Introduction

The geological succession of East Yorkshire and northern Lincolnshire (encompassing the East Riding of Yorkshire, City of Kingston upon Hull, North Lincolnshire and North East Lincolnshire unitary authorities) comprises strata of Late Triassic to Quaternary age. In general, the rocks dip gently eastwards towards the North Sea coast. The area is divisible into several topographically and geologically distinct regions: in the west are the low-lying vales of York and the Trent Levels, which are underlain by Triassic rocks, while to the east lies the ridge of higher ground forming the Yorkshire and Lincolnshire Wolds, which are underlain by Jurassic and Cretaceous rocks. The remainder of the area forms part of the low-lying drainage basin of the Humber Estuary (or Humber Levels) and includes the coastal plain of Holderness – an expanse of unconsolidated Quaternary sediments. Vernacular building stone and other building materials have been obtained from many of the geological units occurring within the area.

The apparent simplicity of the roughly north–south trending rock outcrop pattern (see geological map) belies major changes in both the geological history and structure across the area. A significant ‘basement high’ known as the ‘Market Weighton Axis’ (potentially linked to the presence at depth of a ‘granite’ intrusion) divides the area into two geological provinces, termed the East Midlands Shelf (to the south) and the Cleveland Basin (to the north). East Yorkshire consequently represents a geological transition zone characterised by significant lithological changes in its Jurassic and (unconformably) overlying Cretaceous rock successions.

North and south of the Humber, much of the area remains primarily rural, with many of its oldest buildings having been constructed of locally made bricks e.g. those in Beverley, Howden, Roos, Hedon and Watton. In more prestigious buildings, however, notably including the area’s many churches, a wide variety of local lithologies were used for walling, but these were often not suitable for ashlar work and thus stone from further afield was commonly ‘imported’. Perhaps the most extreme example of this type of stone use is the preponderance of locally gathered Quaternary cobblestones in the church fabrics of the Holderness area. The cobblestones were supplemented (and indeed complemented) by a range of ‘imported’ limestones and, occasionally, sandstones for mouldings, dressings and other decorative stonework.

Elsewhere, medieval higher-status buildings such as Beverley and Howden minsters, Wressle Castle, Hedon, Patrington, Skirlaugh, Stillingfleet and Riccal churches all had sufficient wealth to allow the ‘import’ of ashlar block from a number of the ‘Lower Magnesian Limestone’ (Late Permian) quarries in West Yorkshire. South of the Humber, Lincolnshire Limestone (Middle Jurassic) was introduced from the prolific quarrying areas around Lincoln, Ancaster and Heydour, and ‘ironstones’ were sourced from the Upper Jurassic successions of the Claxby–Tealby area. The development and exploitation, from medieval times onwards, of the overland, river (particularly along the rivers Ouse and Aire from West Yorkshire) and sea transportation modes clearly served to provide very effective means by which substantial quantities of stone could be moved into, and across, the area.

Rapid expansion of the larger towns during the 19C, including Kingston-upon-Hull, Goole, Bridlington, Grimsby, Cleethorpes and Scunthorpe, coupled with the development of local rail networks, led to such settlements ‘importing’ an even wider mix of stone types for use in their principal buildings (e.g. Town Halls and banks), with some lithologies travelling from distant parts of the UK (e.g. Portland Stone and Ashburton Limestone).
East Yorkshire and North and North-East Lincolnshire
Bedrock Geology Map

Derived from BGS digital geological mapping at 1:625,000 scale, British Geological Survey ©NERC. All rights reserved
Triassic

Sherwood Sandstone Group

The oldest rocks present within the East Yorkshire–northern Lincolnshire area form part of the sandstone-dominated Sherwood Sandstone Group succession and extend as a narrow outcrop along its western edge, from Wroot in the south to Stamford Bridge in the north. The outcrop is largely obscured by superficial deposits, however, and there is consequently little evidence of either the quarrying or use of the red sandstones so typical of this group. With the exception of the many churches, for which stone has commonly been used, the older village buildings within the confines of the Sherwood Sandstone Group outcrop are generally of local brick and only occasionally of ‘imported’ stone (e.g. Wressle, Pollington and Wroot).

