GeoEssex
Promoting the geology and landscape of Essex

Colchester City Council
Report on Local Geological Sites

Prepared for Colchester City Council by

Ros Mercer BSc. FGS GeoEssex
Brian Clough BSc. GeoEssex
Gerald Lucy FGS GeoEssex

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Above: Gravel and Sand in worked face at Priors Pit
Below: Greenbank House Sarsen Stone

1. Introduction

The rocks beneath the Essex landscape are a record of the county's prehistory. They provide evidence for ancient rivers, volcanoes, deserts, glaciers and deep seas. Some rocks also contain remarkable fossils, from subtropical sharks and crocodiles to Ice Age hippos and mammoths. The geology of Essex is a story that stretches back over 100 million years.

GeoEssex

GeoEssex is the primary source of information about the geology and physical landscape of Essex. The GeoEssex team, or 'Steering Group', consists of professional and amateur geologists, representatives from local authorities, geological and natural history societies, and from Natural England, the Government's nature conservation body.

GeoEssex promotes geology in all its aspects, from quarries, cliffs and boulders to spas, springs and building stones. It also promotes the county's rich geological heritage of mineral extraction, scientific research and fossil discoveries. The fascinating and often magical world of geology is all around us, if only we know where to look.

A primary task of GeoEssex is to identify the best places in Essex to find out about the Earth's distant past and the landscape processes going on today. These sites are called Local Geological Sites, or LoGS (formerly called Regionally Important Geological Sites or RIGS). It also advises and assists landowners with the management of sites.

GeoEssex aims to advocate and represent geodiversity in planning processes and other initiatives.

Ridgnalls Puddingstone
a distinctive stone transported across Essex by the ancestral River Thames.

Geodiversity

What is geodiversity and why is it important?

Geodiversity is an integral part of the natural environment. It is the variety of rocks, fossils, minerals, landforms and soil, and all the natural processes that shape the landscape.

The only record of the history of our planet lies in the rocks beneath our feet. Here, and only here, can we trace the cycles of change that have shaped the Earth in the past, and that will continue to do so in the future. This is particularly true in Essex, where the record of climate change during the Ice Age is preserved in our quarries and coastal cliffs. The record is unique and much of it is surprisingly fragile.

Apart from the obvious benefits of providing mineral resources such as sand, gravel, chalk and clay, the diversity of the geology is what shapes the landscape, influencing soils, and in turn influencing all of our habitats and species. Geodiversity also has a cultural role to play, influencing the character of our built environment through building stones, providing inspiration to art, and helping to define where we live and our 'sense of place'. It is the link between geology, landscape, nature and people.

And, of course, it must not be forgotten that ***almost everything we know about the Earth's distant past has been learnt by studying geological sites***.

Local and national Geodiversity Action Plans

The UK Geodiversity Action Plan (UKGAP) sets out a shared framework for geodiversity action across the UK. It establishes a common aim, themes and targets which link national, regional and local activities. It encompasses how geodiversity can inspire people and what needs to happen to conserve Britain's geodiversity. The Plan for Essex has been drawn up within this framework.

A Local Geodiversity Action Plan (LGAP) has been produced for Essex. It sets out a framework for geodiversity action in Essex. It is an essential document to conserve the County's geodiversity.

The Essex Local Geodiversity Action Plan aims to:

- *Identify, conserve and enhance the best sites that represent the geological history of an area in a scientific, educational, recreational and cultural setting.*
- *Promote geological sites and make geoconservation relevant to people.*
- *Provide a local geodiversity audit (an audit of sites and skills).*
- *Influence local planning policy.*

