Strategic Stone Study

A Building Stone Atlas of Cheshire

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Introduction

The solid geology of Cheshire is dominated by large tracts of mainly red Permo-Triassic sediments which cover much of the lower-lying western and central ridge areas of the county, stretching from Chester in the west to Congleton in the east, and from Warrington in the north to Nantwich in the south. More resistant, hard pebbly sandstones within the Triassic sequence may form local ridges, as at Malpas, and Alderley Edge. Along the eastern fringes of the county, linear outcrops of Carboniferous limestone, Millstone Grit and Coal Measure sandstones form more prominent higher ground extending from Astbury, and east of Congleton to around Macclesfield; Carboniferous sandstones also form isolated inliers south of Chester.

A small outcrop of Permian sandstone occurs along the northern county boundary south of Stockport. The northeastern tip of a Lower Jurassic outlier (which extends into northern Shropshire) is present on the southern margin of Cheshire around Wilkesley and Coxbank, but is poorly exposed. Apart from occasional tuff layers within the sedimentary succession, there are no significant volcaniclastic, igneous or metamorphic rocks exposed anywhere within the county. Much of this bedrock geology in the lower-lying areas has been subsequently covered by extensive Quaternary drift deposits, including Devensian boulder clays and Flandrian sands and alluvium, especially in the areas around the River Mersey, between Ellesmere Port, Runcorn, Widnes and Warrington.

In comparison with many other English counties, Cheshire has a relatively limited diversity of building stones. The main stones used originate from the Millstone Grit or Coal Measure sandstone horizons, or from red sandstone or pebbly sandstone formations within the Triassic sequence.

The outcrops of lower Carboniferous limestone, Permian sandstones and Blue Lias are either too limited in extent, or not of suitable lithology to have been used as building stones or even rubble stones other than in very localised circumstances.

Within Cheshire, the use of building stone tends to be confined to older buildings, churches, bridges and retaining walls. The oldest known use of stone dates back to the Romans who used local red sandstone in the construction of the former Roman city of ‘Deya’ (Chester). However, the sandstone quarrying industry, still very active in Cheshire in the latter part of the 19th century, died out in the early 20th century. Many 19th-and 20th-century buildings in the county have been built from brick (which was manufactured using local Triassic marls and clays) often laid in a characteristic Flemish Bond style. The brick manufacturing industry was particularly active in the late 19th century. Another feature which is very characteristic of Cheshire architecture, is the widespread use of ‘tudor-style’ wood frame construction, with alternating patterns of black painted wood and white plaster. In many buildings, sandstone blocks were used as foundations or a plinth on which brick or wood frame structures were erected.
Useful accounts of the geology and use of building stones in Cheshire are mainly provided within the relevant memoirs of the British Geological Survey. The Triassic rocks in particular have gone through a complex history of classification and various names have been attributed to the lithologies and the building stone types. For convenience, these are summarised here in Table 1, against the framework of modern formation names which are used in this report.

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Table 1. Summary of Stratigraphical names applied to the Permo-Triassic lithologies in Cheshire (the main sources of building stones are shaded).
Lower Carboniferous
Peak Limestone Group
Astbury Formation
Astbury Limestone & Astbury Sandstone

Rocks of lower Carboniferous age crop out only in a small inlier at Astbury, just south of Congleton. Here massive, thickly-bedded, pale grey limestones (the Astbury Limestone) were once extensively quarried underground, principally for lime, but no exposures remain; the workings are now flooded and the stone is largely worked out. The overlying Astbury Sandstone is a coarse-grained, cream coloured, feldspathic sandstone, resembling the ‘gritstones’ from the Millstone Grit (described below). It was formerly quarried at several places around the southern part of the inlier. Both these rock types were employed locally on a small scale as rough building or rubble stones, and mainly for farm buildings and walls.

Upper Carboniferous
Millstone Grit Group
Morridge Formation
Minn Beds

The Minn Beds crop out on the eastern edge of the county, around Limekiln Brook near Astbury. Eastwards more extensive and thicker outcrops occur on Bosley Minn, Wincle Minn and Biddulph Moor (in Staffordshire). Within Cheshire the Minn Beds are represented by pale greenish-grey, thinly-bedded to massive quartzitic sandstones, typically with very dark carbonaceous partings and siltstone interbeds. The thicker sandstone units are locally called ‘crowstones’. Sandstones in the Minn Beds have been worked in the past as walling-stones (and as poor quality road aggregate), but because they have a tendency to split into small pieces they do not make good building stones. The most extensive workings in Cheshire occur at Rough-Hay and Foxbank quarries, south of Macclesfield, where the lithologies vary from coarse pebbly gritstones to fine sandstone.

