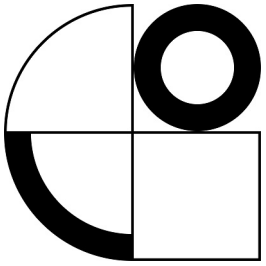


Buildings

4.0

Geoscape

04 May 26

Contents

1 Overview **3**
- 1.1 Product Version . . . 4
- 1.2 Product Version Management . . . 4

2 Technical Description **5**
- 2.1 Data Model . . . 7
- 2.2 Data Dictionary . . . 8

3 Attribution **13**
- 3.1 Attribute Population and Capture Source . . . 13
- 3.2 Attribute Description . . . 14
  - 3.2.1 Date Information . . . 14
  - 3.2.2 Capture Image Type and Resolution . . . 14
  - 3.2.3 Spatial Association . . . 14
  - 3.2.4 Building Use . . . 14
  - 3.2.5 Address Information . . . 14
  - 3.2.6 Building Elevation . . . 14
  - 3.2.7 Building Area Information . . . 14

4 Domain Values **15**

5 Linkages **17**
- 5.1 Cadastre Linkage . . . 17
- 5.2 Property Linkage . . . 17
- 5.3 Address Linkage . . . 18
- 5.4 Locality Linkage . . . 18
- 5.5 Local Government Area Linkage . . . 18
- 5.6 Mesh Block Linkage . . . 19
- 5.7 Statistical Area 1 Linkage . . . 19
- 5.8 State Linkage . . . 19

6 Data Quality **21**
- 6.1 Positional Accuracy . . . 21
  - 6.1.1 Horizontal Accuracy . . . 21
  - 6.1.2 Vertical Accuracy . . . 22
- 6.2 Thematic Quality . . . 22
  - 6.2.1 Classification Correctness . . . 22
- 6.3 Logical Consistency . . . 22
- 6.4 Topological Consistency . . . 23
- 6.5 Temporal Accuracy . . . 23
- 6.6 Completeness . . . 23
  - 6.6.1 Feature Completeness . . . 23
- 6.7 Geometry Validity . . . 23

7 Data Maintenance **25**
- 7.1 Update Frequency . . . 25
- 7.2 Update Scope . . . 25

7.3 Update Rules . . . 25
7.4 Building Change Management . . . 26
7.5 Adds, Retires and Updates. . . . 26

8 Extent/Geographic Description **29**
8.1 Spatial Reference System . . . 29
8.1.1 GDA94 . . . 29
8.1.2 GDA2020 . . . 29

9 Delivery Format **31**
9.1 File Geodatabase . . . 31
9.2 GeoJSON . . . 31
9.3 JSON . . . 32
9.4 ESRI Shapefile . . . 32
9.5 MapInfo TAB . . . 32
9.6 Geopackage . . . 33

10 Metadata **35**
10.0.1 Buildings Metadata Statement . . . 36

Bibliography **39**

Disclaimer

Overview

Buildings is a national digital dataset that represents buildings across all Australian states and territories. It is designed for use in geographic information systems (GIS), visualisation, engineering modelling, and analytics. The dataset includes four layers:

- buildings (spatial)
- building_address (aspatial)
- building_cadastre (aspatial)
- building_property (aspatial)

The Buildings product represents building roof outlines as spatial features, with related address, cadastre, and property information provided in associated aspatial tables to support spatial analysis and integration with other datasets.

Detailed attribute definitions and relationships are provided in the data dictionary and data model.

Geoscape Australia welcomes your feedback on our Buildings product. We also publish regular updates on the development of our products on the Geoscape website (www.geoscape.com.au).

1.1 Product Version

4.0

- Major Version: 4
- Minor Version: 0

1.2 Product Version Management

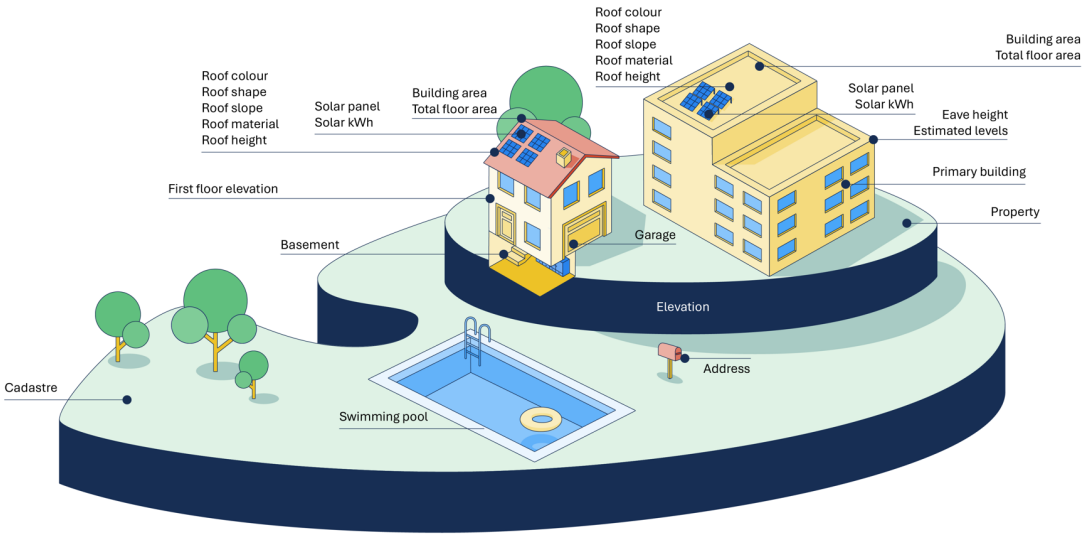
Versioning is managed through incrementing when there is a change to the product schema or a significant change in data population, these are described further below:

- **A schema change can affect a major or minor increment to the versioning.**
  - Additive changes (changes that won't break customers' ability to work with the data) will be incremented with a minor version increment, an example is the addition of a new attribute.
  - Removal of attributes or changing the structure of the schema will enact a major change to identify that this requires the attention of all customers and partners.
- Where a significant geography of Australia either has a new population of data for an attribute or is populated from a much higher quality source a minor increment will be applied to the product version.