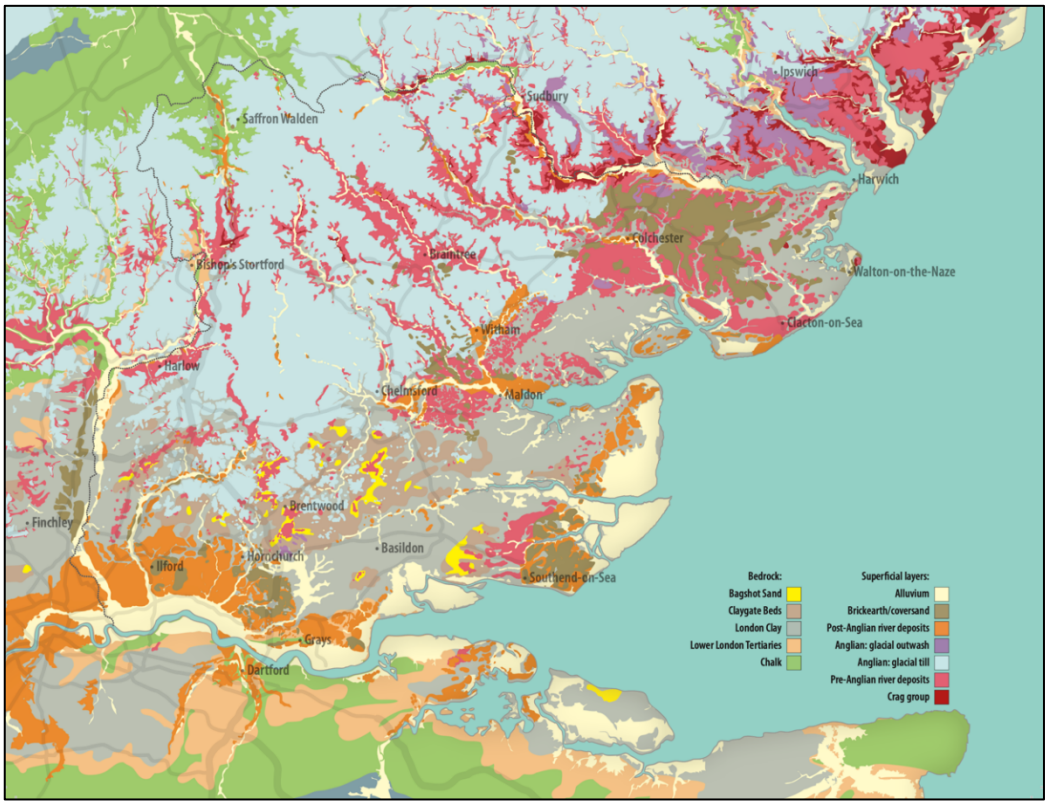
2. The Geology of Essex

Compared to most other parts of Britain the rocks of Essex and adjoining counties are young in geological terms. Even the oldest surface rock in Essex (the Chalk) is only about 80 million years old. Much older rocks are, however, present at depth. We have some idea about these ancient rocks because of the records of boreholes that have been sunk in search of coal and oil.

The surface rocks of Essex that were formed before the Ice Age (from the Chalk to the Red Crag) are described as the 'bedrock' or 'solid' geology. Much of this bedrock geology is concealed beneath the deposits left behind by glaciers and rivers during the Ice Age. The material laid down during the Ice Age is known as 'Superficial' or 'drift' deposits.

Era	Period or Epoch		Approx. age in millions of years	Geological formations in Essex
Caenozoic	Quaternary Ice Age	Holocene	0.01	Recent peat and alluvium
		Pleistocene	0.45	River terrace deposits and brickearth (loess)
			1	Boulder clay (till) and glacial gravel
			2.4	Kesgrave (Thames) sands and gravels
				Norwich Crag (Chillesford Sand)
				Red Crag
	Pliocene		10	*No evidence of rocks of this age in Essex but derived Miocene and Pliocene fossils are found in the Red Crag*
	Miocene			
	Oligocene		20	
	Eocene		50	Bagshot Sand
				Claygate Beds
				London Clay (includes the Harwich Formation)
	Palaeocene		55	Lambeth Group (Woolwich and Reading Beds)
				Thanet Sand
Mesozoic	Cretaceous		80	Chalk
			100	Gault and Upper Greensand (Beneath Essex)
	Jurassic		150	*No evidence of rocks of these ages beneath Essex with the exception of Jurassic Oxford Clay in a graben (a sunken part of the crust bordered by faults) beneath East Tilbury.*
	Triassic		220	
Palaeozoic	Permian		250	
	Carboniferous		300	
	Devonian		400	Shales and mudstones dating from these periods occur at depth (about 300 meters) beneath Essex
	Silurian		420	
	Ordovician		450	*No evidence beneath Essex, however, boreholes have not been drilled deep enough to confirm.*
	Cambrian		500	
Pre-Cambrian	Precambrian		Age of Earth 4,600	

Geological Map of Essex



Map showing glacial outwash rivers that deposited the extensive gravels south of Colchester, shown in pink on the above map.