Marsden Formation
Roaches Grit

The Roaches Grit crops out along the eastern edge of Cheshire, the main outcrops forming prominent ridges and escarpments east of Macclesfield, and southeast of Bollington, especially at Cophurst Edge and Windyway House. Like many of the Millstone Grit sandstones it is pale-coloured, medium to coarse-grained and feldspathic, with some layers becoming sufficiently coarse-grained to be termed ‘gritstones’. It is characterised at outcrop from other grits by the presence of large rounded ferruginous concretions and have a tendency to exhibit sphaeroidal weathering. Roaches Grit was worked at several quarries along the Windyway escarpment north of Tegg’s Nose, including Windyway and Walker Barn quarries.

The Roaches Grit has been used as a tough, durable stone in many buildings along its outcrop, although it tends to be slightly softer than the best layers of Chatsworth Grit. An example of its use is provided by the 16th-century Wild Boar Inn and adjoining buildings at Longgutter (near Macclesfield) which is constructed of roughly squared and coarsed sandstone blocks (below). Roaches Grit also provided the stone for the reservoir dams in the Langley Valley.

Wild Boar Inn at Longgutter, near Macclesfield.
**Chatsworth Grit**

Like many of the thicker sandstones in the Millstone Grit around Macclesfield, the Chatsworth Grit has been extensively quarried for general building purposes and for walling stone. It typically comprises coarse-grained, light purple and grey, locally pebbly sandstones with minor inter-bedded mudstones and siltstones; the basal layers are often represented by massive, tough, compact, fine-grained free-working sandstones.

The Chatsworth Grit occurs along the south-eastern and eastern edges of Cheshire, the main outcrop forming prominent ridges and crags east of Mossley and Congleton (Rainow Hill, Cloud Side) and trending north from Winckle, via Nessit Hill, around eastern Macclesfield (Tegg’s nose, Wards Knob and The Hollins) to east of Bollington.

The workings have mainly been on small scale, but a number of major quarries follow along strike of the Chatsworth Grit outcrop. These are almost all now abandoned, the building stone industry here having greatly declined over the past few decades. In addition to meeting local demand, this stone was formerly carted to the Potteries, and the Chatsworth Grit at Mow Cop had a high reputation as a source of millstones which retained a sharp edge.

One of the largest quarries in the Chatsworth Grit was at Tegg’s Nose, which formerly yielded massive pink and white gritstones, hardened by secondary silicification. Although reserves of the stone remain, quarrying here ceased due to the increasing overburden of the shaly rock above. Like the Roaches Grit, the Chatsworth Grit was also extensively quarried along Congleton Edge and Mow Cop ridge, the main workings being at Rainow Hill, from Girthing Bank to Nick th’ Hill, from Edge Hill to Black Cob, and at Mow Cop.

An example of the typical use of Chatsworth Grit is provided by the hamlet of Ginclough, near Rainow (below), where the mill and many of its cottages are built of locally sourced sandstones.
Rossendale Formation

Rough Rock

The Rough Rock also occurs along the south-eastern and eastern edges of Cheshire, with its main outcrop extending from east of Astbury and Congleton (Timbersbrook), and also being present further north at Macclesfield and Bollington. It commonly forms a good topographic feature on which there are several conspicuous tors, as at Rock End.

The lower parts of the Rough Rock are typically represented by impersistent or flaggy sandstones which around Macclesfield are fine-grained, and coloured purple and grey; the upper parts are more consistent and comprise distinctly pink or light purple coloured, medium to coarse-grained, massive feldspathic sandstones with rare pebble seams. The Rough Rock has been extensively extracted along Congleton Edge and the Mow Cap ridge between Dane-in-Shaw and Timbersbrook, Willocks Wood and near Mount Pleasant. All these workings are now disused. It was also formerly worked east of The Cloud, but only on a relatively small scale.

