CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Pollprughlisk**
Other names used for site	Pollprughlish, Border Pots, Swanlinbar Pots, Pollprughlisk-Pollnatagha-Polliniska System
IGH THEME	**IGH1 Karst**
TOWNLAND(S)	**Alteen, Greenan**
NEAREST TOWN/VILLAGE	**Swanlinbar**
SIX INCH MAP NUMBER	**7**
ITM CO-ORDINATES	**616483E 828830N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This cave is a pothole around 40m deep, which connects underground to two other potholes (Polliniska and Pollnatagha) just across the border in County Fermanagh.

Geological System/Age and Primary Rock Type
The cave is formed within Lower Carboniferous limestone of the Dartry Limestone Formation. The facies of the formation vary greatly and in this area there are some 140m of well bedded cherty limestones.

Main Geological or Geomorphological Interest
Pollprughlisk (and Pollnatagha – Polliniska) is part of an integrated system of fracture controlled vertical caves connected by bedding controlled horizontal caves and is one of the best examples of this geomorphological feature in Ireland. The part of the system in Northern Ireland has been evaluated for its scientific interest. A surface river sinks into Polliniska, but a slight dry valley that continues to the Pollprughlisk entrance suggests it originally also flowed to that cave. At the cavers entrance there are water-worn beds of limestone some of which have foundered into small cave sections.

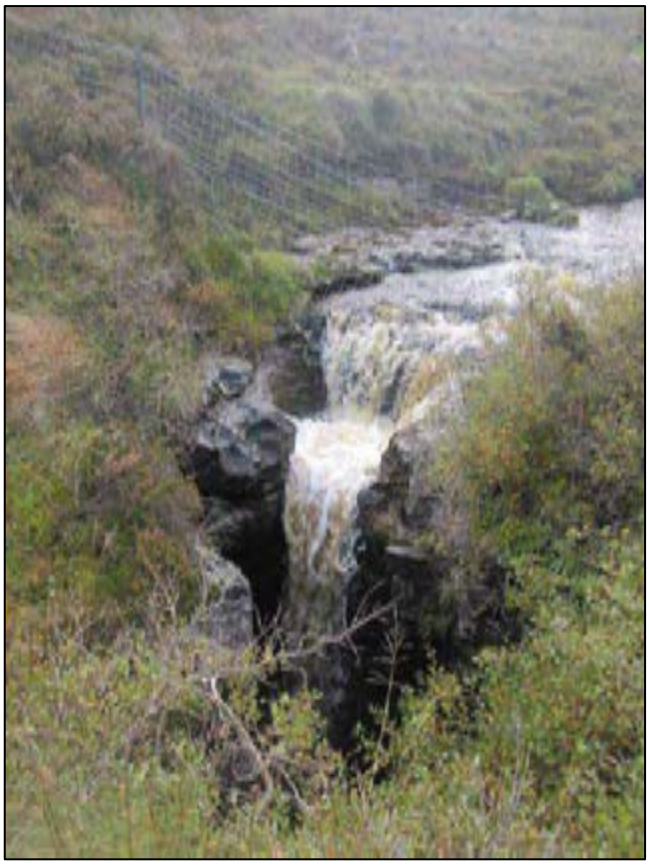
Site Importance – County Geological Site; recommended for Geological NHA
The Pollprughlisk – Pollnatagha – Polliniska Sytem is an excellent example of a horizontal cave system developed at a level controlled by bedding, with multiple fracture-controlled vertical shafts. It is of national importance and is recommended for geological NHA status.

Management/promotion issues
Pollprughlisk is part of an interconnected system of vertical shafts and horizontal caves of which part is in Northern Ireland. The Northern Ireland portion has been assessed as part of the Earth Science Conservation Review and designated as an Earth Science Area of Special Scientific Interest (ASSI). Management should be a co-operative matter with the Northern Ireland Environment Agency, which currently has responsibility for protected areas.

The forestry surrounding the pothole is mature and has largely been felled, but the storm-fallen trees across the pothole have damaged some of the wire fencing around the shaft.

Pollprughlisk main shaft is to the right of the tree stand, with the cavers entrance in the small trees in the near distance. Slabs of waterworn limestone beds have foundered into small cave passages in the foreground.

Pollprughlisk main shaft.



Polliniska, with surface stream sinking into the system.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh (OVERVIEW)**
Other names used for site	Shannon System
IGH THEME	**IGH1 Karst, IGH8 Lower Carboniferous**
TOWNLAND(S)	**Numerous**
NEAREST TOWN/VILLAGE	**Blacklion, Glangevlin, Dowra**
SIX INCH MAP NUMBER	**1,2,3,4**
ITM CO-ORDINATES	**605775E 835600N (centre of area)**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This site is an extensive area of upland karst on the western slopes of Cuilcagh Mountain, extending southwards from near Blacklion and Loughan on the shores of Lough Macnean Upper to the Burren Forest and further south to the western Cuilcagh slopes.

Geological System/Age and Primary Rock Type
The rocks are primarily Lower Carboniferous limestone of the Dartry Limestone Formation, and comprise mostly the carbonate mudbank facies termed the Knockmore Limestone Member.

Main Geological or Geomorphological Interest
This site is an extensive area of upland karst with glacially modified karst, pre- and post-glacial karst, a karst watershed divided by a Tertiary igneous intrusive dyke, abundant surface and underground karstification, and complex hydrological catchments.

Many of the surface features that can be seen and visited are described separately as specific subsites, effectively as highlights, such as Shannon Pot, Burren Forest, Corratirrim, Garvagh Lough, Legeelan Quarry, Pollnaowen, Pollnagossan, Tullydermot Falls and White Father's Cave. The unifying characteristic of the Western Cuilcagh site is the subterranean drainage. Sinks in the upland area have been dye traced to springs and risings in the lowland parts of the site.

Other parts are highly significant yet not visible. The Cuilcagh Dyke, for example is a long intrusion running across the site. It is exposed in Fermanagh, but not seen in Cavan. It plays a very strong role as an impermeable barrier in separating water catchments, dividing karstic flows. The source of the River Shannon was traditionally known as Shannon Pot, but investigations by cavers have shown that big cave systems such as Shannon Cave and a variety of sinks all feed into it and the source of the river is actually high up on the flanks of Cuilcagh Mountain.

Site Importance – County Geological Site; recommended for Geological NHA
The site as whole contains an enormous wealth of karstic landscapes and features. It has already been proposed as a geological NHA to NPWS by the GSI, but has not yet been designated. It is important to note that it complements the geological heritage designations of very similar outstanding geology as Areas of Special Scientific Interest (ASSI) in adjoining areas of County Fermanagh.

Management/promotion issues
Most issues relating to these sites can best be addressed and developed within the framework of the Geopark. In society as a whole the understanding of groundwater, and its vulnerability to pollution, especially in karstic areas, is very poor. The Western Cuilcagh site, through the Geopark, offers many opportunities to raise awareness of the hidden geology of groundwater.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Burren Forest**
Other names used for site	
IGH THEME	**IGH1 Karst; IGH7 Quaternary**
TOWNLAND(S)	**Burren, Gortnaleg, Lanliss**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**4**
ITM CO-ORDINATES	**607080E 834250N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This site comprises the Burren Forest property of Coillte, in which public access roads, parking, paths and signage to geological and archaeological heritage have been developed. In addition an unmanned visitor centre was under construction in autumn 2013.

Geological System/Age and Primary Rock Type
The rock here is Lower Carboniferous limestone of the Dartry Limestone Formation, with both bedded and mudbank type. A patchy covering of glacial till, including many erratic boulders, and peat is also present. The Cuilcagh Dyke, of igneous origin, crosses the site but is not exposed.

Main Geological or Geomorphological Interest
A wealth of geological interest is present in this site, but the most visible features are the glacial erratics. These are large boulders of sandstone from Cuilcagh Mountain that have been dumped by ice onto limestone rocks. Because they are insoluble, the sandstone erratics protect the limestone underneath from solution by rainwater and thereby create a pedestal on which the sandstone boulder sits. The height of this pedestal (around 30 cm on average) reflects how much the limestone land surface has been lowered by weathering in the past 10,000 years or so since the Ice Age ended.

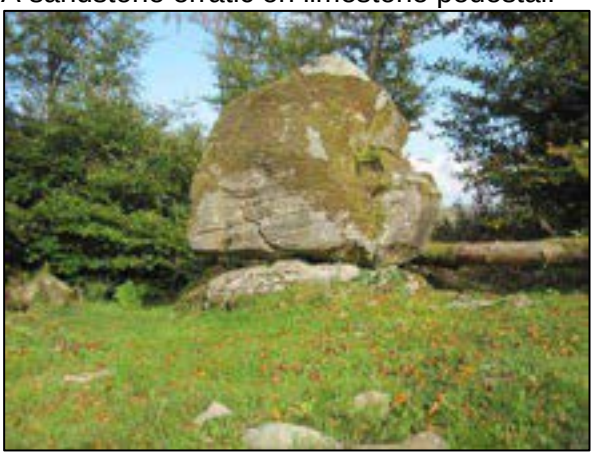
In the northeastern part of the Burren Forest is the Lost Valley, a large doline, or enclosed depression, into or from which no river flows. Such dolines are characteristic of karst landscapes developed on limestone rock. This one is one of the largest in the region and probably formed when the covering of sandstone rocks on top of the limestone was very different to today's pattern, before ice sheets removed vast thicknesses of it. A large river may have flowed down the valley in pre-glacial times, draining off the sandstone slopes above. Due to its size and complexity the Lost Valley may be considered as an uvala, or a series of coalesced dolines, rather than a single one.

Site Importance – County Geological Site; recommended for Geological NHA
The site is a very important component of the West Cuilcagh site proposed for geological NHA status.

Management/promotion issues
The Border Uplands Project, funded through INTERREG, is developing an unmanned visitor centre on site in the Burren Forest. The Geopark and Cavan County Council, in partnership with others, including Coillte, have already invested in this site as a key public amenity. This recognition and value will serve the geological heritage well. The educational publications produced by the Geopark serve the needs of formal school study visits.

A sandstone erratic on limestone pedestal.

The entrance to Burren Forest.



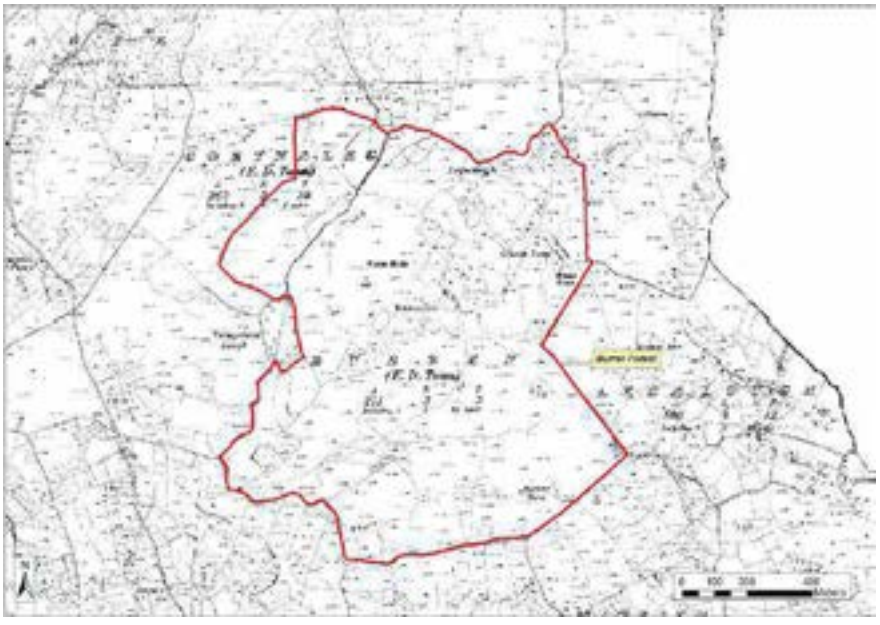
A sandstone erratic on limestone pedestal.

Split rock sandstone erratic is in two halves.

The Lost Valley uvala.

The Burren Forest seen from the south.

Walking infrastructure in the area is well developed with signed trails and stiles etc.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Corratirrim**
Other names used for site	
IGH THEME	**IGH1 Karst**
TOWNLAND(S)	**Corratirrim, Lanliss**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**2**
ITM CO-ORDINATES	**607650E 836010N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This is an area of limestone pavement to the north of the Burren Forest, on the northern edge of the limestone plateau.

Geological System/Age and Primary Rock Type
The rock here are limestones belonging to the Lower Carboniferous Dartry Limestone Formation. They are mudbank facies defined as the Knockmore Member.

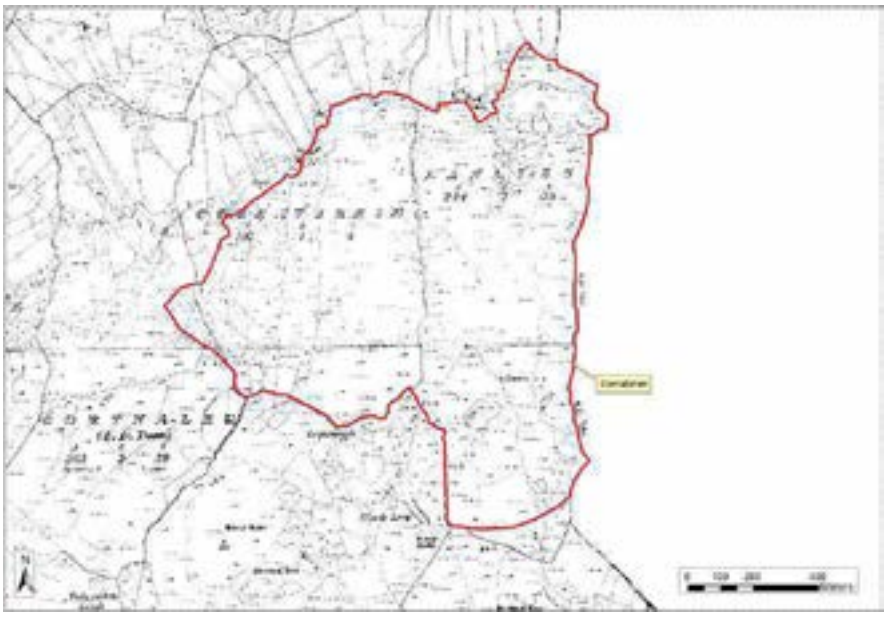
Main Geological or Geomorphological Interest
This site has an extensive area of limestone pavement which developed where cracks and fissures were enlarged by rainwater solution of the limestone to form grykes. The upstanding areas of limestone between the enlarged joints are called clints. There are areas of pavement with bare rock, others where grass has begun to overgrow the pavement and other areas within the site where a complex mosaic of acid soils and vegetation such as heather or rushes are covering the limestone in a thin veneer. A few small caves and dolines are present.