Essex through geological time

It is difficult to know where to begin with our geological story but the earliest evidence we have is the hard rocks deep beneath Essex that were formed some 400 million years ago in the Silurian and Devonian periods (part of the Palaeozoic era) and form what is known as the 'Palaeozoic basement' of Essex.

Deserts to Dinosaurs

- For a very long time (and before the age of the dinosaurs) these hard Silurian and Devonian rocks formed the surface of the land that was eventually to become Essex. During the Permian and Triassic periods Essex was a desert upland in the middle of a vast continent known as Pangea.
- By 200 million years ago, at the start of the Jurassic period, tropical seas had spread around this land forming a dinosaur-infested, forested island.

Buried Island

- If you could dig down 1000 feet (300 metres) under Essex you would reach the hard rocks of that dinosaur island.
- All trace of forests and animals from this time have been swept away from the eroded surface of the island, so there are no dinosaur fossils in Essex.
- By 100 million years ago, in the Cretaceous period, the sea flooded across the island to spread **Gault** Clay and **Greensand**. The sea then deepened to deposit hundreds of metres of soft white limestone known as **Chalk** all over the island as well as much of what is now Britain.

Pebbles and Clay

- The North Atlantic Ocean, which did not previously exist, began to open out to the west, the land of Essex lifted, chalk hills were worn down and flints were eroded out. Billions of these flints were tumbled on beaches to form layers of sand and beautifully rounded pebbles across our area.
- Around 50 million years ago, in the Eocene period, a deep sea fed by muddy rivers spread across what is now Essex and London depositing a great thickness of clay, the **London Clay,** on the sea floor, together with the remains of many plants such as palms and cinnamon, and animals including birds, sharks, turtles, and tiny horses. Atlantic volcanoes poured their ash into this sea.

The Alps and the Thames

- Colliding continents pushed up south and mid-Essex, bending the crust to form the vale of the Thames river system through mid-Essex. About 2.4 million years ago offshore sandbanks formed red shelly sandstone layers across north Essex known as the **Red Crag**.
- Global cooling led to the Ice Age (the Pleistocene epoch), with many warm periods such as the one we are in right now, which is known as the Holocene. As the sea retreated, the ancestral River Thames spread a succession of flint-rich river gravels across the middle of Essex, through Harlow, Chelmsford and Colchester, and out across the area where the North Sea is now.

Ice and people cover Essex

- During an exceptionally cold stage 450,000 years ago a gigantic ice sheet covered most of Britain and Essex as far south as Hornchurch. The moving ice diverted the Thames towards its present-day course and dumped its load of boulder clay, or glacial till, on top of these old Thames gravels.
- During the past million years of the Ice Age, there have been numerous cold and warm stages (right now we are in a warm period known as the Holocene) and humans have migrated to and from Essex, together with the animals they have hunted. They have left thousands of flint tools and tool-making debris on the banks of the ever-changing Thames and its tributaries. Thus, in south Essex we have the best geo-environmental and archaeological record in Europe of the last half a million years.

3. Background to Geological Site designation in Colchester

What is special about Essex Geodiversity?

Essex is an area of predominantly subdued relief with gentle slopes, the result of its underlying geology of soft, relatively young rocks. These generally yield fertile soils. The result is an attractive 'lived in' landscape dominated by arable agriculture, but still retaining forested and heathland areas, particularly where gravels and sands, many of glacial and fluvial origin, have yielded poorer soils.

A mammoth tooth from Essex

Although lacking the more dramatic geology and landforms of many 'hard rock' areas, Essex geology and geomorphology is still of great interest, possessing abundant evidence of the huge environmental and biodiversity changes that our area has witnessed over the last 100 million years. Among the key themes are dramatic and sometimes long-lasting changes in the distribution of land and sea, major shifts in climate, and mass species extinctions. Many of these phenomena are of great relevance today, and so an understanding of our past is essential in interpreting the challenges to come.

Geodiversity's influence on Essex's development

Essex's geodiversity has exerted a major influence on land use, agriculture and landscape.