Mercia Mudstone Group

A large portion of the western part of the area is underlain by strata assigned to the Mercia Mudstone Group. This Middle to Upper Triassic succession is dominated by red-brown, occasionally grey-green, mudstones with gypsum beds, but once again is largely concealed by unconsolidated Quaternary deposits. The thin, hard, dolomitic sandstones known to the south and east – and referred to as ‘skerry sandstones’ – are not well developed in this area, and appear to have yielded no building stone of note.

The thick mudstone beds, however, were (and, near Epworth, still are) locally worked for brick clay. The nodular gypsum beds present around the Isle of Axholme, meanwhile, were once important as a source of upstairs flooring material for nearby houses.

With the exception of a good number of the churches, for which ‘imported’ stone has been used, the older village houses and buildings located within the outcrop area of the Mercia Mudstone Group are generally of local brick e.g. Tetley Hall near Crowle and the small town of Epworth, in which the Church of St Andrew is constructed of Jurassic Lincolnshire Limestone, while the housing is of local brick. Typical of the buildings using ‘imported’ stone is the Church of St John the Baptist at Stamford Bridge, which is largely constructed of thinly coursed, pale greyish-yellow Carboniferous Pennine Lower Coal Measures sandstone (probably Elland Flags), with pale yellow, ooidal, Lincolnshire Limestone dressings.

In contrast, the early Norman Church of St Michael at Sutton-upon-Derwent is (partly) constructed of yellow Late Permian ‘Magnesian Limestone’ (Cadeby Formation), while the churches of St Mary at Ellerton and All Saints at Bubwith are of ‘Magnesian Limestone’ ashlar. Further south, the substantial ruins of Wressle Castle are constructed of high quality, yellow-weathering ‘Magnesian Limestone’ ashlar. The Church of St Oswald in Crowle, dating from the 12C, is constructed of Late Permian ‘Magnesian Limestone’ and serves to exemplify the ‘import’ of stone into the outcrop area of the Mercia Mudstone Group.

Penarth Group

This thin, poorly exposed sequence of rocks largely comprises dark grey, fissile, marine mudstones and marks the end of non-marine, ‘red-bed’ Triassic sedimentation. The group as a whole represents a transitional interval preceding the establishment of fully marine conditions during the subsequent Jurassic. Despite the presence of occasional thin sandstone horizons, there is no evidence of any of the beds having been worked for building stone.
Jurassic

LOWER JURASSIC
Lias Group
(Redcar, Scunthorpe and Charmouth Mudstone Formations)

The Lias Group is characterised by a thick succession of grey mudstones and argillaceous and occasionally bioclastic limestones, with sporadically developed (but nonetheless economically important) sedimentary ‘ironstone’ horizons. The narrow, irregular outcrop extends from Bishop Wilton in the north, skirting the Market Weighton ‘Axis’ and broadening along the western margin of the Yorkshire Wolds, before crossing the Humber and continuing to Messingham in the south. The thin, blue-grey limestone beds commonly used as building stone in other areas where the lower Lias Group (Blue Lias Formation) is present are only poorly developed, and no buildings making use of Lias limestone have been encountered during this study. In general, local village housing on the Lias Group outcrop is of brick, with the more prestigious buildings being constructed of ‘imported’ Magnesian Limestone ashlar.

At higher stratigraphic levels within the Lias Group, limestones become less common and several significant ‘ironstone’ beds occur to the south of the Humber. Each one of these ‘ironstone’ beds has in the past been served as a source of low-grade iron ore, although only the Frodingham Ironstone is thick and extensive enough to have supported a substantial commercial iron industry at Scunthorpe. These ‘ironstone’ beds were also once of local importance as sources of vernacular building stone.

**FRODINGHAM IRONSTONE MEMBER**

This distinctive, ooidal and bioclastic, variably calcareous ‘ironstone’ bed crops out mainly to the south of the Humber in North Lincolnshire (notably around Scunthorpe). The ‘ironstone’ represents a gradual change in depositional setting from the open marine environments of the Lias Group to a generally more restricted, marginal marine environment. The unit progressively thins northwards across the Humber, and becomes less ferruginous and more calcareous in character, before finally thinning out against the ‘Market Weighton High’.

