

4th Questionnaire on 3D Land Administration: status December 2022

Australia Vic

1 response

1. GENERAL/APPLICABLE 3D REAL-WORLD SITUATIONS - Status 2022

1.1. Are all 3D parcels (3D spatial units in LADM terminology) constrained to be within one surface 2D parcel?

1 response

No, e.g. a crown (government) land parcel for a tunnel may be below several 2D land parcels

1.2. Are 2D and/ or 3D ambulatory* boundaries permitted?

[] An ambulatory boundary is a boundary of a land parcel which follows the movements of a natural feature such as a river. Its position determined at points of time (when a survey is carried out), but between such "fixes", the definition of the property is the position of the real world natural feature.*

1 response

Yes

1.3. Regarding the legal/ physical relation of 3D objects:

- (a) Is it allowed to have 3D parcels (spatial units) not related to physical constructs or objects? (e.g. airspace, subsurface volumes)
- (b) If 1.3.a positive: approximately what proportion of new 3D parcels (spatial units) would involve such cases (not related to physical object)?

1 response

a) yes b) this is typically for underground government owned parcels. Strata (building) parcels are typically defined by referencing physical objects. I am not sure about the porportation across Australia

1.4. Are disconnected parts of a single 3D parcel allowed?

1 response

Yes, multipart parcels (e.g. apartement unit as one part lot, parking as one part lot)

1.5. Spatial limitations – e.g. the 3D parcel ‘must be’ related to a closed volume or is it allowed to have ‘open’ or unbounded 3D parcels (e.g. towards the sky)?

1 response

yes, this is allowed when there is no depth or height limitation

1.6. Are curved surfaces to bound the 3D parcels allowed?

1 response

yes, the curved boundaries defined for both aboverground and underground parcels

1.7. Must the curved surfaces (if allowed) be cylindrical sections, or any other constraint?

1 response

there is no specific constraint for defining curved surfaces. These surfaces are sometimes defined by referencing curved physical elements (e.g. a curved wall). The curved boundaries are also defined by measurements including radius, arc lenght and chord length of the curve.

1.8. Any other constraints – e.g. all surfaces must be horizontal or vertical?

1 response

No

1.9. Is there legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).

1 response

The legislations for each state in Australia is different. For example, the Subdivision Act and its regulations define the 3D descriptions of parcels in the State of Victoria.

1.10. Is the legal text available in original language? For example, professional or scientific papers/reports, which explain and justify the registration of 3D parcels.

1 response

Not applicable

1.11. Is the legal text (relevant part) available in English translation at an official document?

1 response

Not applicable

1.12. Do you have example descriptions of typical 3D parcels; either 'prototype' or 'operational'?

1 response

Not sure

1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series (especially LADM, ISO 19152)?

1 response

No, the formal model is currently under development by ICSM, but there is no public information yet about it. See this page: [https://www.icsm.gov.au/what-we-do/cadastral-survey-data-model-and-exchange-project](https://www.icsm.gov.au/what-we-do/cadastral/3d-cadastral-survey-data-model-and-exchange-project)

1.14. Are natural resources (groundwater, mining rights, geo-thermal extraction and storage) shown in your land administration?

If yes, are they considered as 3D parcels (spatial units) with RRRs attached? What about mining concessions (could be limited in time)?

1 response

These are all defined as crown (government) land parcels

1.15. Are legally restricted spaces, above or below the earth's surface, such as polluted areas considered as 3D parcels?

1 response

There are restriction parcels which are defined for protecting vegetation. In addition, the urban planning schemes put a wide range of restrictions on the land parcels, which are not legally registered but these restrictions or conditions are considered by the councils when providing planning permits and certifying the cadastral plan.

1.16. Are spatial plans considered as 3D parcels (so rights or restrictions are related to them)?

Sometimes they are called 'spatial development plans', 'zoning plans' or 'physical plans' (land use, urban, regional, environmental, ...).

1 response

There are not registered as 3D parcels but city councils use this information as another layer on top of the land parcels to manage the land use, urban, regional and environmental aspects. See the Vicplan in this link: <https://mapshare.vic.gov.au/vicplan/>

1.17. Regarding the Marine Space:

(a) Is there a Marine Cadastre established? And if so, are 3D parcels included in this registration?

(b) Is the IHO Maritime Limits and Boundaries standard (S121) in use or under implementation?

(c) Is there a Marine Spatial Plan established? And if so, are 3D marine parcels included in this registration?

1 response

These are all defined as crown (government) land parcels which is under specific legal system of Crown Land (Reserves) Act

1.18. Is there any organised legal instrument for the management of common property? For example, does the law, regulations or systems recognize/require a specific right type for common property?

1 response

yes, the Sudivision Act and regulations specifies the legal definition of the common property. In addiion, there is also specific Owners Corporation Act for managing common property areas.

1.19. Which agency is responsible for the recording of titles information?

1 response

Land Registry. For example, Land Use Victoria in State of Victoria

1.20. Which agency is responsible for recording cadastral transactions?

1 response

Land Registry. For example, Land Use Victoria in State of Victoria

1.21. Are transactions for standard 2D lots and 3D lots done by the same agency or titles office?

1 response

yes

1.22. Are there any 3D storage permissions recorded (e.g. underground storage of CO₂)?

1 response

No

1.23 Has there been developed any country profile based on LADM ISO19152[1]?

(a) Does it support 2D spatial units?