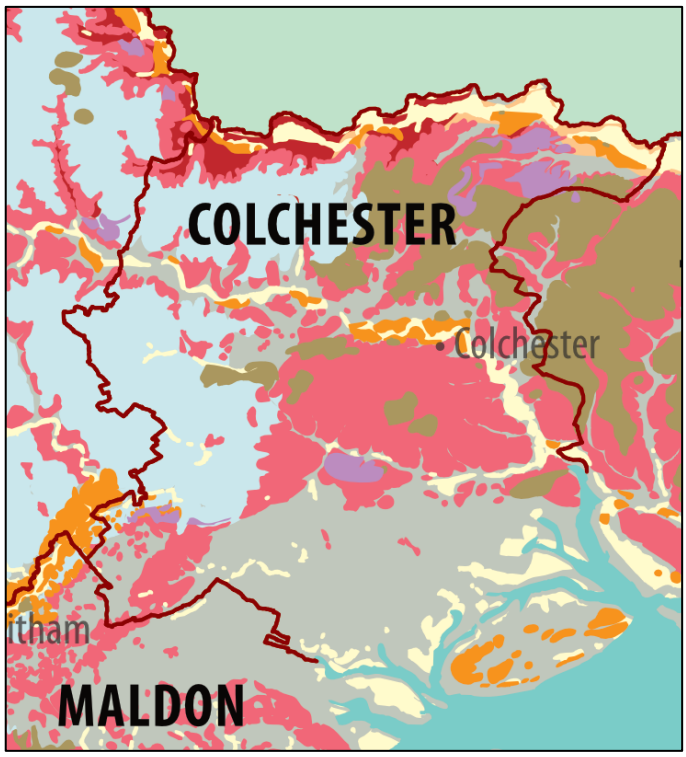
The distribution of less fertile ancient river and glacial gravels has been a major influence on historical land use, resulting in the preservation through to the present day of extensive tracts of woodland and to a lesser extent heathland, in a predominantly arable county. These are of great significance both for biodiversity and recreation.

The chalky boulder clay, or glacial till, found north and west of Chelmsford is highly suitable for cereal cultivation, especially wheat. London Clay outcrops south of Chelmsford, providing soils less suitable for arable agriculture and more suited to pasture. The brickearth of the Tendring district is the basis of the rich agricultural land of this peninsula.

In earlier times rivers penetrating deep inland, together with proximity to the Continent, provided a succession of invaders and colonisers – from Palaeolithic peoples, through to Roman, Viking and Saxon - with easy access.

The deposits of the ancestral Thames and its tributaries and associated glacial outwash deposits have provided Essex with a source of gravel and sand for construction since Roman times. A special kind of gravel naturally cemented by iron called ferricrete was used extensively as a building stone and is found in many medieval churches.

The Geology of the Colchester Area



	Recent alluvium	
	Coversand/Brickearth	Ice Age deposits
	Post-Anglian river deposits	
	Glacial Till	
	Kesgrave sand and gravel	
	London Clay	Eocene 54 million years ago

The pre-Ice Age (bedrock) geology of the district is London Clay which is seen at the surface in the south of the area. It was laid down on the floor of a subtropical sea 54 million years ago and forms characteristic heavy soils and muddy river foreshores. South of Colchester itself, there is an extensive area of Kesgrave sands and gravels which were originally laid down by the ancestral river Thames that flowed across the area before the river was diverted to the south by the Anglian ice sheet 450,000 years ago. These gravels were subsequently reworked by glacial meltwater to form layers of glacial outwash deposits. These sands and gravels are the basis of aggregate extraction in the Stanway and Birch areas.

The Anglian ice sheet spread its load of till across the western part of the district, providing fertile soils based on this chalky boulder clay. In the north of the district the fertility of the soil is due to the spread of cover sand from storms around the ice sheet during the last glacial period some 11,000 years ago.

Puddingstones and Sarsen stones

Puddingstones and sarsens were formed at a time of great warmth, about 55 million years ago, when beach deposits and sandy strata on top of the Chalk were above sea level in desert conditions and were cemented by silica (quartz) from ground waters. This discontinuous layer was extremely resistant to erosion and boulders were transported by ice swollen rivers. They were removed from fields and often set up in conspicuous places.

The fascinating geology of this area has been extensively studied for more than 200 years. John Brown (1780-1859) a stonemason and amateur palaeontologist, who amassed a large collection of local fossils, now housed in the Natural History Museum London, did much to elucidate the geology of the area lived at Judd's Farm and is buried nearby in St. Albright's churchyard, Stanway. The City of Colchester is close to the epicentre of the 1884 Essex earthquake which was the most destructive in the United Kingdom in over 400 years. A plaque commemorating this may be viewed at Lion Walk church. Essex is not renowned for its building stone but in Roman and medieval times blocks of Lower Eocene Harwich Stone Band were shipped from Harwich and extensively employed in constructing the castle and town walls.