The Frodingham Ironstone formed the basis of a substantial local iron-making industry, which reached its peak in the early 20C. When freshly exposed, the ironstone is greenish-grey in colour, but after prolonged exposure becomes more variegated, ranging from yellow-brown to red-brown. These latter colours are more typical of the ‘ironstone’ blocks found in local buildings around Scunthorpe and Frodingham. Any modern replacement stones may retain their unweathered blue-grey coloration for some time (being termed ‘blue-hearted’), before taking on the more familiar brownish colour. The Frodingham Ironstone was fairly widely used as a building and walling stone along its outcrop, but does not appear to have travelled very far from its quarry sources. Examples of its use include the churches of St John the Evangelist and St Lawrence in Scunthorpe, where it is used as a coursed rubblestone with pale Lincolnshire Limestone dressings. Ironstone churches can also be seen at Messingham and Flixborough.
Whitby Mudstone Formation

This poorly exposed grey limestone and calcareous, silty mudstone-dominated succession also includes two comparatively thin ‘ironstone’ beds – the Pecten Ironstone and Marlstone Rock members – both of which have been worked to some degree as iron ores.

PECTEN IRONSTONE MEMBER

The Pecten Ironstone is again best developed south of the Humber, but is poorly exposed overall. As its name suggests, it contains a significant shelly fauna that includes an abundance of very large Pecten bivalve shells. The yellow-brown ironstone itself is typically ooidal and closely comparable to the Frodingham Ironstone in character, but is a much more thinly developed unit. When used as a building stone, removed from its outcrop, it is difficult to distinguish from the Frodingham Ironstone.

MARLSTONE ROCK MEMBER

As with the stratigraphically lower ‘ironstones’ of the Lias Group, the Marlstone Rock forms a distinctive ridge in the landscape. Unlike the other ‘ironstone’ beds of the group, however, the Marlstone Rock comprises a lower interval of calcareous sandstone and an upper interval of fossiliferous, ooidal ironstone. The latter has been worked as an iron ore in the past. The ironstone was also used locally as a vernacular building material but, out of context in a building, it can be difficult to distinguish from the other Lias ‘ironstones’.

Middle Jurassic

Inferior Oolite Group

Northampton Sand Formation

This formation is only thinly developed in North Lincolnshire and does not extend north of the Humber into East Yorkshire. The unit itself, lying at the base of the Middle Jurassic succession, comprises a variegated, strongly ferruginous, yellow-brown to red-brown, bioclastic sandstone. Unlike its much better developed stratigraphic equivalents in Northamptonshire, it does not appear to have been worked to any great extent for local building stone, nor has it formed the basis of a local iron-making industry. Locally, though, it was sometimes used as a building rubblestone.

Lincolnshire Limestone Formation

The Lincolnshire Limestone Formation, of Bajocian age, is dominated by ooidal, bioclastic and finer-grained micritic limestone beds, which are of variable thickness. Their outcrop extends from Kirton in Lindsey in the south to Sancton on the north side of the Humber Estuary, and is usually evidenced by a prominent north-south trending ridge. Quarrying of the Lincolnshire limestones for both lime and building stone was once a very significant local industry. Former building stone workings are known at Hibaldstow, Kirton in Lindsey, Santon, Winteringham, Brough, Brantingham, South Cave, North Newbald and Sancton, and the quarried stones are often named eponymously e.g. ‘Cave Oolite’, ‘Brough Stone’ etc. Most of the villages with associated quarries feature the pale yellow, ooidal and bioclastic limestones to a greater or lesser extent in their buildings. The impressive cruciform Church of St Nicholas in North Newbald, which dates to Norman times, is constructed of locally quarried ‘Cave Oolite’.

The Church of St Nicholas in North Newbald.
A further example of ‘Cave Oolite’ use is provided by the Church of All Saints in North Cave (above). The external fabric of the building exemplifies the colour variation shown by this particular Lincolnshire Limestone. The outcrops of the Lincolnshire Limestone Formation have served as the principal sources of vernacular building and walling stones for the towns and villages within this part of the East Yorkshire–northern Lincolnshire area. It is quite likely, however, that a substantial proportion of the higher quality Lincolnshire Limestone ashlar employed in the building of churches and high status houses was sourced from quarries further south, in the Ancaster–Heydour area, where the limestone bed thicknesses are much greater. Certainly, much modern repair and conservation work relies on Lincolnshire Limestone supplied by the active quarries found around the Ancaster area of Lincolnshire.