Site Importance – County Geological Site; recommended for Geological NHA
The site is a very important component of the Western Cuilcagh site proposed for geological NHA status.

Management/promotion issues
Maintaining grazing regimes should be important.

Limestone pavement at Corratirrim overlooking Lough Macnean Lower.

Limestone pavement with short grass is in a complex mosaic with acid soils and vegetation across the southern part of the site.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Garvagh Lough**
Other names used for site	
IGH THEME	**IGH1 Karst; IGH7 Quaternary**
TOWNLAND(S)	**Tawnamakelly, Garvagh, Mullaghboy, Legeelan**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**4**
ITM CO-ORDINATES	**607612E 833308N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This site is a lake and its surrounds on the limestone plateau of Western Cuilcagh.

Geological System/Age and Primary Rock Type
The bedrock here is Lower Carboniferous limestone of the Dartry Limestone Formation, but the lake is probably perched on glacial till.

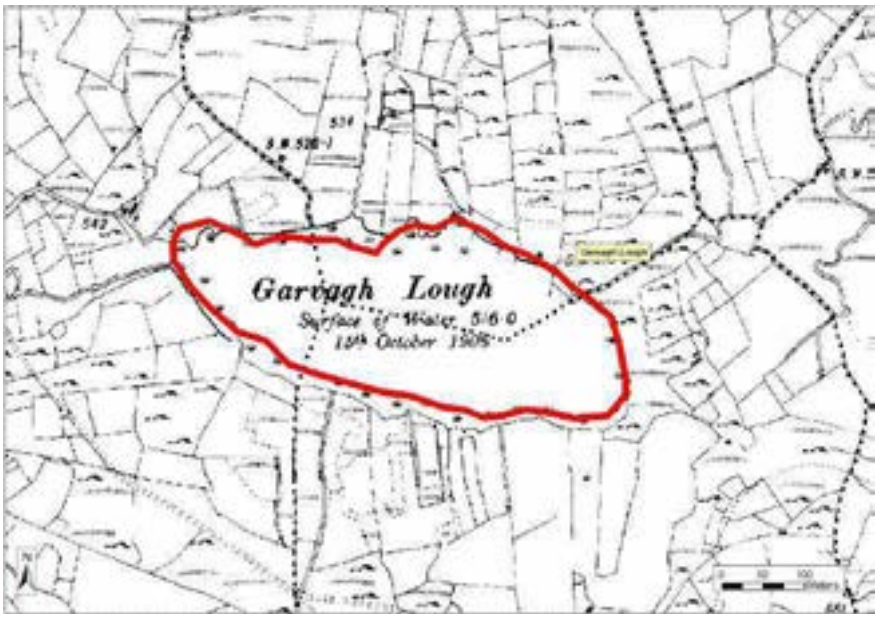
Main Geological or Geomorphological Interest
Garvagh Lough is unusual within the western Cuilcagh site in that lakes do not usually form on limestone terrain as drainage is normally subterranean. Garvagh Lough is probably perched on a veneer of glacial till which serves to seal off the bedrock Several streams enter the lake and one outlet river sinks at Pollnaowen. This lake was the site of the first recorded water tracing experiment in 1872. Wheat chaff thrown into the lake sank at Pollnaowen and reappeared at Shannon Pot.

Site Importance – County Geological Site; recommended for Geological NHA
The site is an important component of the Western Cuilcagh site proposed for geological NHA status.

Management/promotion issues
There is public-road access to the lake and a Geopark interpretative signboard at the lake itself. The same is the case for Pollnaowen where the outlet stream sinks after a few hundred metres travel from the lake.

Lough Garvagh with Cuilcagh mountain in the background.

The signboard at Cuilcagh.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Pollnaowen**
Other names used for site	
IGH THEME	**IGH1 Karst**
TOWNLAND(S)	**Mullaghboy**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**4**
ITM CO-ORDINATES	**606982E 833200N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
Pollnaowen is a small karstic river sink of the river issuing from Garvagh Lough,

Geological System/Age and Primary Rock Type
The.rock here is part of the Lower Carboniferous Dartry Limestone Formation, but the subterranean drainage has developed only in the period since the last Ice Age.

Main Geological or Geomorphological Interest
This site is a classic karstic feature of a surface river sinking into limestone and becoming underground drainage. The river draining from Garvagh Lough sinks into the bedrock over several tens of metres. It is reputedly the site of the first water tracing experiment in 1872, when chaff from harvesting wheat was put in the water and then seen emerging at Shannon Pot. The drainage connection is only one of many in the west Cuilcagh area that connect to Shannon Pot, traditionally considered to be the source of the River Shannon.

Site Importance – County Geological Site; recommended for Geological NHA
The site is a good example of a sinkhole in a karstic terrain, and is within a large area of karstic landscape and subterranean drainage in West Cuilcagh.

Management/promotion issues
The site has permissive access from the landowner to view the sinking river, and a short path from the road brings a visitor to a signboard explaining the site. The Marble Arch Caves Geopark has provided the signboard, and presumably will feature the site in future promotional materials.

A Geopark signboard explains the disappearing river at Pollnaowen.

At Pollnaowen the water seeps away in numerous spots ending finally in this pool.

The roadside sign and pull-in space for one car for visitors to Pollnaowen.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Shannon Pot**
Other names used for site	Source of the River Shannon
IGH THEME	**IGH1 Karst**
TOWNLAND(S)	**Derrylahan**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**4**
ITM CO-ORDINATES	**605332E 831753N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

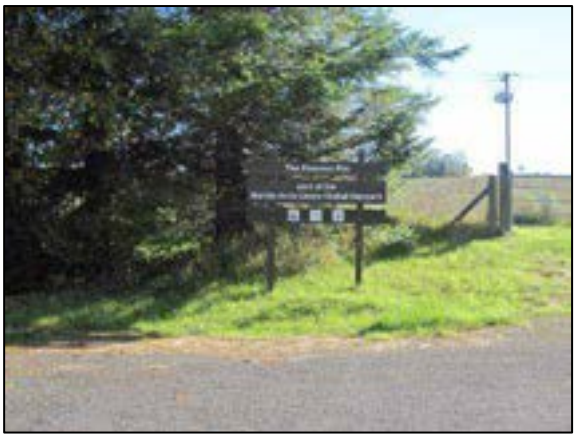
Outline Site Description
This is a spring rising, traditionally regarded as the source of the River Shannon.

Geological System/Age and Primary Rock Type
The water rises through rocks mapped at the surface here as the Meenymore Formation or the Glenade Sandstone Formation, but it passed underground within the Dartry Limestone Formation, which cannot be far below surface. All rocks are of Carboniferous age, from around 330 million years ago. The very extensive network of water inputs from across the Cuilcagh range, indicates that extensive pre-glacial and inter-glacial development of drainage preceded all post-glacial developments.

Main Geological or Geomorphological Interest
This spring rising is traditionally regarded as the source of the River Shannon, the longest river in Ireland. It is a large pool, 16 m in diameter, which has been dived to 9 m depth below which it becomes impassable. The water is sourced from very many sinks in the Cuilcagh uplands to the east, some coming from East Cuilcagh, 10 km away at Pigeon Pot in County Fermanagh. Although it largely travels underground in the Dartry Limestone Formation, it is capped by slightly younger sandstones and evaporite (gypsum-bearing) rocks. These have been breached where the rising occurs at Shannon Pot.

Site Importance – County Geological Site; recommended for Geological NHA
The site is an important component of the Western Cuilcagh site recommended for geological NHA status.

Management/promotion issues
As with many sites in the Geopark, very good infrastructure for visitors, with permissive access from landowners, has been put in place. A well signed public car park with picnic facilities, other walking routes and signboards, allows visitors to make a short walk on a hard surface path to Shannon Pot, where further interpretation signboards are in place.



The signposted access to Shannon Pot.

Signboard at Shannon Pot car park.

Shannon Pot.

Footpath and footbridge to Shannon Pot.

Signboards beside Shannon Pot.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – White Father's Caves**
Other names used for site	St. Augustine's Cave
IGH THEME	**IGH1 Karst**
TOWNLAND(S)	**Loughan, Killycarney, Termon**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**2**
ITM CO-ORDINATES	**605274E 837528N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This site comprises a cave system in three parts with an open streamway in between the sections where erosion and collapse have removed the cave roof.

Geological System/Age and Primary Rock Type
The limestone hosting the cave is the Knockmore Limestone Member, a carbonate mudmound facies within the Dartry Limestone Formation, of Lower Carboniferous age. The cave development is probably post-glacial, but may have an older origin.

Main Geological or Geomorphological Interest
White Father's Caves are three short sections of one cave with unroofed sections between them. The river in the cave comes from the Barran rising about 2 km away to the southwest. It previously sank at Pollnagossan. The first cave is a dry bridge, a short natural bridge under the old road. Beside the new road the river passes into a 60 m long second cave section which passes under the road. The third cave is longer and runs for about 200 m before emerging to run into Lough Macnean. The entire cave is well decorated with speleothems.

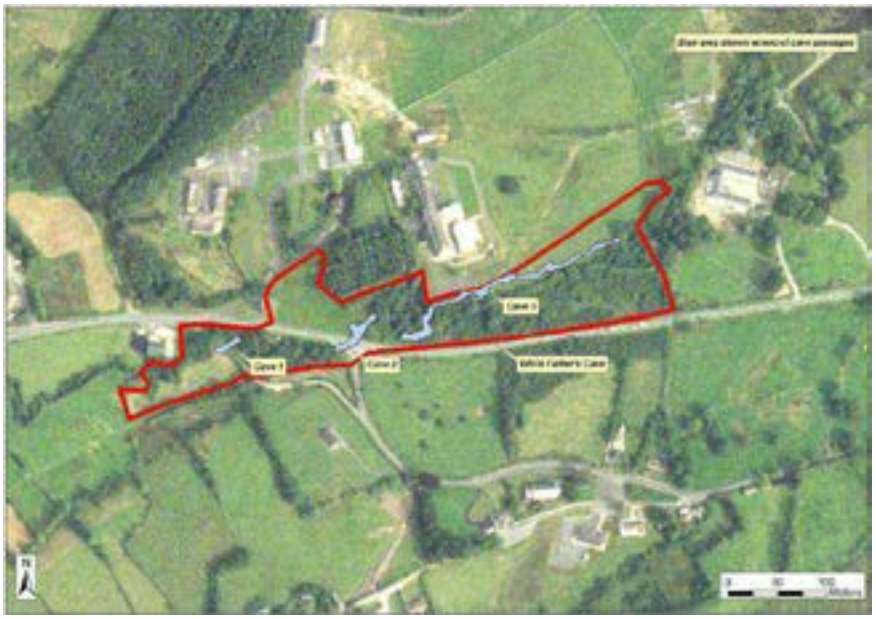
Site Importance – County Geological Site; recommended for Geological NHA
The site is an important component of the Western Cuilcagh site proposed for geological NHA status.

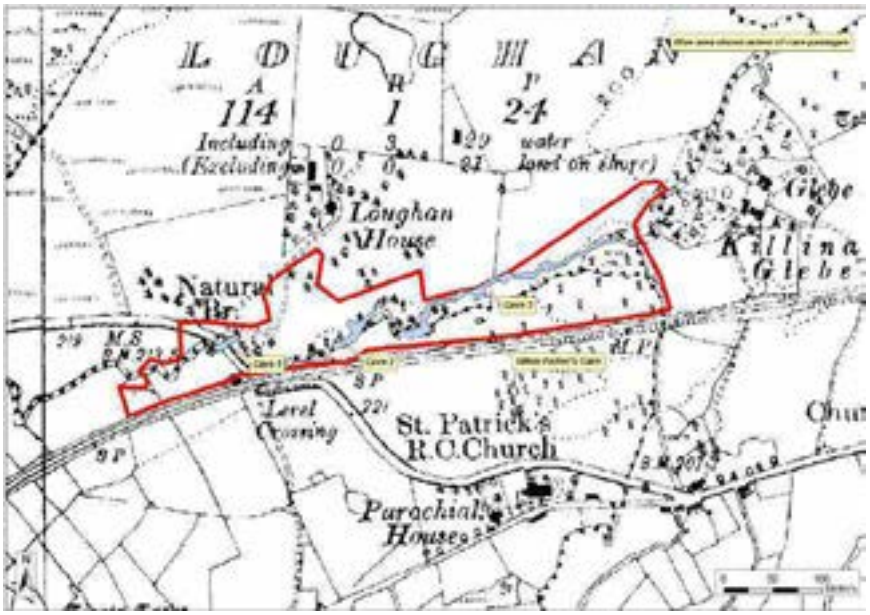
Management/promotion issues
This site is a popular and accessible caving trip used by individual cavers and by organised outdoor pursuits centre groups. It has been the subject of various pollution and other problems over recent years. The White Father's Caves Conservation Plan commissioned by the County Council, and promotion of the cave within the context of the Geopark, will hopefully see no future issues arising.

Steps to viewing platform installed as public infrastructure at the second cave.

Left: Signposted access by gate to section of unroofed cave between first and second cave.
Right: the first cave looking upstream.

Footpath access along unroofed cave section between first and second cave.





CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Cormeen Quarry**
Other names used for site	
IGH THEME	**IGH2 Precambrian to Devonian Palaeontology**
TOWNLAND(S)	**Cormeen**
NEAREST TOWN/VILLAGE	**Stradone**
SIX INCH MAP NUMBER	**26**
ITM CO-ORDINATES	**653000E 803744N**
1:50,000 O.S. SHEET NUMBER	**35 GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This site is a small quarry, intermittently used for farm materials, and some rock faces that have been more recently excavated behind a gun club premises.