Geodiversity and National Planning Policy

The importance of geodiversity as an integral part of nature conservation and the planning system is reflected in The National Planning Policy Framework (NPPF), and in legislation – Wildlife & Countryside Act 1981 and Countryside and Rights of Way Act 2000.

The NPPF states that:

> "Planning policies and decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils" (Paragraph 174).
>
> "Plans should protect and enhance biodiversity and geodiversity" (Paragraph 179).

The current Colchester Local Plan, updated in July 2014 following a Focused Review, includes the following policy:

> 5.7 Environment and Rural Communities Policies ENV1 – Environment
>
> The Borough Council will conserve and enhance Colchester's natural and historic environment, countryside and coastline. The Council will safeguard the Borough's biodiversity, geology, history and archaeology through the protection and enhancement of sites of international, national, regional and local importance.

The Council is now developing a new Local Plan covering the period to 2033, to which this report will contribute details of locally important geological sites.

Site designations

The most important geodiversity sites have been declared as **Sites of Special Scientific Interest** (SSSIs) which are statutorily protected for their scientific importance.

The next tier of geodiversity sites is known as **Local Geological Sites** (LoGS) These have replaced the earlier 'Regionally Important Geological Sites' (RIGS) terminology in line with government guidance.

Local Geological Sites (LoGS) are broadly equivalent to Local Wildlife (species and habitats) Sites ('LoWS') but have a broader remit as they can be designated for their scientific, educational, historical and recreational benefits. Typical Essex LoGS include quarries, pits, walls, boulders, cliffs, springs, and river meanders. Local Wildlife Sites and Local Geological Sites are both designed to provide a system of locally valued, non-statutory sites.

Most importantly, the NPPF gives Local Geological Sites a weighting equal to Local Wildlife Sites, and both are collectively referred to as 'Local Sites'. However, in actuality, the attention and priority afforded to the designation and management of LoGS has historically lagged and continues to lag well behind that of LoWS.

A typical Local Geological Site – an inland cliff in a former quarry at Fingringhoe, consisting of sand and gravel laid down by meltwater from a glacier about 450,000 years ago. The variety of pebble types in the gravel can tell us the route the ice has taken to get to Essex, sometimes from as far away as Norway. Sites like these are valuable for research and education but can easily be obscured or destroyed.

Alas this section is no longer visible, nor accessible.

4. Objectives of current report

Supporting Local Planning Authorities

Biodiversity protection is familiar to planning authorities but geodiversity less so. This report will assist planning authorities in meeting their obligations under the National Planning Policy Framework and helping them identify potential development impacts on LoGS.

GeoEssex is therefore seeking to help Local Planning Authorities fulfil their responsibilities with respect to geodiversity.

> "*Local and neighbourhood plans and planning decisions have the potential to affect biodiversity or geodiversity outside as well as inside designated areas of importance for biodiversity or geodiversity"* (extract from: www.gov.uk/guidance/natural-environment)

Further guidance on statutory obligations is given in Circular 06/2005 (*Biodiversity and Geological Conservation*). Geodiversity should be therefore included alongside biodiversity in local authorities' Local Plans. Identifying these non-statutory sites therefore helps local authorities to meet their obligations.

LoGS can also contribute to *sustainability* programmes by providing information about a key element of the environment that contributes to our natural heritage. In addition, the *awareness raising* and *education* function fits well with the principle of community involvement and enabling people to regain their sense of place.

This cliff at Church Lane, Stanway, is a rare survival of the extensive sand and gravel workings here. It provides an ideal site for creating public access and installing an information sign board to explain the geological interest.

5. Site selection

Site selection and notification to planning authorities

LoGS in Essex are identified by **GeoEssex**, a largely voluntary group composed of representatives from the major Essex geological and conservation bodies and supported by the Essex Field Club, Essex Wildlife Trust, Natural England and Essex County Council (Place Services). The site selection process is based on clearly defined criteria (see below) and includes scientific, educational, historical and aesthetic values. When selecting sites GeoEssex aims to gain the support of landowners whenever possible. The majority of LoGS are on private land and site selection does not infer any right of access.

