

# 3D Cadastres

The logo for 3D Cadastres features the text '3D' in a large, blue, stylized font. To its right is a 3D illustration of a building with a red roof, blue walls, and a green base, with a transparent blue box overlaid on it. The word 'Cadastres' is written in a blue, serif font to the right of the illustration.

## ISO LADM and LandXML in the Development of Digital Survey Plan Lodgement For 3D Cadastre in QLD, Australia

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# This Presentation

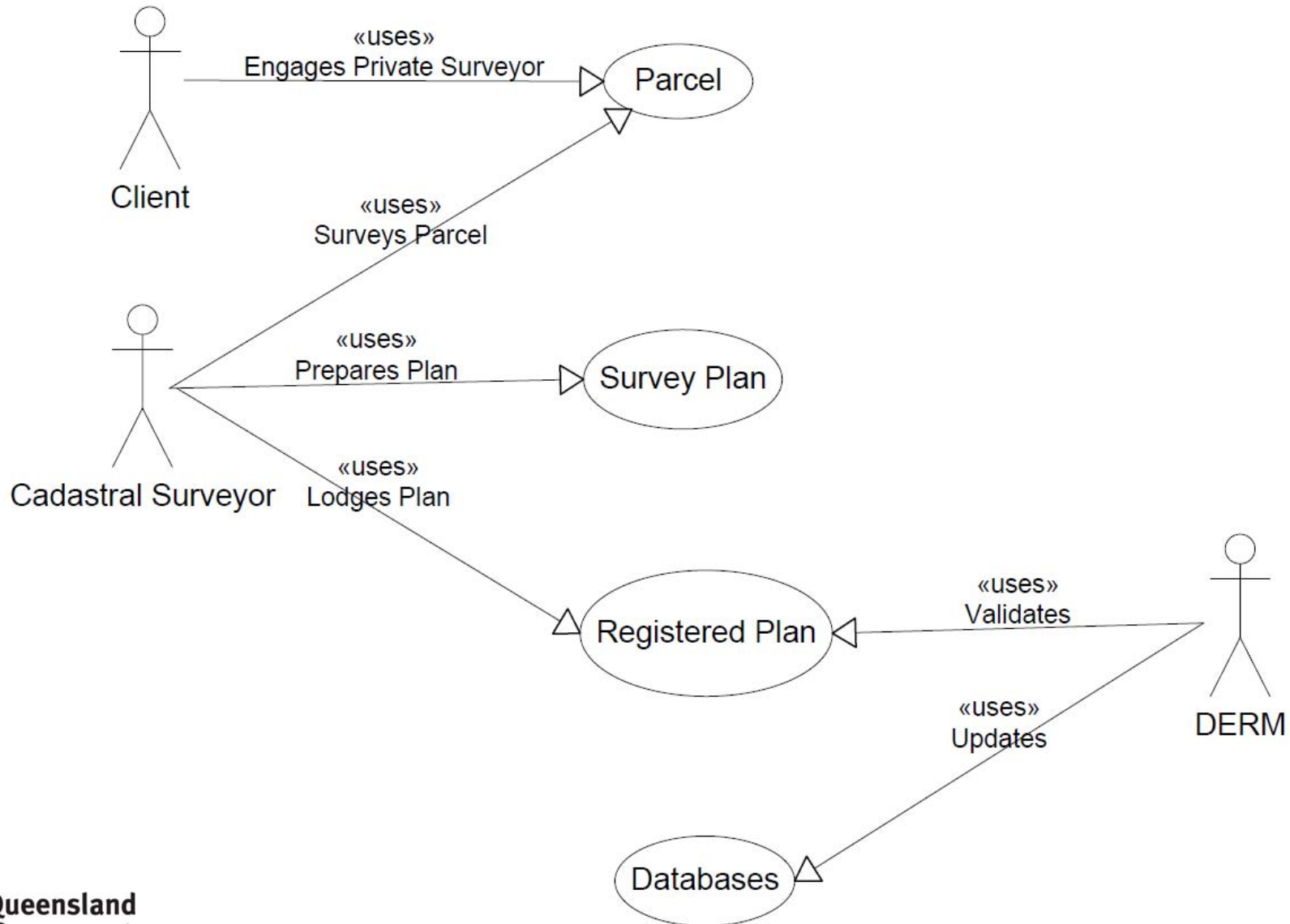
- **Introduction**
- Existing 3D Plan Status in QLD, Aus
- ePlan - LandXML
- Existing Status of ePlan Lodgement
- ISO LADM - ePlan
- 3D Validation Rules