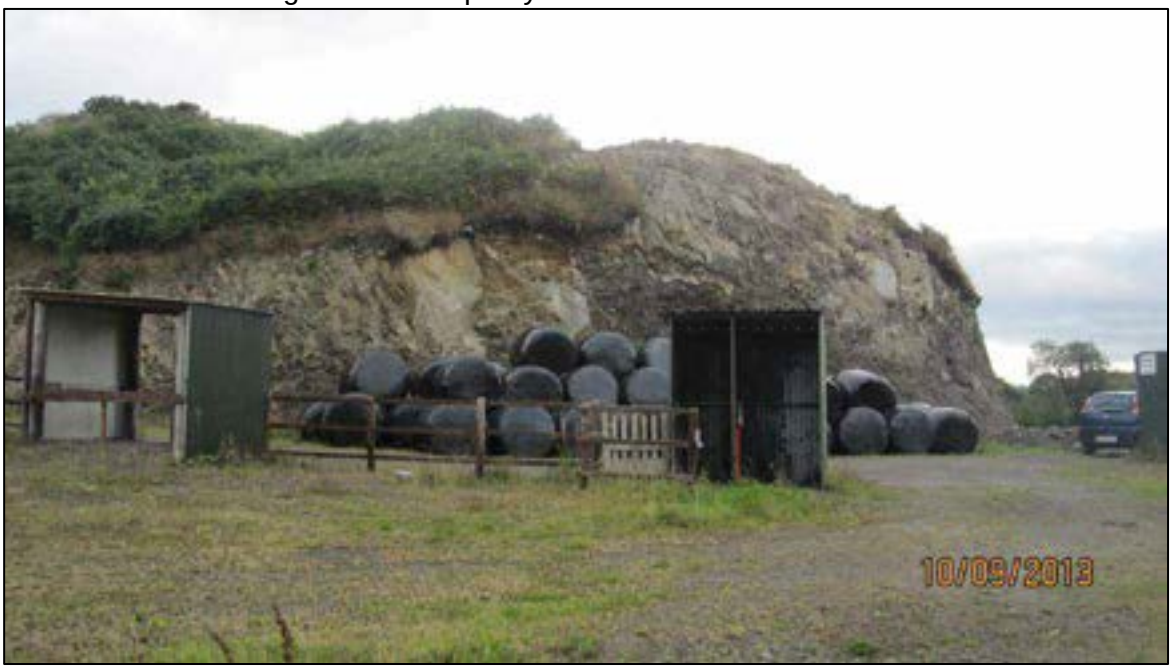
Geological System/Age and Primary Rock Type
The rocks are part of the Ordovician Carrickatee Formation, and some Silurian Lough Avaghon Formation sediments are juxtaposed by faults.

Main Geological or Geomorphological Interest
This site is the best known current representative in Ireland of the 'Moffat Shale' graptolitic horizons which are widespread throughout the Longford-Down inlier. These horizons are composed of black shales that in places contain deep-sea planktonic fossils such as graptolites. The fossils are seen as thin serrated grey and white stripes in various forms. The Moffat shales are commonly found at the major bounding faults between large blocks of rock sequences, or 'tectonic tracts'. These tracts are displaced slices of former sea floor, which have been stacked almost vertically like cards. The shales form relatively weak horizons along which large blocks of rock, sometimes many tens of kilometres in width, were easily displaced. The name "Moffat" comes from the Southern Uplands of Scotland where the geological continuation of the Longford Down rocks was first properly studied and understood. The fossils at Cormeen quarry give an age for the rocks and help explain the regional geological structures.

Site Importance – County Geological Site, recommended for Geological NHA
This site is the best known representative in Ireland of the 'Moffat Shale' graptolitic horizons which are widespread throughout the Longford-Down inlier, and the new faces excavated in recent years add to the value of the site.

Management/promotion issues
The continued small scale excavation of rock for use locally as fill will maintain fresh rock exposures and prevent vegetation, but details of precise features to be seen in sections will change through time. It is important to prevent any subsequent dumping of other material so that rock faces remain accessible. The quarry and the new exposures in the gun club range are on private land and are not suitable for promotion, unless by explicit arrangement with the landowner.

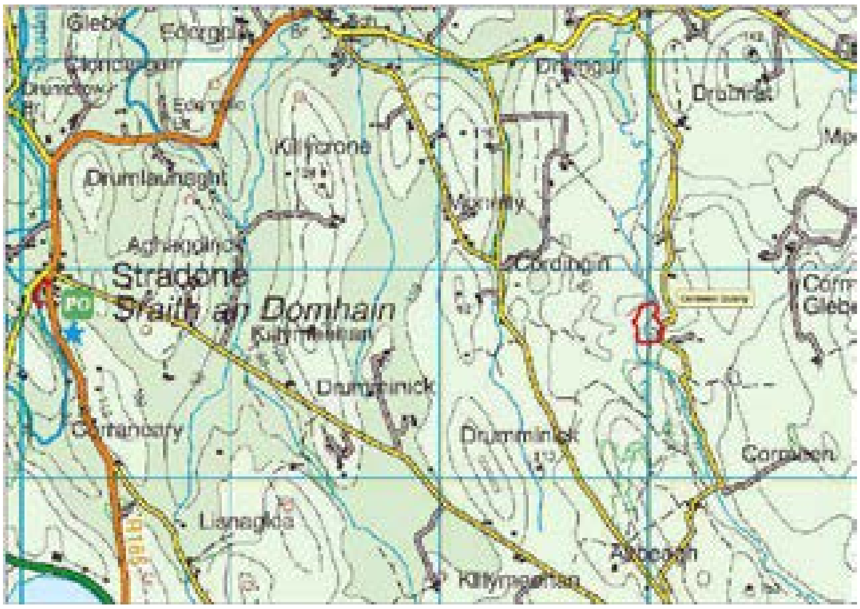
A view from roadside gate of older quarry at Cormeen.

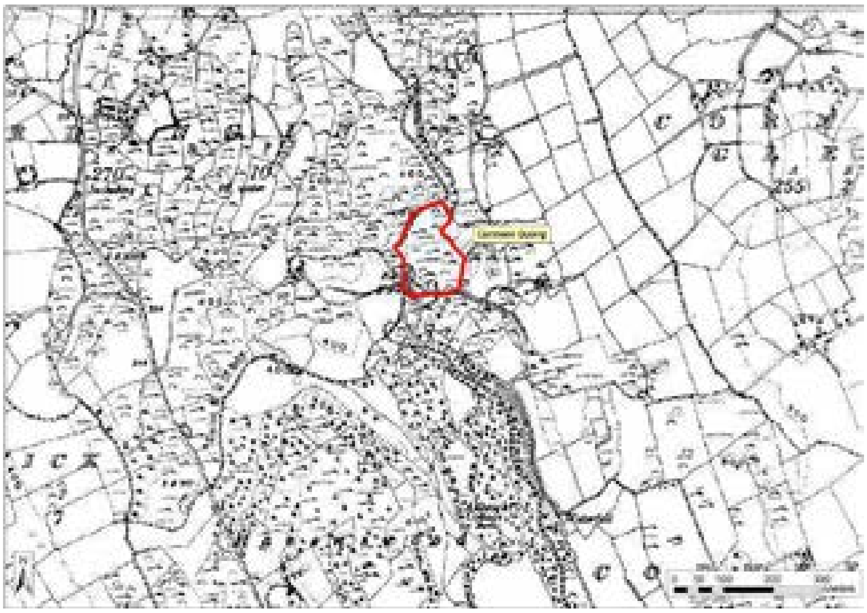


A view of the new exposures behind Clifferna Gun Club shelters and farm silage bales.



Looking northeast along new exposures. The older quarry viewed from the ford on west side.





CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Moneycass Glebe**
Other names used for site	
IGH THEME	**IGH2 Precambrian to Devonian Palaeontology**
TOWNLAND(S)	**Moneycass Glebe**
NEAREST TOWN/VILLAGE	**Stradone**
SIX INCH MAP NUMBER	**2**
ITM CO-ORDINATES	**654312E 804660N**
1:50,000 O.S. SHEET NUMBER	**35 GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This site is a heavily wooded and overgrown field with small quarried faces at the edges.

Geological System/Age and Primary Rock Type
The rocks here are mudstones of the late Ordovician Carrickatee Formation.

Main Geological or Geomorphological Interest
The rock exposures around the margins of the field have yielded a very unusual collection of fossils. The fossils are mostly graptolites but they occur with a trilobite species that is only known from this locality. The combination of fossils is an important rarity for understanding the geology of the region, and dating the rocks in Cavan.

The graptolites of two biozones occur in succession, and a deep water trilobite, now classified as *Songxites cellulana* was washed in with a few other fossils of nautiloids and ostracods. In modern stratigraphical terminology, these are from the late Katian to Hirnantian Stages of the Upper Ordovician, formerly defined as Ashgill.
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Site Importance – County Geological Site; recommended for Geological NHA
The site is an important County Geological Site, and has already been proposed for designation as a geological NHA by the NPWS.

Management/promotion issues
The site is now strongly overgrown with vegetation and difficult to access. It is private land and not recommended for promotion. Any change in land use or clearance would be best conducted with a palaeontologist monitoring for more fossil material.

An overview of the site from the northeast. The tallest trees mark the southwestern limit of the site.

A view of the main southeastern exposure of rock, heavily vegetated.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Swanlibar River**	
Other names used for site		
IGH THEME	**IGH3 Carboniferous to Pliocene Palaeontology**	
TOWNLAND(S)	**Furnaceland, Hawkswood**	
NEAREST TOWN/VILLAGE	**Swanlinbar**	
SIX INCH MAP NUMBER	**7**	
ITM CO-ORDINATES	**619226E 827100N**	
1:50,000 O.S. SHEET NUMBER	**26**	**GSI 1:100,000 BEDROCK Sheet No. 7**

Outline Site Description
This is a short stretch of river bed, where bedrock is often exposed.

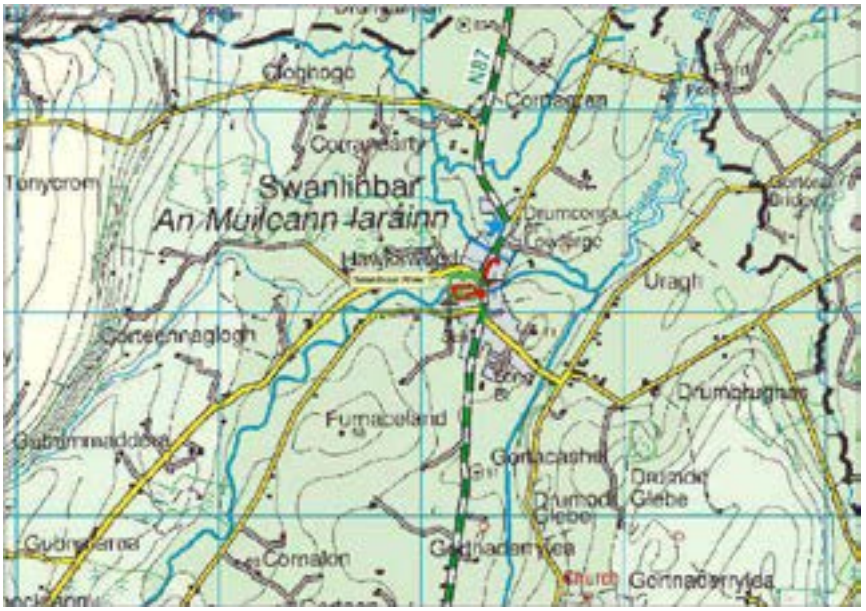
Geological System/Age and Primary Rock Type
The river bed is made up of horizontal layers (or beds) of Lower Carboniferous bedrock, most of which is limestone or shale belonging to the Benbulben Shale Formation.

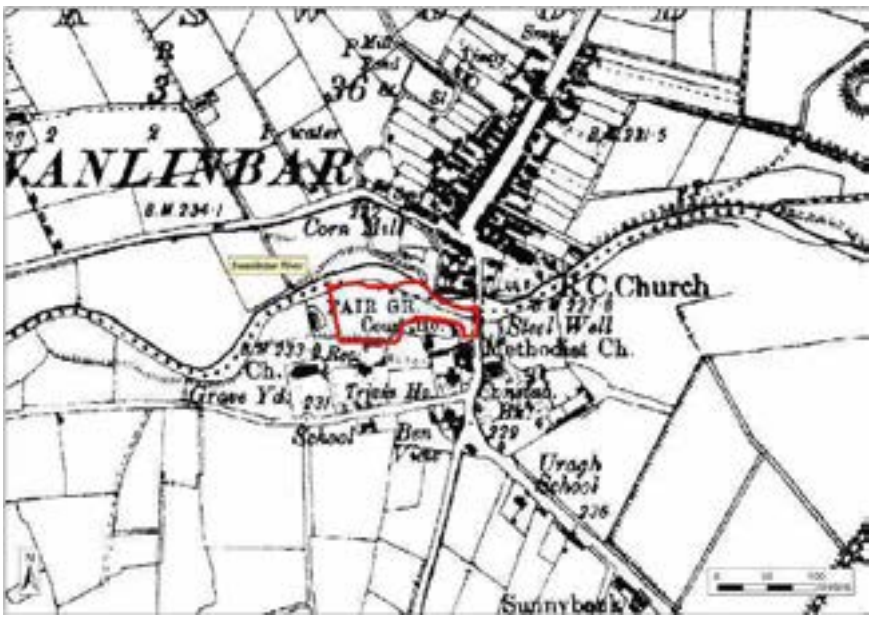
Main Geological or Geomorphological Interest
The main feature is the profusion of numerous well-preserved fossils exposed in the upper bedding surface of the bedrock, typical of the Benbulben Shale Formation. There are however many loose fossil-bearing cobbles in the river bed.

Some of the best preserved fossils include the solitary coral *Siphonophyllia benburbensis* but there are also easily visible scattered crinoid ossicles, and numerous brachiopods.

Site Importance - County Geological Site
This is one of the best localities to see Carboniferous fossils within County Cavan.

Management/promotion issues
This is an excellent site for accessing some prime examples of Carboniferous fossils, located within the boundary of the Marble Arch Caves Global Geopark. There is an interpretation panel adjacent to the site and a small amenity site including a children's play park and seating area.





CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Bruse Hill Quarry**
Other names used for site	
IGH THEME	**IGH4 Cambrian to Silurian**
TOWNLAND(S)	**Bruse**
NEAREST TOWN/VILLAGE	**Arvagh**
SIX INCH MAP NUMBER	**24**
ITM CO-ORDINATES	**631466E 798476N**
1:50,000 O.S. SHEET NUMBER	**34 GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This site comprises a disused quarry into the northern side of Bruse Hill, east of Arvagh.