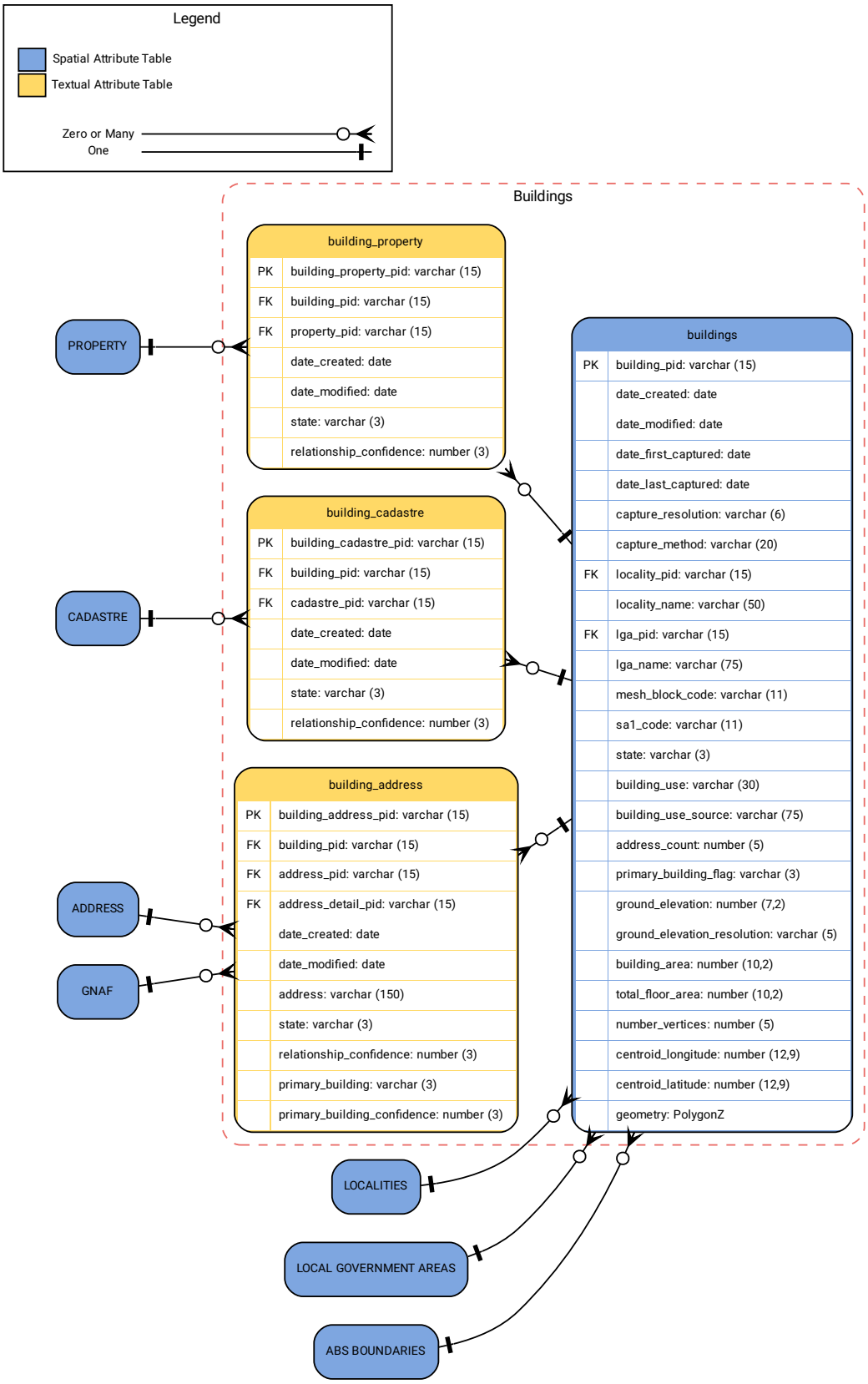
Therefore, the major and minor version will not increment with every data update. Published releases will have a name e.g. 'May 2025' and will reference a version of the product e.g. '1.0'.

Technical Description

The buildings layer consists of digital representations of the roof outline of a building. Buildings have been digitised from high quality, remotely sensed imagery using a combination of automated and manual processes to identify, extract and orthogonalise objects resembling a building structure greater than $9m^2$. The process also determines building attributes describing roof characteristics, such as the colour, shape and type, as well as the presence of solar panels and swimming pools.



2.1 Data Model



2.2 Data Dictionary

This data dictionary is applicable for the buildings, building_address, building_cadastre and building_property tables.