The wall adjoining the church of St Michael and All Angels in Macclesfield, is built of lenticular blocks of greyish current-bedded Rough Rock sandstone, probably originating from the lower part of the formation (below). A further example of its use is provided by the 16th-century Lion and Swan coaching inn at Congleton, in which the plinth and lower levels are constructed of Rough Rock sandstone, with the upper parts built in characteristic black and white ‘Tudor style’ timber frame (above).
Pennine Coal Measures Group
Pennine Lower Coal Measures Formation
Coal Measures sandstones

The outcrop of Coal Measure sandstones is mainly confined to a small area east of Macclesfield, where the rocks occur as a series of north-south or northeast-southwest trending linear exposures extending from near Bollington via Higher Poynton and Handleybarn to south of High Lane.

These sandstones are typically medium-grained and greyish in colour (but some are prone to weather a deep yellow-brown); they vary from being relatively massive to flaggy. The sandstones occur at various levels within the sequences, often separated by thicker units of siltstones, mudstones and coal seams. The miners and quarrymen gave the different sandstone beds various names (such as Woodhead Hill Rock, Milnrow Sandstone, Ridge Stone, Kerridge Stone, Old Lawrence Rock) and used them as marker horizons between the coal seams.

However, these different sandstones are virtually indistinguishable when ex-situ and so are regarded here as ‘Coal Measure Sandstone’ for convenience.

The sandstones are used locally as building and walling stones, mainly in the Macclesfield and Bollington areas. Examples of their use is provided by the the 18th/19th-century entrance lodge to King’s School in Cumberland Street, Macclesfield (top right) where the sandstones are used for the chimney stacks, quoins, window lintels and decoration in an otherwise brick built structure; and in the construction of 17th/18th-century cottages (bottom right) along Bollington Road, Bollington, where the sandstones have been coarsely squared and laid in rough courses.
Warwickshire Group

Salop Formation

Erbistock Beds

The Erbistock Beds (also formerly known as the Erbistock Formation) only occur in two inliers south of Chester: the larger eastern inlier is bounded by Farndon – Coddington – Gateshead - Hatton Heath; only the tip of the smaller western inlier occurs in Cheshire, just south of Poulton. The rocks comprise reddish brown or reddish purple fine-grained sandstones with paler mudstones and seat earths. The thickest sandstones occur in the lowest part of the sequence. The Erbistock Beds are relatively soft (when compared to other red sandstones occurring in Cheshire) and weather relatively easily. This fact combined with their limited distribution, mean that they are only employed very locally as occasional rubblestone and walling stone.

PERMIAN

Appleby Group

Collyhurst Sandstone Formation

Collyhurst Sandstone

The Collyhurst Sandstone has a very limited outcrop within Cheshire, being confined to the far north-east corner of the county where the formation occurs in a 3 km long ‘triangular sliver’ extending from Poynton northwards to Hazel Grove and Stockport (outside the county) where the outcrop is much thicker.

Lithologically, the Collyhurst Sandstone is a bright red-brown or orange-brown coloured sandstone on fresh surfaces, and exhibits a distinctive ‘millet seed’ texture to the sand grains. These medium-grained sandstone beds typically alternate with layers of fine-grained sharp sand.

Outside of Cheshire comparable Permian-aged sandstones are important for building purposes, and forms such as Penrith Sandstone (from Cumbria) are well known. However, within Cheshire, use of the Collyhurst Sandstone is reminiscent of that of the Erbistock beds; it weathers relatively easily and this combined with its very limited distribution, means it is only used very locally for occasional building purposes.

TRIASSIC

Sherwood Sandstone Group

Kinnerton Sandstone and Wilmslow Sandstone Formations

Lower Mottled & Upper Mottled Sandstones

As their name implies, these sandstones have a very distinctive appearance. They are generally soft, incoherent, fine to medium-grained, foxy red and reddish-brown coloured sandstones which are extensively and characteristically mottled with buff and grey patches, blotches and bands.