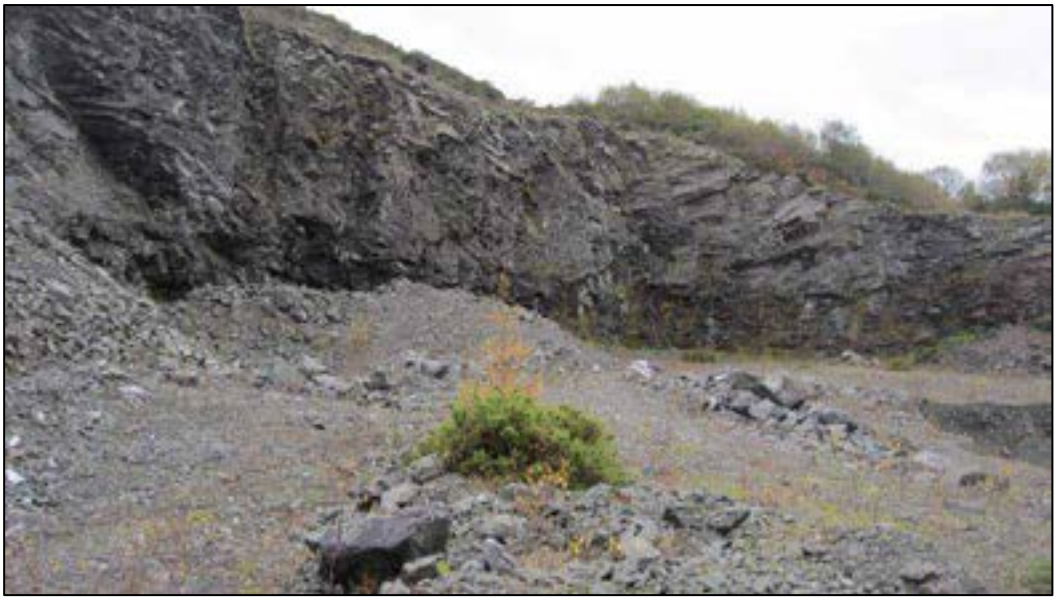
Geological System/Age and Primary Rock Type
The rocks in the quarry are part of the Coronea Formation, which is within Tract 2 in the Northern Belt of the Longford - Down inlier. They are of middle Ordovician age.

Main Geological or Geomorphological Interest
These rocks are representative of one of two formations comprising a major Tract (numbered 2 by geologists) of rocks in the Northern Belt of the Longford – Down inlier (extending and correlating with the Southern Uplands of Scotland). These Tracts are slices of the ocean floor that once separated northwestern Ireland from southeastern Ireland. The ocean is called the Iapetus Ocean, and is a major element of the geological history of Ireland. Sections of ocean floor were squeezed and stacked up as vertical slivers of rock (now called Tracts) adjacent to the subduction zone that consumed the Iapetus Ocean. The ocean closed over a long period during the Ordovician and early Silurian. The Iapetus Ocean floor rocks are poorly exposed in general and so quarries such as this are important reference sections.

The Coronea Formation is best exposed in this quarry and it is defined as the type locality in the Geological Survey of Ireland map report Sheet 8/9 (although the named townland is in error). It is made up of green greywackes, red shales and minor spilitic lavas. Red shales are particularly abundant in the lower part of the formation, averaging 5-10 m thick but can be up to 30 m thick over several hundred metres laterally. Some of these contain thin beds of chert. The spilitic lavas and other rocks are thought to have been deposited in water depths of over 4000 m.

Site Importance – County Geological Site
The site is an important representative of the Ordovician rocks from the Northern Belt of the Iapetus Ocean floor which once separated Ireland in two halves.

Management/promotion issues
The quarry is abandoned and is private property, and is not suitable for general promotion.



A view of the highest bench in the southern part of the quarry.

A view of the quarry from the roadside entrance.

A view of the main floor of the quarry.

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Carrickallen Quarry**
Other names used for site	
IGH THEME	**IGH4 Cambrian to Silurian**
TOWNLAND(S)	**Carrickallen**
NEAREST TOWN/VILLAGE	**Stradone**
SIX INCH MAP NUMBER	**22, 27**
ITM CO-ORDINATES	**656450E 804110N**
1:50,000 O.S. SHEET NUMBER	**35 GSI BEDROCK 1:100,000 SHEET NO. 8**

Outline Site Description
This site is an abandoned quarry.

Geological System/Age and Primary Rock Type
The rocks here are defined as part of the Carrickatee Formation, and are mostly volcanic tuffs locally exposed and exploited in the quarry, although the formation as a whole comprises mostly mudstones. They are of Middle Ordovician to early Silurian age, based on graptolite fossils.

Main Geological or Geomorphological Interest
These rocks are representative of the Moffat Shale horizons at the base of a major Tract (numbered 4b by geologists) of rocks in the Central Belt of the Longford – Down inlier (extending and correlating with the Southern Uplands of Scotland). These Tracts are slices of the ocean floor that once separated northwestern Ireland from southeastern Ireland. The ocean is called the Iapetus Ocean, and is a major element of the geological history of Ireland. Sections of ocean floor were squeezed and stacked up as vertical slivers of rock (now called Tracts) adjacent to the subduction zone that consumed the Iapetus Ocean. The ocean closed over a long period through the Ordovician and early Silurian. The Iapetus Ocean floor rocks are poorly exposed in general and so quarries such as this are important reference sections.

In the eastern end of the quarry there are several well displayed faults that show the style of faulting in these rocks.

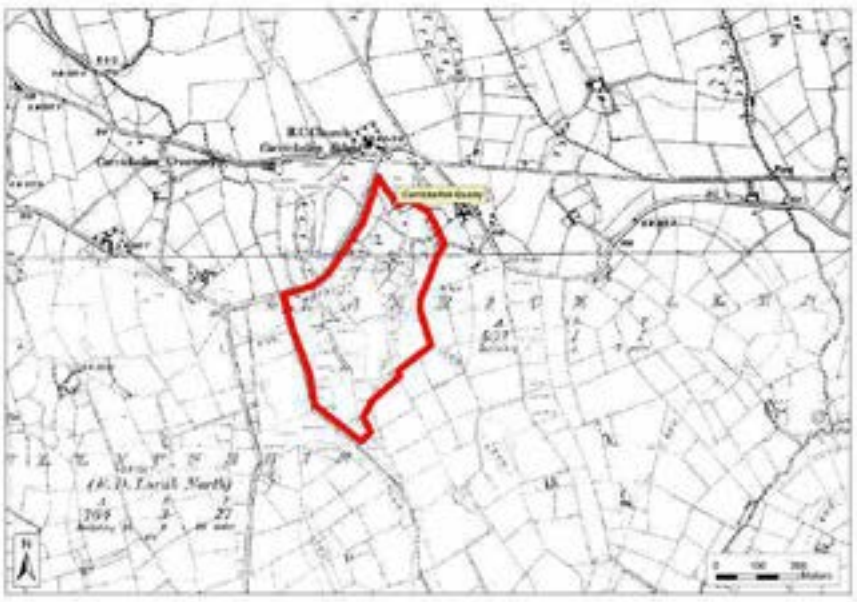
Site Importance – County Geological Site
This is a good representative site of rocks that typically underlie the Lough Acanon district, demonstrating the broader geological history of much of Cavan.

Management/promotion issues
The quarry was abandoned (in 2013) and is private property, unsuitable for general promotion.

A view of the eastern end of the quarry at Carrickallen.

A view of the western extension of the quarry, now flooded.

Left: Thin beds of greywacke sandstones showing complex extensional faulting.
Right: Thick bedded greywacke sandstones in the main quarry face.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Drumcarban**
Other names used for site	
IGH THEME	**IGH15 Economic Geology**
TOWNLAND(S)	**Drumcarban**
NEAREST TOWN/VILLAGE	**Crossdoney**
SIX INCH MAP NUMBER	**25**
ITM CO-ORDINATES	**635593E 798976N**
1:50,000 O.S. SHEET NUMBER	**34 GSI BEDROCK 1:100,000 SHEET NO. 12**

Outline Site Description
The site comprises a series of small outcrops straddling the water line along the shore of a small lake.

Geological System/Age and Primary Rock Type
The Crossdoney granite pluton is considered to be Caledonian in age (c. 400Ma). It is here host to quartz veins and alteration zones containing minor amounts of molybdenite and chalcopyrite mineralization.

Main Geological or Geomorphological Interest
The Crossdoney pluton underlies a relatively small area (c. 15 km^2) 5km southwest of Cavan town. It is of interest as the only granitic intrusion in the county and at Drumcarban it is host to Cu-Mo-sulphide mineralization, a common metal association in granite intrusions worldwide but relatively rare in Ireland. The best-known example of this kind of mineralization in the country is at Mace Head in county Galway.

The pluton comprises granodiorite, monzonite and quartz diorite in its northern part and granodiorite and quartz monzonite in the south. At Drumcarban, the medium-grained equigranular hornblende-biotite granodiorite contains thin (few mm – 20mm wide) quartz veins that trend generally northnorthwest–southsoutheast. The veins contain scattered grains of chalcopyrite ($CuFeS_2$) and molybdenite (MoS_2). The granodiorite surrounding the veins has been intensely altered in places, with the feldspar in the rock altered to sericite and the biotite and hornblende to chlorite. Redistribution of elements during alteration has given rise to light-coloured, “bleached” sericitic zones and greenish chlorite-rich zones in the granodiorite. Sericitized zones also host scattered grains of chalcopyrite and molybdenite.

Site Importance – County Geological Site
The rarity of granite-hosted Cu-Mo mineralization in the country gives Drumcarban a significance that the relatively minor amounts of mineralization on display might not otherwise merit. The site also affords an opportunity to examine outcrop of the only granitic intrusion in County Cavan. For these reasons it should be designated as a CGS. Far better examples of Cu-Mo mineralization are displayed elsewhere in the country so NHA designation is not warranted.

Management/promotion issues
The site is on private land on the southern shore of White Lough, adjacent to pasture where cattle were grazing at the time of the field visit. A drainage ditch separates the site from the minor road 100m to the west. Given that the mineralization is minor and not easily seen, the site is likely to be mainly of scientific interest and would not lend itself to promotion among the wider public.

Southern shoreline of White Lough (view to southeast).

Exposure of altered granite with NNW-SSE-trending joint (left); fractured granite displaying irregular zones of sericitization (S) and chloritization (C).

Unmineralized NNW-SSE-trending 20mm-thick quartz vein in granite (left); strongly sericitized granite with disseminated molybdenite and chalcopyrite (not visible in photo) (right).

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Blackwater Valley**
Other names used for site	
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Ballaghdorragh, Ryefield, Edenburt, Lisduff, Stramatt, Carraghkeelty More, Knocknagartan, Corronagh**
NEAREST TOWN/VILLAGE	**Virginia**
SIX INCH MAP NUMBER	**43, 44**
ITM CO-ORDINATES	**663660E 782360N (centre of valley feature)**
1:50,000 O.S. SHEET NUMBER	**35 GSI BEDROCK 1:100,000 SHEET NO. 13**

Outline Site Description
The Blackwater valley is the most significant river valley in the southernmost part of County Cavan. It extends southeastwards from the southern end of Lough Ramor near Lisduff. The pitted sandur that forms a striking hummocky terrain at the base of the valley is unique in the size and amplitude of its hummocks.

Geological System/Age and Primary Rock Type
The valley is underlain by bedrock which is Silurian in age, and comprises quartz-greywackes and greywackes. The sandur sediments are Quaternary in age, having been deposited across the valley by meltwater rivers, when the ice sheets of the last Ice Age were melting.

Main Geological or Geomorphological Interest
This is one of the best examples of a pitted sandur in Ireland. Pitted sandur features are hummocky outwash plains, formed either because blocks of dead ice melted out from under the meltwater sediments after they were deposited, or because a large-scale, instantaneous meltwater flood occurred.

The source of the Blackwater River is at Lough Ramor and the sandur sediments flank the lake on its western and southern shores. The area between the lake and the Meath county boundary has the best expression of outwash sediments in the entire Blackwater Valley, where the hummocks are high, up to 10m in height, and interspersed with striking hollows, or kettle holes.

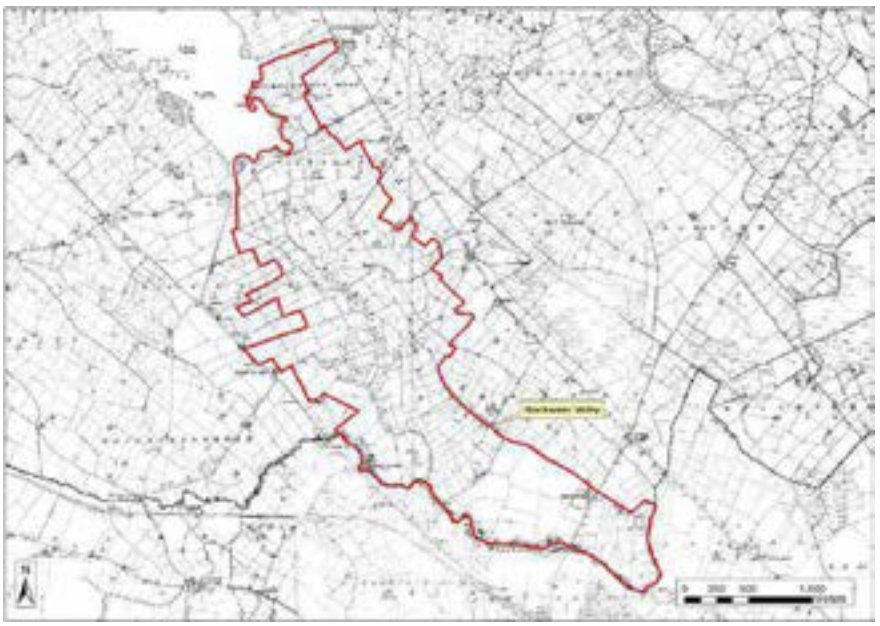
The theory that a large lake formed under the retreating ice sheet, where Lough Ramor now lies, and deposited the sand and gravel sediments along the Blackwater Valley when the lake burst out through the ice in a ‘Jokulhlaup’, cannot be discounted and is worthy of future investigation.

Site Importance – County Geological Site
This is one of the finest examples of a pitted sandur in Ireland.

Management/promotion issues
This is an excellent site in terms of macro-scale Quaternary geomorphology. A signboard in Lisduff village detailing the importance and formation of the features within the valley, as well as the adjacent Bruse Hill, might prove useful.

View westwards across the Blackwater Valley, from the high ridge at Edenburt.