Table 1: buildings

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
building_pid	character string (15)	Persistent identifier for the building.	Yes	Yes	BLD_PID
date_created	date (yyyy-mm-dd)	The date of record creation for the building.	No	Yes	DT_CREATE
date_modified	date (yyyy-mm-dd)	The most recent date that an attribute (not including date_last_captured) has been modified for the building.	No	No	DT_MOD
date_first_captured	date (yyyy-mm-dd)	Formerly capture_date, the date of the image that was used to capture the building for the first time.	No	Yes	DT_FST_CPT
date_last_captured	date (yyyy-mm-dd)	Formerly building_review_date, the date of the image used for the most recent update of the building.	No	Yes	DT_LST_CPT
capture_resolution	character string (6)	Resolution in centimeters of the imagery source used to capture the building geometry.	No	Yes	CAPT_RES
capture_method	character string (20)	Type of imagery source used to capture the building geometry (e.g. Aerial, Satellite, etc.).	No	Yes	CAPT_MTHD
[2] locality_pid	character string (15)	The persistent identifier of the Locality that the building is primarily within.	No	No	LOC_PID
Page 9, [2] locality_name	character string (50)	The name of the Locality that the building is primarily within.	No	No	LOC_NAME
Page 9, [2] lga_pid	character string (15)	The persistent identifier of the Local Government Area that the building is primarily within.	No	No	LGA_PID
Page 9, [2] lga_name	character string (75)	The name of the Local Government Area that the building is primarily within.	No	No	LGA_NAME
Page 9, [2] mesh_block_code	character string (11)	The 2021 Australian Bureau of Statistics (ABS) Mesh Block that the building is primarily within.	No	No	MB_CODE
Page 9, [2] sa1_code	character string (11)	The 2021 Australian Bureau of Statistics (ABS) SA1 code that the building is primarily within.	No	No	SA1_CODE
state	character string (3)	The abbreviated name of the State or Territory that the building is primarily within.	No	Yes	STATE
building_use	character string (30)	Description of the type of building (e.g. residential, commercial). This can be derived from the Planning Zone the building is within or from other additional information.	No	No	BLD_USE
building_use_source	character string (75)	The source used to assign building use, e.g. National Planning.	No	No	BLD_USE_SC
address_count	number (5)	Total number of addresses related to a building.	No	Yes	ADD_COUNT
primary_building_flag	character string (3)	Describes whether the building has been identified as a primary building (residence) for at least one address in the building_address table. Provided as a 'Yes' or 'No' flag.	No	No	PR_BLD_FLG

continues on next page

Table 1 – continued from previous page

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
ground_elevation	number (7,2)	The elevation of the ground at the centroid of the building.	No	No	GRD_ELEV
ground_elevation_resolution	character string (5)	The grid separated distance (GSD) of the source elevation model (in meters) used to extract ground elevation.	No	No	GRD_EL_RES
building_area	number (10,2)	The area of the building polygon footprint in square metres.	No	Yes	BLD_AREA
total_floor_area	number (10,2)	The total floor area of the building in square metres. This is calculated by assessing the associated parts of the building which can have different heights, estimated levels and areas, and using this information to estimate the total floor area for the building.	No	No	TOT_F_AREA
number_vertices	number (5)	The number of vertices for the building geometry.	No	Yes	NUM_VERT
centroid_longitude	number (12,9)	The longitude of the building centroid.	No	Yes	CNTRD_LONG
centroid_latitude	number (12,9)	The latitude of the building centroid.	No	Yes	CNTRD_LAT
geometry	geometry (PolygonZ)	The geometry field for the buildings table, which represents the building polygon (including ground level elevation values for all vertices).	No	Yes	GEOMETRY

Table 2: building_address

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
building_address_pid	character string (15)	The persistent identifier for the building_address record.	Yes	No	BLD_AD_PID
building_pid	character string (15)	The persistent identifier of the building related to an address record.	No	Yes	BLD_PID
address_pid	character string (15)	The address pid that is related to the building feature. The persistent identifier is unique to the address feature this record relates to.	No	Yes	ADD_PID
[3] address_detail_pid	character string (15)	The unique persistent identifier for each address_detail record associated with the address record.	No	No	ADD_DT_PID
date_created	date (yyyy-mm-dd)	The date of record creation for the building_address relationship.	No	Yes	DT_CREATE
date_modified	date (yyyy-mm-dd)	The most recent date that an attribute has been modified for the building_address relationship.	No	No	DT_MOD
address	character string (150)	The address string from the related address record.	No	Yes	ADDRESS
state	character string (3)	The abbreviated name of the State or Territory that the building is primarily within.	No	Yes	STATE
relationship_confidence	number (3)	The percentage confidence that a building has a relationship with an address record.	No	Yes	REL_CONF

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[2] Localities, Local Government Areas, Mesh Blocks and Statistical Area Level 1 (SA1) tables are not included in this product. These are available in the Localities, Local Government Areas and ABS Boundaries products.

Table 2 – continued from previous page

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
primary_building	character string (3)	The primary building, most likely to be the residence, at the given address. Provided as a 'Yes' or 'No' flag. Where there is not enough information to select one primary building and there are multiple building candidates, more than one building can be assigned as the primary building for an address.	No	No	PRM_BLD
primary_building_confidence	number (3)	The percentage confidence rating with which the primary building was assigned to the address.	No	No	PRM_BLD_CN

Table 3: building_cadastre

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
building_cadastre_pid	character string (15)	The persistent identifier for the building_cadastre record.	Yes	No	BLD_CD_PID
building_pid	character string (15)	The persistent identifier of the building related to a cadastral record.	No	Yes	BLD_PID
[4] cadastre_pid	character string (15)	The unique persistent identifier for each cadastre record associated with the building record by spatial intersection.	No	Yes	CAD_PID
date_created	date (yyyy-mm-dd)	The date of record creation for the building_cadastre relationship.	No	Yes	DT_CREATE
date_modified	date (yyyy-mm-dd)	The most recent date that an attribute has been modified for the building_cadastre relationship.	No	No	DT_MOD
state	character string (3)	The abbreviated name of the State or Territory that the building is primarily within.	No	Yes	STATE
relationship_confidence	number (3)	The percentage confidence that a building has a relationship with a cadastre parcel.	No	Yes	REL_CONF