One particular often cited example of the use of ‘Cave Oolite’ limestone is the original walls of the Roman–Medieval town of Kingston upon Hull, although, sadly, little evidence now remains of these walls in the much expanded modern city.

Great Oolite Group

Blisworth (Snitterby) Limestone & Cornbrash Formations

The thick ooidal limestone developments that characterise the Bathonian Great Oolite Group in southern England (notably the ‘Bath Stone' successions of Somerset) are not present in the area covered by this Atlas, where the group instead comprises a thinly developed succession of interbedded limestones (variably fossiliferous and ooidal), mudstones and sandstones.

Nonetheless, in the South Cave area, and occasionally elsewhere near their outcrops, small quantities of the limestones and fine-grained sandstones have been used for construction purposes. These units do not, however, appear to have provided a significant amount of local building stone.

Upper Jurassic

During Late Jurassic (Callovian to Kimmeridgian) and Early Cretaceous times, the presence of the structural ‘high’ commonly known as the Market Weighton ‘Axis’ (or Market Weighton ‘High’ or ‘Structure’) had a significant impact on sedimentation across the East Yorkshire–northern Lincolnshire area.

To the north, in the North Yorkshire area, a rapidly subsiding basin developed in which a thick succession of limestones, sandstones and mudstones was deposited (the Ancholme and Corallian groups). To the south, meanwhile, in what is now East Yorkshire and North Lincolnshire, a more slowly subsiding shelf or platform became established, over which, the sedimentation was ‘condensed’ (the Ancholme Group only is developed).
Ancholme Group

In both North Lincolnshire and the southern part of East Yorkshire, the Ancholme Group succession is, in general, poorly exposed. Where present, it is dominated by fossiliferous mudstone and siltstone lithologies, with occasional thin developments of sandstone. Only the latter have proved suitable for building purposes. Three principal sandstone ‘horizons’ are present in the group, and these lie within the Kellaways Formation (Kellaways Sand Member; Callovian), the West Walton Formation (Brantingham Member; Oxfordian) and the Kimmeridge Clay Formation (Elsham Sandstone Member; Kimmeridgian). Sporadic evidence of the localised use of these sandstones is found around North Cave, Brantingham and Elsham, but they were evidently not sufficiently durable to have warranted ‘export’ beyond their respective outcrop areas.

ELSHAM SANDSTONE MEMBER

The Elsham Sandstone is pale grey to greenish grey, medium-to coarse-grained and has a variable carbonate cement. There is evidence of quarries within the outcrop, but as yet few surviving buildings constructed using the sandstone have been identified.

Cretaceous

Lower Cretaceous

A thin, but lithologically complex, Lower Cretaceous succession is present along the western scarp of the Lincolnshire Wolds. It includes the Spilsby Sandstone, Claxby Ironstone, Tealby and Roach formations. The comparatively thick limestone unit occurring within the Tealby Formation, the Tealby Limestone Member, was an important source of local building stone, despite the fact that its outcrop does not extend into the Atlas area (see Imported Stones section).

Spilsby Sandstone Formation

This distinctive, grey-green, fossiliferous and glauconite-rich sandstone has been widely quarried and used as a building stone in eastern Lincolnshire, but is seen only infrequently in North Lincolnshire where it has been occasionally used for repair work.

Upper Cretaceous

Chalk Group

Hard, white and off-white, micritic limestone lithologies (chalk), with variable developments of flint nodules, dominate the Upper Cretaceous Chalk Group succession which crops out extensively in the Wolds of East Yorkshire and Lincolnshire.

Buildings constructed entirely of chalk are a comparative rarity over much of this area, but surviving examples can be seen in Towthorpe, Carnaby, Wold Newton (Old Vicarage), Flamborough (lighthouse, farm buildings), Londesborough, Langtoft (chalk cottages with brick dressings) and Burton Fleming. The remains of a cruck-framed longhouse of brick and chalk at Octon (near Thwing) is perhaps typical of a once more common use of this stone type as a building material in the Wolds area. The large 12C brick manor house at Burton Agnes, meanwhile, makes extensive use of chalk for quoins and internal stone dressings. In the North Lincolnshire Wolds, a small number of buildings constructed at least in part of white chalk block remain e.g. churches, cottages and farm buildings found at Goxhill, Thornton Curtis, Wootton, Ulceby, Croxton, Barnetby le Wold, Wold Newton and Elsham.
Unlike the Chalk Group successions of southern England, these 'northern chalks' have not proved to be a reliable source of flints suitable for building purposes. Consequently, there are no examples of the elaborate flint pattern-work well known, for example, in East Anglia. However, large, pale grey flint nodules are quite extensively used in some church wall fabrics e.g. Barnoldby le Beck, Ashby cum Fenby and Hatcliffe.
Quaternary (Pleistocene)