(b) Does it support also 3D spatial units?

(c) Is there any provision to include/ align with the new LADM developments of the second Edition of the standard (inclusion of valuation information, marine spaces, spatial plans, interoperability/ reuse of BIM/IFC, ..)?

[1] If yes, is it included at the index presented at the Table 1 of the publication Kalogianni et al. 2021 [Kalogianni, E., Janečka, K., Kalantari, M., Dimopoulou, E., Bydłosz, J., Radulović, A., Vučić, N., Sladić, D., Govedarica, M., Lemmen, C.H.J. and van Oosterom, P.J.M. (2021). Methodology for the development of LADM country profiles, In: Land Use Policy, Elsevier, 105(105380), pp. 1-12, 2021. Available at: http://www.gdmc.nl/publications/2021/LUP_CountryProfile.pdf]

If it is included, are there any further developments/ publications related to it apart from those mentioned at the table? In case there are, could you please provide with a link of a relevant publication?

1 response

yes

1.24. Any other geometric issues related to 3D parcels?

1 response

The issues are mainly related to 2D representations of 3D parcels at this stage. However, if 3D digital parcels are implemented, obviously there will be issues with 3D data validation, storage, etc.

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No responses yet for this question.

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(b) If 1.3.a positive: approximately what proportion of new 3D parcels (spatial units) would involve such cases (not related to physical object)?

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yes, multipart parcels within 3D digital models

1.5. Spatial limitations – e.g. the 3D parcel 'must be' related to a closed volume or is it allowed to have 'open' or unbounded 3D parcels (e.g. towards the sky)?

1 response

3D digital open parcels are allowed if there is no depth or height limitation

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No responses yet for this question.

2. INFRASTRUCTURE/UTILITY NETWORKS - Status 2022

2.1. Do you register utility networks as an entity in the land administration? (e.g. subterranean conduit networks)

1 response

They are defined as easements in a registered cadastral plan.

2.2. If so, then:

- (a) can the network structure be viewed graphically in the land administration?
- (b) can the network structure be traced in the database(s)?
- (c) are networks registered by means of a cadastral identifier (such as a 'parcel number')?
- (d) are RRRs and parties attached to these network objects?
- (e) in which format are usually the utility networks submitted for registration (i.e. CityGML Utility ADE, IFC, MUDDI, shp, ...)?

1 response

a) Very limited number of easements are shown graphically on the property map. However, they are shown graphically in 2D cadastral PDF plans. b) No c)yes For example E1\PS123456A d) yes, in the notation section of a cadastral plan it is mentioned e) currently, either PDF or ePlan (LandXML) format

2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).

1 response

No

2.4. If so, are they registered as 3D property parcels (spatial units)?

1 response

N/A

2.5. Is the text of relevant laws or regulations (question 2.3) available in original language? If so, give references to relevant document(s).

1 response

N/A

2.6. Is the text of laws and regulations (relevant part) available in English translation of an official document?

1 response

N/A

2.7. Do you have example descriptions of typical 3D parcels (spatial units) for networks; either 'prototype' or 'operational'?

1 response

No

2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?

1 response

If two easements intersect, then a new easement is defined for the intersection area. The details of this easement is specified in the notation section of cadastral plan.

2.9. Any other geometric issues related to the registration of networks?

1 response

N/A

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3. CONSTRUCTION/ BUILDING UNITS - Status 2022

3.1. Do you register legal spaces for 3D construction/ building units (separate from the land)?

1 response

yes

3.2. If so, what are the conditions for doing so, and what are the most important types? E.g. apartment units (at least 2 or more in building), or also other buildings or even more general constructions (infra related; such as bridge, tunnel or even other, such as windmills, ...)

1 response

The conditions are specified in the Subdivisionp Act and regulations as well as Building Subdivision Guidelines (see https://www.land.vic.gov.au/__data/assets/word_doc/0020/470135/Building-subdivision-guidelines-update-delwp.doc)

3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).

1 response

yes, they are mainly defined as lot or common property.

3.4. Is the legal text available in original language?

1 response

N/A

3.5. Is the legal text (relevant part) available in English translation at an official document?

1 response

N/A

3.6. Do you have example descriptions of typical 3D parcels; either 'prototype' or 'operational'?

1 response

No

3.7. Regarding the boundaries' definition:

(a) What would be typical 3D boundaries in an apartment complex: i) middle of the wall and floor/ceiling, ii) interior/ exterior of the wall or iii) walls, floor/ceiling as neutral/ shared 3D space?

(b). Is it mentioned in any legislation or is it the convention?

1 response

a) Boundaries are defined by either referencing interior, median or exterior face or any other location within the building element. They can be also defined by survey measurements (e.g. bearing and distance). b) Yes, the Subdivision Act and regulations mention about these boundaries.

3.8. Is common property inside the building registered? If so, how?

1 response

yes, it is defined as a parcel within the cadasatral plan. E.g. CM1\PS123456A

3.9. Who owns the common property inside the building?

1 response

Owners Corporation

3.10. Who owns the land on which the apartment is built?

1 response

The land parcel is not owned anymore since it is extinguished and all new parcels (which can be either lot, common property, road or reserve) have their specific owners.