Table 4: building_property

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
building_property_pid	character string (15)	The persistent identifier for the building_property record.	Yes	No	BLD_PR_PID
building_pid	character string (15)	The persistent identifier of the building related to a property record.	No	Yes	BLD_PID
[5] property_pid	character string (15)	The unique persistent identifier for each property record associated with the building record by spatial intersection.	No	Yes	PR_PID

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[3] ADDRESS_DETAIL table is not included in this product; it is available in Geoscape's G-NAF product.
[4] Cadastre table is not included in this product. It is available in the Cadastre product.

Table 4 – continued from previous page

Attribute	Data Type	Description	Primary Key	Mandatory	10 Character Alias
date_created	date (yyyy-mm-dd)	The date of record creation for the building_property relationship.	No	Yes	DT_CREATE
date_modified	date (yyyy-mm-dd)	The most recent date that an attribute has been modified for the building_property relationship.	No	No	DT_MOD
state	character string (3)	The abbreviated name of the State or Territory that the building is primarily within.	No	Yes	STATE
relationship_confidence	number (3)	The percentage confidence that a building has a relationship with a property parcel.	No	Yes	REL_CONF

[5] Property table is not included in this product. It is available in the Property product.

Attribution

3.1 Attribute Population and Capture Source

Building features are derived from a combination of high resolution aerial and satellite imagery, enabling national coverage while progressively improving data quality across Australia. As a result, the availability and completeness of building attributes varies depending on how each building has been captured.

Buildings captured from aerial imagery represent the highest level of detail within the dataset. Where aerial imagery is used, users can expect:

- More complete and consistently populated building attributes
- Enhanced geometric accuracy and alignment
- Improved population of attributes that rely on fine visual detail or three-dimensional interpretation, such as roof characteristics, height related attributes, and derived indicators

Aerial capture supports the full attribution model where imagery quality and feature characteristics allow.

Buildings captured from satellite imagery support broad coverage and consistent identification of building footprints. For these records, users should expect:

- Core building geometry and identification attributes to be populated
- Reduced availability of attributes that require fine-grained visual detail or height interpretation
- Some attributes to be unpopulated or populated with simplified indicator values

Satellite capture is effective for establishing building presence and basic characteristics, but does not support the same level of attribution richness as aerial capture.

The Buildings dataset contains a mix of satellite and aerial captured buildings across Australia. Consequently:

- Attribute population may vary between buildings, even within the same area
- The absence of a specific attribute value does not necessarily indicate missing or incorrect data, but may reflect capture limitations of the source imagery
- Attribute completeness should be interpreted in conjunction with capture source and metadata

Users are encouraged to consider capture source when utilising the data in analysis or decision making workflows that rely on detailed building characteristics. Where higher confidence or richer attribution is required, aerial captured buildings provide the most complete representation.

3.2 Attribute Description

3.2.1 Date Information

The data model includes several dates describing the currency of the records within the product. The capture dates of the imagery utilised to derive the buildings information are provided in the date_first_captured (original capture of the feature) and the date_last_captured (recapture of the feature if available). The first date at which a record was created within the dataset is captured in the date_created attribute, while the date_modified is populated if the record has been updated since the original capture.

3.2.2 Capture Image Type and Resolution

Buildings features are captured from either aerial or satellite imagery of different resolution. The type of imagery is captured in the capture_method, while the resolution of the utilised imagery is presented in the capture_resolution attribute.

3.2.3 Spatial Association

The Buildings dataset includes information about associated spatial boundaries. Where available the building record will be attributed with the Locality, Local Government Area, Mesh Block, SA1 and State it spatially relates to.

3.2.4 Building Use

A description of the derived building use is provided for features within the buildings layer. This information can be derived from different sources, the source is provided in the building_use_source attribute.

3.2.5 Address Information

Where a building can be associated with an address, the feature will have one or many records within the building_address table. The count of the total number of addresses related to a building geometry is provided in the address_count attribute within the buildings layer. Building_address features have been assigned with a 'Yes' primary_building value if the building has been determined to be the residence for that address. The primary_building_flag in the buildings table will have a 'Yes' value if at least one address considers that building to be a residence.

3.2.6 Building Elevation

The ground elevation at the location of the building geometry as well as the resolution of the source from which the ground elevation was derived are provided in the ground_elevation and ground_elevation_resolution attributes.

3.2.7 Building Area Information

The planar area of the building polygon is provided in the area attribute. In addition, the total_floor_area is provided for features where this information can be estimated based on calculations combining additional inputs such as the detailed 3D geometry of each building feature, the estimated floors and building heights as well as other insights associated with the building.

Domain Values

Table 1: state

Domain Value	Description
ACT	The data is located within the Australian Capital Territory.
NSW	The data is located within the state of New South Wales.
NT	The data is located within the Northern Territory.
OT	The data is located within the Other Territories classification. Other Territories covers the external Australian territories of Cocos (Keeling) Islands, Christmas Island, Jervis Bay and Norfolk Island.
QLD	The data is located within the state of Queensland.
SA	The data is located within the state of South Australia.
TAS	The data is located within the state of Tasmania.
VIC	The data is located within the state of Victoria.
WA	The data is located within the state of Western Australia.