Cobbles

The Quaternary deposits of the Spurn Head (Point)–Holderness coastal strip represent one of the most significant sources of building materials in East Yorkshire. This particular area supplied, from at least the 18C, cobbles, gravel and sand not only for building purposes, but also for road-making and for ship ballast. In some parts, this ‘quarrying’ – or more commonly gathering – of cobbles and boulders (glacial erratics), either directly or indirectly from the eroding till/boulder clay sea ‘cliffs’, was extremely important to the local economy. On-going natural erosion of these ‘cliffs’ serves to replenish the Holderness beaches with cobbles.

The cobble stones collected were lithologically varied, and included fine- and coarse-grained igneous (e.g. Whin Sill dolerite, Shap and Peterhead granites, and red porphyries), metamorphic (e.g. gneisses and schists) and sedimentary (Carboniferous, Permo-Triassic and Jurassic sandstones; Carboniferous, Permian and Jurassic limestones, plus ‘ironstones’ and flints) rock types. Some of the lithologies present are quite clearly of Scandinavian origin. The cobbles and boulders were collected on a very large scale and delivered overland by the cartload or by boat for use in buildings and dock construction along the coast. The ‘industry’ became so large that serious concerns were raised that the removal of the cobbles was in part responsible for occasional breaching of the peninsula during severe storms.

There are numerous examples of these cobblestones being used in houses, farm buildings and, particularly, churches e.g. at Hornsea, Aldbrough, Tunstal, Withernsea, Preston, Burstwick, Keyingham, Skeffling and Easington. At Easington, for example, the church tower is constructed principally of pale Magnesian Limestone from the quarries at Roche Abbey near Rotherham, with the rest of the fabric largely comprising an exotic mix of ‘Spurn’ cobblestones.

The pattern of use of these cobbles in buildings is quite variable. In the cottages at Easington, the wallstone cobbles form a herringbone pattern, with bricks being used for quoins and dressings. In yet other cases, such as the mid-19C Church of St Alban in Withernwick, the walls are coursed using a brick and cobble mix (below).

Some wall fabrics, meanwhile, incorporate cobbles of different sizes, colours and lithologies, and appear to have been selectively used to produce small-scale patterning. In most instances, the cobbles form the principal walling stones, with a variety of other ‘imported’ lithologies being used for ashlar work, mouldings and dressings. ‘Magnesian Limestone’, Lincolnshire Limestone and cross-bedded Middle Jurassic sandstones (presumably from North Yorkshire) all appear in church buildings in the Holderness area.
‘Imported’ and Re-Used Building Stones

The East Yorkshire–northern Lincolnshire area, despite its considerable geographical extent, is generally lacking in indigenous high quality building stones suitable for ashlar and decorative stonework. Indeed, as already noted, most of the built structures in the villages and towns principally make use of local brick (e.g. Burton Constable Hall), with stone being used only for decorative features such as window mouldings. It is clear, however, that for ‘important’ buildings such as churches and a number of the great houses, stone was the building material of choice from Norman times onwards. To meet the demand for such stone, it had to be ‘imported’ into the area from elsewhere by river, sea or overland. Consequently, it is these ‘imported’ stone types that have the greatest impact on the character of the stone architecture over much of the area.

One particularly interesting example of stone re-use is provided by the Church of St Peter at Humberston near Grimsby. This large, structurally complex church (right) dates back to the 15C and has a fabric that includes a brick nave, a large tower which is in part of ‘imported’ pale ‘Magnesian Limestone’, and footings which include a mix of recycled medieval ‘Magnesian Limestone’ tombstone fragments (below) and weathered fragments of dark grey, fossiliferous Purbeck Marble (also probably from a medieval tomb slab).
Carboniferous sandstone

The re-use of previously dressed stone was important in other parts too. The best examples of such stone ‘recycling’ are probably provided by the large, pre-dressed blocks of coarse-grained Carboniferous Millstone Grit sandstone which are seen with some frequency in the churches located along the Humber coastal strip in North Lincolnshire e.g. Barton-upon-Humber and Alkborough. These ‘gritstone’ blocks were probably robbed from nearby Roman sites and transported along the Humber by raft or boat. ‘Recycled’ blocks of Carboniferous Millstone Grit sandstone were used for both the pilaster strip work and the ‘long and short’ work on the Saxon 10C tower of the Church of St Peter in Barton-upon-Humber (below).

