



PRODUCT GUIDE

# OS MASTERMAP<sup>®</sup> TOPOGRAPHY LAYER – BUILDING HEIGHT ATTRIBUTE

ORDNANCE SURVEY MASTERMAP<sup>®</sup>

# OS MasterMap® Topography Layer-Building Height Attribute

## Product guide

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## Introduction

### Purpose of this guide and disclaimer

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### Contact details

Our Customer Service Centre will be pleased to deal with your enquiries:

Customer Service Centre  
Ordnance Survey  
Adanac Drive  
SOUTHAMPTON  
SO16 0AS

General enquiries: +44 (0)3456 050505

Welsh helpline: 03456 050504

Textphone: +44 (0)2380 056146

[customerservices@os.uk](mailto:customerservices@os.uk)

[www.os.uk](http://www.os.uk)

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The documentation is supplied in portable document format (PDF) only. Free Adobe® Reader® software, which displays the guide, incorporates search and zoom facilities and allows you to navigate within. Hyperlinks are used to navigate between associated parts of the guide and to relevant Internet resources by clicking on the blue hyperlinks and the table of contents.



## Chapter 2 OS MasterMap Topography Layer – Building Height attribute

### Height Value source data

The OS MasterMap® Topography Layer – Building Height Attribute is generated from photogrammetrically derived Digital Terrain Models (DTM) and Digital Surface Models (DSM). That is, information gathered from aerial survey as part of our cyclical revision programmes.

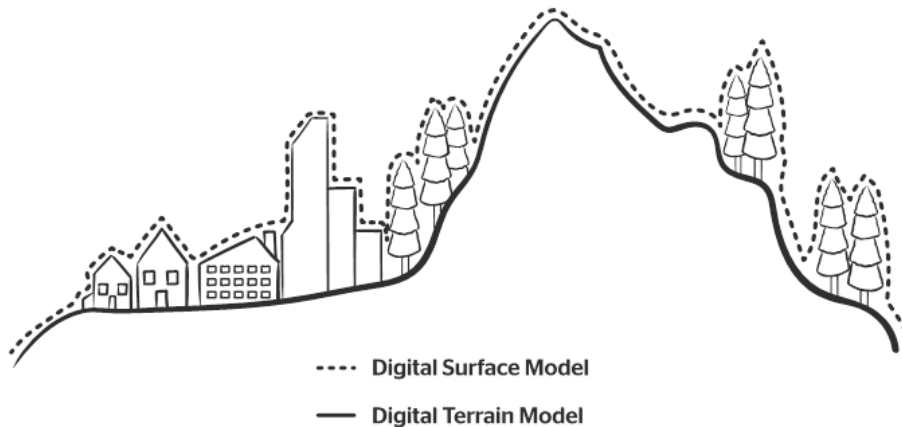


Figure 3 The source data used to create Building Height Attribute

### Height values

#### Absolute Height Values

Absolute Height values represent absolute heights against Ordnance Datum Newlyn at three distinct points within the building structure. The absolute heights require the use of additional terrain height information to provide context to these heights, such as by using them in conjunction with the OS Terrain 5 DTM product. The absolute heights are denoted with the prefix 'Abs'

#### AbsHMin

AbsHMin (Absolute Height Minimum) represents the lowest point extracted from the Digital Terrain Model (DTM) within the footprint of the building as represented in MasterMap Topographic layer. This aims to represent the lowest absolute height of the intersection of the external building walls and the underlying ground surface.