Linkages

Buildings uses the following Geoscape products for inputs into the processing:

- G-NAF
- Cadastre
- Property
- Localities
- Local Government Areas
- Australian Bureau of Statistics Statistical Boundaries (ABS 2021 Mesh Blocks and Statistical Area Level 1)
- Geoscape Planning

The linkages with buildings are explained in detail below.

5.1 Cadastre Linkage

A building will be linked to a cadastre parcel where the area of overlap is 7% or greater of the buildings area or 40% or greater of the cadastre parcels area. Cadastre parcels with a parcel type of road are not used in the creation of these relationships. If a building is related to multiple cadastre parcels and one of those parcels fully contains another of these parcels, a building linkage to the container cadastre parcel is not created.

Relationship confidence values are assigned to describe the confidence in these building_cad relationships. The relationship confidence values use the area of overlap to broadly describe the likelihood that a building is related to a cadastre parcel, with higher overlap inferring a greater confidence in the relationship.

Spatial Overlap	relationship_confidence
>= 80% building area overlap or >= 40% parcel area overlap	90
60% to <80% building area overlap	80
40% to <60% building area overlap	50
20% to <40% building area overlap	30
7% to <20% building area overlap	20

5.2 Property Linkage

A building will be linked to a property parcel where the area of overlap is 7% or greater of the buildings area or 40% or greater of the property parcels area. If a building is related to multiple property parcels

and one of those parcels fully contains another of these parcels, a building linkage to the container property parcel is not created.

Relationship confidence values are assigned to describe the confidence in these building_property relationships. The relationship confidence values use the area of overlap to broadly describe the likelihood that a building is related to a property parcel, with higher overlap inferring a greater confidence in the relationship.

Spatial Overlap	relationship_confidence
>= 80% building area overlap or >= 40% parcel area overlap	90
60% to <80% building area overlap	80
40% to <60% building area overlap	50
20% to <40% building area overlap	30
7% to <20% building area overlap	20

5.3 Address Linkage

A building will be linked to a Geoscape Address where the address either intersects the building geometry or the address intersects a cadastre or property parcel that has been related to the building through the above building_cadastre or building_property linkage rules.

Linkage is limited to active principal addresses relating to the building centroid, building centroid manual, property centroid, property centroid manual, frontage centre setback, property access point setback or unit centroid.

Geoscape Addresses is an address dataset containing a standardised and quality assured national set of addresses that are linked to G-NAF and updated as frequently as addresses are provided by each jurisdiction. This link to Geoscape Addresses assigns an address string to the building_address record and where the Geoscape Address is related to a G-NAF record the address_detail_pid is also assigned to the building_address.

Relationship confidence values are assigned to describe the confidence in these building_address relationships. The relationship confidence value for a building_address relationship will be 95% if the address intersects the building. If the building_address relationship has been created through cadastral or property relationships, the relationship confidence value for the building_address record will match that used for the building to parcel relationship, described above.

5.4 Locality Linkage

A building will be assigned a locality_pid and locality_name value relating to the gazetted locality boundary that the building is primarily within, based on maximum area of intersection. This linkage will not be made if the maximum area of intersection is less than 7% of the building area. If a gazetted locality does not intersect the building, the locality_pid of a district (ACT) may be assigned based on maximum area of intersection if this intersection is 7% or greater based on the building area. If a locality does not intersect the building the value will be NULL.

5.5 Local Government Area Linkage

A building will be assigned a lga_pid and lga_name value relating to the local government area boundary that the building is primarily within, based on maximum area of intersection. This linkage will not be made if the maximum area of intersection is less than 7% of the building area. If a local government area does not intersect the building the value will be NULL.

5.6 Mesh Block Linkage

A building will be assigned a mesh_block_code value relating to the 2021 Australian Bureau of Statistics (ABS) Mesh Block that the building is primarily within, based on maximum area of intersection. This linkage will not be made if the maximum area of intersection is less than 7% of the building area. If a mesh block does not intersect the building the value will be NULL.

5.7 Statistical Area 1 Linkage

A building will be assigned a sa1_code value relating to the 2021 Australian Bureau of Statistics (ABS) Statistical Area Level 1 boundary that the building is primarily within, based on maximum area of intersection. This linkage will not be made if the maximum area of intersection is less than 7% of the building area. If a Statistical Area Level 1 boundary does not intersect the building the value will be NULL.

5.8 State Linkage

A building will be assigned the abbreviated name (e.g. 'NSW') of the state or territory that the building feature is primarily within.

Data Quality

The quality of Buildings data is assessed by averaging the results of measures applied to samples from the full dataset. Therefore, any figures set out below are only indicative of the quality of the Buildings data. Image quality factors including currency, capture geometry, and applicable weather conditions influence the specific image which can be utilised for further processing. Where aerial imagery is available a suitable high-quality Digital Surface Model is constructed to assist with feature extraction.

6.1 Positional Accuracy

Positional accuracy is an assessment of the closeness of the location of the spatial objects in relation to their true positions on the earth's surface. Positional accuracy consists of 2 assessments:

- Horizontal accuracy
- Vertical accuracy

The horizontal and vertical positional accuracy is the assessed accuracy after all transformations have been carried out.

6.1.1 Horizontal Accuracy

The horizontal accuracy of Buildings data reflects the positional accuracy of source sensors utilised in the data collection, and the reliability of feature classification and associated orthogonalisation processes.

