

# LANDMAP Methodology Overview

The Welsh approach to describing and evaluating landscape character.

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## What is this document about?

This guidance explains the LANDMAP methodology for the Geological Landscape, Landscape Habitats, Visual & Sensory, Historic Landscape, Cultural Landscape Services and LANDMAP Monitoring. It replaces all 2016 LANDMAP methodology guidance.

The complete set of LANDMAP Methodology guidance includes:

|        |                                                      |
|--------|------------------------------------------------------|
| GN007a | LANDMAP Methodology Overview                         |
| GN007b | LANDMAP Methodology Datasets                         |
| GN007c | LANDMAP Methodology Classifications and Definitions  |
| GN007d | LANDMAP Methodology Survey Questions and Definitions |
| GN007e | LANDMAP Methodology Quality Assurance                |

You can download the LANDMAP Methodology Guidance Note from the LANDMAP webpage page: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

## Who is this document for?

This guidance is aimed at all users of LANDMAP as a landscape evidence resource for Wales that need to understand how LANDMAP information is derived, and the definitions of terms, classifications and evaluations.

Key users will be local authority and National Park landscape and planning officers, consultants engaged in landscape assessments, woodland planners, land management decision makers and those using landscape information as an opportunity.

For most users, the technical steps for carrying out a LANDMAP assessment are to help users understand the methodological process, links within the guidance are for further detail if this is required.

The guidance is also aimed at those preparing new, or updating existing, LANDMAP datasets ensuring it is consistent and robust evidence.

## Contact for queries and feedback

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## Version History

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# LANDMAP overview

LANDMAP is a complete all-Wales GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. Natural Resources Wales is responsible for commissioning LANDMAP assessments and the management and accessibility of the resource.

LANDMAP embraces a whole landscape approach that covers all landscapes, designated and non-designated, rural and urban to the low water mark. Landscape information is collected in a structured and consistent way that is defined by the LANDMAP methodology.

LANDMAP comprises five spatially related datasets representing aspects of the landscape, geographical landscape areas are called aspect areas. The five LANDMAP datasets are summarised below.

1. The Geological Landscape considers the physical, primarily geological, influences that have shaped the current landscape. It identifies landscape qualities which are linked to the influence exerted by bedrock, surface processes and hydrology. Emphasis is on recording the strongest influences on the landscape.
2. Landscape Habitats focuses on recording habitat features, characteristics and their spatial relationships within the context of the wider landscape network. Landscape scale areas may encompass whole valleys, a dominant habitat or a mosaic of habitats.
3. Visual & Sensory relates the physical attributes of landform, land cover, elements and features, visible patterns and interrelationships together to identify landscapes with distinctive characteristics and qualities.
4. Historic Landscape records prominent landscape characteristics that depend on key historic land uses, patterns and features. These contribute to the overall historic character of the present landscape.
5. Cultural Landscape Services connects some of the non-material, intangible benefits people may experience from landscapes and nature with place, contributing to our understanding of cultural ecosystem services. Examples include landscapes as natural settings, places for aesthetic appreciation, tranquillity and inspiration, as well as associations with cultural heritage, identity and sense of place.

You can download GN007b LANDMAP Methodology Datasets for a fuller explanation from: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

LANDMAP maps and classifies landscapes from the perspective of each dataset. The surveys linked to mapped areas describe their characteristics, qualities and components; evaluates their importance from a national to local scale and recommends locally appropriate management guidelines.

For further information visit [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

Planning Policy Wales Edition 11 advocates the use of LANDMAP assessments to inform development management decisions, landscape character assessment, design and landscape sensitivity studies and can be accessed from: [Planning policy Wales | GOV.WALES](https://gov.wales/planning-policy-wales)

## Overview of methodology

This guidance outlines the five methodological steps for preparing new, or updating existing, LANDMAP datasets. The five steps are:

Step 1 Gather key sources of information.

Step 2 Classify and map the area into discrete geographical areas (see GN007c)

Step 3 Complete a desk and field survey (see GN007d)

Step 4 Quality assure (see GN007e)

Step 5 Monitor and update.

Appropriately qualified specialists (e.g., CMLI, IFLA) undertake steps 1, 2, 3 and 5, step 4 quality assurance must be completed by alternative qualified specialists relevant to the dataset.

## Step 1 Key sources

The gathering of information and data relevant to each LANDMAP dataset is the responsibility of the specialist undertaking the work, potentially via a contract. A record should be compiled of data and information sources used. Sources should be included in the assessment section of each survey; this could be completed as part of a survey bulk upload.