# Introduction - 1





# Introduction – Present Plan Life

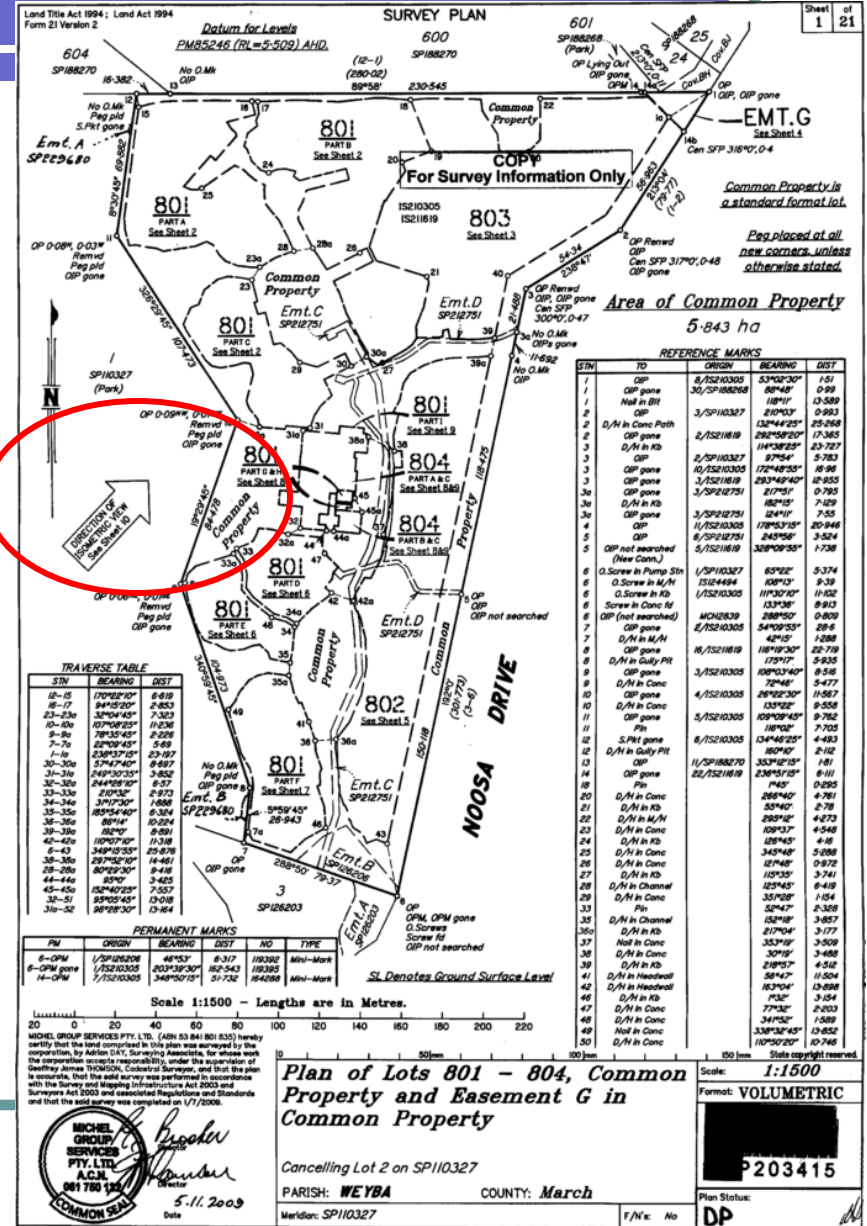
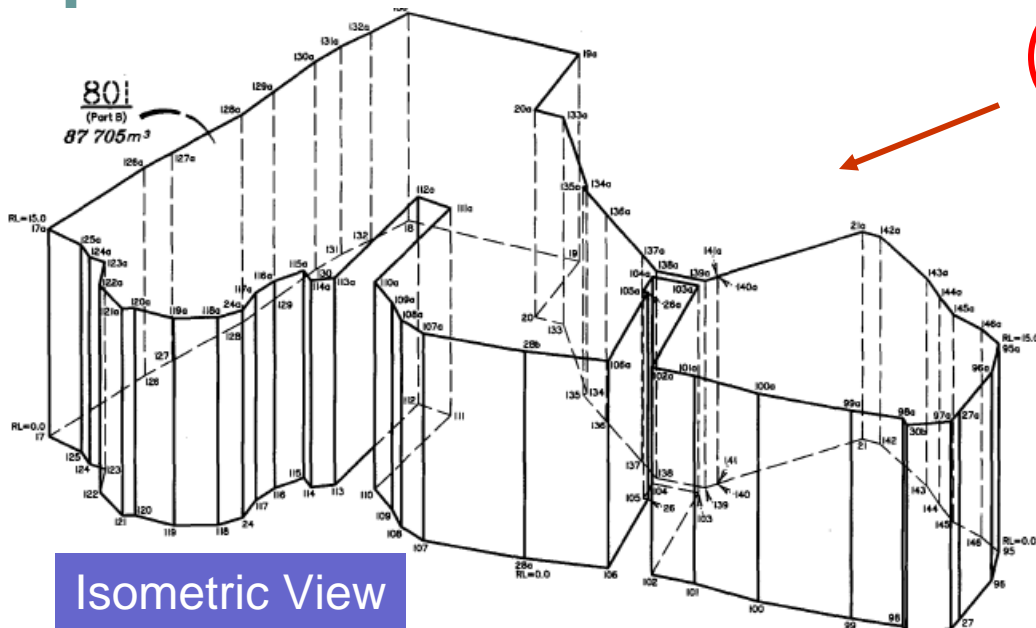


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# 3D Survey Plans - VFP

- Volumetric Format Plan

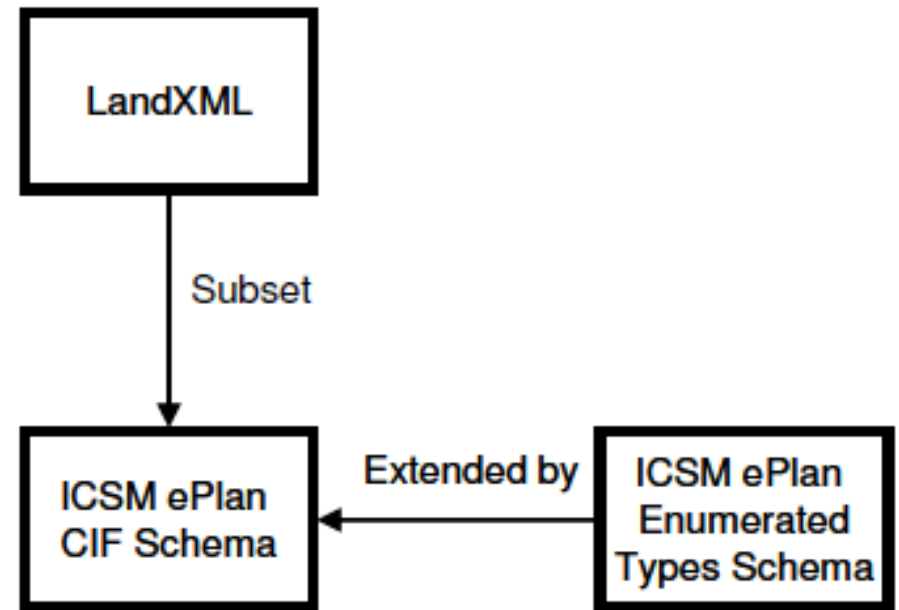


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# ePlan Schema

- Subset of LandXML  
<http://www.landxml.org/>

- Jurisdictional schemas exist to accommodate differences



## Example:

*//Survey/SurveyHeader@desc is:*

- Optional in the ICSM ePlan CIF schema
- Omitted from the Victorian schema, and
- Mandatory in the Queensland schema