Although mottled sandstones have an extensive outcrop within Cheshire, the normal facies are readily weathered into characteristic wind-blown holes, hollows and caves, and is too soft and easily eroded to be used as a building stone. Occasionally these sandstones may be affected by baryte mineralisation (indicated by abundant pale buff rosettes of baryte crystals) and are then grey or greyish-brown in colour and become harder and resistant. These mineralised sandstones are used locally for building purposes near Overton (Malpas) and along the scarps of the mid-Cheshire ridge. The Mottled Sandstones do provide valuable ‘marker formations’ as they are very distinctive and lie adjacent to other harder red sandstones which do form important sources of building stone in Cheshire.
**Chester Pebble Beds Formation**

**Pebble Beds (Bunter Pebble Beds)**

The Chester Pebble Bed Formation forms an extensive surface outcrop through Cheshire; a main central swathe extends from the south (Castletown - Shocklach Hall and Holt - Farndon areas) through the Chester district including east Chester, Wilverton, Tattenhall and Tarvin. The formation is largely obscured by drift northwards towards the River Mersey, Ellesmere Port and Elton; but it also crops out immediately north of Macclesfield and then extends to the northeast corner of the county as a North-South trending belt running east of Wilmslow and via Tytherington, Bollington and Poynton to Bramhall. The formation also occurs in southeastern parts of Cheshire, mainly as small, fault-bounded exposures near Kidsgrove, and between Scholar Green and Astbury.

The typical lithology is reddish brown, medium to coarse-grained, cross-bedded sandstones, incorporating rounded quartzitic pebbles which may vary in size, but rarely exceed 8 cm in diameter. Sandstone beds with few or no pebbles also occur and ‘millet seed’ sand grains are common in the coarser, more mica-free sandstone beds. Particularly conglomeratic horizons occur towards the lower parts of the sequence east of Chester.

The only other red Triassic conglomeratic or pebbly sandstones that were widely used as building stones in Cheshire occur within the Delamere Member of the Helsby Sandstone Formation, although the latter sandstones typically contain smaller pebbles (up to 2.5 cm diameter) than the usual Chester Pebble Bed facies. However, it is important to note that non-pebbly sandstones occur in both these different formations and these may be virtually indistinguishable from each other when ex situ.

The harder sandstones, pebbly sandstones and conglomerates of the Chester Pebble Bed Formation were formerly much employed as a valued building stone along the outcrop, as is borne out by the numerous old quarries, although little, if any of this material is currently worked. Many of the villages located in the outcrop area are situated on hills formed by the Pebble Beds, and in many of these the church and other principal buildings have been constructed of well cemented Pebble Bed sandstones (with or without scattered pebbles) obtained from quarries in the immediate neighbourhood. Examples include Eccleston, Christleton, Waverton, Saighton, Handley (Handley Stone), Tattenhall and Tarvin. A number of old buildings in Chester itself were also constructed from the local Pebble Beds, including Chester Cathedral. Representative examples of the use of Pebble Bed sandstones can be found in Farndon, notably the 14th-century St Chad’s church (below) and roadside retaining walls on the east side of Churlton Road which is constructed from roughly dressed pebbly sandstone blocks.
Helsby Sandstone Formation

Helsby Sandstone

Along with the Chester Pebble Beds, the Helsby Sandstone represents one of the most important and widespread Triassic red-coloured sandstones used as a building stone in Cheshire. This formation covers an extensive area in Cheshire and it forms much of the high ground of the mid Cheshire Hills, although the outcrop is faulted and discontinuous. There are three main areas of outcrop: the Helsby-Manley outlier, escarpments and hilly ground between Rileybank and Rangeway Bank farm, and narrow outcrops near Kelsall. A large outcrop lies around Delamere, Willington, Quarrybank and Cotebrook. In the south, Beeston Castle surmounts a small inlier of Helsby Sandstone (the Passage Beds), and is detached from another major outcrop that forms Peckforton Hills with a faulted appendage between Burwardsley and Bolesworth Castle. In south Cheshire the beds occur in a Northeast-Southwest trending narrow belt between Treakwood and Broxton. In north Cheshire the strata are intermittently exposed from Frodsham to Runcorn to south Warrington, but are heavily concealed beneath boulder clay and Quaternary drift.

Further east in the county, the Helsby Sandstone crops out northeast of High Leigh, around Wilmslow, and between Alderley Edge and Prestbury, extending south to west Macclesfield. A small exposure is also present south of Alsager.

The lower part of the Helsby Sandstone Formation (the Delamere Sandstone Member) consists of fairly well cemented, reddish-brown, locally grey or buff, mainly coarse-grained, cross-bedded sandstones with much clay-gall conglomerate, especially in the lower parts of each major unit. Interbedded dark red micaceous shaly mudstones and siltstones also occur. The upper part of the formation (the Frodsham Sandstone Member) comprises relatively soft, finer-grained, very highly cross-bedded, red-brown, buff or grey sandstones, with few pebble horizons.