3.11. Do you allow sub-division of apartments or apartment blocks?

1 response

yes

3.12. Can the land on which the building is built be sub-divided or sold or mortgaged without the consent of majority of the apartment owners?

1 response

No

3.13. What is the numbering convention for apartments (please specify in terms of cadastral parcel as well as street addressing)

1 response

See rows from 63 in this link:

https://www.spear.land.vic.gov.au/spear/documents/eplan/scff/SCFF_Defined_CAD_Layers-v5.docx

3.14. Are there any mandates* that set specifications on the delivery of design/ construction drawing of properties in BIM-based format, when registering new 3D parcels (from design)?

**That arise through legislation or from the procurement process.*

1 response

No

3.15. Are there any operational or in prototype stage platforms. implementations that reuse BIM information from design as cadastral/ land administration input?

1 response

Prototype BIM models are implemented for 3D cadastre

3.16. Any other geometric issues?

1 response

No

3. CONSTRUCTION/ BUILDING UNITS - Expectations 2026

3.1. Do you register legal spaces for 3D construction/ building units (separate from the land)?

0 responses

No responses yet for this question.

3.2. If so, what are the conditions for doing so, and what are the most important types? E.g. apartment units (at least 2 or more in building), or also other buildings or even more general constructions (infra related; such as bridge, tunnel or even other, such as windmills, ...)

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No responses yet for this question.

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No responses yet for this question.

4. COORDINATES - Status 2022

4.1. Do the plans of survey guarantee X/Y coordinates? (and are they relative or in an absolute spatial reference system?)

1 response

They are relevant and include bearing and distance values.

4.2. Are the cadastral database coordinates authoritative?

1 response

yes

4.3. If not, what is the authoritative source of X/Y coordinates?

0 responses

No responses yet for this question.

4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?

1 response

yes, building boundaries see:

https://www.land.vic.gov.au/__data/assets/word_doc/0020/470135/Building-subdivision-guidelines-update-delwp.doc

4.5. What is the spatial reference system for X/Y Coordinates? (Please , provide the EPSG)

1 response

MGA - Map Grid of Australia

4.6. When owners receive or purchase a copy of the plan what can they see on the plan to help them identify their parcel/lot

(e.g. bearings and distance, identifying corners or recovery marks, neighbouring lots, coordinates etc.)?

1 response

yes, this is include as part of Contract of Sale (CoS) document as mentioned in Section 32 of Sale of Land Act. See this link

http://www5.austlii.edu.au/au/legis/vic/consol_act/sola1962100/s32.html

4.7. Have there been any changes, w.r.t. the spatial reference system, made in the way cadastral information is recorded and represented from a historical point of view?

0 responses

No responses yet for this question.

4.8. Any other X/Y coordinate issues?

0 responses

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5. REPRESENTATION OF 3rd DIMENSION: HEIGHT (OR DEPTH) - Status 2022

5.1. Are the height values of 3D parcels relative to local ground?

1 response

No, It is defined as Reduced Level (RL) values relative to the Australian Height Datum

5.2. Are height values reduced to a standard datum (absolute)? If so, what is the spatial reference system for this 3rd ordinate?

1 response

If it is recorded and shown on the plan, it is defined as Reduced Level (RL) values relative to the Australian Height Datum

5.3. In principle, is it possible to store both relative and absolute height/ depth values?

1 response

yes

5.4. Is the earth surface (elevation) explicitly stored (in the DCDB or other accessible register)?

1 response

No

5.5. What is the source of height values for the 2D surface parcel?

1 response

It is Reduced Level (RL) values if it exists

5.6. How is elevation information recorded in the cadastral plan or database?

1 response

It is recorded in cadastral plan diagrams.

5.7. Do you expect the elevation recorded in cadastral plans to be used for any other purpose

(e.g. development of 3D city models or civil constructions etc.)?

1 response

yes, it can be used for aboveground and aboveground developments. In particular, underground tunnels.

5.8. Are there any 3D City Model/ Digital Twin developments carried out at a national or city level that can be used for orientation or reference purposes?

1 response

yes, see <https://digitwin.com.au/> and <https://vic.digitaltwin.terria.io/>

5.9. Any other 3rd dimension ordinate value issues?

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6. TEMPORAL ISSUES (4th DIMENSION) - Status 2022

6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?

1 response

No

6.2. Are moving parcels allowed?

1 response

The ambulatory boundaries defined for parcels would allow these parcels to move.

6.3. Are there any limitations on the range of temporal limits?

(e.g. only on 3D apartments).

1 response

No

6.4. Is there any attempt to integrate 3D space and temporal representations, into a single 4D space/time representation?

1 response

Not yet but under investigation

6.5. In the case of tidal boundaries, what happens to the 3D ambulatory parcel if the 2D land parcel changes extent due to the movement of High Water Mark?

1 response

Surveyor-General Practice guidelines take the form of case studies that demonstrate the impact of a river changing course on an associated cadastral boundary.

The guidelines emphasise the significance and importance of the following orders and acts:

1881 Order In Council, by which land along 280 rivers was permanently reserved

1905 Water Act, which clarified the term 'bed and banks'

1850 Separation Act, which dealt with the Murray River as the state boundary

See this link for further info: <https://www.land.vic.gov.au/surveying/professional-resources/ambulatory-boundaries>

6.6. In case 3D Marine Cadastre is present and moving boundaries are allowed, how is this represented?

e.g. using 4D geometry and topology.