# Example CIF

- ePlan - Cadastral Information File

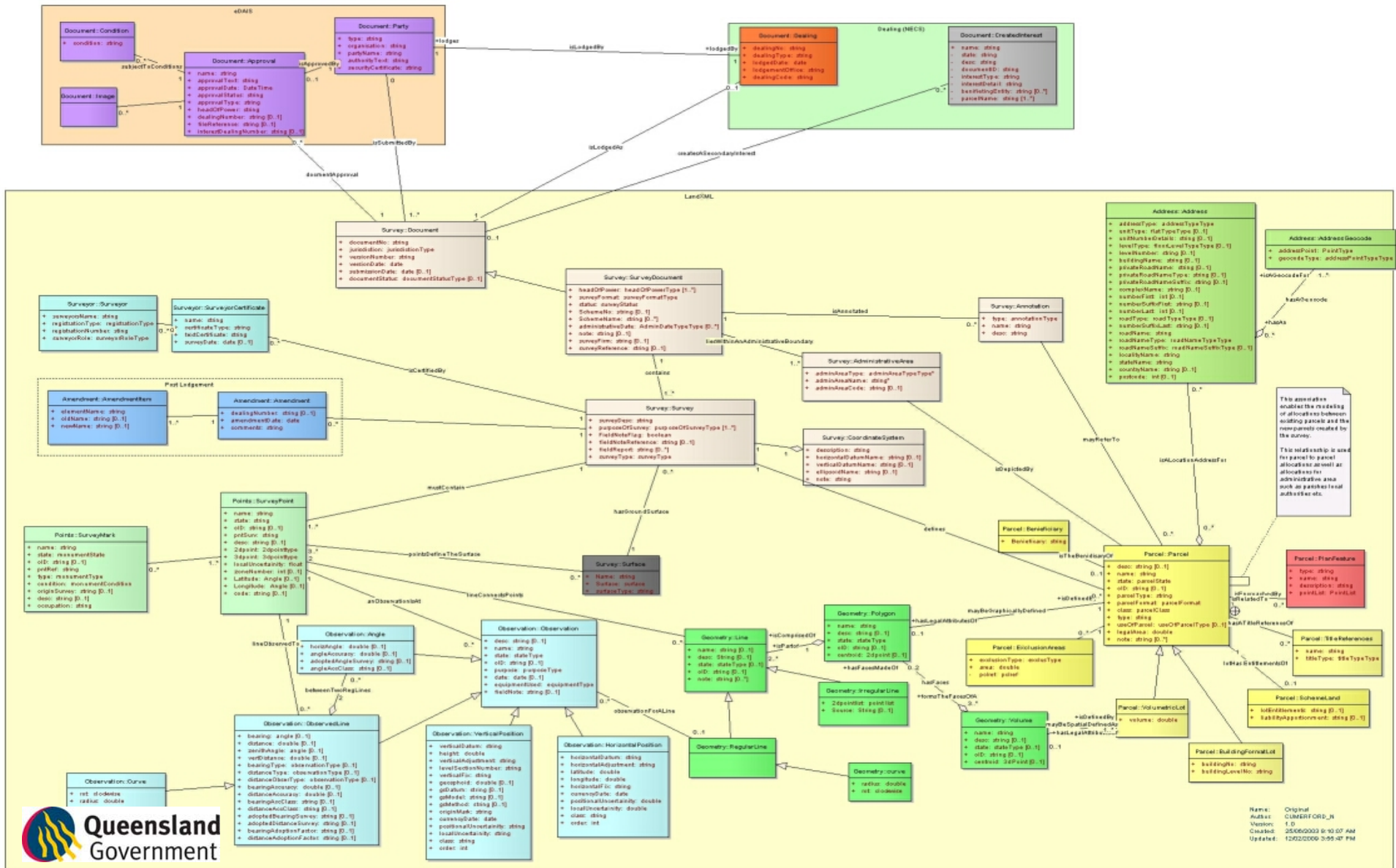
```
0190     </ns1:Feature>
0191 </ns1:Parcel>
0192 <ns1:Parcel buildingLevelNo="B" useOfParcel="Main" class="Lot" buildingNo="A" parcelFormat="Building" state="created" p
0193     <ns1:CoordGeom name="CG-47-SP185407" />
0194 </ns1:Parcel>
0195 <ns1:Parcel useOfParcel="Main" class="Lot" parcelFormat="Building" state="created" parcelType="multipart" area="13294"
0196     <ns1:Parcels name="fully allocated">
0197         <ns1:Parcel pclRef="800cb/SP185407" name="800cb/SP185407" />
0198         <ns1:Parcel pclRef="800cc/SP185407" name="800cc/SP185407" />
0199         <ns1:Parcel pclRef="800cd/SP185407" name="800cd/SP185407" />
0200         <ns1:Parcel pclRef="800ce/SP185407" name="800ce/SP185407" />
0201         <ns1:Parcel pclRef="800mf/SP185407" name="800mf/SP185407" />
0202         <ns1:Parcel pclRef="800rf/SP185407" name="800rf/SP185407" />
```

Building Format Plan

```
2657 </ns1:Parcel>
2658 <ns1:Parcel class="Lot" parcelFormat="Volumetric" state="created" parcelType="multipart" name="80
2659     <ns1:Parcels name="fully allocated">
2660         <ns1:Parcel name="801a/SP203415" pclRef="801a/SP203415"/>
2661         <ns1:Parcel name="801b/SP203415" pclRef="801b/SP203415"/>
2662         <ns1:Parcel name="801c/SP203415" pclRef="801c/SP203415"/>
2663         <ns1:Parcel name="801d/SP203415" pclRef="801d/SP203415"/>
2664         <ns1:Parcel name="801e/SP203415" pclRef="801e/SP203415"/>
2665         <ns1:Parcel name="801g/SP203415" pclRef="801g/SP203415"/>
```