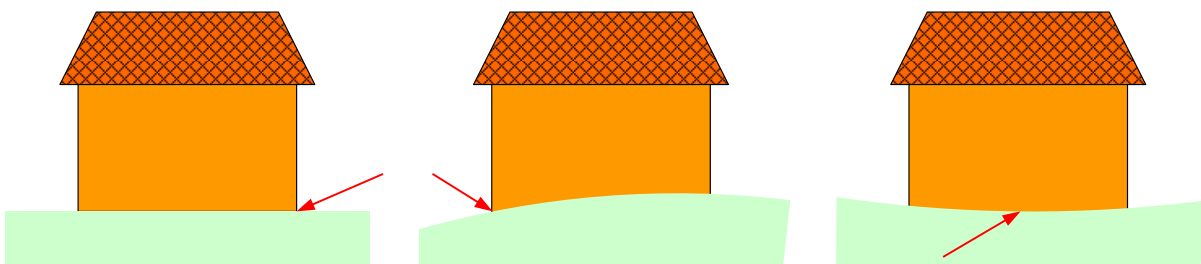


Figure 4 Illustration of Minimum Height at ground locations

## AbsHMax

AbsHmax (Absolute Height Maximum) represents the highest point of the building extracted from the Digital Surface Model (DSM) within the footprint of the building or structure as represented in OS MasterMap Topographic layer. The highest point could be represented by any structure on top of the building, provided it is of sufficient size to be captured in the DSM source data. This may include industrial chimney stacks, machinery and any substantial structures that may be present on top of the building. Smaller structures like chimney stacks as found on residential buildings will be excluded from the AbsHMax measurement.

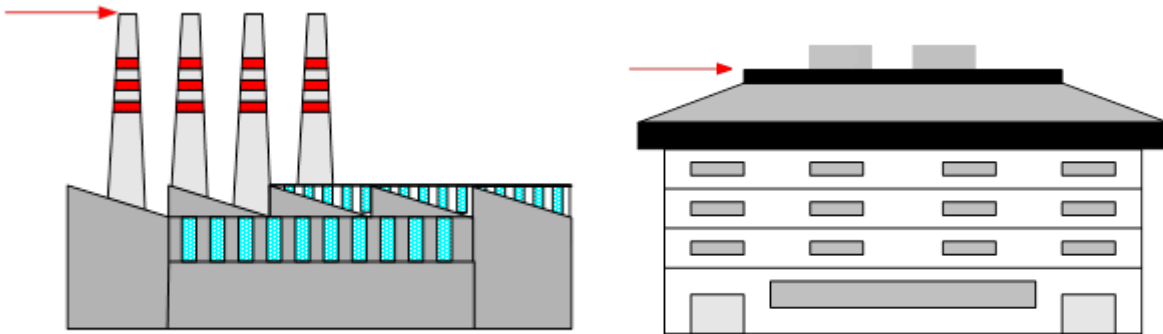


Figure 5 Illustration of possible Maximum Height of building

## AbsH2

AbsH2 (Absolute Height 2) is a calculated value which aims to represent the lowest point where the roof intersects the alignment of the external vertical walls of the principal part of the building. This is usually referred to as the building eaves.

The principal part of the building is defined as the main structure excluding elements at higher or lower elevation. In buildings with multiple heights, for example a main two storey building with a smaller single storey extension, the eave height is calculated from the largest building extent.