All LANDMAP datasets should use the following sources.

- 1:25,000 and 1:10,000 Ordnance Survey maps
- Aerial Photographs at 1:10,000, ortho-rectified
- Existing landscape and seascape assessments. Local Development Plans. National Park and Area of Outstanding Natural Beauty Management Plans and their Special Qualities.
- Local specialist knowledge

Additionally, for each LANDMAP dataset the following resources are recommended.

## Geological Landscape

British Geological Survey (BGS) 1: 50,000 geological map sheets, Special Sheets 1: 25,000 (if available) and summary descriptions. Geological Conservation Review volumes.

MINESCAN reports (Welsh Metallophyte and Metallogenic Evaluation Project). Mineral Local Plans. Soil Survey Maps. Hydrological information. Sites of Special Scientific Interest (SSSIs) with geological interest features. Regionally Important Geological Site (RIGS)

reports. Geoparks. Local Geodiversity Audits and Action Plans (LGAPS). Regional surveys e.g., South Wales coalfields.

## Landscape Habitats

Phase 1 and Phase 2 Habitat Survey, specialist habitat inventories and surveys. National Forest Inventory. Designated site information SSSI, SACs, SPAs, Ramsar, Sites of Importance for Nature Conservation (SINCs). Local Record Centre species records. Soils Survey. Section 7 lists. Priority Ecological Networks Map. Resilient Ecological Networks (RENs) maps/information.

## Visual and sensory

Field survey work, landscape related supplementary planning guidance, tranquillity assessments, dark skies data.

## Historic Landscape

Archived cartographic materials and photos. Registered Historic Landscape and existing historic landscape characterisation reports. Regional Historic Environment Record (HER), National Monuments Record, oblique aerial photographs.

## Cultural Landscape Services

LANDMAP Visual and Sensory, Geological Landscape, Landscape Habitats, Historic Landscape, Wales Tranquil Areas, World Heritage Sites. Dark sky reserves. Percentage of people identifying as Welsh and as Welsh speakers. Historic Environment Record (Point (object) in polygon [PIP] from classes derived from Period and Broad Class attributes).

## Step 2 Map and classify

Landscape typologies enable the identification and classification of areas with a similar landscape character. In LANDMAP the typologies associated with a dataset are nested in a hierarchical classification of landscape types. The LANDMAP classifications and their associated typologies are unique to each dataset. The exception being Cultural Landscape Services, which adopts the Visual and Sensory classifications.

The landscape scale of the typologies is represented using levels. Level 1 represents the largest scale, becoming more detailed to level 3. LANDMAP areas must be mapped, classified, and surveyed to at least level 3. Level 4 is an optional level of detail when needed, usually for more detailed projects or plans. Definitions for the classification types and levels ensures compatibility between adjacent surveys and consistency across Wales.

Table 1 presents an overview of the LANDMAP hierarchical classification levels, and the scale each level represents in the context of that dataset.

**Table 1: LANDMAP classification levels and scales for the typologies**

| <b>LANDMAP dataset</b>      | <b>Level 1</b>                | <b>Level 2</b>                    | <b>Level 3</b>                               | <b>Level 4</b>                      |
|-----------------------------|-------------------------------|-----------------------------------|----------------------------------------------|-------------------------------------|
| <b>Geological Landscape</b> | General landscape character   | Large-scale terrain or topography | Medium-scale typifying terrain or topography | Small-scale landform                |
| <b>Landscape Habitats</b>   | Broad ecosystems              | Secondary habitats                | Primary habitats                             | e.g., Phase 1 Habitat Survey, EUNIS |
| <b>Visual &amp; Sensory</b> | Broad landform and land cover | Landform                          | Land cover                                   | Detail                              |
| <b>Historic Landscape</b>   | Dominant context              | Dominant land use                 | Dominant landscape pattern                   | Detail                              |

The Visual & Sensory dataset includes two adapted landscape classifications, LMP09 and LMP14 (questions 54 and 55). Tables 5 and 6 set out the 9 and 14 landscape types.

You can download GN007c LANDMAP Methodology Classification & Definitions from: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

Mapping the study area and allocating a classification to each landscape aspect area identified benefits from an iterative approach, desk defined landscape aspect areas may be refined by later fieldwork. Aspect areas are defined by their landscape character and will therefore differ in size and shape.

Digital maps should be prepared, using a 1:10,000 or 1:25,000 OS digital topographical base map with contours to define landscape aspect areas as polygons. Aerial photography may help to identify or resolve features which are not clear from OS maps. Digital Elevation Models (DEM) of bare ground elevations draped with orthorectified aerial photographs or topic related maps can also be used.