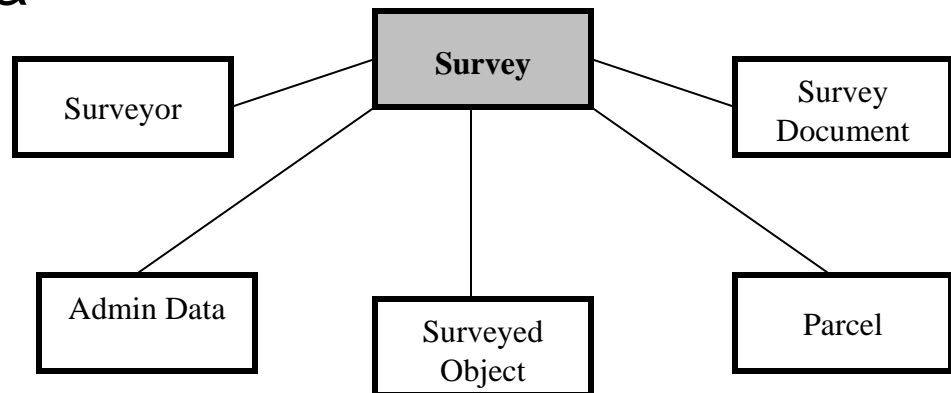
Volumetric Format Plan

# ePlan Model



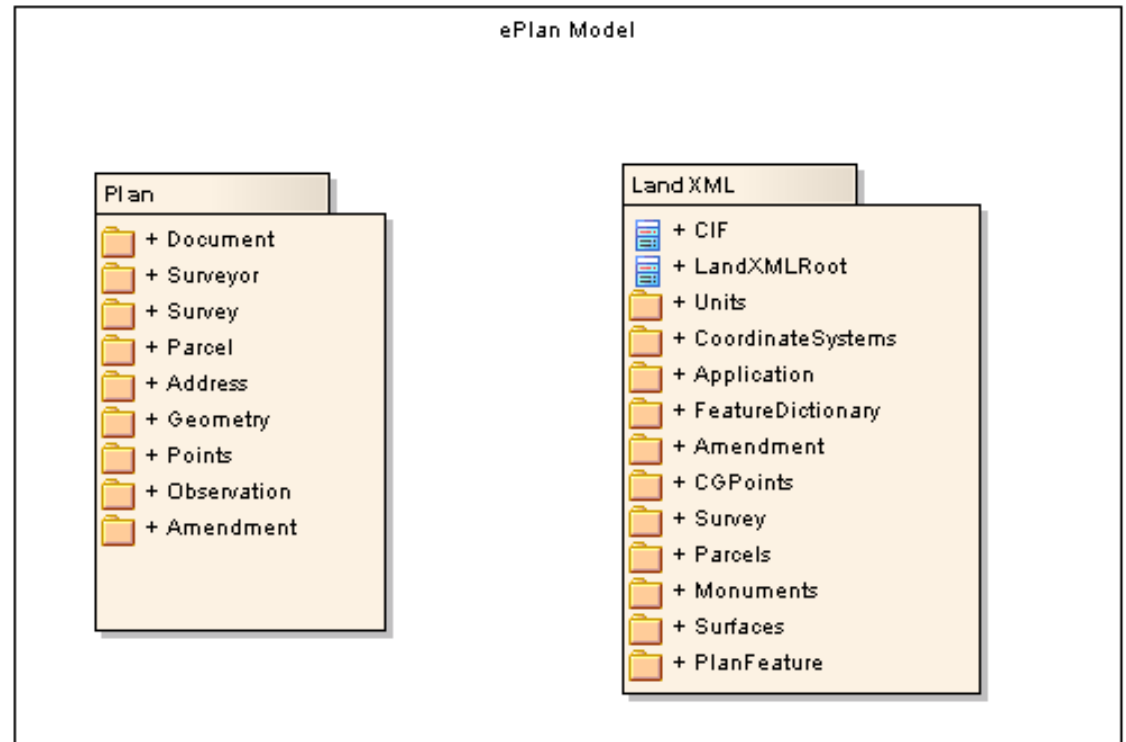
# ePlan Model

- Contains information that appear in Survey plans; a schematic representation of a plan
- This is translated into a LandXML schema
- Stored as Cadastral Information File (CIF) based on LandXML
- CIF is treated as a controlled document



# Plan – LandXML (Overall)

- Plan mapped to LandXML
- Almost all Plan features represented in LandXML

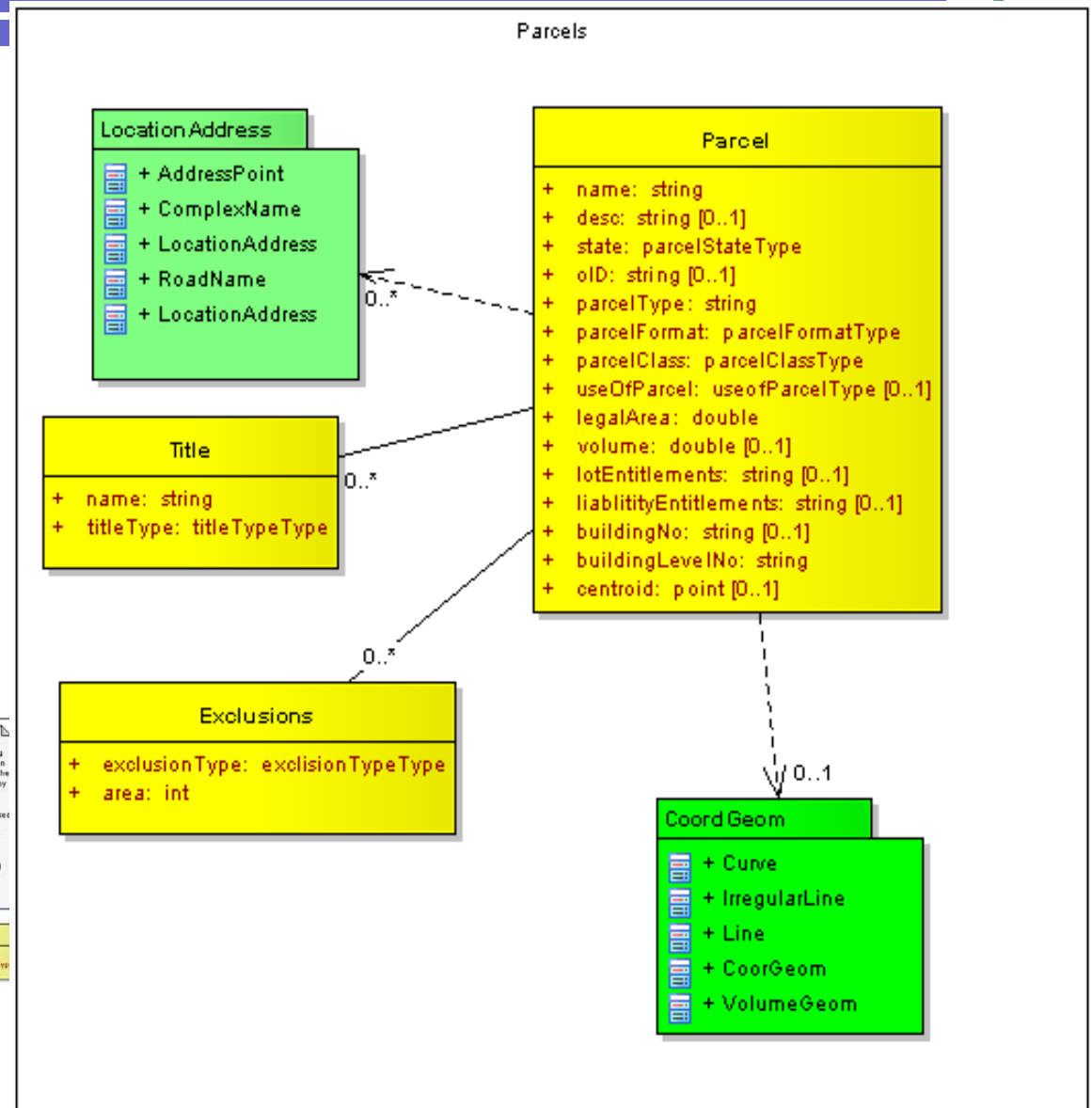
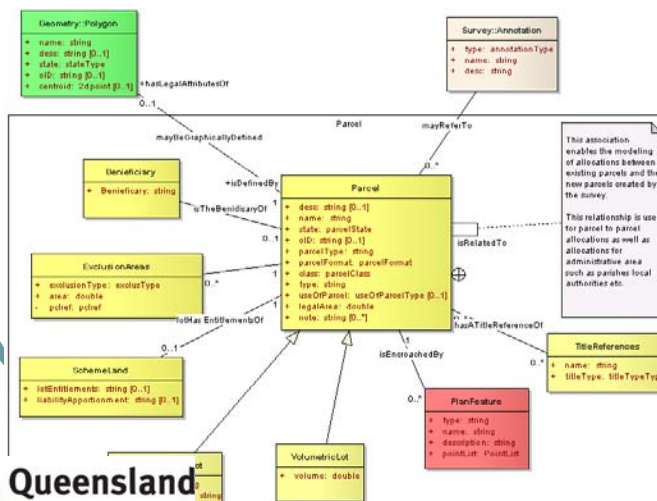