Some of the most important source quarries for Helsby Sandstone were at Helsby, Simmond’s Hill, Delamere, Kelsall, Peckforton and Manley. At Manley Quarry, the local variant of the Helsby Sandstone Formation (termed Manley Stone) is a coarse-grained, sharp sandstone containing rolled lumps of green shale and small quartzite pebbles. It has been used in the construction of Grosvenor Bridge and Chester Castle.
Other famous landmarks in Chester are also built from Helsby Sandstone:

- **Eastgate Street, Chester**, with the Eastgate Clock (1899) and arched gateway, marks the original entrance to the Roman fortress of ‘Deva Victrix’ and forms part of the city walls walkway. The gateway is constructed mainly of red sandstones from the lower parts of the Helsby Sandstone Formation (the Basement Beds), which were also used by the Romans for the facing of their city walls.

- **Chester Cathedral**, which dates from 1093, exhibits all the major styles of English medieval architecture, ranging from Norman to Perpendicular; extensive gothic-style restoration was undertaken in 1868-1876 partly due to major weathering of the red sandstone (Pebble Bed) exterior. A significant proportion of the stone formerly used in the cathedral (and the abbey buildings adjoining it) was obtained from old quarries in the vicinity of Northgate Street and Windmill Lane. The 19th-century restoration of the cathedral mainly used subdued brownish-red sandstones, occasionally mottled with white, from the Helsby Sandstone Formation.

Formerly there were also Helsby Sandstone quarries around Beacon Hill near Runcorn. These sandstones, locally called ‘Runcorn Red’ were widely used in Cheshire (for example in Runcorn Town Hall and the old Police Station, and also restoration works at Chester Cathedral and the city walls) and were transported via the River Mersey and canals, including the Bridgewater and Ship canals.
Passage Beds, Basement Beds

Above the Wilmslow Sandstone Formation (the Upper Mottled Sandstone) and below the Delamere Sandstone (Keuper Sandstone Conglomerate) there is occasionally developed a series of hard brown, flaggy, interbedded coarse-grained sandstones with reddish 'millet-seed' sandstones. These share characteristics of both the underlying and overlying strata and have therefore been termed the Passage (or Basement) Beds. Usually these beds are absent, and the Delamere Sandstone rests with an unconformable base upon the Wilmslow Sandstone Formation.

A classic example of the exposure and use of the Passage Beds is provided by Beestone Castle (below) which sits on a prominent outlier formed by resistent Passage Beds overlying softer Upper Mottled Sandstones. The castle itself dates from 1220 and is constructed largely from locally sourced, crudely coarsed and snecked sandstones belonging to the Passage Beds and Delamere Sandstone Member. Quarrying for building stone was carried out within the castle grounds in the 18th century, and unfortunately the gatehouse leading into the outer bailey was demolished to build an access track for the removal of stones from the site.
The Delamere Sandstone crops out in a narrow northeast-southwest trending belt extending from south Cheshire near Threapwood, and forms the resistant cap rock of the scarps around Broxton, Clutton, Bulkeley and Duckington, extending to the Burwardsley and Peckforton Hills areas. A series of northwest-southeast fault-bounded exposures of the sandstone also occur immediately east of Alderley Edge, near Motram St Andrew.

Lithologically, the Delamere Sandstone comprises coarse-grained, dark reddish-brown, red-orange, pale yellow to grey sandstones, gritstones and pebbly sandstones, containing well-rounded hard, pale grey or dark purple quartzitic pebbles similar to, but generally smaller than (up to 2.5 cm), the pebbles of the Chester Pebble Beds. The rock is generally well cemented and resistant, the harder sandstones and pebbly sandstones making good building stones that are much used all along the outcrop.

Examples of use of the sandstone include (top right) Delamere railway station (opened in 1870) and the Abbey Arms at Delamere (middle right), and also the former schoolhouse and adjoining schoolmasters’ house at Harthill, built in 1868 of reddish brown Delamere sandstone ashlar with a roof of Welsh slate (bottom right).