Like LoWS, proposed LoGS are presented to the Local Sites Partnership for endorsement and then passed to local authorities for inclusion in their Local Plans. Local authorities receive a citation and boundary map.

The sites selected as LoGS in the Colchester district are summarised below, together with a list of other sites which are potential LoGS. Other sites may be identified in the future, occasioned by housing or other development and restoration following mineral extraction.

Site protection

Like their biodiversity counterparts, LoGS have no statutory protection, and the conservation and management of individual sites relies heavily on the support of landowners. Inclusion within local plans also forms a vital role in the protection of LoGS. An example of a comprehensive natural environment policy incorporating geodiversity can be provided on request.

It is recommended that the Local Sites Partnership should be consulted if any development is proposed that would affect a LoGS.

Site Assessment Criteria

The assessment criteria used for identifying LoGS are based on DEFRA document *Local Sites: Guidance on their identification, selection and site management* (2006). The guidance states that assessment is a matter of judgement but must be based on an understanding of geological principles and processes, and the distribution and abundance of the resource (national, regional and local). Those sites selected must be 'of substantive importance to the geodiversity of the local area'.

There are four value categories: scientific, educational, historical and aesthetic. A site qualifies for notification as a Local Geological Site if it fulfils the criteria under one or more of these categories. Each site is also given a site assessment score. This score is not a measure of the site's value or importance but a relative assessment of the usefulness of the site in promoting geodiversity.

Land Ownership Notification

Where the landowner is identified as a public body eg. a local authority, Forestry Commission etc., notification is by letter to that authority. For sites under private ownership, where the landowner can be identified, they will be informed by letter.

6. Additional Sources of Information

Scientific literature

If a LoGS has been referred to in the scientific literature these references are of given in the LoGS citation. If a site has been referred to in the scientific literature this means that the site is of historical interest and some of these sites will have potential for research.

Site interpretation

If a site is accessible or simply visible to the general public, it is the aim of GeoEssex to provide interpretive information where possible and practical. This could be in the form of interpretive boards or leaflets. Such interpretation will be with the cooperation of landowners and other interested parties.

Other organisations

GeoEssex www.geoessex.org.uk
Background geological information for Essex, together with a selection of sites in each district (SSSIs and public accessible sites) can be found on the GeoEssex website

Essex Field Club www.essexfieldclub.org.uk
The Essex Field Club, founded in 1880, exists to promote the study of the county's natural history, and geology. The club has a centre for Biodiversity and Geodiversity in Wat Tyler Country Park at Pitsea, near Basildon, with extensive collections. It is open to the public most weekends. Their website provides comprehensive data on a large number of wildlife and geological sites which can be searched in a number of ways. Details of several hundred geological sites across Essex can be found here which includes LoGS and potential LoGS.

British Geological Survey www.bgs.ac.uk
Other geological resources, maps and borehole information are available on the website of the British Geological Survey.

Essex Rock & Mineral Society www.erms.org.
The Essex Rock and Mineral Society, founded in 1967, is the club for Essex geological enthusiasts.

GeoEast
GeoEast is the East of England Geodiversity Partnership. It is a partnership of organisations active in conserving and promoting Earth heritage in this region.

Earth Heritage Magazine www.earthheritage.org.uk
Earth Heritage magazine is produced for the geological and landscape community by Natural England, Scottish Natural Heritage, the Countryside Council for Wales.

Geologists' Association www.geologistsassociation.org.uk
The Geologists' Association, founded in 1858, is Britain's largest society for amateur geologists.

Quaternary Research Association https://www.qra.org.uk
The Quaternary Research Association researches 'Ice Age' geology, palaeobiology and Palaeolithic archaeology and has published several field guides covering many sites in southern and eastern Essex.

Books and articles relating to Essex geology and geoconservation

ALLEN, P. 1999. **The Anglian cold stage in Essex – a review**. *Essex Naturalist.* Vol. 16 (New series). Pages 83-100.

BRIDGLAND, D.R. 1994. **The Quaternary of the Thames**. Chapman and Hall. Geological Conservation Review Series.

ELLISON, R.A. 2004. **Geology of London**. Special Memoir for 1:50,000 Geological sheets 256 (North London), 257 (Romford), 270 (South London) & 271 (Dartford). British Geological Survey.

GIBBARD, P.L. 1994. **Pleistocene History of the Lower Thames Valley**. Cambridge University Press.