## Current Exceptions:

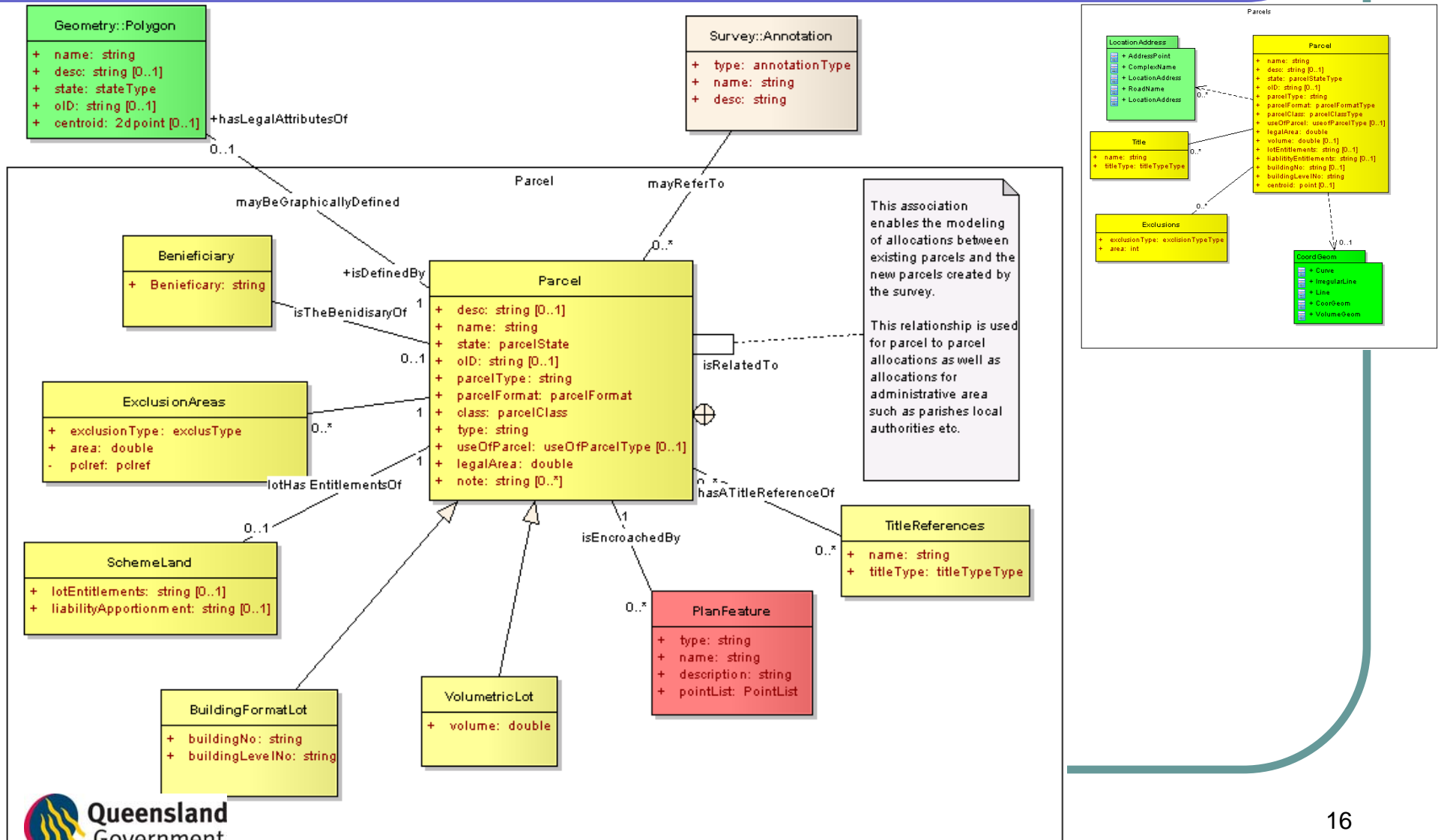
Reference Marks, Scale, Statements on Plan, Allocations, Replacement Marks, Station Info, New Conn, New Ref etc.

# Plan – LandXML (E Plan Parcel)

- Example of Plan–LandXML relationship for Parcel



# Plan – LandXML Parcel



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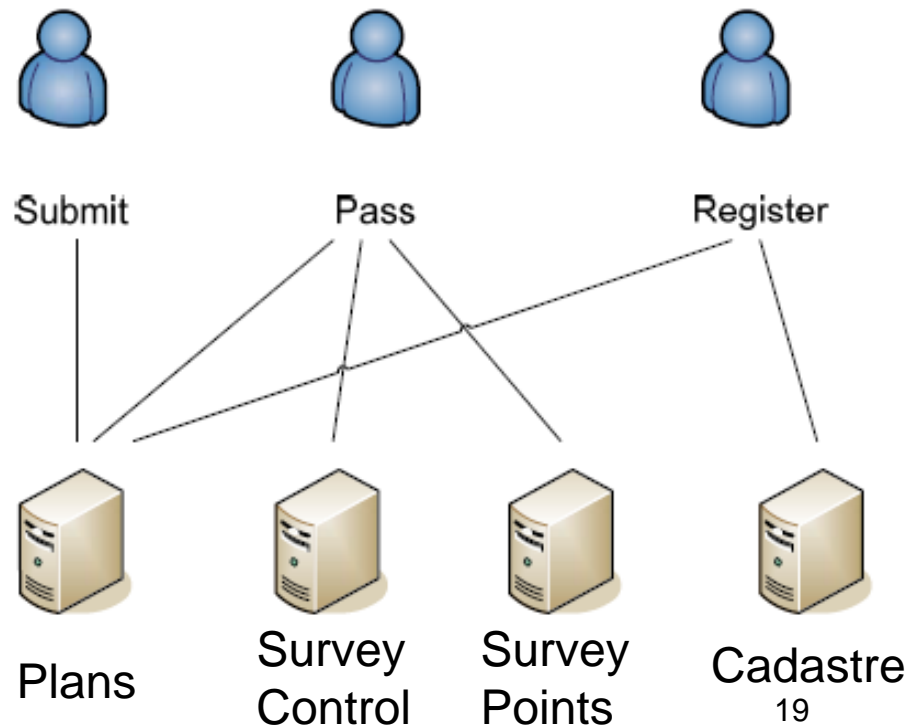
# eLodgement - EARL

