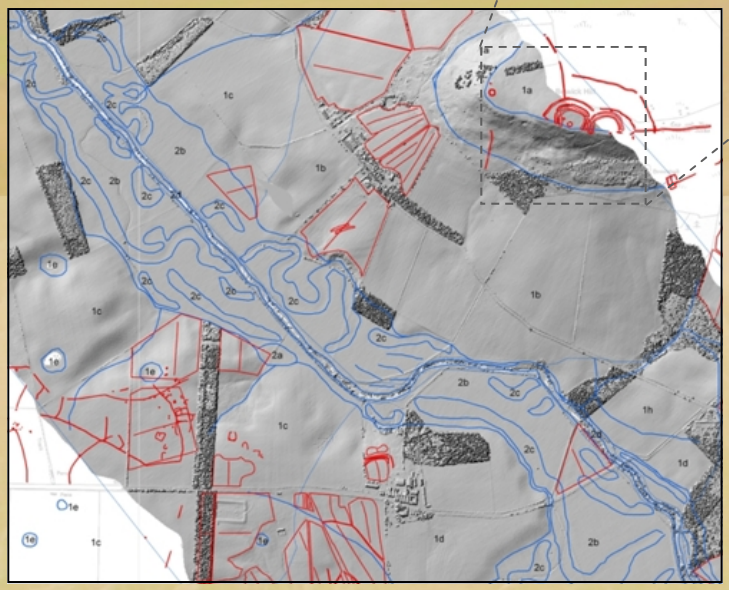
The various landforms of the Till-Tweed area have been differentiated on the basis of their age and geomorphology and these form an individual layer on the accompanying maps. The first table in this booklet (Table 1) describes each type of landform that occurs in the Till-Tweed area, the type of archaeological and/or environmental remains that could be associated with it and the types of impacts that are likely to occur. Table 2 describes the incremental responses and most appropriate archaeological and environmental techniques for assessing different landform elements. The key underlying principle behind Planning Policy Guidance 16 (PPG 16) is a presumption in favour of preservation in-situ of nationally important remains and their settings. However, in order to test whether archaeological or palaeoenvironmental remains survive in an area, and their relative importance, a staged programme of evaluation is undertaken as part of the Environmental Impact Assessment (EIA). The key evaluation techniques are discussed in more detail later on in this booklet.



Map extract from the Till-Tweed GIS showing the area around Old Bewick and including the LiDAR imaging to better show relief.

Aerial photograph of Old Bewick Hillfort shown on the GIS extract below.

By using the maps in conjunction with Tables 1 and 2, areas with the highest archaeological and environmental sensitivity are able to be identified in advance of potentially expensive planning proposals. This said, it is important to emphasise that just because some areas currently have no crop marks visible it does not mean that there is nothing there (See also page 9).

The Historic Environment Record (HER) kept by Northumberland County Council is constantly updated so the information contained in the GIS must be checked against the current HER by contacting the County Archaeologist. Strategic planning that seeks to minimise impacts on the historic environment from an early stage not only assists with long term landscape conservation but it also reduces costs for developers.

Combining good conservation practice with cost-effective development will contribute to achieving the goal of sustainable development. When carefully planned, development can produce positive impacts on the historic environment by providing opportunities to progress research, make academic breakthroughs, train students and professionals, develop techniques and improve understanding of how best to conserve fragile deposits. This guidance document and the accompanying GIS are intended to provide all stakeholders involved in landscape planning and development with exactly the same information on which to base their decision making, strategic planning and mitigation responses. Before any development proposals are drawn up it is always best to consult the County Archaeologist at an early stage.

Landform Classification

Table 1 categorises 14 discrete landform element categories that have been defined in the Till-Tweed study area. Landform elements may be broadly differentiated into landforms dating to the Late Glacial period (Categories 1a-h), or of Holocene (postglacial) age (Category 2a-e and elements of Category 1e and f). Landform elements will have experienced differing rates and scales of environmental change since the last glaciation, and hence also present contrasting scenarios for the preservation of archaeological and palaeoenvironmental remains. Table 1 summarises the typical geomorphological history of each landform element, together with their archaeological associations and palaeoenvironmental potential.