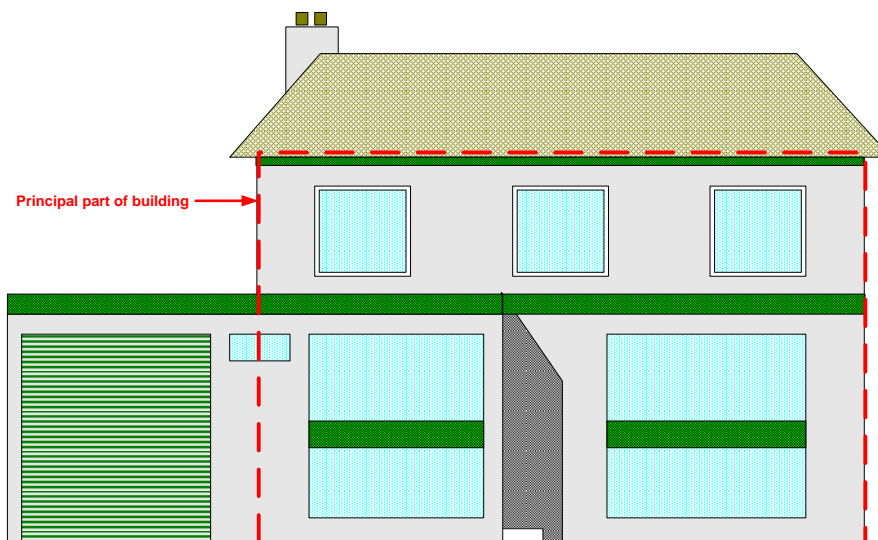


Figure 6 Illustration of AbsH2 Height of Building

## Relative Heights

The two relative building heights are generated from the differences between the absolute elevation values. The relative heights can be used in isolation to provide a third dimension to buildings while all other features will be flat, as they refer only to the height of the building, rather than height above Ordnance Datum Newlyn (ODN). Relative heights are denoted with the prefix 'Rel'. These attributes are also applicable to the Tank, Glasshouse and Chimney Stack structures included in the data.

### RelHmax

RelHMax (Relative Height Maximum) is the derived value from the calculation of AbsHMax, the calculated absolute value for the building height, minus AbsHmin, the calculated absolute value for ground height.

### RelH2

RelH2 (Relative Height 2) is the derived value from the calculation of AbsH2, the calculated absolute value for the eave height, minus AbsHmin, the calculated absolute value for ground height.

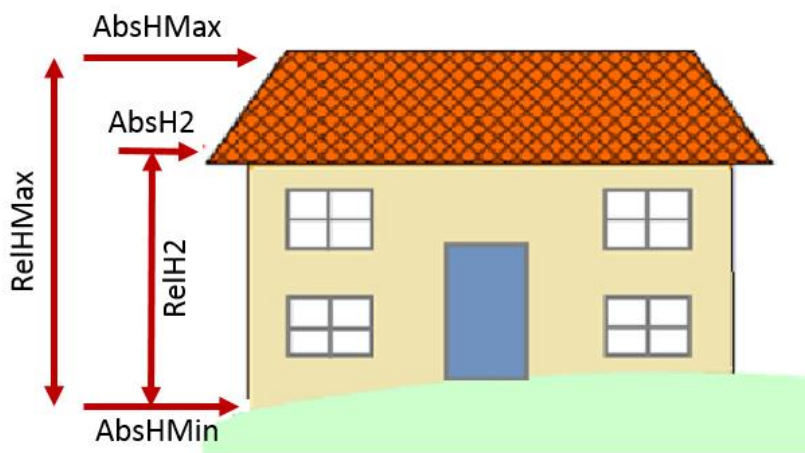


Figure 7 Illustration of Relative and Absolute Height values

## Other attributes

### Tile Reference

The tile reference corresponds to the OSMM Topography layer 5km tile to which the BHA data applies.

For consistency, the Tile Reference attribute will follow the 5k naming convention adopted by OSMM Topography Layer and Building Height data. For example, TQ2060, TQ2560, TQ2065 etc.

### TOID

Building Height Attribute contains the unique feature references, or TOID, from the OS MasterMap Topography Layer. This enables associated Building and Structure Height data to be joined to the Topographic Area features within the Topography Layer.

The TOID is a persistent and unique identification string published in the OS MasterMap Topography layers. These identifiers have a prefix of 'osgb', are either 13 or 16 digits in length and are allocated sequentially when a new building feature is created. TOIDs are retained throughout their lifecycle and are never re-assigned to a different feature. In order for these TOIDs to be consistent across all OS products, the identifier should not be altered in any way.

On occasion, a building TOID in OS MasterMap Topography Layer may have no corresponding height values in the BHA data. This can occur because of different update cycles or when a building has been constructed after the capture of the source BHA data.



## **TOID Version**

The TOID version attribute represents the version of the OS MasterMap Topography Layer TOID for which the height values were calculated. The BHA production process means that in certain cases the version number for a given TOID in the BHA data may differ from the version number in the latest Topography holding. As the Topography Layer and BHA have different release schedules, this can occur when a Topography Layer feature has been modified since the Building Height Attribute data values were calculated or because the most up-to-date version of the Topography Layer is not being used.

In some areas, the BHA values from the preceding Alpha release have been included; in those cases, BHA will contain the version of Topography Layer Feature from which it was created. This may be an earlier TOID version than in the current version of the Topography Layer.

## **BHA Process date**

The BHA process date represents the date when the Building Height Attribute data was created.