The horizontal accuracy of imagery used for the extraction of buildings ranges from:

- +/- 3 pixels RMSE for aerial imagery
- +/-2.5m Circular Error 90% (CE90) for satellite imagery
- +/-10.9 Circular Error 90% (CE90) for satellite imagery

The capture_source and capture_resolution attributes inform about the image type and resolution utilised for each features capture.

Influences on horizontal accuracy

The accuracy of the aerial imagery used in the buildings product is measured at ground level. Across the imagery there are occurrences of building lean which can influence a building's position. In these locations elevation models are utilised where available to adjust the building feature to its base.

The positional accuracy of the vertices of unobstructed building features will reflect the accuracy of the source imagery from which it is extracted. Obstructed vertices will have their position estimated with building shapes orthogonalised using trained algorithms with some operator assistance. Users should note that anomalies from the building extraction algorithm may cause erroneous capture and further reduce the positional accuracy of the vertices of building features.

6.1.2 Vertical Accuracy

Source elevation accuracy is dependent on the reference data used for the assignment of height and elevation attributes. Heights are derived either from satellite derived DSM or aerial derived stereo digitisation.

Source elevation data used for the derivation of building height attributes have absolute spatial accuracies described below:

- Absolute vertical (LE90) accuracy: ranging from 1m (aerial) to 2m (satellite).
- Relative vertical (LE90) accuracy: ranging from 1m (aerial) to 2m (satellite).

Multiple factors can impact the quality of the assigned elevation or height, these include but are not limited to:

- Age of source imagery: Where any imagery used within the production of the DSM is older than the date of construction of a building then the heights attributed to that building are likely to be erroneous.
- Correct classification of the feature: Where a building is not correctly defined (i.e. the highest point is not within the representation) then the height assigned to the feature has an increased likelihood of being erroneous.
- The omission of the feature: Where a building is not captured it cannot be assigned a height.
- Obscured building: Where a building is obscured by a tree or other feature then there is an increased likelihood of erroneous height values being assigned despite processes being run to
- Tree coverage surrounding a building: Where a building is surrounded by trees then the algorithm to calculate the roof height may struggle to obtain a representative ground elevation value. In these circumstances, there is an increased likelihood of an erroneous height assignment.
- The off-nadir angle of source imagery: Where imagery used for the classification of buildings is off-nadir the side of a building may be represented within the boundary of the footprint. Intersecting this part of the building against the DSM will return lower elevation values than those expected for the roof of the building. Where this occurs, there is an increased likelihood of an erroneous value being assigned to the eave height. The likelihood and impact of this issue are increased relative to the height of a building.

6.2 Thematic Quality

Thematic accuracy is defined as the accuracy of quantitative attributes, the correctness of non-quantitative attributes, and of the classification of features and their relationships. Data from aerial source is targeting higher quality levels than data from satellite source.

6.2.1 Classification Correctness

Classification correctness is an assessment of the reliability of values assigned to features in the dataset in relation to their true ‘real world’ values.

6.3 Logical Consistency

Logical consistency is a measure of the degree to which data complies to a technical specification. The test procedures are a mixture of software scripts and manual visual analysis. The data structure of Buildings has been tested for conformance to the data model. The following have been tested and confirmed to conform:

- File names
- Attribute names
- Attribute lengths

- Attribute types
- Attribute domains
- Attribute order in the file
- Object type
- Compulsory attributes populated

6.4 Topological Consistency

Topological consistency is the measure of how features spatially relate to other features within and across the Buildings theme. Topological inconsistencies are identified using a combination of automated rules. Where topological inconsistencies are identified, they are notified back to the supplier for remediation. Some minor topological inconsistencies are corrected during product processing. The level of topological consistency is dependent on the data supplied to Geoscape.

6.5 Temporal Accuracy

Temporal accuracy is an assessment of both temporal consistency (how well-ordered lifecycle events are) and temporal validity (validity of data with respect to time). Building polygons are attributed with the capture date of the imagery from which the original outline has been captured for the building pid.

6.6 Completeness

Completeness is an assessment of the extent and range of the dataset with regard to completeness of coverage, and completeness of attribution.

6.6.1 Feature Completeness

Building features are considered to have an omission rate below 5% in aerial image coverage areas, with the majority of omission being smaller buildings such as garden sheds. In satellite image coverage areas, buildings with an area of less than 100 square metres are considered to have an omission rate of less than 10% and buildings with an area of greater than 100 square metres are considered to have an omission rate below 5%.

6.7 Geometry Validity

Building geometry is validated to ensure polygons are a valid representation and free of self-intersection. Issues being detected and resolved include spikes, bow ties, duplicate vertices, null geometries, multi-part geometries, and self-contacts.

Overlapping polygons can occur due to the differing horizontal accuracy of source imagery as well as small overlaps occurring between features extracted from the same source imagery.

Polygon orientation conforms to the following specifications:

- OGC Simple Feature Access Specification v1.2.1 [Section - 6.1.11.1]
- The GeoJSON Specification RFC7946 [Section 3.1.6 dot point 4]

This means the polygon outer boundary will be counter clockwise and the inner boundary will be clockwise for file formats that support the above standards.

Buildings has been processed to assure all polygons are stored as single part features to improve compatibility with a range of software applications.

Data Maintenance

We endeavour to source the most up to date imagery available for any product refresh. Several factors such as weather patterns or natural disasters can impact the ability to capture suitable imagery. The selection of update areas are driven by the availability of updated imagery, as well as developments like subdivisions or industrial/commercial activities.

7.1 Update Frequency

Updates to Buildings are applied continuously and released on a quarterly schedule.

7.2 Update Scope

Buildings updates occur for all existing objects with changed geometry, attributes and/or metadata, as well as data for new objects supplied prior to the release time period.