The source of the Blackwater River, flowing through the wide floodplain at Stramatt Bridge adjacent to Lough Ramor, with the hummocky sands and gravels in the distance.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Bruse Hill**
Other names used for site	**Carrigasimon Hill**
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Carrigabruse, Bruse, Carrakeelty, Carrigasimon, Enagh, Fartagh**
NEAREST TOWN/VILLAGE	**Virginia, Mullagh**
SIX INCH MAP NUMBER	**44**
ITM CO-ORDINATES	**664471E 784020N (summit of crag)**
1:50,000 O.S. SHEET NUMBER	**35 GSI BEDROCK 1:100,000 SHEET NO. 13**

Outline Site Description
This is an excellent example of a crag and tail ridge.

Geological System/Age and Primary Rock Type
The crag comprises quartz-greywacke of the Castlerahan Formation. The crag-and-tail feature itself is Quaternary in age, having been formed at the base of the ice sheet moving northeast to southwest during the maximum period of the last Ice Age.

Main Geological or Geomorphological Interest
This is one of the few discrete examples of a crag and tail ridge throughout the drumlin belt, where composite crag-and-tail features are more common.

Crags are formed when a glacier or ice sheet passes over an area that contains a particularly resistant mass of rock (in this case the rock summit of Bruse Hill itself). The force of the glacier erodes the surrounding softer material, leaving the rocky block protruding from the surrounding terrain. The crag then serves as a partial shelter to softer material in the wake of the glacier, which remains as a gradual fan or ridge forming a tapered ramp (called the tail) up the leeward side of the crag. This is seen on the southeastwards side of the crag itself, tailing into Enagh and Fartagh townlands.

The Bruse Hill tail feature extends for a distance of just under 3 kilometres, and the crag reaches a height of 196m O.D. at its summit.

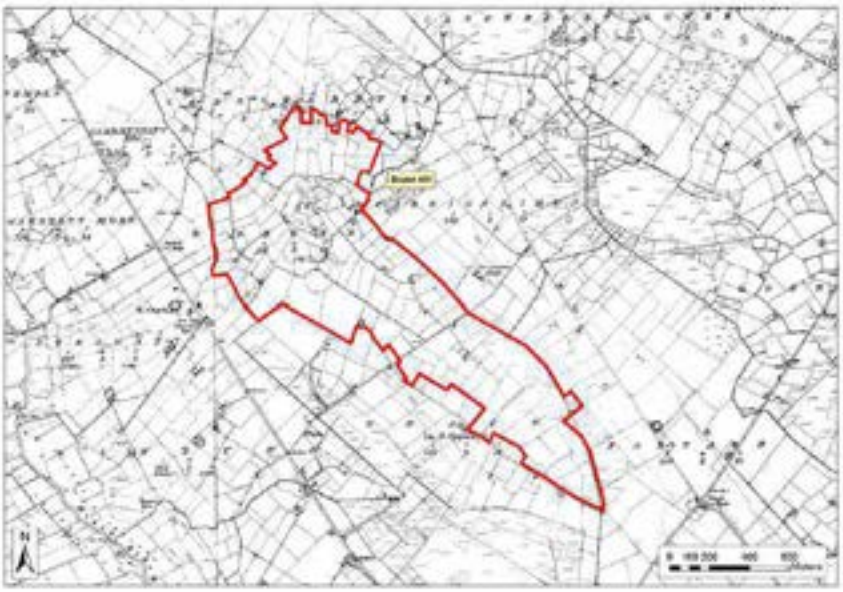
Site Importance – County Geological Site
This is probably the finest discrete crag-and-tail within the entire drumlin belt.

Management/promotion issues
This is an excellent site in terms of macro-scale Quaternary subglacial geomorphology. The feature is beside the N3 and is easily visible from the road itself.

A signboard in Lisduff village detailing the importance and formation of the feature, and the adjacent Blackwater Valley, might prove useful.

Bruse Hill, viewed from the west.

The rock ‘crag’ on Bruse Hill itself, at the break of slope with the ‘tail’.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Cuilcagh Mountain**
Other names used for site	
IGH THEME	**IGH9 Upper Carboniferous to Permian** **IGH8 Lower Carboniferous; IGH7 Quaternary**
TOWNLAND(S)	**Garvagh, Edenmore, Legnagrow, Legglass, Eshveagh, Ardvagh, Tullycrafton, Dunmakeever, Commas, Bursan, Bellavally Lower, Legnadirk, Aghnacollia, Altbrean, Tullydermot, Binkeeragh, Aghaboy, Moneydoo or Tonycrom, Alteen,**
NEAREST TOWN/VILLAGE	**Swanlinbar, Blacklion**
SIX INCH MAP NUMBER	**4, 6, 7**
ITM CO-ORDINATES	**612600E 826700N**
1:50,000 O.S. SHEET NUMBER	**26** **GSI 1:100,000 BEDROCK Sheet No. 7**

Outline Site Description
This mountain is a long plateau-like ridge of sandstone and shale upland that straddles the boundary between counties Cavan and Fermanagh.

Geological System/Age and Primary Rock Type
All of the bedrock is Carboniferous in age and is part of the Leitrim Group, which underlies much of Leitrim, Sligo and northern Roscommon, and extends into Fermanagh. The oldest part of the Leitrim Group is Dinantian in age and includes the Meenymore Formation, the Glenade Sandstone Formation, the Bellavally Formation and Carraun Shale Formation. Overlying these are the younger, Namurian formations of the Leitrim Group, including the Dergvone Shale Formation, the Briscloonagh Sandstone Formation, the Gowlaun Shale Formation and the Lackagh Sandstone Formation, which caps the mountain.

Main Geological or Geomorphological Interest
The mountain comprises a thick succession of Carboniferous Dinantian and Namurian rocks. The sequence as a whole represents an episode of delta formation as falling sea levels saw Namurian sands begin to fill the shallow limestone seas of the Dinantian. This episode of delta formation started in the northern part of Ireland and spread southward. The Meenymore Formation represents a very shallow sea, which locally dried up enough to form evaporate minerals such as gypsum. The shale formations are the ‘background’ deposition of muddy sediments from rivers entering the marine seas, from the north. Occasionally rapid deposition was accompanied by ironstone formation in the same rocks to the west. The sandstones mark major episodes of deltaic advance southwards. To the west in Leitrim and Roscommon, swamps sometimes formed on top of the deltas and left coal deposits, but not in Cuilcagh.

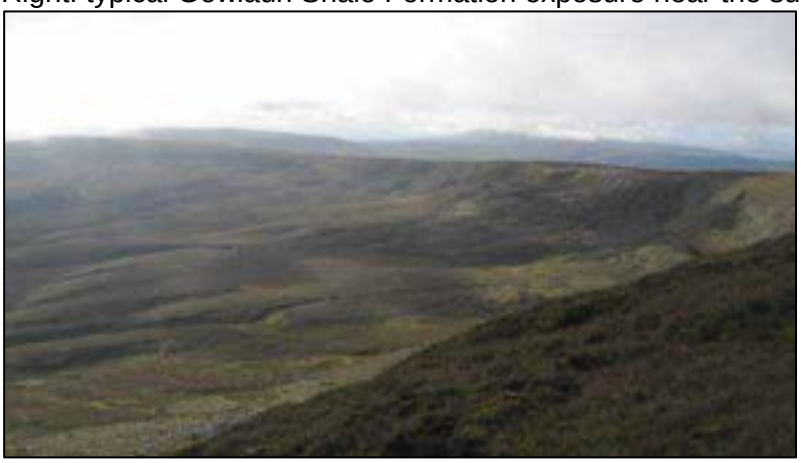
Evidence from the coals and fossil spores indicate that all these rocks were once buried under other rocks several kilometres thick, but these have since been eroded away. The Lackagh Sandstone Formation on the top of Cuilcagh forms a hard resistant cap that has prevented the erosion that has reduced adjacent areas to a much lower height. A corrie has been etched into the mountain along its eastern flank.

Site Importance – County Geological Site; may be recommended for Geological NHA
The site is one of the best representations of the Carboniferous Leitrim Group within the region.

Management/promotion issues
Continued co-operation with Fermanagh District Council, especially through the Marble Arch Caves Global Geopark, is the best option for promotional efforts.

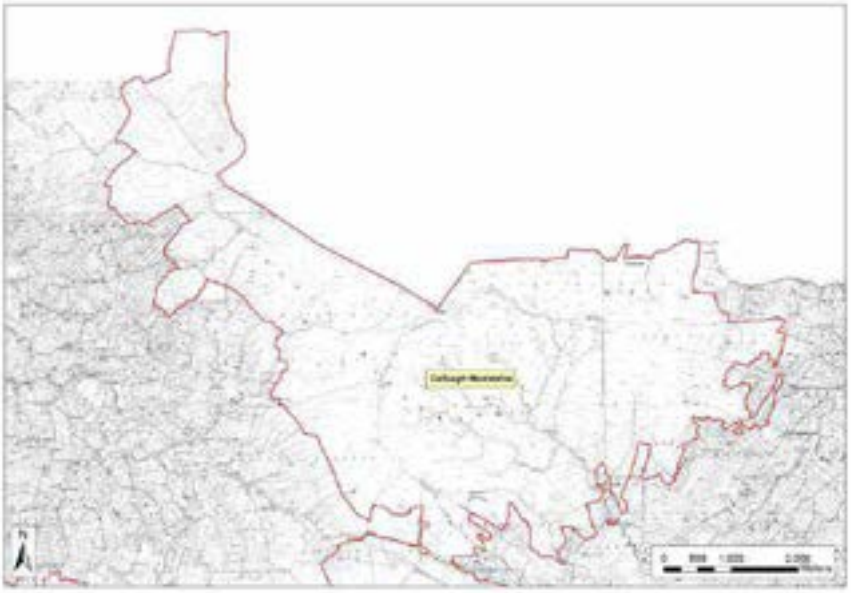
The Cuilcagh ridge viewed from the south west, showing the sandstone escarpment.

Left: The summit plateau looking northwest
Right: typical Gowlaun Shale Formation exposure near the summit.



The large corrie to the south of the summit of Cuilcagh.

Cuilcagh Mountain viewed from the fence along the Cavan – Fermanagh border on the northeast side, showing the steep northern face compared to gentler southern slopes.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Cuilcagh Meltwater Channels**
Other names used for site	Blackrock's Cross channels (southwestern feature only)
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Altateskin, Altnadarragh, Legnaderk, Altachullion Upper, Altachullion Lower, Altbrean, Srahlahan, Drumcask, Knockroe, Knockranny, Gubrimmaddera, Cornalon, Gorteennaglogh, Furnaceland, Hawkswood, Aghaboy, Buinkeeragh**
NEAREST TOWN/VILLAGE	**Swanlinbar**
SIX INCH MAP NUMBER	**6, 7, 8, 9**
ITM CO-ORDINATES	**614200E 823230N (centre of largest channel at Altachullion)**

1:50,000 O.S. SHEET NUMBER **26** **GSI BEDROCK 1:100,000 SHEET NO.** **7**

Outline Site Description
The Cuilcagh Meltwater Channels comprise three deep gullies that were formed by meltwater erosion on the southeastern flank of Cuilcagh Mountain.

The gullies are oriented generally northwest–southeast, with several localised variations. They extend for distances of 1 km to just over 3 km. The channels are named the Altachullion Channel, the Tullydermot Channel and the Gubbrimmaddera Channel.

Geological System/Age and Primary Rock Type
The features are formed in an area of glacial till of varying thickness and bedrock crops out in some parts of the gullies. The till forms a field of ribbed moraines and drumlins in this area flanking Cuilcagh and was deposited at the maximum of the last Ice Age. The channels themselves date from deglaciation at the end of the last Ice Age.

The bedrock in the locality is varied, with Upper Carboniferous (Namurian) shales on the higher ground to the west, and Lower Carboniferous limestones on the lower ground to the east.

Main Geological or Geomorphological Interest
The channels are up to 35m deep and all have a U-shaped profile, typical of meltwater channels. All host misfit streams, which are watercourses that are much smaller than the channel hosting the watercourse.

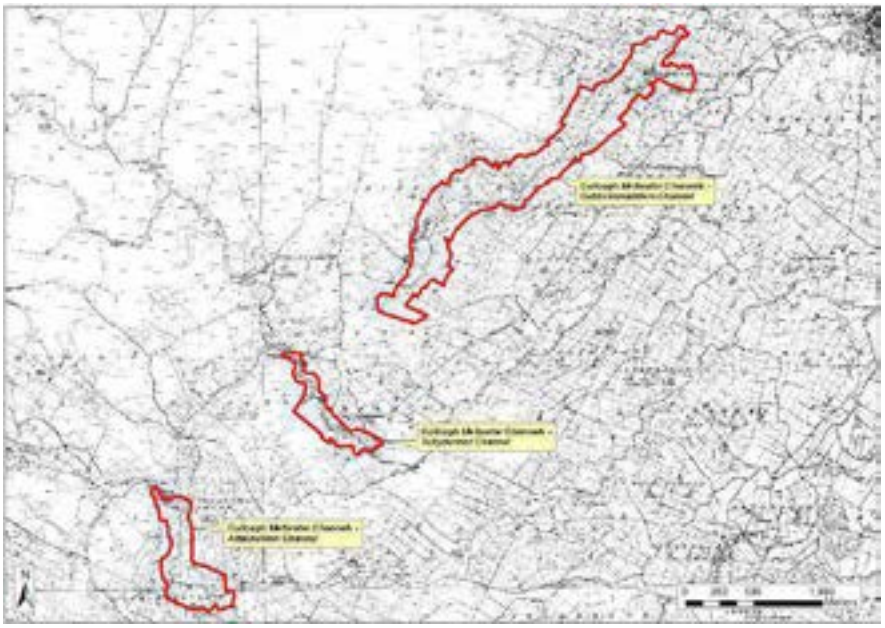
Though no dating or detailed study has been completed on the features, they are considered to have formed completely in the late-glacial Period. The deepest channel at Altachullion (adjacent to Blackrock's Cross) may have been formed by the bursting of a glacial lake, given its unusual depth and size.

Site Importance – County Geological Site
This is a site with good teaching potential on glacial meltwater erosion, as the features are all accessible and easily viewed from roads. The site is definitely of County Geological Site importance but the channel at Altachullion may be considered to be of national importance when further work on the glacial history of the area is completed.

Management/promotion issues
The roadside location of the channels means they are easily accessible, although they are presumably either privately owned or in commonage. However, there is no parking nearby and it is difficult to stop safely on the road. Some wide gates are present at the edge of the Altachullion channel, but no more than two cars may stop and park at any one time.

Steep ‘U’ shaped profile along a stretch of the Altachullion channel, etched into bedrock along this portion.