Elsewhere, in later times, there is also evidence of a considerable trade in the finer-grained, brown-coloured Pennine Coal Measures sandstones (such as the Ackworth and Mexborough rocks).

These sandstones were suitable for decorative window and door mouldings and, in some cases, were even put to use as ashlar blocks e.g. the Church of St John the Baptist at Stamford Bridge (above).
Permian

‘Lower Magnesian Limestone’

Perhaps the best example of the ‘importation’ of stone into the area is that of the widespread use of the dolomitic limestones of the Late Permian Cadeby Formation (‘Lower Magnesian Limestone’). These dolostones were quarried extensively from medieval times onwards along their north–south trending outcrop which lies just outside the area in West Yorkshire (notably around Wathworth, Steetley, Pontefract, Huddleston and Tadcaster). The structures of the massive minsters and parish churches at Beverley, Hedon, Patrington and Skirlaugh are dominated by white or cream ‘Magnesian Limestone’. The church at Howden owned the rights to work stone at a Tadcaster quarry, which was duly used to construct the very substantial Howden Minster. Other smaller, but no less significant, ‘Magnesian Limestone’ buildings include: the Bishop’s Manor, Howden; the Church of St John the Baptist, Carnaby; the Church of St Mary, South Dalton (Steetley Stone); Wressle Castle and; the Priory Church of St Mary the Virgin, Swine.

In North Lincolnshire, ‘Magnesian Limestone’ was ‘imported’ from quarries near Tadcaster and put to decorative use in the construction of Thornton Abbey’s magnificent 14C brick gatehouse (top right). The stone was carried from the quarries first to the Wharfe, then moved along the Ouse and down the Humber, before being taken to the abbey site. Also evident in the fabric of the gatehouse are large blocks (presumably repairs) of now badly weathered, yellowish limestone with large bivalve fossils i.e. more locally sourced Tealby Limestone.

JURASSIC

MIDDLE JURASSIC

In the northern part of East Yorkshire, fine-grained sandstones worked from the Middle Jurassic successions of the Cleveland Basin are conspicuous. These sandstones almost certainly originated from quarries located near Whitby, which produced what is now commonly known as ‘Whitby’ or ‘Aislaby Stone’. This sandstone was used for decorative work in conjunction with the less suitable locally available stone types. The Church of the Holy Trinity at Bridlington apparently also used the same Glaisdale-produced sandstone. The Aislaby Stone quarries are still actively supplying stone to the East Yorkshire area and elsewhere.

E Yorkshire and N-NE Lincolnshire Strategic Stone Study 12
Upper Jurassic

The Upper Jurassic succession tends to be both poorly developed and exposed in East Yorkshire. Where present, it is characterised by interbedded fine-grained mudstone-siltstone lithologies, which generally do not provide suitable building material. To the north west, however, outside the East Yorkshire area, the succession comprises a thick sequence of fine-grained spicular sandstones (including the Lower, Middle and Upper Calcareous Grit formations) separated by beds of ooidal and bioclastic limestone. Collectively, these sandstones and limestones comprise the Corallian Group.

Sandstones quarried from this Upper Jurassic succession lying just to the north of the area covered by this atlas (within the Howardian and Tabular hills) have seen common use in northern and northwestern parts of East Yorkshire. Though comparatively soft and sometimes coarsely fossiliferous and ferruginous, these sandstones are seen with some frequency in church fabrics, mainly as ashlared blocks, but also as decorative mouldings and dressings e.g. Burton Fleming, Thwing, Fridaythorpe, Fangfoss, Kilham, Bempton and Wold Newton. Ashlared blocks of Upper Jurassic Corallian Group ‘Calcareous Grit’ sandstone (likely Lower Calcareous Grit Formation) dominate the external stonework of All Saints’ Church in Wold Newton (top right). The nave dates to the 12C, while the south porch, bell turret and chancel date to the 19C. In general, the ‘Calcareous Grits’ are fine- to medium-grained, calcareous, marine sandstones, which are often characterised by large crustacean (Thalassinoides) burrows (middle right), concretions and bioclasts. These sandstones were comparatively easy to cut and dress, resulting in their use as large ashlar blocks. However, they are relatively weakly cemented, and can often show signs of significant weathering and cavernous decay. Blocks of ‘Calcareous Grit’ sandstone have also seen use in bridges, with the 18C River Derwent crossing at Stamford Bridge serving as an example (bottom right). In general, the sandstones have not weathered well.