Additional topic related GIS layers may also be used to inform the classification and mapping, for example the Phase I Habitat Survey, Priority Ecological Networks Map and Resilient Ecological Networks (RENS) maps. Stereo pairs of aerial photographs may identify subtle topographic features of less than 2m height for the Geological Landscape dataset, for example landforms such as drumlins. Some aspect areas may include a range of characteristics and features that significantly contribute to type, but are not dominant, these can be recorded in the survey.

It is likely that level 1 will be defined first, followed by the subdivision to level 2 and then level 3, refining boundaries as necessary. The precision and justification of the landscape aspect area boundaries must be recorded in the associated survey. Boundaries may be evident where there is a change in topography or land use, where there are subtle changes, a contour line or linear feature can be used.

Finalise and digitise boundaries for each landscape aspect area. All aspect areas require a LANDMAP unique identifier to connect the survey to the GIS polygon.

Creating a thematic map based upon classification information can illustrate landscape diversity, distribution, rarity and commonplace landscape types.

## Survey codes

To generate a LANDMAP survey code, known as a unique identifier (UID), for a new aspect area launch the online application LANDMAP Portal. Valid users will be given the URL, a username and password.

Enter the login details and select the relevant authority region and LANDMAP aspect dataset to be edited. Choose the add survey tab and complete the three survey fields, entering an appropriate geographical or landscape name and using the drop-down menus for the authority region and LANDMAP aspect dataset. Complete by selecting add survey. This will generate a new survey with a unique identifier.

The unique identifier is made up of three parts, abbreviated initials to represent the authority region, an abbreviation of the LANDMAP dataset and three numerical characters. For example, SWNSVS622 is the unique identifier for Rhossili Down, the unique identifier represents SWNS (Swansea) VS (Visual & Sensory) 622 (3 numeric characters).

It is important to now enter the classification for the newly generated aspect area using the Classification tab in Portal. Ensure you have the correct survey to edit by checking the area name at the top is correct and the intended survey row in the database is green. Use the drop-down menus to select the classification for levels 1, 2 and 3, and 4 if appropriate, save the update. Use the unique identifier in the GIS to link the polygon and survey together.

Portal can be used to change an existing survey classification if monitoring suggests a different classification is now more appropriate.

## Step 3 Completing surveys

A survey may be created when a new landscape aspect area is developed, or an existing landscape area is subdivided. An existing survey may be updated to reflect a real landscape change or to update existing information.

Every landscape aspect area has an associated survey which must be created or amended using LANDMAP Portal, the online data entry programme. The overall structure of the online survey is the same for each of the five LANDMAP datasets.

All LANDMAP datasets contain the survey sections and questions for monitoring, aspect area boundary, bibliography and assessment. In addition, each LANDMAP dataset includes the sections description, evaluation, evaluation matrix, recommendations and tolerance to change, but the questions are unique to each dataset. The Visual & Sensory dataset uniquely includes additional sections, for example dark skies, tranquillity & place and key views.

Every effort should be made to fill in every question in the survey. Some questions can only be completed with a field survey and some only if it is a level 4 survey.

Field survey is a requirement for new Visual & Sensory aspect areas and are highly recommended for monitoring updates. Between one and three field survey viewpoints per aspect area should be visited to assess intrinsic qualities and confirm boundaries, if required. The number of viewpoints will be dependent on size, character and accessibility. Photographs from key and representative viewpoints are recommended for reference.

Definitions for the terms used in each LANDMAP survey aids accuracy and consistency across Wales.

You can download GN007d LANDMAP Methodology Survey Questions and Definitions from the LANDMAP page from: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

All LANDMAP surveys will include a SurveyUrl hyperlink that opens a html version of the survey with all questions and fields visible direct from the live database. This is helpful when a GIS attribute table cannot display the full survey responses and truncates the information.

## Step 3 LANDMAP evaluation

Landscape aspect areas are evaluated from a Welsh national to local scale of landscape importance, recognising that all landscapes matter (European Landscape Convention). Landscape evaluation is one component of a place, areas may be more highly valued for other benefits, such as recreation and health and wellbeing.

Four of the five LANDMAP datasets are evaluated. All evaluation questions are unique to each LANDMAP dataset, they are set out and explained in GN007d LANDMAP Methodology Survey Questions and Definitions. LANDMAP evaluation questions are based upon the importance of the characteristics and qualities within each landscape aspect area, assessed in the context of the LANDMAP dataset. Evaluations may differ, or be consistent, between the LANDMAP datasets.