The deep Tullydermot meltwater channel southeast of Tullydermot Falls, also etched into bedrock along this stretch.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Lough Kinale-Lough Sheelin Deltas**
Other names used for site	
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Carrick, Magheraboy Upper, Moat, Bracklagh, Kilgolagh**
NEAREST TOWN/VILLAGE	**Finnea (Westmeath), Mount Nugent (Cavan)**
SIX INCH MAP NUMBER	**41**
ITM CO-ORDINATES	**639600E 781970N (centre of Kilgolagh Delta)**
1:50,000 O.S. SHEET NUMBER	**34 GSI BEDROCK 1:100,000 SHEET NO. 12**

Outline Site Description
These deltas comprise a number of wide, flat-topped sand and gravel ridges, which stand proud above the surrounding peat bog in southwesternmost County Cavan.

Geological System/Age and Primary Rock Type
The deltas were formed on bedrock which of Lower Carboniferous limestone. The features themselves are Quaternary in age, having been deposited at the edge of the northwestward-retreating ice sheet during deglaciation after the last Ice Age.

Main Geological or Geomorphological Interest
The delta features are fine examples of the type of ice-marginal, deglacial features that often form at the edge of glacial lakes. The ridges seem to be comprised of several individual deltas, which coalesced to form one large ice marginal standstill in the locality.

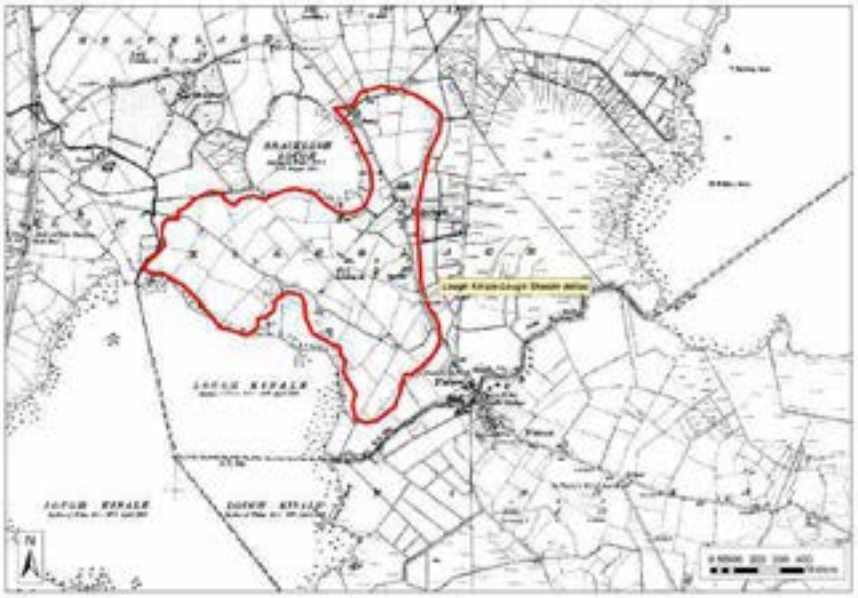
The deltas are chiefly made up of Lower Palaeozoic-age shale and sandstone clasts that were derived from the bedrock northwest of the site. These were carried by ice, released into a meltwater conduit on top of or within the ice, and then deposited subaqueously at the ice margin as the river left the ice. This water flowed off southeastwards into a lake much larger than modern-day Lough Sheelin. At that time, at the end of the Ice Age, both Lough Sheelin and Lough Kinale (as well as the adjacent Bracklagh Lough) would have formed part of the same lake.

Site Importance – County Geological Site
These deltas are excellent examples of deglacial, ice-marginal, meltwater-deposited features.

Management/promotion issues
This system comprises a number of superb features and should be listed as a County Geological Site. The features can be seen very clearly from the junction of the R394 and R194 roads at Kilgolagh, and a signboard in the wide lay-by here might help promote the features.

The delta feature at Kilgolagh, along the northwestern side of Lough Kinale, viewed from the R394 road.

View from the flat-topped delta feature towards Lough Sheelin.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Mid-Cavan Drumlinised Ribbed Moraines**
Other names used for site	
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Too many to list … this portion of the field covers over one hundred individual townlands, across an area of 180 km^2**
NEAREST TOWN/VILLAGE	**Cavan, Cootehill, Stradone**
SIX INCH MAP NUMBER	**15, 16, 20, 21**
ITM CO-ORDINATES	**654000E 811000N (centre of features)**
1:50,000 O.S. SHEET NUMBER	**27a, 28a GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This field of ribbed moraines forms part of the largest field of ribbed moraines found anywhere in the world. The entire field includes over 3,000 individual features, but this subset covers an area of 15 by 12 kilometres and contains approximately 170 individual features.

Geological System/Age and Primary Rock Type
The ribbed moraines were formed on bedrock of either Silurian or Ordovician metasediments and volcanic rocks. The moraines themselves are Quaternary in age, having been deposited at the base of the ice sheet moving in a southeasterly direction during the maximum period of the last Ice Age.

Main Geological or Geomorphological Interest
These ribbed moraines each contain many superimposed drumlins on their crests, and the area has traditionally been known as the middle portion of the 'Drumlin Belt'. Owing to their size, the true scale and size of the ribbed moraines can only be seen using digital elevation modelling (DEM) and satellite imagery.

This ribbed moraine field is not only unusual in its size and for the size of individual features, but also for being interspersed with thick peat which allows the features to stand out in a quite striking fashion. They form the perfect 'ribbed' topography.

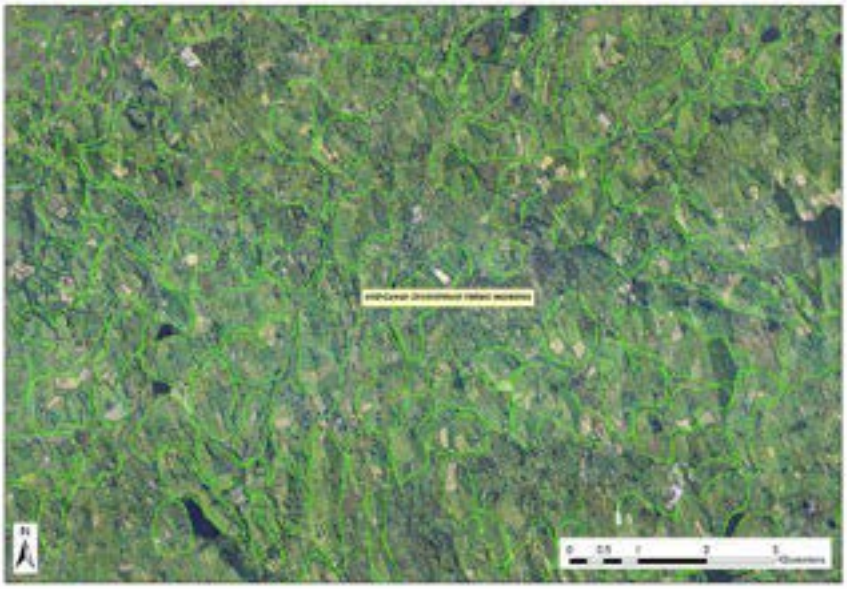
The moraines in this portion of the field are generally 1km to 2km long and 500m or so wide, with individual superimposed drumlins being c. 500m long and 100m to 200m wide. They are typically 20m high but can attain a maximum height of about 35m. The largest individual feature in this portion of the field is 4 km long, 650m wide and up to 35m high.

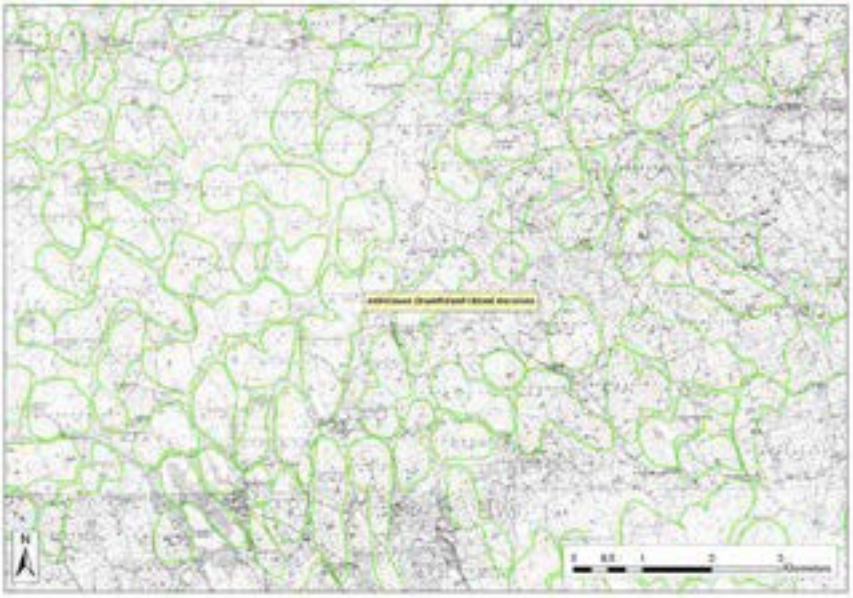
Site Importance – County Geological Site
This area forms part of the largest field of discrete ribbed moraines in the world, and is therefore a prime example of the kind of features found within the most important such field in Ireland.

Management/promotion issues
This is an excellent site in terms of macro-scale Quaternary subglacial geomorphology. The features are too large to undertake any conservation efforts on their part, but the landscape itself is noteworthy and should be promoted as unique amongst landscape elements within the Cavan County Development Plan, and in Landscape Characterisation. The features are especially well viewed from the high ridge at Artonagh-Edrans, on the Stradone to Cootehill road.

A view across the mid-Cavan Drumlinised Ribbed Moraines, White Lough, west of Cootehill.

Individual ribbed moraine ridge at Rakane, near Cootehill, looking north.





CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Rockcorry-Cootehill Ribbed Moraines**
Other names used for site	
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Too many to list … this portion of the field covers over two hundred individual townlands, across an area of 180 km^2**
NEAREST TOWN/VILLAGE	**Cootehill, Rockcorry (just inside Monaghan)**
SIX INCH MAP NUMBER	**Cavan 16, 17, 18**
ITM CO-ORDINATES	**666000E 891000N (centre of features)**
1:50,000 O.S. SHEET NUMBER	**28a GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This field of ribbed moraines forms part of the largest field of ribbed moraines found anywhere in the world. The entire field includes over 3,000 glacial features, but this subset covers an area of 18 by 10 kilometres, containing approximately 160 individual features, and includes the largest individual ribbed moraines found anywhere in the world.

Geological System/Age and Primary Rock Type
The ribbed moraines were formed on bedrock of metasediments and volcanic rocks of either Silurian or Ordovician age. The features themselves are Quaternary in age, having been deposited at the base of the ice sheet moving in a southeasterly direction during the maximum period of the last Ice Age.

Main Geological or Geomorphological Interest
These ribbed moraines each contain many superimposed drumlins on their crests, and the area has traditionally been known as the middle portion of the 'Drumlin Belt'. Owing to their size, the ribbed moraines can only be seen using digital elevation modelling (DEM) and satellite imagery.

This ribbed moraine field is not only unusual in its huge size and the large size of individual features around Rockcorry and Cootehill, but because they are interspersed with thick deposits of peat, the features are quite strikingly defined, forming the perfect 'ribbed' topography.

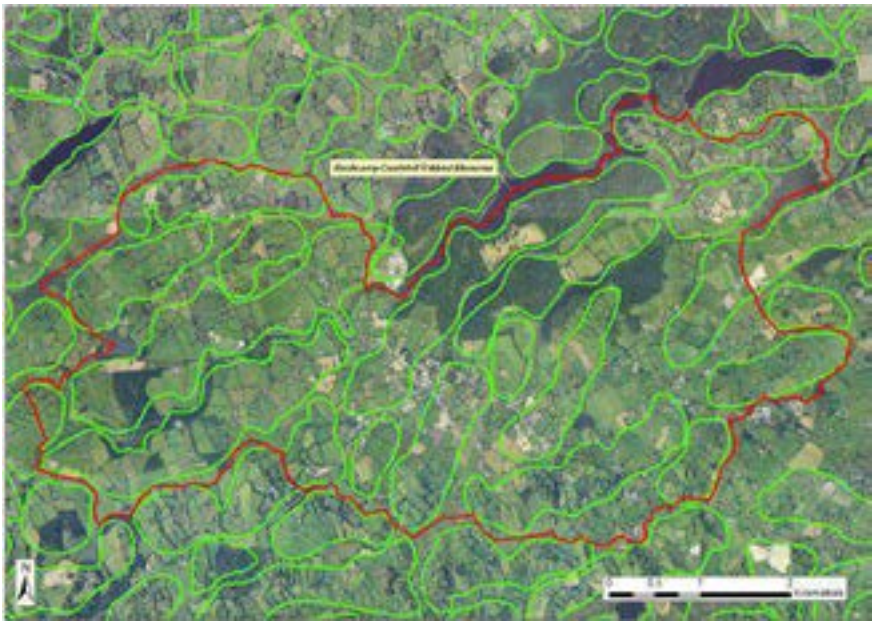
The moraines are generally 5–8km long and 800m or so wide, with individual superimposed drumlins being c. 600m long and 100–200m wide. They attain a maximum height of about 50m but are typically 30m or so high. The largest individual feature is 10 km long, 1 km wide and up to 45m high, meaning it comprises approx. 400 million tonnes of sediment.

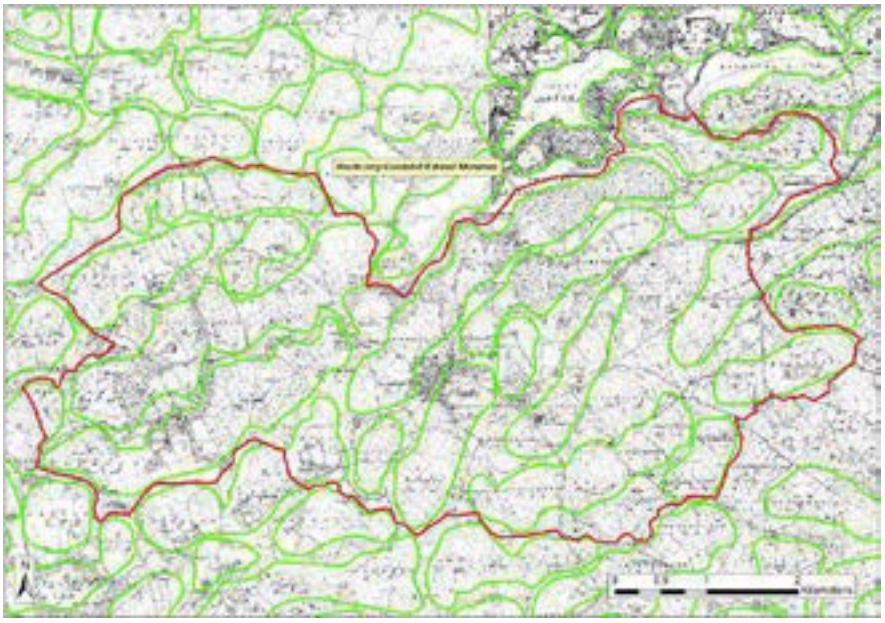
Site Importance – County Geological Site; recommended for Geological NHA
These are the largest individual ribbed moraine features anywhere in the world, and therefore one of the most important geological terrains in Ireland. Study of these features will lend insights into how ribbed moraines form, which has always been difficult to ascertain as they form under ice sheets and can not be seen in modern analogue conditions.