HOSE, T.A. (ed). 2016. **Geoheritage and Geotourism: A European perspective**. The Boydell Press.

LUCY, G. 1999. **Essex Rock: A look beneath the Essex landscape**. Essex Rock and Mineral Society.

MERCER, I. & MERCER, R. 2022. **Essex Rock: Geology beneath the landscape** (2nd edition updated and greatly expanded). Pelagic.

O'CONNOR, T. 2015 Managing the Essex Pleistocene. Place Services, Essex County Council

PROSSER, C., MURPHY, M. and LARWOOD, J. 2006. **Geological Conservation: A Guide to Good Practice**. English Nature.

SUMBLER, M.G. 1996. **British regional geology: London and the Thames valley**. British Geological Survey. Fourth edition. HMSO.

WHITAKER, W. 1889. **The Geology of London and of Part of the Thames Valley**. Memoirs of the Geological Survey. HMSO.

7. List of Sites

The following is a representative list of geological sites in the district. For completeness it includes geological SSSIs but these sites are statutory sites and do not form part of this report.

The list gives an idea of the range of sites that can qualify as Local Geological Sites (LoGS). It includes those LoGS that have already been approved by the Local Sites Partnership.

Note: *Not all of the sites here described are accessible. Some sites are on private land and can only be viewed from footpaths that pass through or alongside the site. Inclusion of a site on this list does not, therefore, imply any right of access.*

Sites of Special Scientific Interest (SSSIs)

Coopers Beach (Restaurant site) Colne Estuary SSSI
Beneath the beach shingle here is a 'channel' infilled with sediments dating from the Ipswichian interglacial period (125,000 years old) containing fossils including hippopotamus bones (see also Cudmore Grove, East Mersea). The sediments are beneath the beach and therefore not normally accessible.

Cudmore Grove Cliffs and Foreshore SSSI
The cliffs at Cudmore Grove Country Park provide superb exposures of gravels laid down by the Thames-Medway River during a glacial period 300,000 years ago. Organic sediments at beach level sometimes yield fossils, including fossil wood and mammal bones, that indicate that they were deposited during an interglacial period. Also exposed on the foreshore are deposits from a more recent interglacial period, the Ipswichian interglacial (120,000 years old), and known as the 'hippo site' due to the presence of hippopotamus bones.

Marks Tey Brick Pit SSSI
Marks Tey has uniquely important Ice Age sediments, which have yielded a continuous pollen record through the entire Hoxnian Interglacial stage (400,000 years ago). No other site in the British Isles has so far produced a comparable vegetational record for this or any other interglacial. Of considerable interest also are the laminations (seasonal layers) within these lacustrine (lake) sediments which have made it possible to estimate the duration in years of the Hoxnian Interglacial.

WIVENHOE. Wivenhoe Gravel Pit SSSI
The SSSI is the type locality for the Wivenhoe Gravel, a gravel deposited by the early Thames during two cold stages of the Ice Age. Interbedded with the gravel is an interglacial deposit containing fossils from a warm or temperate climate. Humanly worked flint flakes have also been found. The deposits are over 500,000 years old. The conserved area of the SSSI is an overgrown flooded depression just inside the Colchester district. Restoration plan for part of quarry includes a fine Sand Martin cliff at TM 0505 2202. Private land, permission to visit is required from the quarry owners.

Local Geological Sites (LoGS)

Sites agreed by Local Sites Partnership.

CoG1 - Church Lane Gravel Cliff, Stanway
The disused gravel pits south of Church Lane, Stanway have mostly been infilled and much of the land is now occupied by housing. However, a vertical cliff of Kesgrave Sands and Gravels (pre-diversion Thames gravel) is preserved south of Church Lane just west of the new Stanway Western Bypass.

CoG2 - Fingringhoe Wick Nature Reserve
Fingringhoe Wick was a working gravel quarry, known as Freshwater Pit, between 1924 and 1959. Visible in many places are mounds and banks of glacial sand and gravel (known as Upper St. Osyth Gravel) which was deposited some 450,000 years ago by colossal torrents of meltwater issuing from the Anglian ice sheet, the edge of which was then situated only 12 kilometres west of here.