Cultural Landscape Services includes evaluations drawn in from the four datasets but does not have its own overall evaluation due to its multifaceted content.

The specialist completing the evaluation questions should record a LANDMAP evaluation based on a professional understanding of the character of the landscape from the information gathered. LANDMAP evaluation assessment criteria are completed before determining, and summarising, an overall evaluation and justification.

The four evaluation outcomes are:

**Outstanding**, of international or national importance within the LANDMAP dataset

**High**, highly valued, of regional or county importance within the LANDMAP dataset

**Moderate**, locally valued, of local importance within the LANDMAP dataset

**Low**, lower influence, of relatively lower local importance or landscape influence within the LANDMAP dataset

The survey responses to evaluation questions should be carefully worded as they may be used in development management, designations and decision making.

Thematic maps of evaluation criteria or overall evaluation for a LANDMAP dataset can be created to give an all-Wales or local perspective.

The LANDMAP evaluation methodology is included in the Landscape Institute Technical Guidance Note on landscape value.

You can [download the Landscape Institute \(LI\) Assessing landscape value outside national designations Technical Guidance Note | 02/21, from the LI website](#)

LANDMAP evaluations can be used to contribute to an assessment of the relative value or importance attached to different landscapes, in Landscape and Visual Impact Assessments and when assessing landscape sensitivity.

You can download GN046 Using LANDMAP in Landscape and Visual Impact Assessments, published in 2021, from: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

You can download the Landscape Sensitivity Assessment Guidance for Wales, published in 2022, from: [Natural Resources Wales / Assessing Landscape Sensitivity in Wales](#)

Previously a technical report was produced to accompany the preparation or monitoring update of a LANDMAP dataset for an identified authority, or at an all-Wales level. This is no longer a requirement. It is important that all relevant information, references, justifications and explanations of key decisions are recorded within the LANDMAP surveys.

## Step 4 Quality assurance

To ensure national consistency and high standards, all LANDMAP information has been quality assured and approved before being made available.

The quality assurance process verifies that:

- The LANDMAP methodology has been adhered to.
- Appropriate resources for each layer have been used and consulted.
- Proposals for updating, or not updating, surveys following monitoring are well supported, consistent and valid.
- The updating of LANDMAP GIS and surveys is accurately implemented.

You can download GN007e LANDMAP Quality Assurance from: [Natural Resources Wales / LANDMAP - the Welsh landscape baseline](#)

## Step 5 Monitoring and updating

LANDMAP has been in place in Wales since 1997, as a landscape evidence baseline it must be periodically monitored and updated. The LANDMAP monitoring methodology is applicable to individual landscape aspect areas or whole datasets and can be repeated as required.

Monitoring and updating of LANDMAP could occur in response to specifically identified landscape change or new information, or as a periodic update to maintain the resource, this may be at intervals of five to ten years.

Areas are identified where change has occurred since the last update; the change is then considered in the context of its relevance to the LANDMAP dataset being monitored. Substantive land use, land cover or management change, which is outside of the natural cycle of change, are the most likely causes to require an update, but smaller incremental changes which are cumulatively significant are also important.

### Stage 1 Change detection

A range of information is used to detect change, for example local knowledge, GIS datasets and processed information derived from remote sensing. Such change detection maps should be prepared with the relevant LANDMAP aspect area boundaries overlain an OS base map as context. Table 2 includes examples of change detection resources.

**Table 2: Examples of LANDMAP change detection resources**

| Change detection resource                                                           | Relevance                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current LANDMAP dataset<br>GIS and surveys.                                         | Existing baseline information.                                                                                                                                                                            |
| Ordnance Survey Raster<br>1:25,000, 1:50,000, 1:250,000.                            | For interpretation and context.                                                                                                                                                                           |
| Aerial Photography<br><br>Most recent available.                                    | For interpretation and clarification of change<br><br>e.g., expansion of the built environment, changing agricultural use, woodland cover, reclamation.                                                   |
| Normalized Difference<br>Vegetation Index (NDVI)<br>Derived from Satellite imagery. | To detect changes in living and nonliving surfaces<br><br>e.g., changes in land use, reclamation or biological productivity associated with grassland improvement or a more seminatural vegetation cover. |
| Change in roads and buildings<br>(artificial surfaces) OS<br>MasterMap.             | To detect change in structures and surfaces since the last update e.g., new roads, by-pass, individual buildings, settlement expansion.                                                                   |