(Electronic Access for Registry Lodgement)

- EARL – I, II and III
- Survey Information Processing (SIP) = EARL – I
- Presently between EARL I and II (expected 6 months for Earl II)
- Expected to Automate Lodgement, Validation and Update of Databases and Indices

# Present Plan Capture

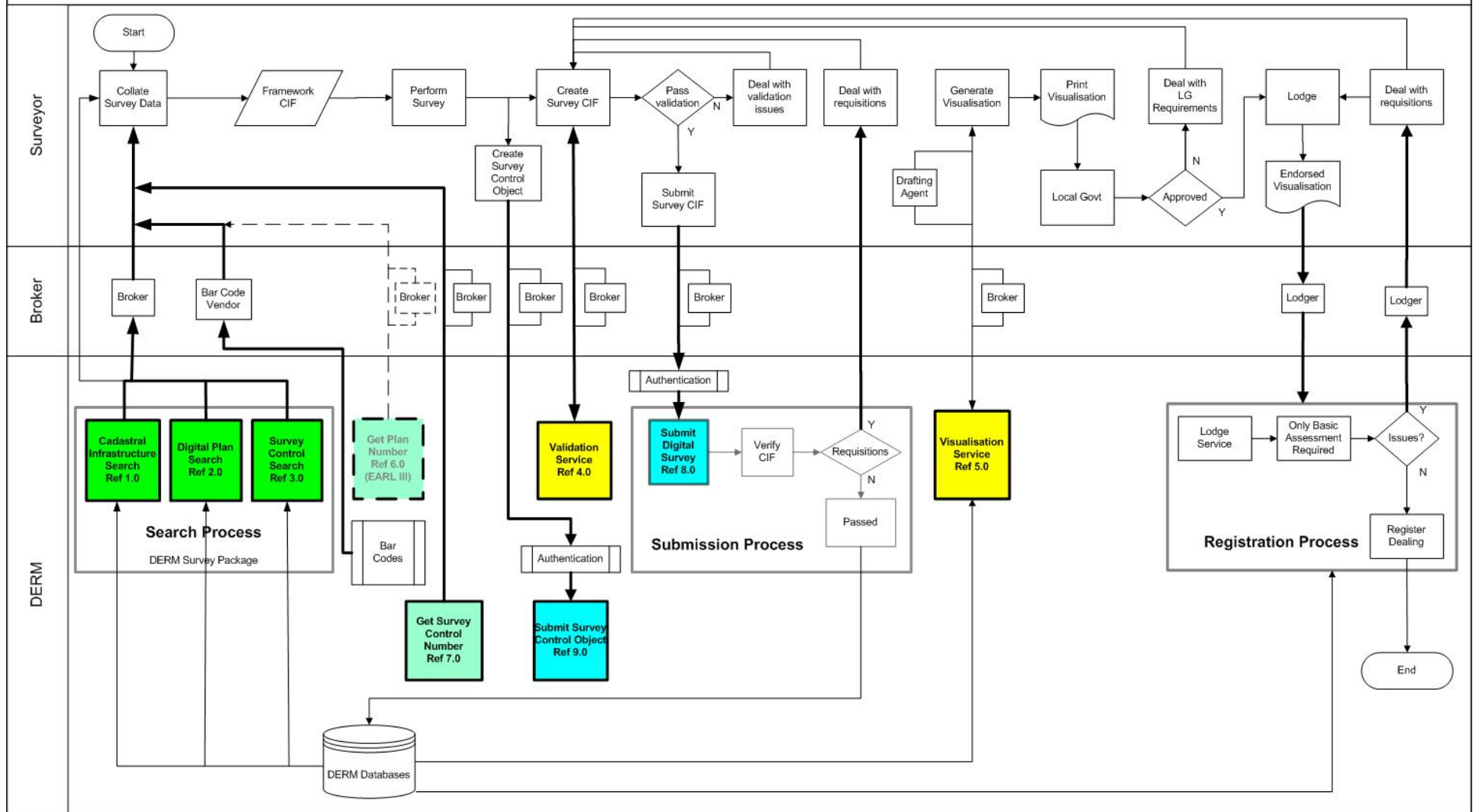
- SIP – Part of EARL I
- Capture Team enters survey & admin data (~9000/yr)
- Plan auditors verify and pass plans which automatically updates plan database, survey control and survey points databases
- Titles team register it
  - Information updated
  - Cadastral database updated manually from CIF



# EARL - II

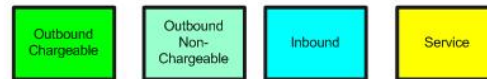
## EARL II Web Enabled Survey Plan Life Cycle

