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## ELC\_10: Dirleton Castle

### Site information

#### Location and summary description:

Dirleton Castle is located within the village of Dirleton and is perched on a porphyritic trachyte crag within the grounds. The igneous rock is part of the Garleton Hills Volcanic Formation and was extruded as lava during the Carboniferous age. The ruined castle dates back to the late 13th Century and underwent three phases of building. Due to its elevated position it was ideal for defensive purposes from land and sea.

#### National Grid reference:

Mid-point: [NT 51616 83954]

**Site type:** Natural exposure

**Site ownership:** Historic Scotland

**Current use:** Visitor Attraction

**Field surveyors:** Sarah Arkley and Eileen Callaghan

**Current geological designations:** None known

**Date visited:** 14th May 2014

**Other designations:** Scheduled Ancient Monument, Castle, doocot and boundary wall are Category A listed buildings.

### Site map

(Figure 15) Dirleton Castle Location Map. The site boundary is drawn to include key exposures, access to the castle and grounds and coincides with the area of the Scheduled Ancient Monument. The castle itself is also considered to be part of the geologically significant area associated with the site.

### Site description

#### Background

Dirleton Castle lies within the village of Dirleton approximately 2.5kms from the town of North Berwick. The castle stands on an outcrop of porphyritic trachyte, forming part of the Garleton Hills Volcanic Formation (ELC\_10\_P1). Dirleton Castle is owned by Historic Scotland who charges for entry into the castle and grounds. The castle's strategic position lends to good views of the surrounding countryside and coast.

#### Igneous rocks

The red-purple stained, fine-grained trachyte lava exposed at Dirleton Castle is typical of the trachyte lavas which form the Garleton Hills. The north-west corner of the exposure is up to 5 metres in height displaying large jointed faces (ELC\_10\_P2). The porphyritic trachyte is purplish in colour, with feldspar phenocrysts up to 5mm in size, (ELC\_10\_P3) and weathered out vesicles. The exposure to the west and south is blockier in appearance, (ELC\_10\_P4), again purplish in colour with vesicles (ELC\_10\_P5).

Concentric ring structures (ELC\_10\_P6) are seen within the trachyte at the western edge of the exposure. These structures, exposed by weathering, may be original features which may have developed through cooling of the lavas.

### **Access and additional information**

Dirleton Castle is easily accessible as it is owned and managed by Historic Scotland. It is open throughout the year and opening times can be found on their website. There is a charge for entry into the castle and gardens.

The castle is constructed of igneous blocks, probably locally derived and dressed in sandstone that may have been derived from quarries near the nearby village of Gullane (ELC\_10\_P7).

### **Stratigraphy and rock types**

**Age:** Lower Carboniferous

**Formation:** Garleton Hills Volcanic Formation

**Rock type:** Porphyritic trachyte

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

**Road access and parking** Located within the village of Dirleton, the castle is easily accessed by car and bus. The A198 passes Dirleton village. There is parking beside the castle and also public toilets.

**Safety of access** The site is easily accessible with paths throughout the site.

**Safety of exposure** Some of the faces exposed are up to 5 metres in height. Where the rock is weathered and fractured care should be taken when observing the exposure close up. There are signs prohibiting climbing on the rocks.

**Access** Historic Scotland charge an admission fee for entry to the castle and grounds.

**Current condition** The rock is well exposed and free from vegetation. The surfaces are weathered but on close inspection fractures, structural features and composition of the rock can be seen.

**Current conflicting activities** Tourist attraction.

**Restricting conditions** Opening times of the site.

**Nature of exposure** Natural exposure

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

**Historic, archaeological & literary associations** Dirleton Castle dates back to the 13th Century and has been partially destroyed, rebuilt and extended over the following 400 years (ELC10\_P8). The gardens that surround the castle date from the late 19th and early 20th centuries. The Nisbet family passed the castle and gardens into state care in the 1920's.