| <b>Change detection resource</b>                                                                                   | <b>Relevance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Land cover complexity (segmented density maps)</p> <p>Derived from satellite imagery or aerial photographs.</p> | <p>An indicator of change in the complexity of structural components. Houses and gardens, industrial areas and woodlands are texturally complex areas in contrast to playing fields or improved agricultural fields which are more homogenous. Comparative segment density maps can be used to identify an increase in complexity, a decrease or no change e.g., potential conversion of land or changes to main habitat type diversity or development of scrub and bracken.</p> |
| <p>Tranquillity &amp; Place – Dark Skies 2021 and Visually Tranquil Areas 2022.</p>                                | <p>For change detection, interpretation and understanding change. Reference could be made to the 2009 Wales Tranquillity Map, although not direct comparisons.</p>                                                                                                                                                                                                                                                                                                               |
| <p>Phase I Habitat Survey</p> <p>Most recent resource</p>                                                          | <p>Interpreting changes about vegetation type and productivity detected in other data sets. Used for clarification after normalized difference vegetation index (NDVI) changes are detected</p>                                                                                                                                                                                                                                                                                  |
| <p>Mega Change map</p>                                                                                             | <p>A composite map of the most significant or prominent changes from the change detection mapped resources, with LANDMAP aspect area boundaries and an OS 1:50,000 scale map base.</p>                                                                                                                                                                                                                                                                                           |

Additional data resources may include maps of renewable energy developments, forest resource plans, updated Local Record Centre data, CuRve (ecosystem resilience), Living Wales, urban tree canopy cover, National Forest Inventory, and Regionally Important Geological Sites (RIGS). Information derived from local authority departments and relevant external organisations, through a questionnaire or workshop, contributes valuable local information.

The change detection maps and resources should be analysed and interpreted to identify aspect areas where significant landscape change is evident that is relevant to the LANDMAP dataset and that will require an update of any of the following, GIS boundaries, survey classification, description, evaluation, recommendations.

All aspect areas that will be updated should be recorded in a summary monitoring table (MS Excel or Word) that links change detection evidence to landscape change and LANDMAP surveys. The summary monitoring table should include columns for the aspect area UID and name, each change detection source used, fieldwork if relevant, and a recommendation of change (GIS, survey, or both) and why. Zoomed in map images of the aspect area change can be a helpful additional record.

Field survey remains a requirement when updating Visual & Sensory aspect areas in help update the survey comprehensively or to determine if cumulative small changes warrant a

survey update. The field survey may identify additional aspect areas where significant change has occurred to those already identified.

Complete the summary monitoring table for all aspect areas requiring an update.

## Stage 2 Updating surveys

This stage implements the required updates as detailed in the monitoring table recommended LANDMAP amendments.

All surveys should record that they have been monitored and whether they have been updated or remain unchanged. All changes to the surveys will be made through the online LANDMAP Portal application. The completion of questions 1 to 1e in the monitoring section ensures that monitoring and updating activity is associated with individual surveys.

The monitoring section includes the date of monitoring, who has undertaken the monitoring and quality assurance and whether the survey was updated or remained unchanged following monitoring. For those surveys that will be updated there are additional questions to record the key sources indicating change, which parts of the survey will be updated and if the change has been verified by fieldwork. Questions that will have the same information added can be completed via an arranged bulk upload, likely suitable questions include 1, 1a, 1e, 35 and 36.

In addition to the monitoring questions, the relevant survey questions and/or GIS boundaries as identified in the summary monitoring table should be updated to reflect the current landscape character and qualities relevant to the LANDMAP dataset. Aspect area GIS boundaries should match at authority boundaries to reflect landscape character not administrative boundaries.

By arrangement, updates to the LANDMAP surveys can be kept offline until quality assurance approves the changes, they can then be made live and the monitored and updated LANDMAP information released for use.

## Stage 3 Quality assurance

Repeat the LANDMAP methodology step 4.

## How to access LANDMAP datasets

You can explore the introduction to LANDMAP and view classification and evaluation maps from: [Welsh Landscape Collection | Wales Environmental Information Portal \(arcgis.com\)](#)

You can view quality assured LANDMAP data from: [Environmental data - Map Series Builder StoryMap | Wales Environmental Information Portal \(arcgis.com\)](#)

From DataMapWales you can download the LANDMAP GIS datasets (select Downloads), this is preferable for statistical analysis or complex querying. The cached LANDMAP datasets are automatically updated every month to include any updates. Remember to update the datasets periodically.

You can download LANDMAP GIS datasets from: [Home | DataMapWales \(gov.wales\)](#)