Ooidal limestone blocks from the Corallian are occasionally observed in the fabrics of churches located within northwestern East Yorkshire.
CRETACEOUS

Lower Cretaceous

Tealby Formation

TEALBY LIMESTONE MEMBER

The Tealby Limestone comprises dark yellow-brown, argillaceous, ferruginous limestone that is often characterised by the presence of very large mollusc shells (occurring either in isolation or in clusters). The limestone was worked into large ashlar blocks, but its fine-grained, soft, muddy nature has resulted in it weathering badly. The wall fabrics of the many churches in which it has been extensively used, in both Lincolnshire and North Lincolnshire, show sizeable areas of serious decay. A particularly striking feature of many of the weathered stone blocks is the nests of the aforementioned thick-walled bivalve fossils, which tend to stand proud of the block surface. The limestone was unsuitable for carved work, mouldings and dressings, thus paler, ooidal Lincolnshire Limestone was generally used for this purpose (e.g. Worlaby and Cadney churches).

Tealby Limestone is also extensively used in churches in North East Lincolnshire (e.g. Hatcliffe, Brigsley, Barnoldby le Beck and Ashby cum Fenby), and was occasionally used for housing and farm buildings in this area (e.g. Wold Newton). Tealby Limestone was also occasionally used in the construction of dwelling houses, such as in The Welfitts (the Old Manor) in Wold Newton (above). Extensive repair work has evidently been necessary, presumably due to the failure of the ‘limestone’ blocks.
Glossary

Ashlar: Stone masonry comprising blocks with carefully worked beds and joints, finely jointed (generally under 6mm) and set in horizontal courses. Stones within each course are of the same height, though successive courses may be of different heights. ‘Ashlar’ is often wrongly used as a synonym for facing stone.

Calcareous: A rock which contains significant (10-50%) calcium carbonate principally in the form of a cement or matrix.

Dolomitic, dolomitised limestone, dolostone: Descriptive terms for a limestone that has had some of its calcium carbonate replaced by magnesium carbonate.

Dressings: To say a building is constructed of brick with stone dressings means that worked stone frames the corners and openings of the structure.

Ferruginous: Containing iron minerals usually in the form of an iron oxide which gives the rock a ‘rusty’ stain.

Ironstone: Sedimentary rock which is composed of more than 50% iron-bearing minerals.

Limestone: A sedimentary rock consisting mainly of calcium carbonate (CaCO₃) grains such as ooids, shell and coral fragments and lime mud. Often highly fossiliferous.

Lithology: The description of a rock based on its mineralogical composition and grain-size e.g. sandstone, limestone, mudstone etc.

Mouldings: Anything with a contour or section, either projecting or inset, to give emphasis, usually to horizontal and vertical lines.

Mudstone: A fine-grained sedimentary rock composed of a mixture of clay and silt-sized particles.

Ooid: A spheroidal grain of calcium carbonate formed by precipitation (by algae) of calcium carbonate in concentric layers.

Rubble: Rough, undressed or roughly dressed building stones typically laid uncoursed (random rubble) or brought to courses at intervals. In squared rubble, the stones are dressed roughly square, and typically laid in courses (coursed squared rubble).

Sandstone: A sedimentary rock composed of sand-sized grains (i.e. generally visible to the eye, but less than 2 mm in size).

Sedimentary rock: A rock that is commonly formed by the binding together (lithification) of sediment particles (e.g. sandstone, siltstone, mudstone, limestone).

Stratigraphy: Branch of geoscience dealing with stratified rocks (generally of sedimentary origin) in terms of time and space, and their organisation into distinctive, generally mappable units.
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Further Reading


BGS Memoirs and Sheet Explanations