1 response

2D cadastral plans

6.7. Can time bound rights be created and extinguished in the title? (e.g. temporary titles created for a period and when the time is up it can be extinguished)?

1 response

yes, the parcels may have different states in various time periods. These states include extinguished, created, affected, encroached and exsiting.

6.8. Is it possible to identify all the changes made by any operator to the cadastral plans or database and to rollback if there is an error made?

0 responses

No responses yet for this question.

6.9. For Cadastral transactions, how far in time do buyers need to make a search to ensure the title or deed is legal?

1 response

The latest registered plan ensures the legal security of the parcels. Typically, the solicitors (behalf of owners) do this search. This means that the previous plan is not used for ensuring legality of the title. When a plan is registered, all the new created parcels are considered as legally valid while the previous parcels (which are subdivided or consolidated in the latest plan) are not legally valid anymore since they are extinguished.

6.10. Are there object classes in the registration that require both real-world (or valid) times and database load (or system) times, i.e. bi-temporal support?

0 responses

No responses yet for this question.

6.11. Any other temporal issues?

0 responses

No responses yet for this question.

6. TEMPORAL ISSUES (4th DIMENSION) - Expectations 2026**6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?**

0 responses

No responses yet for this question.

6.2. Are moving parcels allowed?

0 responses

No responses yet for this question.

6.3. Are there any limitations on the range of temporal limits?

(e.g. only on 3D apartments).

0 responses

No responses yet for this question.

6.4. Is there any attempt to integrate 3D space and temporal representations, into a single 4D space/time representation?

0 responses

No responses yet for this question.

6.5. In the case of tidal boundaries, what happens to the 3D ambulatory parcel if the 2D land parcel changes extent due to the movement of High Water Mark?

0 responses

No responses yet for this question.

6.6. In case 3D Marine Cadastre is present and moving boundaries are allowed, how is this represented?

e.g. using 4D geometry and topology.

0 responses

No responses yet for this question.

6.7. Can time bound rights be created and extinguished in the title? (e.g. temporary titles created for a period and when the time is up it can be extinguished)?

0 responses

No responses yet for this question.

6.8. Is it possible to identify all the changes made by any operator to the cadastral plans or database and to rollback if there is an error made?

0 responses

No responses yet for this question.

6.9. For Cadastral transactions, how far in time do buyers need to make a search to ensure the title or deed is legal?

0 responses

No responses yet for this question.

6.10. Are there object classes in the registration that require both real-world (or valid) times and database load (or system) times, i.e. bi-temporal support?

0 responses

No responses yet for this question.

6.11. Any other temporal issues?

0 responses

No responses yet for this question.

7. RIGHTS, RESTRICTIONS AND RESPONSIBILITIES (RRRs) - Status 2022

7.1. Please provide the range of RRRs on 3D parcels. If there is an online depository, provide the link.

1 response

See SCFF layers for all types of ownership RRRs in this link:

<https://www.spear.land.vic.gov.au/spear/pages/eplan/scff/scff-layers-examples-templates.shtml>

In addition, the planning schemes may impose a wide range of RRRs on the 3D parcels. See this link for Victoria: <https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance>

7.2. Are there any limitations on the range of rights related to 3D spatial units? (e.g. subterranean parcels must be owned by Govt).

1 response

yes underground parcels are mainly owned by Government (crown land parcels) if there is depth limitation on the 2D surface land parcels. If specified, this depth limitation is 50 feet (~15 meter) in Victoria.

7.3. Are there any limitations on the range of restrictions or responsibilities related to 3D spatial units? (i.e. currently in use and related to 2D spatial units, but that would not be applicable to 3D).

1 response

yes, e.g. building envelope restrictions.

7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)

1 response

yes, strata plans and crown plans the RRRs are only 3D when height and depth limits of the parcels are specified.

7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.

1 response

No, for Victoria state of Victoria. However, other Australian states have specific legislation on 3D strata subdivisions.

7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?

1 response

yes, the subdivision of underground and aboveground spaces allow this.

7.7. What applications do you foresee for 3D land administration?

1 response

Facility management, planning, delivering and managing underground infrastructure, Disaster management,

7.8. Are the administrative source documents (source of RRRs) title or deed based?

1 response

Title

7.9. Who is responsible for the correctness of the specified 3D boundaries in spatial source documents (which authority)?

1 response

Licensed Land Surveyor

7.10. Is registration of 3D parcels done inside the cadastral mapping agency, the land registry or elsewhere?

1 response

Land Registry

7.11. Are 3D registrations handled by the same organisation that handles traditional (2D) land administration?

1 response

yes

7.12. Do you supply paper-based titles or deeds or proof of ownership? If yes, does this contain depictions of the 2D or 3D parcel?

1 response

yes, PDF plans and it includes 2D diagrams (floor plans and cross section diagrams) describing 2D or 3D parcels.

7.13. Is the 3D registry separate or integrated with the 2D registry?

1 response

Integrated

7.14. Any other RRR issues?

0 responses

No responses yet for this question.

7. RIGHTS, RESTRICTIONS AND RESPONSIBILITIES (RRRs) - Expectations 2026

7.1. Please provide the range of RRRs on 3D parcels. If there is an online depository, provide the link.

0 responses

No responses yet for this question.