## **BHA Confidence Level**

The BHA confidence attribute describes the confidence we have in the accuracy of the BHA values per building. For the Beta release only three of these values will be used;

**99** - Buildings for which the confidence level of the BHA values has not been assessed.

**90** - Buildings for which we have not been able to calculate some or all of the Building Height Attribute values

**20** - Buildings that are represented well by the BHA values but where we do not have a high confidence in the geometric accuracy of the height values

OS are still investigating methods to assess quality, as such most buildings currently have a confidence flag of 99.

Further detail on these values can be found in the Technical Specification.

## Chapter 3 Data Supply

### Supply Format

Building Height Attribute will be delivered in CSV file format only.

Data will be refreshed every 6 months.

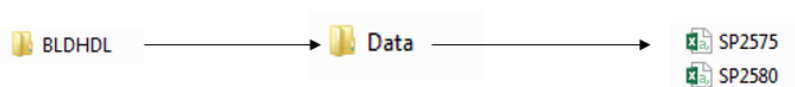
### Supply Media

BHA data is supplied via download only via [OS Orders](#)

### Coverage and File Sizes

OSMM BHA data will be supplied in 5km tiles. Data will be uncompressed and file sizes will vary significantly depending on the number of buildings and structures contained within the 5km<sup>2</sup> area. For customers with a full holding of OSMM Topography Layer, a full GB set is also available. For those that do not have a full Topo supply, only tiles that intersect OSMM Topography Layer holdings may be downloaded.

#### 5x5 Tiles



#### GB National Set



Figure 8 Illustration of data download structure

For the beta release, not all 5k<sup>2</sup> tiles will contain a full coverage supply of data. This is a result of the collection process of source DTM and DSM data which has not been undertaken on a 5km tile basis, and the fact that the beta release does not contain full national coverage.

For the Beta release, it is possible that some of the coverage tiles will contain no data. This occurs when the data within that tile has been discarded as corrupt and has failed validation checks. Over time, as the product is updated and coverage improves, this will become less likely. A list of tiles that contain no data is present on Building Height webpage.

Each 5km<sup>2</sup> tile will contain building height data for any building that is partly or wholly contained within that tile. As such buildings that traverse tile boundaries will be duplicated in contiguous holdings.

### Currency and completeness

Building Height Attribute, is derived from source DTM and DSM from the last five years. As the product develops the currency will move towards three-yearly.

The beta release does not contain full national coverage. Currently national coverage contains in excess of 37 million buildings.

For up-to date information on BHA coverage please see coverage map on BHA webpage.

## Inclusion of Alpha Data

For the purposes of completeness, areas that were covered in the 2014 Alpha release of BHA data that currently do not have more up-to-date DSM and DTM source data, are infilled with data from the Alpha release. In addition, within areas of predominantly Beta Building Height data, buildings that have missing BHA values, or have clearly been generated from corrupt DTM or DSM data, have been replaced with existing data from the 2014 Alpha product. The outcome of this is that within any area there can be a combination of buildings with heights derived from the Alpha and Beta products. Over time, as new source data is created, these areas will become less prevalent.

For the purposes of distinguishing Alpha and Beta BHA values, BHA data that is from the Alpha release will contain a processing date of 2014 or earlier only. More recently created BHA Beta data will contain a processing date of 2017 and later as data is added over time.

BHA values will always contain the TOID version number of the TOID version from which they were created. In the case of Alpha data this will often not be the current TOID version number held in any current Topography Layer holdings.

## Header Information

For the purposes of simplifying the merging process, the individual 5km<sup>2</sup> tiles are supplied without header information. Instructions on the merging process can be found in the Getting Started Guide. The format and structure of the individual columns within the data will consistent.

A header file can be downloaded from the BHA Webpage.

OS_Topo_ TOID	OS_Topo_TOID_ Version	BHA_Process Date	Tile Ref	AbsH Min	Abs H2	AbsH Max	Rel H2	RelH Max	BHA_ Conf
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Figure 9 BHA Header Information

## Data Precision

All heights have been calculated in metres to one decimal place (decimetre).