Landform Element		Geomorphological Activity	Archaeological Associations
1a	Hard rock, potential discontinuous shallow drift cover.	Landform stability over Holocene.	Prehistoric rock art, rock shelter sites, mixed age assemblages of earthworks and artefacts.
1b	Undifferentiated drift (Glacial/ Glaciofluvial).	As 1a.	Mixed age assemblages of crop marks, earthworks and artefacts. Can occur as upstanding features in underlying deposits or as artefacts in ploughsoils.
1c	Glaciofluvial outwash surfaces.	As 1a.	As 1b. Particularly common are Mesolithic flint scatters, Neolithic pits and ceremonial monuments and Early Bronze Age and Anglo-Saxon settlement sites.
1d	Late Glacial glacio-deltaic / glacio-fluvial terrace surfaces.	As 1a.	As 1c.
1e	Late Glacial / Holocene palaeochannel belts, kettle holes and enclosed basins inset within 1b, 1c and 1d.	As 1a but possibility of local sediment accumulation.	Potential of ice-wastage features to contain Late Glacial and Early Holocene archaeological and palaeoenvironmental deposits. Palaeochannels can be of varying date and have the potential to contain well preserved archaeological and palaeoenvironmental remains.
1f	As 1e,but containing proven (or high potential for) organic-rich deposits of Late Glacial / Holocene age.	As 1a, but high probabaility of or proven burial of Holocene land surfaces and sedimentary sequences.	As 1e, but with proven or high probability of burial of Late Glacial and Holocene land surfaces and / or organic deposits.
1g	Late Glacial glacio-lacustrine deposits.	Landform stability over Holocene.	Mixed age assemblages of crop marks, earthworks and artefacts within ploughzone and cut into underlying sediments.
1h	Late Glacial alluvial fans.	Landform stability over Holocene.	As 1e.
2a	Holocene alluvial fans and colluvial spreads.	Possible Holocene alluviation / colluviation and burial of earlier land surfaces and archaeological sites.	Limited or no surface archaeology, but proven (or high probability of) buried *in situ* land surfaces, reworking and truncation of older Holocene surfaces.
2b	Pre 19th C. Holocene alluvial terraces and floodplain surfaces.	Alluviation and local fluvial erosion resulting in burial and potential erosion of archaeological remains.	Mixed age cropmarks (rare), earthworks and artefacts within ploughzone, high potential for buried Holocene land surfaces and organic deposits, local reworking and truncation of older Holocene surfaces.
2c	Holocene alluvial palaeochannels and floodbasins developed on surface of 2b with proven (or high potential for) organic-rich deposits.	As 2b.	Limited or no surface archaeology, but proven (or high probability of) buried *in situ* land surfaces and organic deposits.
2d	19th. C and later alluvial terraces and palaeochannels.	As 2b.	No intact pre-19th C. archaeology on or beneath surface.
2e	Holocene peat bogs / mires	Accumulation of peat and organic-rich deposits.	As 2c.
3	Made ground / disturbed		see associated landform elements

Table 1. Landform elements and their archaeological associations for the Till-Tweed area.

Landform elements defined in this project present contrasting scenarios for the preservation and evaluation of archaeological and palaeoenvironmental resources, and also dictate the level to which such resources are threatened (either directly or inadvertently) by modern land-use activities. Table 2 identifies the typical sequence for archaeological and palaeoenvironmental evaluation and decision making and the most appropriate methods that can be used to inform and guide management of the historic environment. Such evaluation forms part of the Environmental Impact Assessment (EIA) process that is required by large-scale developments. Further information on how the EIA process works can be found on web sites printed on the inside back page of this booklet and more detailed information can be obtained by contacting the local planning authority or consultants.