7.2. Are there any limitations on the range of rights related to 3D spatial units? (e.g. subterranean parcels must be owned by Govt).

0 responses

No responses yet for this question.

7.3. Are there any limitations on the range of restrictions or responsibilities related to 3D spatial units? (i.e. currently in use and related to 2D spatial units, but that would not be applicable to 3D).

0 responses

No responses yet for this question.

7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)

0 responses

No responses yet for this question.

7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.

0 responses

No responses yet for this question.

7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?

0 responses

No responses yet for this question.

7.7. What applications do you foresee for 3D land administration?

0 responses

No responses yet for this question.

7.8. Are the administrative source documents (source of RRRs) title or deed based?

0 responses

No responses yet for this question.

7.9. Who is responsible for the correctness of the specified 3D boundaries in spatial source documents (which authority)?

0 responses

No responses yet for this question.

7.10. Is registration of 3D parcels done inside the cadastral mapping agency, the land registry or elsewhere?

0 responses

No responses yet for this question.

7.11. Are 3D registrations handled by the same organisation that handles traditional (2D) land administration?

0 responses

No responses yet for this question.

7.12. Do you supply paper-based titles or deeds or proof of ownership? If yes, does this contain depictions of the 2D or 3D parcel?

0 responses

No responses yet for this question.

7.13. Is the 3D registry separate or integrated with the 2D registry?

0 responses

No responses yet for this question.

7.14. Any other RRR issues?

0 responses

No responses yet for this question.

8. THE CADASTRAL DATABASE (Digital Cadastral Database - DCDB) - Status 2022

8.0. Is the database schema LADM based?

1 response

No

8.1. Does the DCDB contain representation of 3D parcels (in any form)?

1 response

No

8.2. If so, how are they represented (in the DCDB)?

0 responses

No responses yet for this question.

8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?

0 responses

No responses yet for this question.

8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?

1 response

No

8.5. Is it possible to manage a 3D topological structure in the DCDB?

1 response

Not at this stage

8.6. Are constraints/rules defined for valid 3D objects (closed volume, no overlap, no gap in 3D)? What about rules for a mix of 2D and 3D representations?

1 response

The validation rules are only define for 2D parcels.

8.7. How can internal and external user query and visualize the 3D content supporting rotating, slicing, transparency, perspective (3D web/view service, 3D pdf documents, ..)?

1 response

See this prototype: <https://www.spear.land.vic.gov.au/spear/pages/eplan/3d-digital-cadastre/3dprototype/prototype.html>

8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?

1 response

Oracle Spatial. No 3D capabilities are used at the moment.

8.9. Do you have any validation rules for 3D representation in the database?

1 response

No

8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?

1 response

Open source tools are used for this purpose and it is mainly working for 2D parcels. However, from a research perspective, Cesium platform is used for 3D visualisation.

8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?

1 response

Cesium

8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?

1 response

Object Oriented

8.13. How do you query 3D objects in your DCDB?

0 responses

No responses yet for this question.

8.14. Is it possible to query neighbourhood parcels to a 3D object, vertically as well as horizontally?

0 responses

No responses yet for this question.

8.15. Any other DCDB issues?

0 responses

No responses yet for this question.

8. THE CADASTRAL DATABASE (Digital Cadastral Database - DCDB) - Expectations 2026

8.0. Is the database schema LADM based?

0 responses

No responses yet for this question.

8.1. Does the DCDB contain representation of 3D parcels (in any form)?

0 responses

No responses yet for this question.

8.2. If so, how are they represented (in the DCDB)?

0 responses

No responses yet for this question.

8.3. If so, how are they presented on cadastral "maps" (including screen presentations)?

0 responses

No responses yet for this question.

8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?

0 responses

No responses yet for this question.

8.5. Is it possible to manage a 3D topological structure in the DCDB?

0 responses

No responses yet for this question.

8.6. Are constraints/rules defined for valid 3D objects (closed volume, no overlap, no gap in 3D)? What about rules for a mix of 2D and 3D representations?

0 responses

No responses yet for this question.

8.7. How can internal and external user query and visualize the 3D content supporting rotating, slicing, transparency, perspective (3D web/view service, 3D pdf documents, ..)?

0 responses

No responses yet for this question.

8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?

0 responses

No responses yet for this question.

8.9. Do you have any validation rules for 3D representation in the database?

0 responses

No responses yet for this question.

8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?

0 responses

No responses yet for this question.

8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?

0 responses

No responses yet for this question.

8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?

0 responses

No responses yet for this question.

8.13. How do you query 3D objects in your DCDB?

0 responses

No responses yet for this question.

8.14. Is it possible to query neighbourhood parcels to a 3D object, vertically as well as horizontally?

0 responses

No responses yet for this question.

8.15. Any other DCDB issues?

0 responses

No responses yet for this question.

9. PLANS OF SURVEY (INCLUDING FIELD SKETCHES) - Status 2022

9.1. Do the survey plans carry 3D parcel representations?

1 response

No, it is just the abstract of field record which describes the connection of parcel boundaries to the geodetic network using a survey traverse.

9.2. If so, how are they represented?

0 responses

No responses yet for this question.

9.3. Is there specific legislation (regulations) describing the requirements for Plans of Survey in 3D? This could cover:

- (a) accuracy/ quality,
- (b) 3D survey method,
- (c) conceptual information model survey plan,
- (d) portrayal rules for graphic representation,
- (e) format or encoding for submission.