Management/promotion issues
This is an excellent site in terms of macro-scale Quaternary subglacial geomorphology. The features are too large to undertake any conservation efforts on their part but the landscape itself is noteworthy and should be promoted as unique amongst landscape elements within the Cavan County Development Plan, and in Landscape Characterisation.

A view across some of the Rockcorry-Cootehill ribbed moraines at Cargaghbane, east of Cootehill.

Ribbed moraines near Latton, County Monaghan, looking south.





CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Scotshouse-Redhills Cross-cutting Ribbed Moraines**
Other names used for site	
IGH THEME	**IGH7 Quaternary**
TOWNLAND(S)	**Too many to list … this portion of the field covers over 75 individual townlands, across an area of 70 km^2**
NEAREST TOWN/VILLAGE	**Redhills, Scotshouse (just inside Monaghan)**
SIX INCH MAP NUMBER	**Cavan 11, 12, 15, 16, 17, 18**
ITM CO-ORDINATES	**644600E 818000N (centre of features)**
1:50,000 O.S. SHEET NUMBER	**28a GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This site is part of the largest field of ribbed moraines found anywhere in the world. The entire field includes over 3,000 individual glacial features but this subset covers an area of 10 by 7 kilometres containing approximately 50 individual features. It includes the only mapped area of cross-cutting ribbed moraines yet found in the world.

Geological System/Age and Primary Rock Type
The ribbed moraines were formed on bedrock of either Lower Carboniferous shales and limestones or Ordovician metasediments and volcanic rocks. The moraines themselves are Quaternary in age, having been deposited at the base of the ice sheet that initially moved in a southwesterly direction during the initial phase of the last glaciation, and then in a southeasterly diection during the glacial maximum.

Main Geological or Geomorphological Interest
These ribbed moraines each contain many superimposed drumlins on their crests, and the area has traditionally been known as the northern portion of the 'Drumlin Belt'. Owing to their size, the ribbed moraines can only be seen using digital elevation modelling (DEM) and satellite imagery.

Nowhere else in the world have ribbed moraines been noted where they record two separate ice flows. Here, the major orientation of the moraines is northwest to southeast, but there are also forms adjoined to these which are oriented northeast to southwest. The features therefore record flow from two different directions. In plan view they appear as irregular, wavy, snake-like forms.

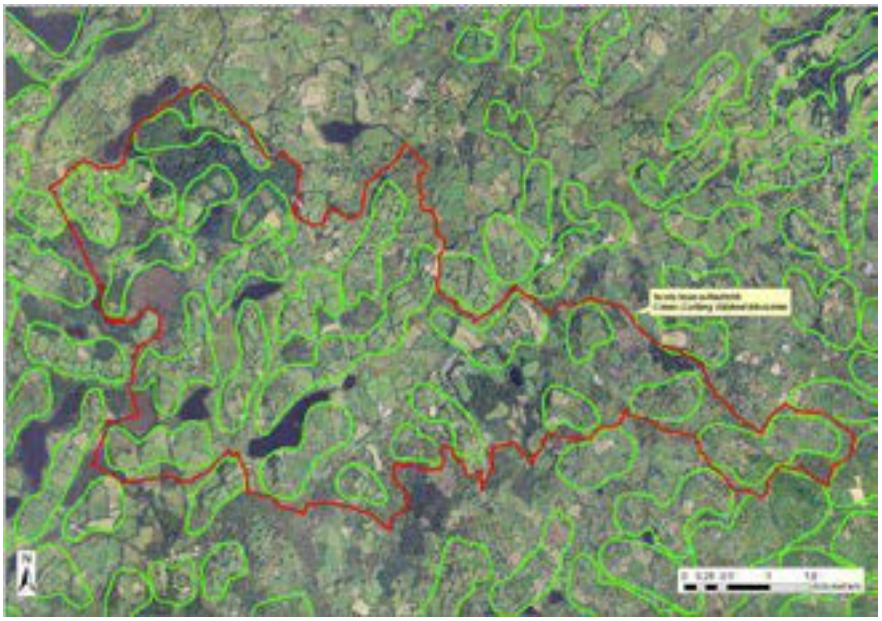
The features are generally 1-2km long and 500m or so wide, with individual superimposed drumlins being c. 400m long and 100m-200m wide. The ribbed moraines are typically 20m high but can reach a maximum height of 30m.

Site Importance – County Geological Site; recommended for Geological NHA
These are the only mapped cross-cutting ribbed moraine features anywhere in the world and therefore form one of the most important geological terrains in Ireland. The area of cross cutting features is recommended for Geological NHA status.

Management/promotion issues
This is an excellent site in terms of macro-scale Quaternary subglacial geomorphology. The features are too large to undertake any conservation efforts on their part, but the landscape itself is noteworthy and should be promoted as unique amongst landscape elements within the Cavan County Development Plan, and in Landscape Characterisation.

A view across some of the cross cutting ribbed moraines at Coolnacarte, west of Scotshouse.

Cross cutting ribbed moraines at Corraskea, north of Scotshouse, looking southeast.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Western Cuilcagh – Legeelan Quarry**
Other names used for site	
IGH THEME	**IGH8 Lower Carboniferous**
TOWNLAND(S)	**Legeelan**
NEAREST TOWN/VILLAGE	**Blacklion**
SIX INCH MAP NUMBER	**4**
ITM CO-ORDINATES	**606696E 833988N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This is a small disused quarry beside the road from Blacklion to Burren Forest.

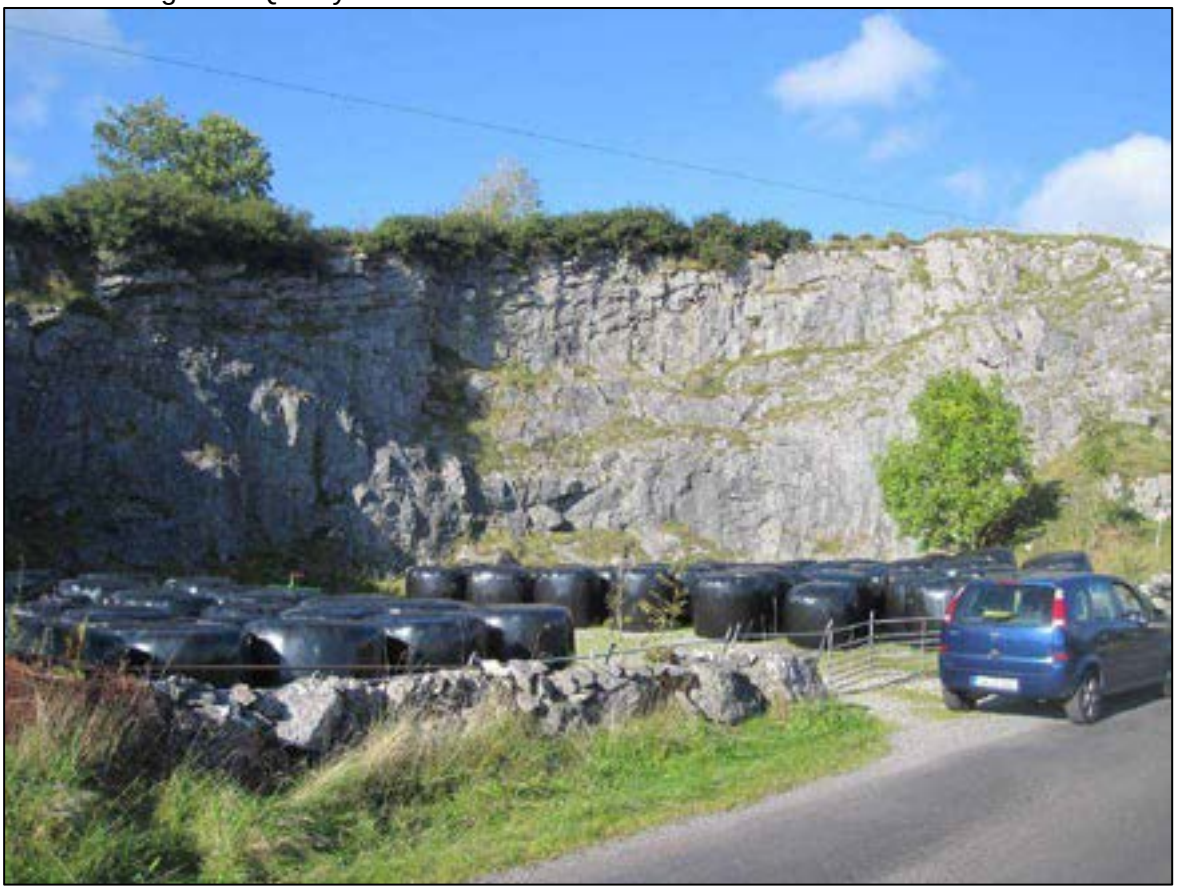
Geological System/Age and Primary Rock Type
The rocks here are part of the Lower Carboniferous Dartry Limestone Formation, and the quarry displays a good example of the Knockmore Limestone Member, which is the carbonate mudbank facies of the formation.

Main Geological or Geomorphological Interest
The quarry displays the internal structure of a Lower Carboniferous mud mound, typical of the Knockmore Limestone Member of the Dartry Limestone Formation. Mud mounds found in Ireland formed on the Lower Carboniferous sea floor, both by the vertical accumulation of lime mud and by lateral migration of mud banks over the sea floor surface. These mudmounds formed contemporaneously with the bedded, cherty limestone of the Dartry Limestone Formation so it is common to see beds of limestone flanking the massive mud mounds. At Legeelan Quarry a mud mound can be seen as massive limestone, with beds of limestone draped over the mound and dipping down the flanks.

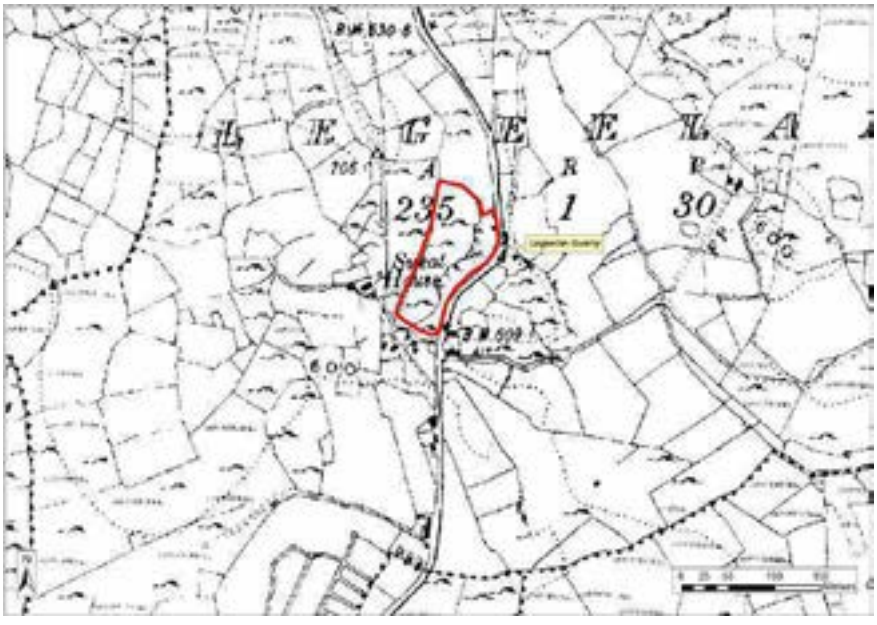
Site Importance – County Geological Site; recommended for Geological NHA
This is a useful section to visualise and demonstrate the morphology of a carbonate mud mound.

Management/promotion issues
The quarry floor is usually filled with silage bales but these do not obscure the view of the carbonate mud mound from the road. The land is private but the view from the public road is perfectly adequate to visualise this small mound development.

A view of Legeelan Quarry from the road to the south.



A view of Legeelan Quarry from the road, showing the mudmound and draping beds.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Crossdoney Granite Quarry**
Other names used for site	
IGH THEME	**IGH11 Igneous intrusions,**
TOWNLAND(S)	**Gortnashangan Upper or Hermitage**
NEAREST TOWN/VILLAGE	**Crossdoney**
SIX INCH MAP NUMBER	**25**
ITM CO-ORDINATES	**637600E 800444N**
1:50,000 O.S. SHEET NUMBER	**34 GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
This site is a small, shallow disused quarry.

Geological System/Age and Primary Rock Type
The quarry has been excavated into the Crossdoney Granite, a small intrusion of granite which underlies a small area of about 20 km^2 around the village of Crossdoney. The granite was intruded during the Caledonian Orogeny, around 417 million years ago.

Main Geological or Geomorphological Interest
The Crossdoney Granite is one of a limited number of small early-Caledonian granitic intrusions across Ireland. These were emplaced during the early stages of the Caledonian orogeny that occurred as the Iapetus Ocean closed near the end of the Silurian period. Larger granitic intrusions, including the Leinster Granite, formed slightly later in the orogeny, around 405 million years ago.

The Crossdoney Granite is composed of a number of different granite types. It is the only granite known to occur in county Cavan but it is generally very poorly exposed. This site is the best known exposure in the county. The quarry was opened between 2000 and 2005 and a small body of granite has been removed but it is a very shallow quarry, with little exposure of rock left except on the periphery of some excavations.

