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## ELC\_22: Garleton Hills

### Site information

#### Location and summary description:

The Garleton Hills form a distinctive area of ice-moulded volcanic hills located 2.5 km north of Haddington.

#### National Grid reference:

Mid-point: [NT 51017 76294]

**Site type:** Natural landform; Natural view

**Site ownership:** not known.

**Current use:** Agricultural land (mainly) Field surveyor: John Gordon

**Current geological designations:** SSSI (Igneous petrology: Carboniferous–Permian Igneous); GCR ID 1155

**Date visited:** 26th September 2014

**Other designations:** None known

### Site map

(Figure 27) Garleton Hills Location Map. The site boundary covers an area of erosional glacial landforms. The area contains numerous exposures of volcanic bedrock, but these have not been marked as they are already covered by SSSI designation.

### Site description

#### Background

The Garleton Hills form a prominent area of higher ground to the north of Haddington that has been streamlined and moulded by glacial erosion. The site boundary includes the core area of glacial landforms, and largely coincides with the boundaries of the SSSI.

#### Quaternary deposits and landforms

The Garleton Hills form an area of low hills, comprising the more resistant remnants of an area of trachyte and basaltic lavas, belonging to the Garleton Hills Volcanic Formation of Carboniferous age.

The hills have the form of an escarpment, the lavas dipping southwards (ELC\_22\_P1) with a series of rock ridges and scarps facing north (ELC\_22\_P2). The lavas are more areally extensive than the present area of higher ground, suggesting scarp retreat from the north by erosion during pre-glacial times and latterly by ice sheets during the course of repeated Quaternary glaciations. Glacial erosion has streamlined the hills in a direction slightly north of east, in alignment with other indicators of ice movement in the area, producing a smooth, ice-moulded outline when viewed from the south (ELC\_22\_P1). At a more detailed level, differential glacial erosion of the scarps has formed several fine examples of crag and tail landforms, with steeper slopes facing westwards and streamlined tails extending eastwards (e.g. Byres Hill and Craigy Hill, (ELC\_22\_P3), (ELC\_22\_P4). Skid Hill also has the form of a roche moutonnée when viewed from the north. Several deep channels run between the scarps. These were probably formed by glacial erosion but also occupied by

glacial meltwaters (ELC\_22\_P2). Clough et al. (1910) described a series of ice-marginal meltwater benches along the northern slopes.

The Hopetoun Monument on Byres Hill provides an excellent viewpoint to appreciate the geology and landscape of East Lothian.

## **Stratigraphy and rock types**

**Age:** Carboniferous

**Formation:** Garleton Hills Volcanic Formation

**Rock type:** Trachyte, plagioclase-macrophyric basalt

**Age:** Carboniferous

**Formation:** Southern Scotland Dinantian Plugs and Vents Suite

**Rock type:** Tuff and breccia

**Age:** Carboniferous

**Formation:** Central Scotland Late Carboniferous Tholeiitic Dyke Swarm

**Rock type:** Quartz-microgabbro

## **Assessment of site: access and safety**

**Road access and parking** There is good access from Haddington via the A6137 and B1343 with parking near Hopetoun Monument, an East Lothian Council Countryside Site. A minor road with limited roadside parking runs across the hills between Haddington and Drem.

**Safety of access** There is a footpath to the summit of Hopetoun Hill and other footpaths and tracks allow the main landforms to be viewed.

**Safety of exposure** Not applicable

**Access** Access possible by footpaths, the site can also be viewed from roads. Current condition Generally good, the area is largely agricultural land.

**Current conflicting activities** None known

**Restricting conditions** None known

**Nature of exposure** Landscape feature, glacial landforms.

## **Assessment of site: culture, heritage & economic value**

**Historic, archaeological & literary associations** There is a prehistoric fort at Kae Heughs, near Barney Mains.

**Aesthetic landscape** The Garleton Hills provide excellent viewpoints to appreciate the geology and landscape of East Lothian.

**History of earth sciences** Not applicable.

**Economic geology** Former quarry on Skid Hill.

## Assessment of site: geoscientific merit

	Rarity	Quality	Literature/collections	Primary interest
<b>Lithostratigraphy</b>				
<b>Sedimentology</b>				
<b>Igneous/mineral/metamorphic geology</b>				
<b>Structural geology</b>				
<b>Palaeontology</b>				
<b>Geomorphology</b>	Regional	Excellent	Clough et al, 1910; Jackes, 1973; Sissons, X 1975, Hall, 2012.	

## Site geoscientific value

The Garleton Hills are part of a suite of ice-moulded bedrock features characteristic of East Lothian. They form a fine example of ice-moulded lowland hills, with several crag and tail landforms and streamlined bedrock forms produced by glacial erosion.

The site is an excellent example of a glaciated escarpment and lowland forms of glacial erosion with regional significance.

## Assessment of site: current site usage

**Community** Hopetoun Hill is a popular walk and there is a footpath from Athelstaneford to the minor road near Yellow Craigs.

**Education** It is unknown to what extent the site is used for education. It has potential to be used for school visits and local interest groups for education and interpretation of glacial landforms.