## Height Datum

The BHA dataset uses Ordnance Datum Newlyn as the national height datum for all height values across mainland Britain. Other British height datums, for example Lerwick for the Shetland Islands, are used where applicable. All height datums are incorporated within the National Geoid Model OSGM15.

A guide to coordinate systems in Great Britain is available at:

<http://www.ordnancesurvey.co.uk/docs/support/guide-coordinate-systems-great-britain.pdf>

A general introductory guide to BNG is provided at;

<http://www.ordnancesurvey.co.uk/resources/maps-and-geographic-resources/the-national-grid.html>

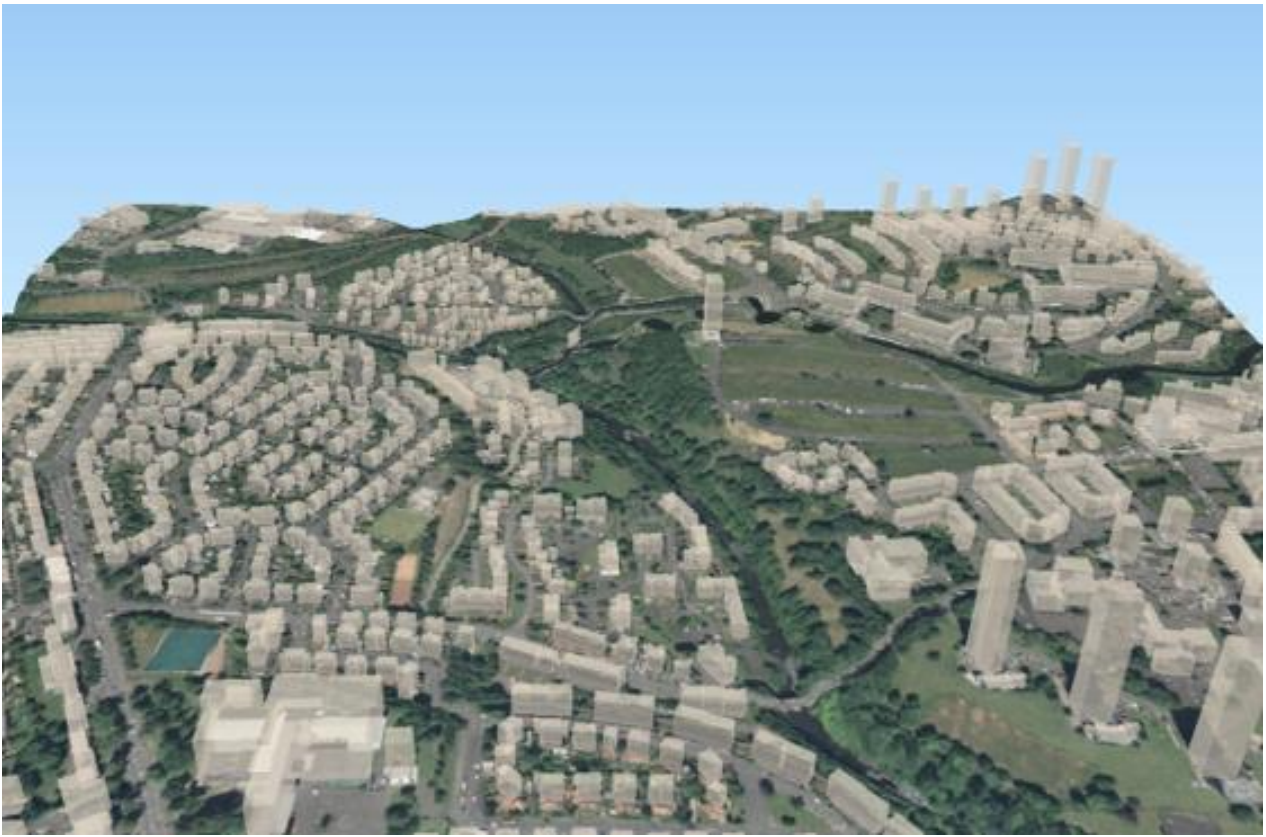


Figure 10 Image depicting BHA attribute displayed over OS Terrain 5 and OSMM Imagery Layer