**Aesthetic landscape** Historic building sited on a natural exposure of rock. History of Earth Sciences John Muir Way passes through Dirleton

**Economic geology** The castle building stone may have been brought from Gullane Quarry.

### **Assessment of site: geoscientific merit**

|                                     | Rarity | Quality   | Literature/collections | Primary interest |
|-------------------------------------|--------|-----------|------------------------|------------------|
| Lithostratigraphy                   |        |           |                        |                  |
| Sedimentology                       |        |           |                        |                  |
| Igneous/mineral/metamorphic geology | Local  | Excellent |                        | x                |
| Structural geology                  |        |           |                        |                  |
| Palaeontology                       |        |           |                        |                  |
| Geomorphology                       |        |           |                        |                  |

## Site geoscientific value

The rock on which Dirleton Castle is situated is an excellent exposure of porphyritic trachyte of the Garleton Hills Volcanic Formation. The rock is well exposed, free from vegetation and easily accessible. The castle and grounds are managed by Historic Scotland which charge entry into the site.

Dirleton Castle and crag provides an excellent example of Carboniferous extrusive volcanic rock, with local significance. The overall site has important historical associations.

## Assessment of site: current site usage

**Community** The site is visited throughout the year; figures show it had 24,512 visitors in 2013–14 (figures from the Historic Scotland website).

**Education** The site at present is probably used for historical relevance rather than earth science education.

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

**Fragility** Weathering; activities relating to heritage preservation that may obscure the rock features.

**Potential use** On site interpretation. At present there are interpretation boards with relation to the history of the castle (ELC\_10\_P8), a paragraph of the rock outcrop could be added to these. The John Muir Way passes through Dirleton, information pertaining to the outcrop could be added to their

literature or an interpretation board could be erected on the village green.

## Geodiversity summary

The main value of this site is the historical association that Dirleton Castle has within East Lothian. There are other exposures of porphyritic trachyte at nearby Craigs Quarry ([ELC\\_11](#)), Peppercraig Quarry ([ELC\\_3](#)) in Haddington, and Yellowcraig Coast ([ELC\\_6](#)). The exposure at Dirleton Castle provides one of the best exposures of porphyritic trachyte across East Lothian, with direct historical associations.

## Site photos

(ELC\_10\_P1) View of Dirleton Castle, built upon a crag of porphyritic trachyte .© BGS, NERC.

(ELC\_10\_P2) Good exposure of the trachyte is found within crags at the north-west corner of the site. © BGS, NERC.

(ELC\_10\_P3) Feldspar phenocrysts within the trachyte, measuring up to 5mm in size. © BGS, NERC.

(ELC\_10\_P4) The trachyte is more blocky in appearance to the south and west of the site. © BGS, NERC.