If so, please give link to the relevant documents.

1 response

No

9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?

1 response

No

9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?

1 response

It is possible but again the form of representation is 2D plans. The notation section of the cadastral plan specifies this relationships between 3D parcel and its 3D real world objects.

9.6. In what format are the 3D parcels submitted for registration; attached to legal document in a single pdf (which has good 3D capabilities) or in an extension of (city) GML for 3D parcels, or....?

1 response

N/A

9.7. Are the 3D parcels somehow checked for spatial validity; e.g. volume is closed, does not overlap with neighbour volume (and also no unwanted 3D gaps)?

1 response

Not implemented yet but there are research investigations for this in Victoria.

9.8. Do you have examples of (prototype or production) 3D survey plans available?

1 response

yes, some prototypes are implemented in research studies.

9.9. Are any reference objects visible on the survey plan (e.g. real buildings, roads, that is 3D topography)?

0 responses

No responses yet for this question.

9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning, ...)?

0 responses

No responses yet for this question.

9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?

1 response

Currently, CAD software are used e.g. AutoCAD, LISCAD, Microstation

9.12. Can 3D parcels be subdivided, consolidated or nullified?

1 response

yes

9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?

1 response

The practice directives specify data collection but not specifically focused on 3D data collection. See this link: <https://www.land.vic.gov.au/surveying/cadastral-survey/practice-directives>

9.14. Are the surveyors required to undertake a field survey for 3D cadastral data?

1 response

yes

9.15. Are building construction plans used to compile 3D cadastral information for apartments?

1 response

yes

9.16. Is 2D/3D field survey done by private licensed surveyors or by government surveyors?

1 response

By private licensed surveyors

9.17. Are plans of survey created for each new 2D/3D parcel or are they updated in an index map or a cadastral database.

1 response

yes

9.18. Do you show dimensions or isometric views of 3D parcels on survey plans (do you also store this in a database)

1 response

yes, the dimensions are shown when the boundary is surveyed.

9.19. Do the cadastral survey plans differentiate between different types (e.g. volumetric plans, building plans and standard 2D plans)?

1 response

Their differences are mainly due to the legal system. For freehold land parcels, the Subdivision Act is used and the cadastral plan is called Subdivision Plan or Consolidation Plan while for government (crown) land parcels, the Crown Land Act is used and the cadastral plan is called Title Plan or Original Plan.

9.20. What are the usual elements shown on the plan (e.g. North Arrow, Marks table, Observation table, Administrative data, Plan face and dimensions etc.?)

1 response

See this exmaple: <https://www.spear.land.vic.gov.au/spear/pages/eplan/3d-digital-cadastre/3dprototype/images/PS704971N.pdf>

9.21. Are authoritative cadastral surveys carried out by government surveyors or private licensed surveyors or both?

1 response

private licensed surveyors

9.22. What is the legal description of a cadastral boundary (e.g. coordinates or bearing and distance or lines on plan or any other)?

1 response

Bearing and distance as well as notations for building boundaries(i.e. those boundaries defined by referencing physical objects)

9.23. How much time does it usually take for a subdivision process to complete?

1 response

This varies from plan to plan and several factors such as complxiry of the subdivision may change it.

9.24. What is the legal source for cadastral representation (e.g. cadastral plans, or DCDB or index plans or descriptive sketch/text etc.?)

1 response

Cadstral Plans

9.25. What is the positional accuracy of the cadastral plans (e.g. boundaries may be accurate but may not be referenced in datum properly)?

1 response

Boundaries are relevativley accurate since they the ground measurements are used for showing bearing and distance of the boundary

9.26. Any other survey plan issues?

0 responses

No responses yet for this question.

9. PLANS OF SURVEY (INCLUDING FIELD SKETCHES) - Expectations 2026

9.1. Do the survey plans carry 3D parcel representations?

0 responses

No responses yet for this question.

9.2. If so, how are they represented?

0 responses

No responses yet for this question.

9.3. Is there specific legislation (regulations) describing the requirements for Plans of Survey in 3D? This could cover:

- (a) accuracy/ quality,
- (b) 3D survey method,
- (c) conceptual information model survey plan,
- (d) portrayal rules for graphic representation,
- (e) format or encoding for submission.

If so, please give link to the relevant documents.

0 responses

No responses yet for this question.

9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?

0 responses

No responses yet for this question.

9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?

0 responses

No responses yet for this question.

9.6. In what format are the 3D parcels submitted for registration; attached to legal document in a single pdf (which has good 3D capabilities) or in an extension of (city) GML for 3D parcels, or....?

0 responses

No responses yet for this question.

9.7. Are the 3D parcels somehow checked for spatial validity; e.g. volume is closed, does not overlap with neighbour volume (and also no unwanted 3D gaps)?

0 responses

No responses yet for this question.

9.8. Do you have examples of (prototype or production) 3D survey plans available?

0 responses

No responses yet for this question.

9.9. Are any reference objects visible on the survey plan (e.g. real buildings, roads, that is 3D topography)?

0 responses

No responses yet for this question.

9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning, ...)?

0 responses

No responses yet for this question.

9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?

0 responses

No responses yet for this question.