Updates to the product include:

1. **Feature level building change management:**
    a. Addition of newly captured buildings,
    b. Retiring of non-identified buildings,
    c. Validation of existing building geometry,
    d. Updates to building geometry to improve real-world representation, and
    e. Updates to building attribution.
2. The inclusion of any new captures of buildings received from third-party partners for inclusion within Buildings.
3. All Buildings relationships to other Geoscape products (G-NAF, Cadastre, Property, ABS Boundaries, Localities and Local Government Areas) to account for any changes in these products.
4. Corrections and/or improvements to production processes in generating Buildings.

7.3 Update Rules

The update process describes rules that are applied to records to determine persistence. A record can be updated, retired or created.

The following table outlines the required attributes needed to be changed to cause a record to be retired.

Table 1: Attributes used for persistence.

Table Name	Attributes used for persistence
building	building_pid
building_address	building_pid, address_pid
building_property	building_pid, property_pid
building_cadastre	building_pid, cadastre_pid

7.4 Building Change Management

When updating an area of Buildings, new imagery is captured to review for building changes, new buildings and demolished buildings. Automated processes are applied to extract buildings from the new capture imagery.

Newly captured buildings are compared against existing features in Buildings to determine if a footprint is new, an existing footprint no longer exists, or an existing footprint can be better represented with confidence to increase fidelity and accuracy. The logic for several change management scenarios is outlined in the sections below.

The following applies to all change management scenarios:

- Where a new Buildings record is created, new related aspatial linkage records are also created if relationships to Cadastre, Property or Address exist.
- Where an existing Buildings record is retired, all existing related aspatial linkage records are also retired.

7.5 Adds, Retires and Updates.

The following rules describe the building change management process used for adding, retiring and updating records in the buildings table. Buildings from higher quality captures will be used in preference over other buildings where there is overlap.

For all buildings in the previous area of interest related to the new capture area, an overlap is performed between the previous buildings and the new capture of buildings. The rules for this are as follows:

- Any buildings that have no overlap with the new capture of buildings are retired.
- Any buildings that match against multiple buildings in the new capture are retired.
- Any buildings that have an overlap of less than 20% with a new capture building are retired and the new capture building is added.

For all buildings in the new capture, an overlap is performed with the previous buildings related to the new capture area. The rules for this are as follows:

- Any buildings that overlap multiple previous buildings will not result in any new or retired buildings.
- Any buildings that overlap a previous building by less than 20% will be added.
- Any buildings that overlap a previous building by between 90% and 99% will be treated as a minor update for that existing building. The previous building will be retired, and the new building polygon will be added with the same building_pid as the previous representation.
- Any buildings that overlap a previous building by between 20% and 90% will be treated as a major update for that existing building. The previous building will be retired, and the new building polygon will be added with the same building_pid as the previous representation.
- Any building that has 100% overlap with a previous building will be treated as an update. In this scenario the building polygon will remain the same as the previous representation, with the same building_pid.

- Any building captured without height attribution will be assessed against existing buildings, and where the new and previous building are determined the same, if no refreshed height attributes are available, the existing heights will be maintained.

Extent/Geographic Description

The spatial coverage includes Australia's land mass and surrounding offshore islands. Buildings does not currently include data for other territories of Christmas Island, Cocos (Keeling) Islands and Norfolk Island.

The Bounding Box for this data is as follows:

- North bounding latitude: -9˚
- South bounding latitude: -44˚
- East bounding longitude: 160˚
- West bounding longitude: 100˚

8.1 Spatial Reference System

8.1.1 GDA94

Horizontal Datum: The Geocentric Datum of Australia 1994 (GDA94) is the target horizontal datum.

Coordinate System: Geographic Coordinate System Geocentric Datum of Australia 1994 (GDA94).

8.1.2 GDA2020

Horizontal Datum: The Geocentric Datum of Australia 2020 (GDA2020) is the target horizontal datum.

Coordinate System: Geographic Coordinate System Geocentric Datum of Australia 2020 (GDA2020).

Delivery Format

Buildings is provided at a National and State/Territory level, depending on the file format selected. The data is made available in the File Geodatabase, GeoJSON, ESRI Shapefile, MapInfo TAB and Geopackage formats described below.

Format	National	State/Territory
File Geodatabase	Yes	Yes
GeoJSON	Yes	Yes
ESRI Shapefile	No	Yes
[1] MapInfo TAB	No	Yes
Geopackage	Yes	Yes

9.1 File Geodatabase

Format name
File Geodatabase – ESRI™

Specification
This format includes files with the following extensions: *.gdb
ESRI File Geodatabase Technical Description. Follow this link: http://desktop.arcgis.com/en/desktop/latest/manage-data/administer-file-gdbs/file-geodatabases.htm

Language
English

9.2 GeoJSON

Format name
GeoJSON

Specification
This format includes files with the following extensions: *.geojson
GeoJSON specification: https://tools.ietf.org/html/rfc7946

Language

[1] Z values not included in Buildings data.

English

Note

The GeoJSON specification states that the coordinate reference system for all GeoJSON coordinates is:

"a geographic coordinate reference system, using the World Geodetic System 1984 (WGS 84) datum, with longitude and latitude units of decimal degrees"

Buildings will be provided with coordinates using the datum selected for download (GDA94/GDA2020) with longitude and latitude units of decimal degrees.