In the Peckforton area, the Delamere Sandstone is termed Peckforton Stone, and provides a good, durable building stone that has been widely used for farm buildings and stone walls. There are numerous old quarries in the sandstone in the Peckforton Hills, and Peckforton Castle is built from it.
Frodsham Sandstone Member

Frodsham Sandstone
(Lower Keuper Sandstone)

The Frodsham Sandstone Member differs from the underlying Delamere Sandstone Member in being pebble free. It typically consists of red to reddish-orange, grey or buff, soft, predominantly fine-grained, well-sorted sandstones with spherical to sub-spherical ‘millet-seed’ sand grains in a red argillaceous matrix. It is not appreciably pebbly, but may contain numerous small nodal accretions of harder, baryte-cemented material. The Frodsham Sandstone Member is relatively weakly cemented and softer than the underlying Delamere Member. It is used locally along the outcrop area. The village of Frodsham provides several good examples of its use, including the 12th-century St Lawrence’s church, constructed from large, squared and coarsed sandstone blocks (top right) and part of the Ring O’ Bells inn, built from squared and roughly coarsed red sandstones (bottom right). The Frodsham Sandstone is easily worked into regular sandstone blocks and can be used as ashlar, as indicated by 18th /early 19th-century cottages in the High Street at Tarporley.

Mercia Mudstone Group

Tarporley Siltstone Formation

Tarporley Siltstone (Keuper ‘Waterstones’)

The Tarporley Siltstone Formation often occurs as a series of (partially) fault-bounded outcrops throughout Cheshire. In the western part of the county it crops out between Chester and Northwich, mainly centred on Alvanley, western Delamere Forest, Willington, and Tarporley; further east the formation occurs as thin fault-bounded linear exposures around Monks Heath and Henbury; in north Cheshire it crops out as small exposures south of the River Mersey around Frodsham and east Runcorn, although these are partly concealed beneath glacial boulder clay. In north east Cheshire the Tarporley Siltstones crop out as small scattered exposures around Bollington and Mobberley, and also as North-South trending linear outcrops around Alderley Edge and Wilmslow; in south Cheshire the outcrop area occurs around Malpas between Newton and Hampton (and here the distinct bright red sandstones are referred to the Malpas Sandstone Member). The formation is heterolithic, comprising inter-laminated and inter-bedded siltstones, mudstones and sandstones in approximately equal proportions. The sandstones are mostly grey-brown (paler than the siltstones and mudstones), very fine- to fine-grained, well sorted, and micaceous. Sandstone beds are commonly less than 0.5 m thick, although composite units, consisting of several individual sandstone beds, may reach over 5 m thick. Flaggy units also occur. Intraformational mudclast conglomerates are common, with mudclasts concentrated at the bases of sandstone beds. The Tarporley Siltstone Formation was employed as a general building stone along much of its outcrop length. The flaggy sandstones in particular were much used for hearth-stones, doorsteps and window-sills. Noted quarries formerly occurred on Kidnall Hill, Longley Hill, Luddington Hill and near Tarporley itself.
Malpas Sandstone Member
Malpas Sandstone

The Malpas Sandstone Member is a locally developed sandstone-rich facies of the Tarporley Siltstone Formation and occurs in the upper part of the formation in south Cheshire, mainly around the Malpas area.

The Malpas Sandstone comprises very distinctive, massive, bright red coloured, fine to medium-grained sandstones, containing abundant ‘millet-seed’ sand grains. Some beds also exhibit grey to fawn blotches and bands. Subordinate bands of red-brown to brownish fine-grained, micaceous and laminated sandstones, coarse siltstones and occasional mudstones also occur; these resemble lithologies of the parent Tarporley Siltstone Formation. The upper Malpas Sandstone beds (which lie directly beneath the Mercia Mudstones) characteristically contain abundant pale grey baryte crystals which show prominently on weathered surfaces. Like many of the other Triassic red sandstones in Cheshire, the Malpas Sandstones exhibit low angle cross-bedding.

The Malpas Sandstone is not particularly hard and durable, often weathering with a distinctive ‘cavernous’ structure. Nevertheless, it is used extensively as a building stone within the outcrop area, notably within the town of Malpas itself, where a number of significant buildings are built substantially from this stone, or use it for footings or a plinth base.