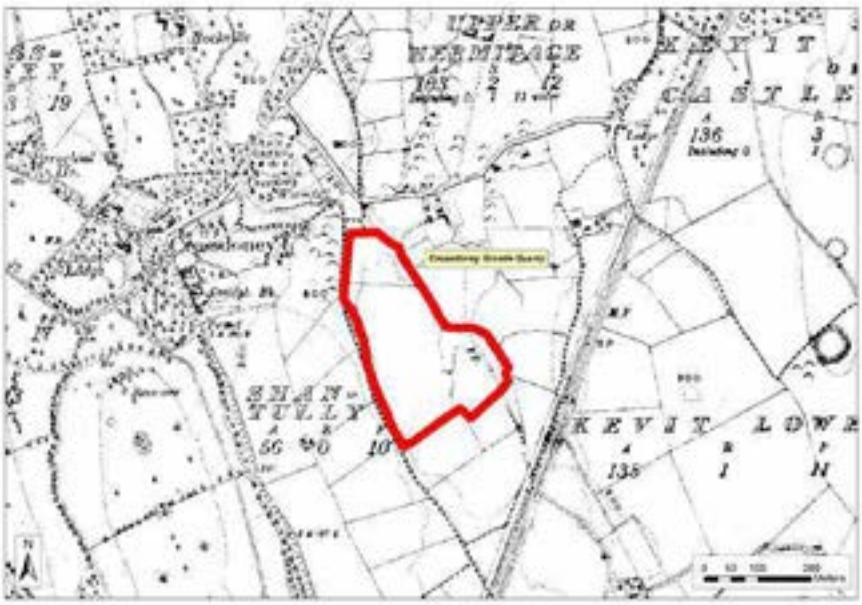
Site Importance – County Geological Site
This is a good representative site of the only known granite body in county Cavan.

Management/promotion issues
The quarry is apparently now disused. It is private property and is not suitable for promotion.

A view of the Crossdoney Granite Quarry.

A view of the best actual rock exposure in the Crossdoney Granite Quarry.

A view of the Crossdoney Granite Quarry, looking towards the entrance.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Tullydermot Falls**
Other names used for site	
IGH THEME	**IGH14 Fluvial and lacustrine geomorphology**
TOWNLAND(S)	**Tullydermot, Altbrean**
NEAREST TOWN/VILLAGE	**Swanlinbar**
SIX INCH MAP NUMBER	**7**
ITM CO-ORDINATES	**614935E 824797N**
1:50,000 O.S. SHEET NUMBER	**26 GSI BEDROCK 1:100,000 SHEET NO. 7**

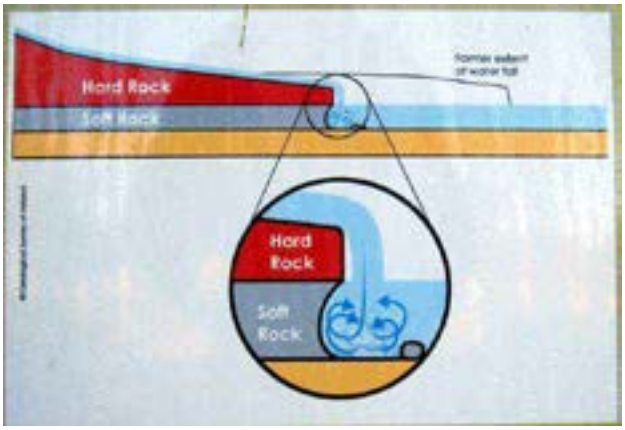
Outline Site Description
This site comprises a waterfall on the Cladagh or Swanlinbar River, as well as the access footpath from the roadside car park, with an explanatory signboard.

Geological System/Age and Primary Rock Type
The waterfall occurs at a thick bed of sandstone in the Lower Carboniferous Glenade Sandstone Formation.

Main Geological or Geomorphological Interest
The waterfall is a small but well developed example of a waterfall occurring at a thick sandstone bed. The turbulence caused in the plunge pool where the water passes over the bed, has had the action of eroding out the underlying shale bed, which is much less resistant to erosion. As the shale is eroded out the thick sandstone becomes unsupported and eventually collapses. This causes the waterfall to recede upstream, and the process continues again.

Site Importance – County Geological Site
This site is a good example of the geomorphological process of waterfall development and recession.

Management/promotion issues
The landowner has allowed permissive access and the public can walk right up to the side of the waterfall on a hard path from the car park at the road side. There is a Geopark signboard providing an explanation of the waterfall development.

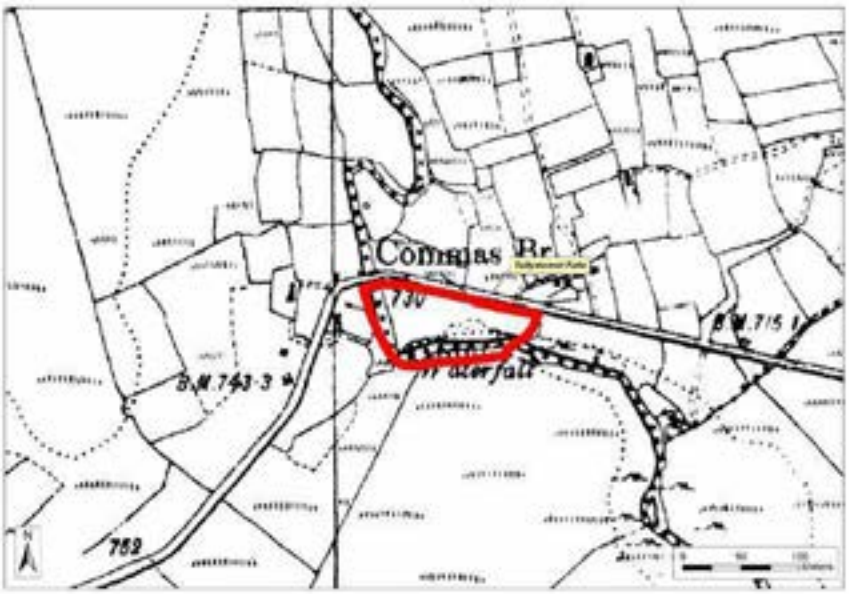


Explanation of waterfall development.

Tullydermot Falls.

The waterfall before a 2004 collapse of the undercut sandstone bed

Left: The Geopark signboard at Tullydermot Falls.
Right: The landowner conducting some path maintenance.



CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Kill**
Other names used for site	
IGH THEME	**IGH15 Economic Geology**
TOWNLAND(S)	**Kill**
NEAREST TOWN/VILLAGE	**Kilnaleck**
SIX INCH MAP NUMBER	**37**
ITM CO-ORDINATES	**642601E 790507N**
1:50,000 O.S. SHEET NUMBER	**34 GSI BEDROCK 1:100,000 SHEET NO. 12**

Outline Site Description
The site comprises several outcrops and in-filled pits in a field of rolling grassland as well as a small spoil heap at the rear of a farm outbuilding.

Geological System/Age and Primary Rock Type
The bedrock consists of grey Silurian shales of the Kilnaleck Shale Formation within which carbonaceous layers have been altered to coal.

Main Geological or Geomorphological Interest
Kill is the only known location in the country where coal is found in Lower Palaeozoic rocks. Most coal found around the world resulted from lithification of plant material deposited in the Upper Carboniferous (Coal Measures). Hercynian deformations is considered to have remobilized graphite, converting the thin carbon(graphite)-rich horizons in the shale into a high-quality anthracite. The thickness of the coal-bearing layer varied from 3.4 m to mms (average 0.2m). Several pits were sunk in the 19th century and small amounts of the coal were raised but it proved to be practically incombustible and the workings were abandoned.

The site today is largely devoid of any trace of the former coal workings. A few flat outcrops of shale, without any apparent coal, occur near the road at the edge of the field in which the pits were sunk but the pits themselves are filled in. A grassed-over mound at the rear of the land-owner's farmhouse, adjacent the site of a former pit, contains shale fragments with small amounts of anthracite and is presumably a mine spoil heap.

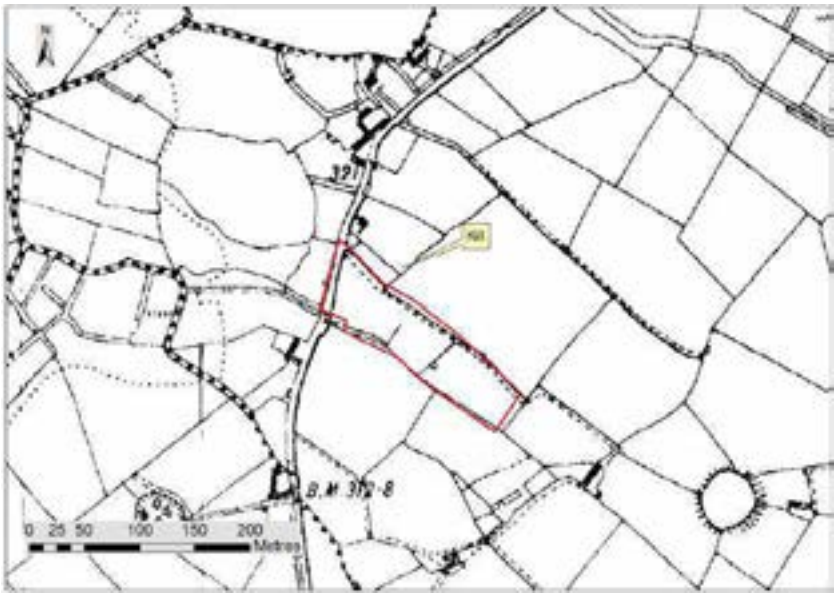
Site Importance – County Geological Site
Although the occurrence of anthracitic coal in shale at Kill is, as far as is known, unique in Ireland, the site contains little trace of mining. Only the presumed spoil heap beside the farm outhouse provides tangible evidence of coal. Nevertheless, its uniqueness means it should be granted recognition as a CGS.

Management/promotion issues
The only visible remains of mining is the presumed spoil heap and, as this is essentially part of the back garden of the farmhouse, it is not a site that lends itself to promotion for public visits. Although the current landowner is aware of the spoil heap and the sites of former coal pits, the heap is vulnerable to removal or alteration as part of any future farm works.

Kill, view to east of area formerly mined for coal.

Area behind farmhouse with grassed-over spoil heap, to right of outhouse, in front of site of former pit.

Outcrop of shale at entrance to field shown in main image.



CAVAN- COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Redhills**
Other names used for site	Claragh
IGH THEME	**IGH15 Economic Geology**
TOWNLAND(S)	**Claragh**
NEAREST TOWN/VILLAGE	**Redhills**
SIX INCH MAP NUMBER	**7**
ITM CO-ORDINATE	**646877E 815675N**
1:50,000 O.S. SHEET NUMBER	**27 GSI BEDROCK 1:100,000 SHEET NO. 8/9**

Outline Site Description
The site is a small, partly overgrown excavation into small hillside exposure, containing a number of exposed faces that are the remains of 19th-century mining. The site is in use for cattle pasture and feeding.

Geological System/Age and Primary Rock Type
The rocks exposed are red, ferruginous shales of the Ordovician Coronea Formation, part of the Northern Belt of the Longford-Down inlier.

Main Geological or Geomorphological Interest
The site is one of three in the Redhills area where the red shales of the Coronea Formation were mined for iron in the 19th century. The other sites are at Kilnacross, 600m southwest across the Redhills–Cootehill road, and Carrigmore, a further 2.6km southwest, some 1.8km north of Ballyhaise. While red shales can be seen to crop out at Kilnacross, the Carrigmore site appears to be reclaimed to farmland.

The original Fe content of the red shales at Claragh is 5–7% but local enrichment occurred, under conditions of faulting and folding, to produce a low-grade ore containing 17–24% soluble iron. The rock is broken up by a dense network of joint planes along which Fe enrichment has occurred. The ore is composed mainly of hematite (Fe_2O_3).

The Redhills Mining Company first worked the deposit in 1872, producing c. 5,000 tonnes by June of that year, but by 1878 production had ceased because of the high silica content of the ore. The Redhills Syndicate investigated the deposit in detail in 1959-60 but the estimated 68,000 tonnes of ore at an average grade of 20% was insufficient to warrant further development.

Site Importance – County Geological Site; may be recommended for Geological NHA
The Redhills iron deposits have some significance as one of the few mineral deposits of any description in County Cavan. The Claragh site is the best remaining exposure and as such warrants CGS status.

Management/promotion issues
The site is in continuous use for keeping cattle and not readily accessible as a consequence. Exposure is limited to a few faces and a considerable portion of the original site, as defined on historical maps, is overgrown by shrubs and trees. Consideration should be given to clearing and fencing off a section of the site to preserve the excavations and allow access.

View of Redhills mine (quarry) from north

CAVAN - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	**Dromod Spa Well**
Other names used for site	
IGH THEME	**IGH16 Hydrogeology**
TOWNLAND(S)	**Drumod Glebe**
NEAREST TOWN/VILLAGE	**Swanlinbar**
SIX INCH MAP NUMBER	**7**
ITM CO-ORDINATES	**620025E 826607N**
1:50,000 O.S. SHEET NUMBER	**26** **GSI BEDROCK 1:100,000 SHEET NO. 7**

Outline Site Description
This is a small natural spring, at the side of a minor road, that has been enclosed by a walled structure.

Geological System/Age and Primary Rock Type
The Spa Well is a post-glacial (i.e. <10,000 years old) development of hydrogeology. The local bedrock is of Lower Carboniferous age.

Main Geological or Geomorphological Interest
The Spa Well is a hydrogeological phenomenon, where groundwater, which has been suffused with sulphurous minerals, rises naturally from the limestone bedrock. This typically occurs where limestone rocks are juxtaposed against impermeable shale rocks. Water that can flow through enlarged conduits in limestone is in effect forced to the surface when it comes into contact with the impermeable rocks.

Most groundwater will have some dissolved minerals which control its chemistry, detrmining the hardness or softness of the water as well as its taste and colour. Sulphur rich groundwater is relatively unusual, and the sulphur gives the water a distinctive taste and smell, usually of the offensive ‘rotten eggs’ nature. It has been prized in the past as contributing to good health and as a cure for rheumatism, and at one time Swanlinbar was a Spa Town, receiving many visitors who came to take the waters.

This is one of two sulphur wells in Swanlinbar; a third was rich in magnesium.

Site Importance – County Geological Site
The site is a good representative example of the spa wells found in the district at Swanlinbar, Glangevlin and Dowra.

Management/promotion issues
The well is publicly accessible with an information signboard provided by the Geopark, and is in good order. It features in several trail leaflets but other wells listed in such leaflets were not found during this audit. Revisions of any promotional literature or new resources should update information to current status.

The roadside sign to Dromod Spa Well.

The Geopark information signboard alongside Dromod Spa Well.