sand and brick pits (that is, oversize fluvio-glacial material). Locally derived sandstones, along with more 'exotic' igneous and metamorphic rocks from the Lake District and south-west Scotland, are well represented among the cobbles, whereas the limestone examples present were likely derived from either Morecambe Bay or the Pennine area.

Commercial working of river deposits has taken place at various points along the Rivers Calder and Ribble, for example at Ribchester and Preston. This continued into the second half of the 20th century.

Historically, cobbles have had only limited use as street paving (in Preston, for example) and as a walling material (in Ribchester, for example). A fine example of the use of such materials is the group of former farm buildings at Brock Side, where large, roughly dressed cobbles from the nearby River Brock have been used to construct all of the buildings.

At Lytham St Annes, cobbles are employed on a far more extensive scale, and cobble-built walls are a characteristic of the townscape in some parts. A few buildings also incorporate them. Estate boundary walls made from cobbles, including those of the 18th-century Lytham Hall, provide the most notable example of the use of this material.

Figure 31: Lytham Hall boundary walls. Cobbles.

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.

Lancashire references

Champness, J 1989 *Lancashire's Architectural Heritage. An Anthology of Fine Buildings*. Preston: Lancashire County Planning Department

Crosby, A 1998 *A History of Lancashire*. Chichester: Phillimore

Dalziel, N 1993 'Trade and transition 1690–1815', *in* White A (ed) *A History of Lancaster 1193–1993*. Keele: Ryburn Publishing

GeoLancashire 'Geotrails', interpretation boards and posters
https://geolancashire.org.uk/publications-and-interpretation/

Hartwell, C and Pevsner, N 2009 *The Buildings of England: Lancashire: North*. London: Yale University Press

Lancashire County Council and Egerton Lea Consultancy 2000-*6 Historic Town Assessment Reports* (33 volumes). Preston: Lancashire County Council and Egerton Lea Consultancy

Parker, N 1972 *The Preston and Longridge Railway*. Lingfield: Oakwood Press

Parsons, V 2001 'The building stones of Lancaster and Williamson Park', *Proceedings of the Westmorland Geological Society*, **29**, 15–18

Pevsner, N 1969 *The Buildings of England: Lancashire 1: The Industrial and Commercial South*. London: Penguin Books

Pevsner, N 1969 *The Buildings of England: Lancashire 2: The Rural North*. London: Penguin Books

Pevsner, N 1959 *The Buildings of England: Yorkshire: The West Riding*. London: Penguin Books

Pollard, R and Pevsner, N 2006 *The Buildings of England: Lancashire: Liverpool and the South-West*. London: Yale University Press

Slack, M 1986 *The Bridges of Lancashire and Yorkshire*. London: Robert Hale

Till, J M 1993 *A History of Longridge and its People*. Preston: Carnegie Publishing

White, A (ed) 1993 *A History of Lancaster 1193–1993*. Keele: Ryburn Publishing

Williams, J K and Rhodes, S J (eds) 2008 *The Geology and Landscapes of Lancashire*. Chorley: GeoLancashire

British Geological Survey publications

Aitkenhead, N, Barclay, W J, Brandon, A, Chadwick, R A, Chisholm, J I, Cooper, A H and Johnson, E W 2002 *British Regional Geology: The Pennines and Adjacent Areas* (4th edition). Keyworth: British Geological Survey

Aitkenhead, N, Bridge, D M, Riley, N J, Kimbell, S F, Evans, D J and Humphreys, B 1992 *Geology of the Country Around Garstang: Memoir for 1:50 000 Geological Sheet 67*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Arthurton, R S, Johnson, E W and Mundy, D J C 1988 *Geology of the Country Around Settle: Memoir for 1:50 000 Geological Sheet 60*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Brandon, A, Aitkenhead, N, Crofts, R G, Ellison, R A, Evans, D J and Riley, N J 1998 *Geology of the Country Around Lancaster: Memoir for 1:50 000 Geological Sheet 59*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Crofts, R G, Hough, E and Northmore, K J 2010 *Geology of the Rochdale District: A Brief Explanation of the Geological Map Sheet 76 Rochdale*. Keyworth: British Geological Survey