9.12. Can 3D parcels be subdivided, consolidated or nullified?

0 responses

No responses yet for this question.

9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?

0 responses

No responses yet for this question.

9.14. Are the surveyors required to undertake a field survey for 3D cadastral data?

0 responses

No responses yet for this question.

9.15. Are building construction plans used to compile 3D cadastral information for apartments?

0 responses

No responses yet for this question.

9.16. Is 2D/3D field survey done by private licensed surveyors or by government surveyors?

0 responses

No responses yet for this question.

9.17. Are plans of survey created for each new 2D/3D parcel or are they updated in an index map or a cadastral database.

0 responses

No responses yet for this question.

9.18. Do you show dimensions or isometric views of 3D parcels on survey plans (do you also store this in a database)

0 responses

No responses yet for this question.

9.19. Do the cadastral survey plans differentiate between different types (e.g. volumetric plans, building plans and standard 2D plans)?

0 responses

No responses yet for this question.

9.20. What are the usual elements shown on the plan (e.g. North Arrow, Marks table, Observation table, Administrative data, Plan face and dimensions etc.?)

0 responses

No responses yet for this question.

9.21. Are authoritative cadastral surveys carried out by government surveyors or private licensed surveyors or both?

0 responses

No responses yet for this question.

9.22. What is the legal description of a cadastral boundary (e.g. coordinates or bearing and distance or lines on plan or any other)?

0 responses

No responses yet for this question.

9.23. How much time does it usually take for a subdivision process to complete?

0 responses

No responses yet for this question.

9.24. What is the legal source for cadastral representation (e.g. cadastral plans, or DCDB or index plans or descriptive sketch/text etc.?)

0 responses

No responses yet for this question.

9.25. What is the positional accuracy of the cadastral plans (e.g. boundaries may be accurate but may not be referenced in datum properly)?

0 responses

No responses yet for this question.

9.26. Any other survey plan issues?

0 responses

No responses yet for this question.

10. DISSEMINATION OF 3D LAND ADMINISTRATION INFORMATION - Status 2022

10.1. Is there a general-purpose web-based dissemination of 2D cadastral (graphical or text) information (e.g. a portal for the public or for professionals)?

If yes, please provide the link and refer it includes 3D data?

1 response

yes, this link: <https://maps.land.vic.gov.au/lassi/>

10.2. Are there specific file formats or standards used to distribute 3D LA/ Cadastral information?

(e.g. LandXML, CityGML, BIM/IFC, 3D pdf,...)

1 response

LandXML, BIM/IFC

10.3. Are there specific cartographic styling rules for representing 3D cadastral plans, or to represent 3D cadastral objects on 2D cadastral maps?

1 response

N/A

10.4. Are there specific cartographic styling rules for 3D cadastral maps (models; e.g. as disseminated in 3D pdf)? If yes, are there 3D specific cartographic rules developed or being developed?

1 response

No

10.5. Is the 3D Cadastral information accessible in integrated manner with the 2D Cadastral information?

1 response

No

10.6. Are there specific symbols on the 2D cadastral map (paper, digital or web-based) indicating the presence of 3D Cadastral objects (and in web-context perhaps even linked)?

1 response

yes

10.7. Is the legal information (RRRs and Parties) available in integrated manner in dissemination portal with the 3D Cadastral objects? (even if source of legal data may be a different organization, but then use information infrastructure approach)

0 responses

No responses yet for this question.

10.8. Are 2D/3D cadastral data available to the general public or just to the relevant parties?

1 response

The cadastral data available to public as open data but it is only 2D land parcels and properties.

10.9. Any other 3D cadastral information dissemination issues?

0 responses

No responses yet for this question.

10. DISSEMINATION OF 3D LAND ADMINISTRATION INFORMATION

- Expectations 2026

10.1. Is there a general-purpose web-based dissemination of 2D cadastral (graphical or text) information (e.g. a portal for the public or for professionals)?

If yes, please provide the link and refer it includes 3D data?

0 responses

No responses yet for this question.

10.2. Are there specific file formats or standards used to distribute 3D LA/ Cadastral information?

(e.g. LandXML, CityGML, BIM/IFC, 3D pdf,...)

0 responses

No responses yet for this question.

10.3. Are there specific cartographic styling rules for representing 3D cadastral plans, or to represent 3D cadastral objects on 2D cadastral maps?

0 responses

No responses yet for this question.

10.4. Are there specific cartographic styling rules for 3D cadastral maps (models; e.g. as disseminated in 3D pdf)? If yes, are there 3D specific cartographic rules developed or being developed?

0 responses

No responses yet for this question.

10.5. Is the 3D Cadastral information accessible in integrated manner with the 2D Cadastral information?

0 responses

No responses yet for this question.

10.6. Are there specific symbols on the 2D cadastral map (paper, digital or web-based) indicating the presence of 3D Cadastral objects (and in web-context perhaps even linked)?

0 responses

No responses yet for this question.

10.7. Is the legal information (RRRs and Parties) available in integrated manner in dissemination portal with the 3D Cadastral objects? (even if source of legal data may be a different organization, but then use information infrastructure approach)

0 responses

No responses yet for this question.

10.8. Are 2D/3D cadastral data available to the general public or just to the relevant parties?

0 responses

No responses yet for this question.

10.9. Any other 3D cadastral information dissemination issues?

0 responses

No responses yet for this question.