9.3 JSON

Format name
JSON

Specification
This format includes files with the following extensions: *.json
JSON specification: https://www.json.org/json-en.html

Language
English

9.4 ESRI Shapefile

Format name
Shape – ESRI™

Specification
This format includes files with the following extensions: *.shp, *.shx, *.dbf
ESRI Shapefile Technical Description, an ESRI White Paper, July 1998. Follow this link: www.esri.com/library/whitepapers/pdfs/shapefile.pdf

Language
English

9.5 MapInfo TAB

Format name
TAB – MapInfo Professional™

Specification

This format includes files with the following extensions: *.tab, *.dat, *.id, *.map
The MapInfo TAB format is a popular geospatial vector data format for geographic information systems software. It is developed and regulated by MapInfo as a proprietary format. TAB files support

geospatial standards such as Open GIS, the OGC, ISO, W3C and others.

Language
English

9.6 Geopackage

Format name
Geopackage

Specification
This format includes files with the following extensions: *.gpkg
OGC Geopackage Standards. Follow this link: https://www.geopackage.org/

Language
English

Metadata

Direct Download `buildings.xml`.

10.0.1 Buildings Metadata Statement

Metadata for the Metadata

Metadata Identifier: 4b639e93-acbc-448f-b556-2798d93cb561

Time:

- Create Date: 2022-02-02T01:56:57.785613Z
- Revision Date: 2025-06-18T06:30:35.152518Z

Responsible Party:

- Individual: Michael Dixon
- Organisation: Geoscape Australia
- Position: Chief Data Officer
- Telephone: +61 2 6260 9000
- Delivery point: Unit 6, 113 Canberra Ave Griffith ACT 2603 Australia

Access, Use, Security:

Standard: ISO 19115-3

Language: English

Resource Metadata

Title: Buildings

Abstract: Buildings is a national digital dataset representing buildings for each State and Territory in Australia. The dataset consists of four layers which represent the outlines of building objects, related building characteristics and linkages to related foundational data themes

Purpose: The purpose of Buildings is to spatially represent building-related features for use by industry and government in geographic information systems, visualisations, engineering modelling, and for the derivation of analytics.

Responsible Party:

- Organisation: Geoscape
- Telephone: +61 2 6260 9000
- Delivery point: Unit 6, 113 Canberra Ave Griffith ACT 2603 Australia

Access, Use, Security:

- Legal Constraints: Geoscape Australia and its authorised partners license this dataset. Users must comply with the applicable licence terms and the Geoscape Copyright Notice and Disclaimer, available at geoscape.com.au/data-copyright-disclaimer/.
- Security Constraints: None. This dataset is not subject to any security classification.
- Use Limitations: Refer to the product guide available via docs.geoscape.com.au for data quality and related information.
- Releasability: This dataset must not be distributed except in accordance with the terms of the licence under which it was accessed.

Extents

- West/Min X: 100.00
- East/Max X: 160.00
- South/Min Y: -44.00
- North/Max Y: -9.00

Reference System:

- GDA2020 (EPSG:7844)
- GDA94 (EPSG:4283)
- Australian Height Datum (EPSG:5111)

Keywords:

- Buildings
- Buildings datasets
- Buildings file
- Solar panels
- Swimming Pools
- Planning data
- Address linkages
- Land parcel linkages
- Built environment
- Building height

Distribution:

This dataset is available from Geoscape Australia.

Format/s:

- ESRI Shapefile
- Mapinfo TAB

- GeoJSON
- ESRI File Geodatabase
- GeoPackage

Status: completed

Lineage:

Statement:

The buildings theme (buildings layer) consists of digital representations of the roof outline of a building. Buildings have been digitised from remotely sensed imagery using a combination of automated and manual processes to identify, extract and orthogonalise objects resembling a building structure greater than 9 square metres. The process also determines building attributes including roof materials, the presence of solar panels and the presence of swimming pools. Image quality factors including currency, capture geometry, and applicable weather conditions influence the specific image which can be utilised for further processing. A suitable high-quality Digital Surface Model is constructed to assist with feature extraction. Data quality and potential capture timelines will vary across Australia based on three categories. Each category has been developed based on several factors defined by the population distribution (categorised based on population size), industrial/commercial activities, the probability of natural events (e.g. flooding) and the image source. Urban (satellite source) - areas with a population greater than 200, or with significant industrial/commercial activity in a visual assessment, digitised from satellite imagery Urban (aerial source) - areas with a population greater than 200, or with significant industrial/commercial activity in a visual assessment, digitised from aerial imagery. Rural - all other areas. Linkages from the Buildings theme to other Geoscape data themes (specifically G-NAF, Cadastre, Property, Localities, Local Government Areas, ABS Boundaries, Geoscape Planning) are created through internal production processes. Building change management processes which determine how adds, retires and updates are applied to the dataset are described in the associated product guide.

Additional Documentation

- Title: Buildings Product Description
- Alternate Title: Buildings Product Guide
- Edition: 4.0
- Presentation Format: documentDigital
- Linkage: https://docs.geoscape.com.au/projects/buildings_guide/en/4.0/index.html
- Name: Buildings Product Description
- Description: Product Description of the current version of the Geoscape Buildings Product.
- Function: information

Maintenance and Update Frequency: quarterly

Bibliography

[Aerometrex, 2023] Aerometrex. Aerial imagery. Raster Dataset, 2023. URL: https://aerometrex.com.au/.

[Environmental Systems Research Institute, Inc, 1998] Environmental Systems Research Institute, Inc. Esri shapefile technical description. techreport, Environmental Systems Research Institute, Inc, July 1998. URL: https://www.esri.com/content/dam/esrisites/sitecore-archive/Files/Pdfs/library/whitepapers/pdfs/shapefile.pdf.