## Assessment of site: fragility and potential use of the site

**Fragility** The landforms are potentially sensitive to any large-scale quarrying, afforestation or tipping.

**Potential use** School education and interpretation linking geology and landscape. Educational visits could be combined with visits to Whitekirk and North Berwick Law.

## Geodiversity summary

The site is a good example of an ice-moulded escarpment. There is significant potential for developing the geodiversity value of the site through the provision of geological information on-site as part of the existing countryside site interpretation and through engagement with local schools.

## Site photos

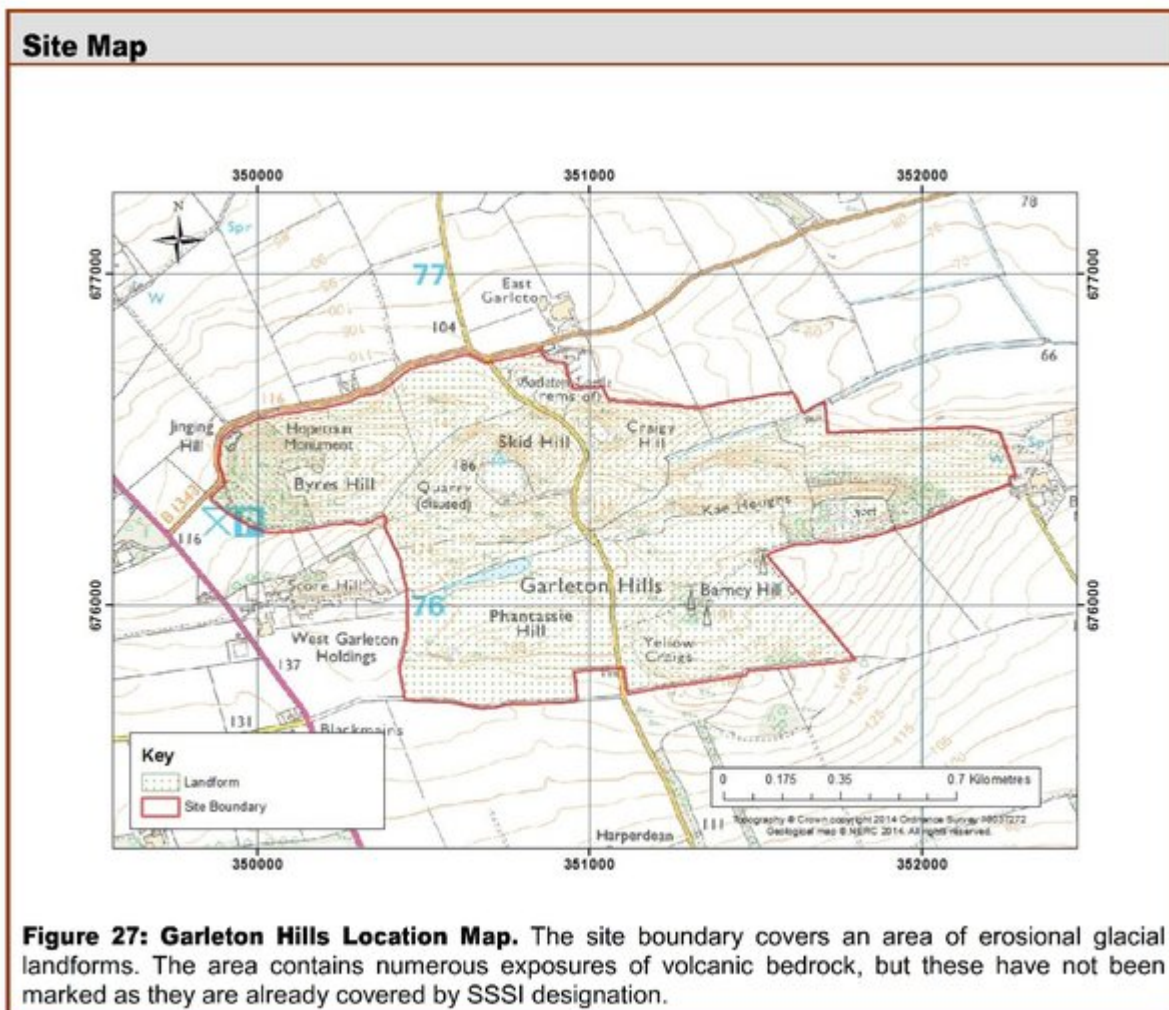
(ELC\_22\_P1) Dip slope of the Garleton Hills viewed from the south-east. © John Gordon.

(ELC\_22\_P2) View east along the Garleton Hills from Hopetoun Hill, showing a series of escarpments and channels between them. © John Gordon.

(ELC\_22\_P3) Garleton Hills. View north-west from Barney Hill showing streamlined bedrock forms. © John Gordon.

(ELC\_22\_P4) Craigie Hill crag and tail (centre) © John Gordon

## References



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(ELC\_22\_P1) Dip slope of the Garleton Hills viewed from the south-east. © John Gordon.



*(ELC\_22\_P2) View east along the Garleton Hills from Hopetoun Hill, showing a series of escarpments and channels between them. © John Gordon.*



*(ELC\_22\_P3) Garleton Hills. View north-west from Barney Hill showing streamlined bedrock forms. © John Gordon.*



*(ELC\_22\_P4) Craigy Hill crag and tail (centre) © John Gordon*