Examples of its use are provided by the late 15th / early 16th-century church of St Oswald (top right) which is constructed from locally sourced red sandstone ashlar from both the Tarporley Siltstone Formation and the Malpas Sandstone Member, and a roadside wall in Church Street, Malpas (bottom right), the basal layers of which show the distinctive, intensely red coloured, cross-bedding sandstones so characteristic of the Malpas Sandstone facies.

A number of old sandstone quarries formerly existed in the Malpas area, including those on the south-west side of Oat Hill and opposite St Joseph’s College, Malpas.
Mercia Mudstone Group (upper) and Penarth Group

Above the Tarporley Siltstone Formation lies a very thick sequence of reddish marls and mudstones (the so called Mercia Mudstones or ‘Keuper Marls’) containing several saliferous (halite) beds. These belong to a number of different formations, and in turn are overlain by black shales and grey or green calcareous mudstones assigned to the Penarth Group (‘Rhaetic’). All of these sediments are too soft to be used as building stones.

JURASSIC
Lias Group
Blue Lias Formation

In Cheshire, the only outcrop of Jurassic aged sediments is confined to a small semicircular outcrop (up to 5 km wide) along the southern edge of the county around Dodcott, Wilkesley and Coxbank, extending to just south of St Audlem. The strata consists of thin (up to 15 cm thick) grey limestone beds, varying from earthy to porcellaneous, set within a predominantly well-bedded mudstone sequence. The limestone beds vary from regular, tabular limestones to being laminated and irregular, with uneven, deeply undulating surfaces jointed with calcite veining.

Because of their limited distribution, and the dominance of mudstone facies over limestones facies within the Cheshire sequence, the Blue Lias Formation is only used as an occasional, very localised rough rubblestone and walling stone.
Glossary

**Ashlar**: Stone masonry comprising blocks with carefully worked beds and joints, finely jointed (generally under 6 mm) 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.

**Baryte (Barite)**: (BaSO$_4$) An industrial mineral important because of its high density.

**Carbonaceous**: Consisting of, containing, relating to, or yielding carbon.

**Cemented**: The materials which bind the grains and/or fossil components together to form a rock.

**Conglomerate**: A sedimentary rock made up of rounded pebbles (>2mm), cobbles and boulders of rock in a finer-grained matrix.

**Facies**: A term describing the principal characteristics of a sedimentary rock that help describe its mode of genesis e.g. dune sandstone facies, marine mudstone facies.

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

**Flaggy**: A finely laminated, sedimentary rock that splits into thin sheets when exposed to weathering.

**Flemish Bond**: Header-stretcher-header in each course, with closers next to the quoins to keep the bonds.

**Igneous Rock**: Rocks formed when molten magma cools and solidifies. It includes extrusive rocks erupted from volcanoes (e.g. basalt) and intrusive rocks that cool beneath the Earth’s surface (e.g. granite, gabbro, granodiorite, dolerite).

**Inlier**: A term used to describe an outcrop of older rocks surrounded by geologically younger rocks.

**Limestone**: A sedimentary rock consisting mainly of calcium carbonate (CaCO$_3$) grains such as ooids, shell and coral fragments and lime mud. Often highly fossiliferous.

**Lintel**: A horizontal beam over an opening to support the wall over it.

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

**Metamorphic**: Rocks which have been subject to heat or pressure which has caused changes in their solid state e.g. mudstone to slate, limestone to marble.

**Mica**: Group of silicate minerals composed of varying amounts of aluminum, potassium, magnesium, iron and water. All micas form flat, plate-like crystals. Crystals cleave into smooth flakes. Biotite is dark, black or brown mica; muscovite is light-coloured or clear mica.

**Mineralization**: The formation of minerals. New minerals may be added to fractures and empty spaces in a rock or by replacing preexisting minerals with different ones.

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

**Outcrop**: Area where a rock unit is exposed at the ground surface.

**Quartzite**: A durable metamorphic rock consisting mainly of quartz grains and silica cement, formed by alteration of a sandstone by heat and pressure.

**Quoin**: The external angle of a building. The dressed alternate header and stretcher stones at the corners of buildings.

**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).

**Siltstone**: A sedimentary rock composed of silt-sized grains (i.e. only just visible to the eye).
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Further Reading


BGS Memoirs


Hull, E & Green, A. H (1866) Geology of the country round Stockport, Macclesfield, Congleton and Leek. Memoir of the Geological Survey of Great Britain, Sheets 81 NW and 81 SW.