Version 2.0 - 05.06.2009



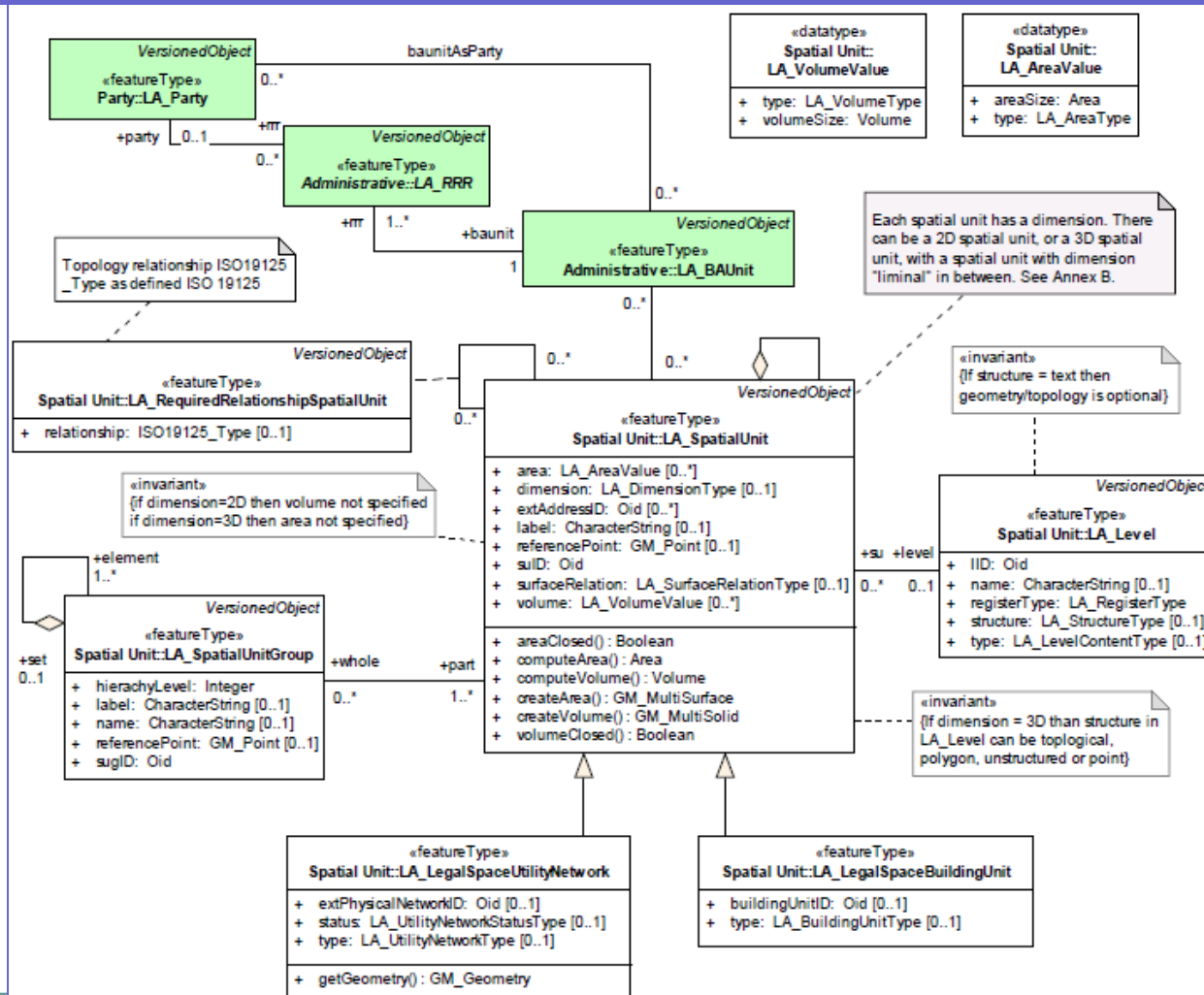
**Legend**

- EARL III
- \_\_\_\_\_ Optional
- \_\_\_\_\_ Required

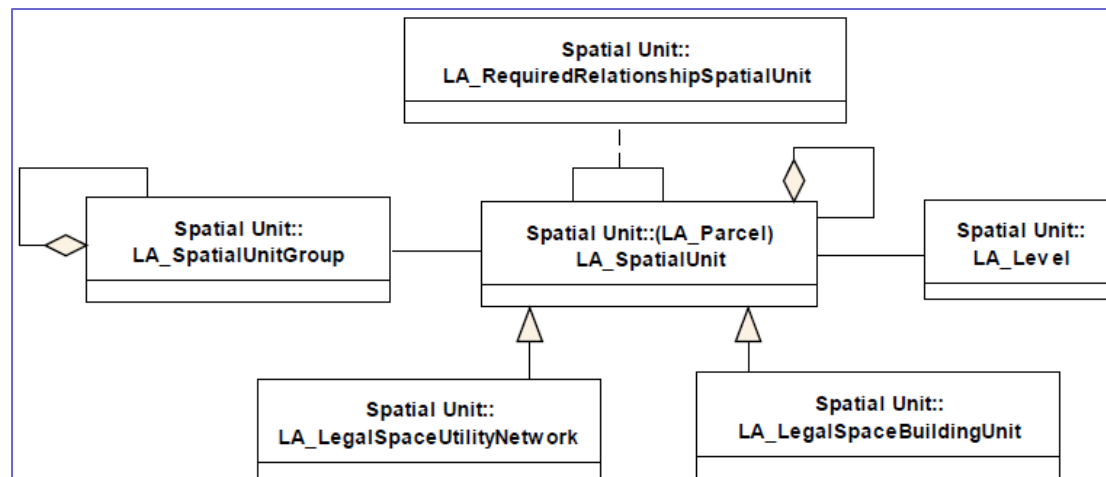
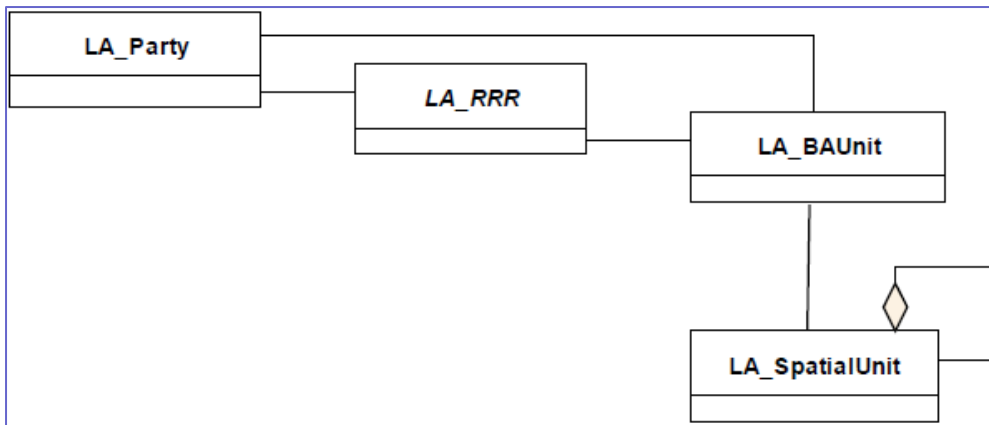


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# LADM – 3D Cad.