Earp, J R, Magraw, D, Poole, E G, Land, D H and Whiteman, A J 1961 *Geology of the Country Around Clitheroe and Nelson: One-inch Geological Sheet 68*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Jones, R C B, Tonks, L H and Wright, W B 1938 *Wigan District: Explanation of Sheet 84*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Price, D, Wright, W B, Jones, R C B, Tonks, L H and Whitehead, T H 1963 *Geology of the Country Around Preston: Explanation of Sheet 75*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Wilson, A A and Evans, W B 1990 *Geology of the Country Around Blackpool: Memoir for 1:50 000 Geological Sheet 66*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Wray, D A and Cope, F W 1948 *The Geology of Southport and Formby: Explanation of Sheets 74 and 83*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

Wright, W B, Sherlock, R L, Wray, D L, Lloyd, W and Tonks, L H 1927 *The Geology of the Rossendale Anticline: Explanation of Sheet 76*. Memoirs of the Geological Survey of Great Britain (England and Wales). London: HMSO

4 Contact Historic England

East of England
Brooklands
24 Brooklands Avenue
Cambridge CB2 8BU
Tel: 01223 582749
Email: eastofengland@HistoricEngland.org.uk

Fort Cumberland
Fort Cumberland Road
Portsmouth
Hampshire PO4 9LD
Tel: 023 9285 6700
Email: fort.cumberland@HistoricEngland.org.uk

London and South East
4th Floor
Cannon Bridge House
25 Dowgate Hill
London EC4R 2YA
Tel: 020 7973 3700
Email: londonseast@HistoricEngland.org.uk

Midlands
The Foundry
82 Granville Street
Birmingham B1 2LH
Tel: 0121 625 6888
Email: midlands@HistoricEngland.org.uk

North East and Yorkshire
Bessie Surtees House
41-44 Sandhill
Newcastle Upon
Tyne NE1 3JF
Tel: 0191 269 1255
Email: northeast@HistoricEngland.org.uk

North East and Yorkshire
37 Tanner Row
York YO1 6WP
Tel: 01904 601948
Email: yorkshire@HistoricEngland.org.uk

North West
3rd Floor, Canada House
3 Chepstow Street
Manchester M1 5FW
Tel: 0161 242 1416
Email: northwest@HistoricEngland.org.uk

South West
Fermentation North
(1st Floor)
Finzels Reach
Hawkins Lane
Bristol BS1 6JQ
Tel: 0117 975 1308
Email: southwest@HistoricEngland.org.uk

Swindon
The Engine House
Fire Fly Avenue
Swindon SN2 2EH
Tel: 01793 445050
Email: swindon@HistoricEngland.org.uk

5 Acknowledgements

The Building Stones of England series was developed by Geckoella Ltd (Andy King), the British Geological Survey (Don Cameron, Graham Lott, and Stephen Parry), and Historic England (Clara Willett).

Historic England and the British Geological Survey developed the Building Stone Database for England with advice from many local geologists and historic building experts and all these individuals are thanked for their contributions.

For this guide, Historic England would like to also thank GeoLancashire and the Lancashire Group of the Geologists' Association.

The Department for Levelling Up, Housing and Communities supported the development of the Building Stones of England database project.

Figures

Historic England

We are the public body that helps people care for, enjoy and celebrate England's spectacular historic environment.

Please contact NationalSpecialistServices@HistoricEngland.org.uk with any questions about this document.

HistoricEngland.org.uk

If you would like this document in a different format, please contact our customer services department on:
Tel: 0370 333 0607
Email: customers@HistoricEngland.org.uk

All information and weblinks accurate at the time of publication.
Please consider the environment before printing this document.

Product code: HEBSE24
Publication date: November 2017
Reissue date: May 2023
Design: Historic England