Stage	Evaluation Sequence	Lateglacial / early Holocene landform elements					Holocene landform elements					
		1a-d	1e	1f	1g	1h	2a	2b	2c	2d	2e	3
Stage 1	**Consultation** This should be undertaken with the County Archaeologist and/or consultant resulting in an agreed scheme of work.											
Stage 2	**Desk-Based Assessment** of Till Tweed GIS database and additional records (*e.g.* SMR, NMR & early maps where appropriate) to identify recorded archaeology and landform element classification. A walkover survey may also be included at this stage.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stage 3	**Pre-Determination Evaluation** The type of evaluation required will be determined by the type of landform element and its archaeological associations and could include any of the following:											
	(i) *Aerial Photography*	✓	✓	✓		✓		✓	✓			
	(ii) *Fieldwalking and/or Test Pits*	✓			✓	✓	✓	✓			✓	
	(iii) *Geophysical and/or Geochemical Survey* for both archaeological and palaeoenvironmental remains (*e.g.* resistivity, magnetometer, ground penetrating radar *etc.*)	✓	✓	✓	✓	✓	✓	✓	✓			
	(iv) *Evaluation Trenching*	✓	✓	✓	✓	✓	✓	✓	✓		✓	
	(v) *Geoarchaeological Evaluation* (such as landform mapping and hydrological survey)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(vi) *Sediment Analysis* (*e.g.* quarry faces and river bank sections, but may require machine excavation / test pitting / sediment coring)		✓	✓	✓	✓	✓	✓	✓		✓	
Stage 4	**Planning Decision** This may result in further archaeological recording or evaluation (see stage 5), or the preservation in-situ of remains identified during stages 1-3, or that the development may go ahead with no further fieldwork required but stages 6 and 7 completed.											
Stage 5	**Archaeological and Palaeoenvironmental Recording** This stage may not be necessary depending on the outcomes of Stage 4. Potential actions as follows:											
	(i) *Watching Brief*	✓			✓	✓	✓	✓			✓	
	(ii) *Excavation*	✓			✓	✓	✓	✓			✓	
	(iii) *Archaeological Survey*	✓			✓	✓	✓	✓		✓		
	(iv) *Palaeoenvironmental Analysis* (*e.g.* pollen, plant macrofossils, insects *etc.* from organic-rich sedimentary sequences including buried soils)	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Stage 6	**Post-excavation, Analysis and Dating**	All data is collected from preceding stages and is fully analysed and documented										
Stage 7	**Archiving, Dissemination and Publication**	All data from previous stages is archived and a dissemination and publication strategy adopted										

Table 2. The historic environment evaluation sequence and techniques that can be used on different landform elements. These techniques can be used individually or in combination, depending on the specific requirements of each development.

Evaluating Development Sites

Under the provisions of Planning Policy Guidance 15 and 16 developers are obliged to fund the evaluation and recording of archaeological, palaeoenvironmental and historic sites that may be impacted upon as a result of the development. This approach is now widely adopted throughout Western Europe and North America and is supported by the terms of the Valetta Convention.

There are a range of established techniques used to evaluate and record archaeological and palaeoecological deposits. Some of the techniques are geared towards site detection (e.g. aerial photography, fieldwalking, geophysics) while others are geared towards recording structures and deposits (e.g. surveying and excavation). No single technique exists that can identify all buried remains so evaluating any given area that is deemed to be archaeologically sensitive usually requires a combination of techniques that are directly appropriate to the type of landform and potential archaeology that may be encountered.

Archaeologists and geomorphologists assessing sand and gravel deposits at a quarry in the Breamish Valley.

Evaluation of the historic environment component of a proposed development site is undertaken in an incremental process based on the stages that set out in Table 2.

Aerial photograph of a field east of Wark on Tweed showing the clarity with which crop marks can reveal buried archaeology (©Tim Gates).

Decision Making

After Stage 3, as outlined in Table 2, a decision is taken by the Planning Authority as to whether a development should go ahead. Permission may be granted subject to further evaluation work or full archaeological recording (Stage 5), or that remains identified during the evaluation stage are 'preserved in-situ', or that no further action is required other than the analysis and dissemination stages (Stages 6 and 7). Preservation in-situ is an option used when the remains are considered to be sufficiently important. In some cases such an option is beneficial to both the protection of the archaeology and the developer, as the latter does not have to bear the cost of full excavation. There is also a presumption in favour of preservation in-situ in PPG 16 of nationally important remains and their settings. Consideration is also given to the landscape character of the surrounding area and any impacts on historic buildings.