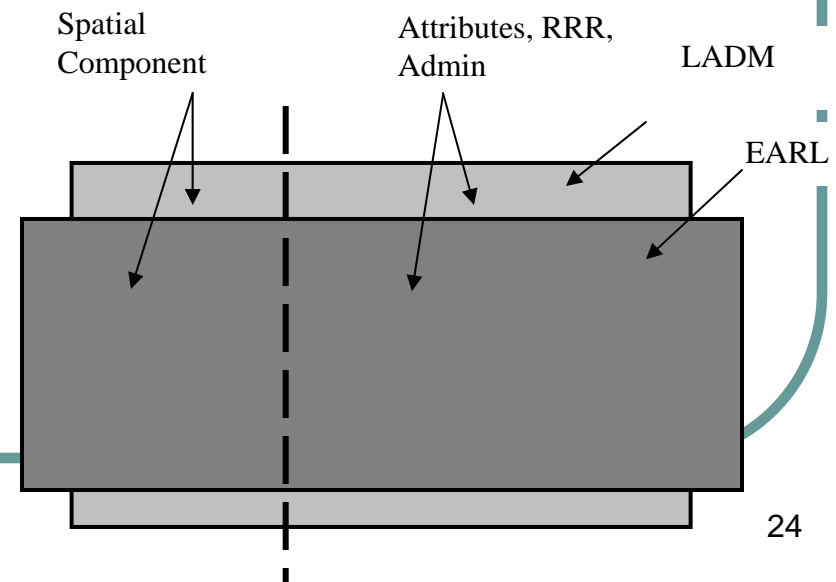


# LADM – 3D Cad.



# ePlan – ISO LADM

- Both ePlan Model and ISO LADM have Spatial and Attribute Components
- Not a total match but significant overlap
- ePlan needs to take advantage of 3D issues covered in LADM



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# Example Validation Rule - EARL

## **Consistency of plan description (Created Parcels)—VR009**

*This rule checks that new parcels exist in the plan, rule VR070 (§ 3.1.15.6.1) checks the spatial extent of new parcels. This rule also implements VR011 (§ 3.1.5.1.4).*

### **Rule**

*Each lot identified in the plan description as being created must have an equivalent parcel in the plan that is being created (i.e. parcel state is “created”) except for parcels with a class of road and hydrography.*

### **ePlan element**

*Description:*

*Document:SurveyDocument:Survey:surveyDesc*

*LandXML/Survey/SurveyHeader@desc*

*Parcels:*

*Document:SurveyDocument:Survey:Parcel:Parcel:parcelState*

*LandXML/Parcels/Parcel@state*

### **Reason**

*“Created parcel ‘<parcel identifier>’ in description is not in plan”*

<b>Classification</b>	<b>Mandatory</b>	<b>QLD Specific</b>	<b>Error Type</b>	<b>Checked By</b>
<i>Validation</i>	<i>Y</i>	<i>Y</i>	<i>Fatal</i>	<i>—</i>

# Validation 3D – BFP Admin

- Identification checks of BFP
- Automatic based on specs

Building Format  
8 - 0

CAD13142	Building Format Plan Requirements	VR113	BuildingFormatRequirements
CAD13181	BF Lot Numbering	VR116	LotNumberingTemplate
CAD13182	Building Identifiers	VR118	MultipleBldgID
CAD13183	BF Encroachments	VR132	EncroachmentCertificate
		VR133	Existing Bldg Plan Encroachment Exception
		VR134	Additional Bldg Plan Encroachment
		VR135	Encroachment
		VR136	EncroachmentApproval

# Validation 3D – BFP Geometry

- Verifying total area
- Verifying voids
- Verifying private yards
- Verifying building footprint

Building Format EARL III

Building Format EARL III

VR117	LoNumbering Template Except
VR119	Building Number Format
VR120	Validate Total Area
VR121	Validate Court Yard Area
VR122	Use of Parcel validation
VR123	Private Yards
VR124	Dimensions
VR125	Void Areas
VR126	Voids ib Common Property
VR127	Location of Voids
VR128	Spatial Extent of Building Fc
VR129	Location of Footprint
VR130	Location of Multi Footprints
VR131	Footprint Encroachment
VR213	Lot Numbers Across CTS
VR214	Numbering System Used

# Validation 3D – VFP Admin

Volumetric  
11 - 0

CAD13143	VFP Common Property	VR170	CommonProperty
		VR172	AreaOfCommonProperty
CAD13184	Volumetric Plan Requirements	VR139	VolumetricFormatPlans
CAD13186	VFP Remainer Lots	VR148	StdFormatRemainderLots
		VR149	Multiple Std Format Remainder Lots
CAD13196	VFP Foorprint	VR153	ExtentOfVolumetricLot
		VR154	AreaOfVolumetricLoFootprint
CAD13197	VP Annotaions	VR160	VolumetricAnnotation
		VR169	VolumetricAnnotation
CAD13199	VFP - Datum and Origin	VR164	CoodinatesOrigin
		VR166	CoodinatesDatum
CAD13200	Restricted easements	VR167	Restricted Parcel Lot Or Easement

- Common property
- Plan requirements
- Remainder Lots
- Annotations
- Datum and Origin
- Restricted easements

# Validation 3D – VFP Geometry

Volumetric geometry  
19 - 0

Volumetric Geometry	
VR084	3D Topology
VR140	Definition of Bounds
VR141	Faces of a Volume
VR142	Bounding Surfaces
VR143	Vertices
VR144	Slope Distances
VR145	Bounding Edges
VR146	Completeness
VR152	Vol Footprint projection
VR155	Marking Footprint
VR156	Lot Volume
VR157	Part Lot Volumes
VR158	Total Lot Volumes
VR159	Validate Lot Volume
VR161	Aprox Ground Level
VR162	Vertical Location
VR163	Occupation
VR165	Coordinates
VR168	Approx Ground Level
VR233	Adjoining Volumes

- Geometrical shape
- Geometrical volume
- Geometrical location
- Adjoining geometry



- **Discussions and Conclusion**

# Discussions - 1

- From Questionnaire Survey
  - Need to integrate ePlan data into DCDB like:
    - 3D geometrical information
    - Different geometries like utility networks, curved surfaces etc
    - Relative and absolute elevations for volumetric parcels
    - Support for legal parcels
    - 3D data manipulation and validation

# Discussions - 2

- Validation rules to be considered in ePlan lodgement:
  - Capture, storage & visualisation of 3D
  - Automatic validation
  - Data manipulation and query

# Conclusion

- Awareness raised about
  - Various data models
  - Status of ePlan in QLD Australia
  - Validation rules drawn from ePlan, LADM and questionnaire
  - LADM presents future prospects for digital lodgement

Thank You

- Questions ?