CoG3 - Greenbank House Sarsen Stones, Boxted Church Road
Four sarsen stones are situated by the entrance to Greenbank House in Boxted Church Road near the junction with Holly Lane. Sarsens are extremely hard boulders of sandstone formed around 55 million years ago and were brought here by the owner from farmland in the nearby Stour Valley.

CoG4 - Greenstead Puddingstone
This very fine and colourful puddingstone is in mint condition and shows no sign of being transported by a river or an ice sheet. It was presumably found when the housing estate was constructed in the 1960s.

CoG5 - Greenstead Sarsen Stone
A sarsen stone stands by a bus stop in Avon Way. It is very unusual to see a sarsen stone in such an urban setting. It is the largest of several sarsen stones in the vicinity, presumably all found when the housing estate was constructed in the 1960s.

CoG6 - Lexden Springs Nature Reserve
In Spring Lane, off Lexden Road, is a patch of ancient meadowland where a natural spring issues from the junction of the Kesgrave Sands and Gravels and the underlying London Clay.

CoG7 - Rams Farm Sarsen Stone, Fordham
At Rams Farm, Fordham is a fine sarsen stone standing upright by the roadside. The boulder was moved to its present position in the 1960s. This may be the stone at Fordham referred to in 1914 “in a roadside bank”.

CoG8 - Wormingford Mere
Wormingford Mere is a deep, dark body of water, fed by springs and joined on the northern side to the River Stour through a small cut. It is thought to be a glacial solution feature or pingo left by the retreating ice sheet.

CoG9 - Mount Bures Boulders
Two boulders of puddingstone and sarsen can be seen outside the churchyard entrance and the adjacent Mount Bures Hall.

CoG10 - Priors Pit, Fingringhoe
Cliff face from disused pit once worked by the Prior Family (using coasters to take aggregate from the Colne at Fingringhoe Ballast Quay to London via the River Thames). The gravel here provides evidence of an exceptionally cold period of the Ice Age, a time when Essex was barren of virtually all life.

CoG11 - Ridgnalls Puddingstone, Boxted Church Road
A rare example of a puddingstone in this part of Essex. Probably local derived from local gravel workings in the Kesgrave formation of the ancestral Thames that once flowed across this area.

Other sites of geological interest in the district

For completeness, the following sites also contribute to the geodiversity of the district.

Birch Quarry, Birch, near Colchester (TL 928 193)
Birch Quarry is a working gravel quarry with exposures of Kesgrave (Thames) Sands and Gravels overlain by a small thickness of boulder clay (till). The site is situated at what was the southern edge of the Anglian Ice Sheet.

Copford Brick Pits, Colchester, site of (TL 926 242)
The famous brick pits at Copford (closed by 1920) yielded numerous Ice Age fossils in the mid-19th century, including bones of bear, ox, bison, red deer, beaver, hippopotamus and mammoth. The famous Essex geologist John Brown of Stanway described the site and collected many of the fossils. The deposits are of Hoxnian interglacial age (about 400,000 years old).

St. Mary's Church, Sarsen Gravestone, Dedham (TM 057 331)
In the churchyard of St. Mary's Church is a sarsen stone used as a gravestone. It is crudely inscribed "*Edwrd Ward and his wife Martha*" and parish records show the burial to have taken place in 1690. The story is that Edward Ward was a local ploughman who came across this stone in a field during the course of his work and instructed his relatives to use it as his gravestone. This is the only example in Essex of a sarsen being used for this purpose although the practice is common in Wiltshire where sarsens are more abundant. Another sarsen can be seen by the church porch.

Deremy's Stone, East Mersea (TM 0369 1426)

Opposite the Old Rectory, on the East Mersea Road, by the East Mersea road sign, is a rounded boulder of dolerite known locally as Deremy's Stone. It was dug up on this spot in 1974 and provided with a plaque stating that it was originally placed here in 1046 to define the boundary of the manor of West Mersea granted by Edward the Confessor. This boulder is probably a glacial erratic, carried south to Essex from Northern England by the Anglian Ice Sheet 450,000 years ago.

Deremey's Stone, East Mersea. Photo: Gerald Lucy

Stanway Quarry, Stanway, Colchester (TL 957 226)

Stanway Quarry is a working gravel quarry extracting aggregate from the deposits of a large glacial outwash fan that spread over the earlier Thames gravels. Detailed logging of the quarry faces has enabled lobes of the fan to be mapped.

Cross bedded gravel in a worked face at Tarmac Quarry, Stanway