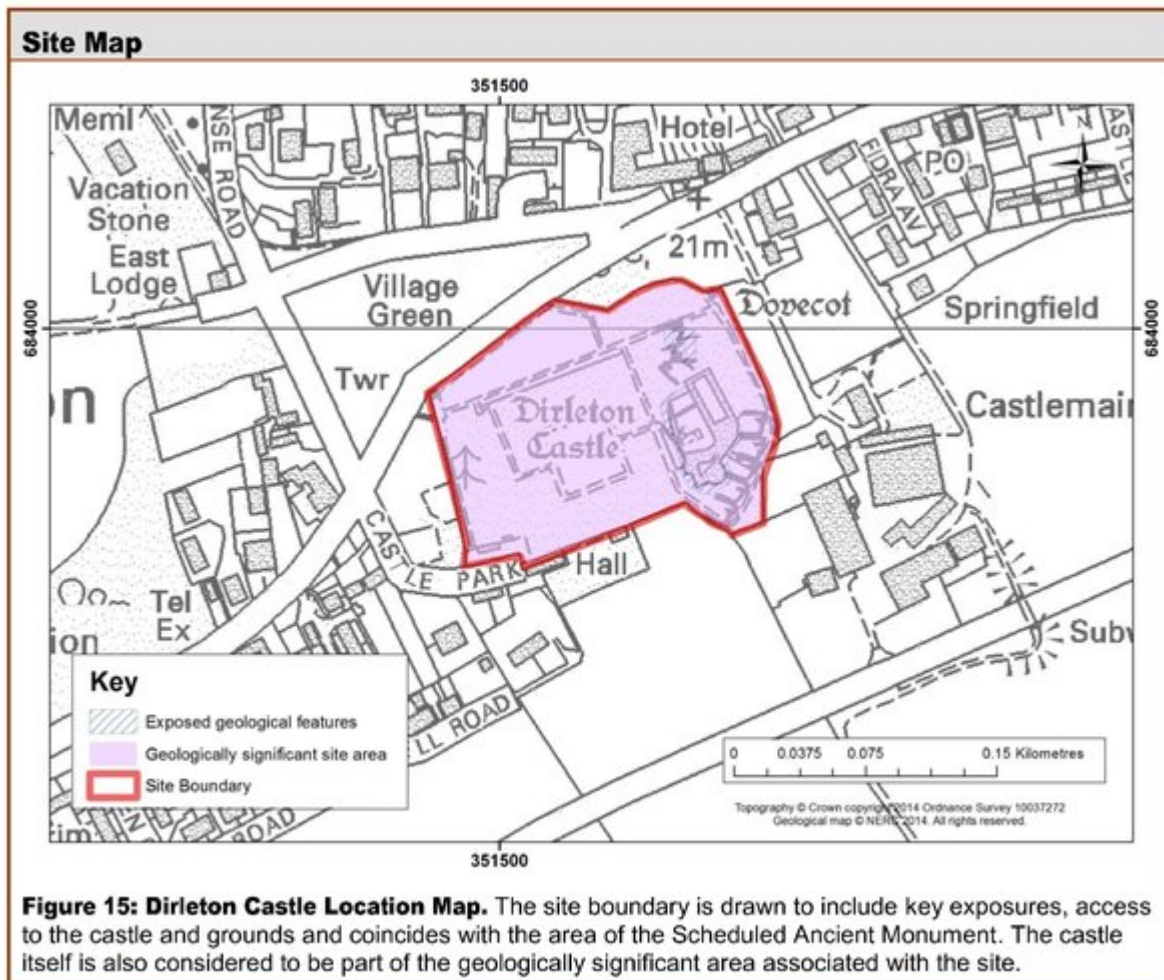
(ELC\_10\_P5) Weathered out feldspars and vesicles (formed by gas bubbles within the laval) give the trachyte a pockmarked appearance in places. © BGS, NERC.

(ELC\_10\_P6) Structural features within the trachyte, such as these concentric rings, are exposed through weathering. It is thought these ellipsoids were developed during the cooling process of the lava.© BGS, NERC

(ELC\_10\_P7) Blocks of igneous rock (dark reddish brown) have been used in the construction of the castle; the castle has then been dressed by the paler yellow/white sandstone blocks which are seen weathering in the photograph. © BGS, NERC.

(ELC\_10\_P8) Existing Interpretation panel describing the history of Dirleton Castle. Additional information could be provided on interpretation boards like these to describe the bedrock foundations on which the castle is built. © BGS, NERC.

## References



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(ELC\_10\_P2) Good exposure of the trachyte is found within crags at the north-west corner of the site. © BGS, NERC.



*(ELC\_10\_P3) Feldspar phenocrysts within the trachyte, measuring up to 5mm in size. © BGS, NERC.*



*(ELC\_10\_P4) The trachyte is more blocky in appearance to the south and west of the site. © BGS, NERC.*



*(ELC\_10\_P5) Weathered out feldspars and vesicles (formed by gas bubbles within the laval) give the trachyte a pockmarked appearance in places. © BGS, NERC.*





*(ELC\_10\_P6) Structural features within the trachyte, such as these concentric rings, are exposed through weathering. It is thought these ellipsoids were developed during the cooling process of the lava. © BGS, NERC*



*(ELC\_10\_P7) Blocks of igneous rock (dark reddish brown) have been used in the construction of the castle; the castle has then been dressed by the paler yellow/white sandstone blocks which are seen weathering in the photograph. © BGS, NERC.*



(ELC\_10\_P8) Existing Interpretation panel describing the history of Dirleton Castle. Additional information could be provided on interpretation boards like these to describe the bedrock foundations on which the castle is built. © BGS, NERC.