11. STATISTICAL INFORMATION - Status 2022

11.1. What is the smallest 2D and 3D parcel that is present/ allowed to be registered in the land administration?

1 response

There is no specific allowable size

11.2. What is the largest 2D and 3D parcel that is present allowed to be registered in the land administration?

1 response

There is no specific allowable size

11.3. What is the typical (or average) size of 2D and 3D parcels which are registered in the land administration? Subdivide by nature of 3D parcel when relevant (e.g. related to building, apartment, airspace, tunnel,...)

1 response

size varies from parcel to parcel.

11.4. How many 2D and 3D parcels do you currently have in your land administration?

1 response

Around 3 million

11.5. Which year did you start registering 3D parcels in the land administration?

0 responses

No responses yet for this question.

11.6. What is the ratio of 3D parcels in rural vs. urban areas?

0 responses

No responses yet for this question.

11.7. Please specify names of cities or towns or suburbs or regions or locations where there are significant numbers of 3D parcels.

1 response

CBD areas of Sydney, Melbourne, Brisbane, Perth, Hobart, Adelaide, Darwin, Canberra

11.8. Please provide the following data: (a) Size of jurisdiction in square kilometres

(b) Current number of 2D parcels

(c) Current number of 3D parcels

(d) Current population

0 responses

No responses yet for this question.

11.9. Approximately what are the proportions of various types of the 3D parcels (related to apartments, subsurface parking, subsurface shopping centres, bridges, tunnels, airspace, utility networks, etc)?

0 responses

No responses yet for this question.

11.10. Approximately what surface area of the jurisdiction is affected by 3D parcels (the total area of all the footprint of all 3D parcels).

0 responses

No responses yet for this question.

11.11. Any other interesting statistical fact(s)?

0 responses

No responses yet for this question.

11. STATISTICAL INFORMATION - Expectations 2026

11.1. What is the smallest 2D and 3D parcel that is present/ allowed to be registered in the land administration?

0 responses

No responses yet for this question.

11.2. What is the largest 2D and 3D parcel that is present allowed to be registered in the land administration?

0 responses

No responses yet for this question.

11.3. What is the typical (or average) size of 2D and 3D parcels which are registered in the land administration? Subdivide by nature of 3D parcel when relevant (e.g. related to building, apartment, airspace, tunnel,...)

0 responses

No responses yet for this question.

11.4. How many 2D and 3D parcels do you currently have in your land administration?

0 responses

No responses yet for this question.

11.5. Which year did you start registering 3D parcels in the land administration?

0 responses

No responses yet for this question.

11.6. What is the ratio of 3D parcels in rural vs. urban areas?

0 responses

No responses yet for this question.

11.7. Please specify names of cities or towns or suburbs or regions or locations where there are significant numbers of 3D parcels.

0 responses

No responses yet for this question.

11.8. Please provide the following data: (a) Size of jurisdiction in square kilometres
(b) Current number of 2D parcels
(c) Current number of 3D parcels
(d) Current population

0 responses

No responses yet for this question.

11.9. Approximately what are the proportions of various types of the 3D parcels (related to apartments, subsurface parking, subsurface shopping centres, bridges, tunnels, airspace, utility networks, etc)?

0 responses

No responses yet for this question.

11.10. Approximately what surface area of the jurisdiction is affected by 3D parcels (the total area of all the footprint of all 3D parcels).

0 responses

No responses yet for this question.

11.11. Any other interesting statistical fact(s)?

0 responses

No responses yet for this question.

12. REFLECTION

12.1. Compared to the 2010, 2014, 2018 and 2022 expectations, which 3D land administration developments did go faster than expected?

1 response

Visualisation

12.2. Same question, but now, which developments did go slower than expected?

1 response

Institutional and legal

12.3. If some (limited) form of 3D Land administration functionality has become available, what are the observed benefits? And for who?

1 response

For various stakeholders including land registries, city councils, owners, utility companies, construction firms, 3D land admin can provide several benefits in terms of better understanding and interpretation of RRRs when planning, designing, construction, operating and managing constructions, underground developments and cities.

12.4. What are the (top 3) challenges of issues to be addressed to realize further 3D Land administration progress?

1 response

1. Legal and cultural shift towards 3D digital environment 2. Technical issues such as 3D DCDB, visualisation (VR/AR), 3D Data Validation and Integrity 3. Guidelines for 3D Data Capturing by Surveyors and 4. Robustroadmap towards 3D land administration

12.5. In case of not, yet, fully operational status, were there any 3D LA/ Cadastre registration pilots to take steps towards a more complete implementation?

1 response

No, it is at research stage only in Victoria and Australia

12.6. In case of known legal barriers, have there been made progress in creating and adopting new legislation to support 3D land administration?

1 response

Not yet

12.7. Any other reflections?

0 responses

No responses yet for this question.

13. OTHER ISSUES

13.1. Country (State, Province)

1 response

Australia (Victoria)

13.2. Name/ Surname

1 response

Behnam Atazadeh

Function/ Position

1 response

ARC DECRA Fellow

Organization

1 response

The University of Melbourne

13.3. Contact details/ Address

1 response

behnam.atazadeh@unimelb.edu.au

Address

1 response

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Email & telephone

1 response

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13.4. Other issues

0 responses

No responses yet for this question.

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