



# 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



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ADDITIONAL SHEET

Scale 1: 80t

201  
9.9713

LOT 201  
(Pt.P)

**LOT 201**  
(Pt.0)

LOT 201 (PLJ)  
LOT 201 (Pt.B)

LOT 201

(Pt.N)

LOI 201 -  
(PLM)

LOT 201

(Pt.L) ☐

LOT 201

(Pl.B,C,E)

1

LOT 20

LO

1

1

1

1

1

1

1

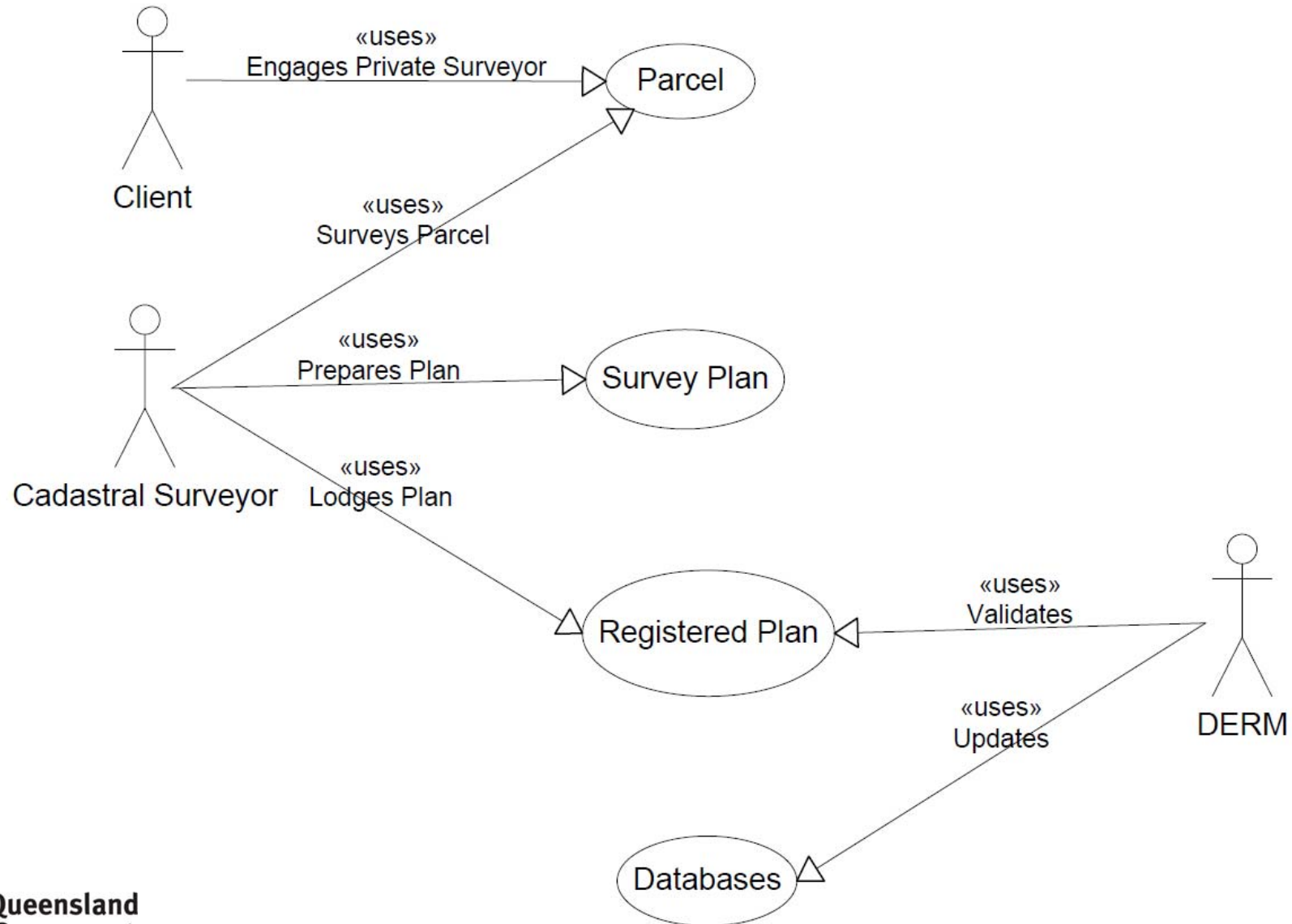
1

1 1 1

50 mm 100 mm 150 mm

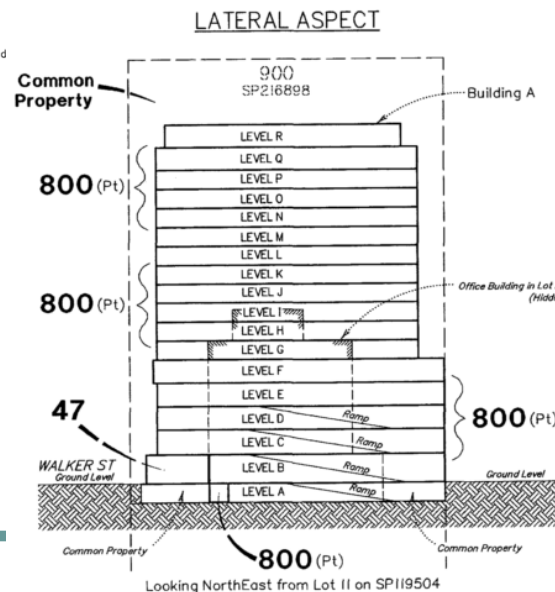
Insert  
Plan  
Number

# Introduction – Present Plan Life



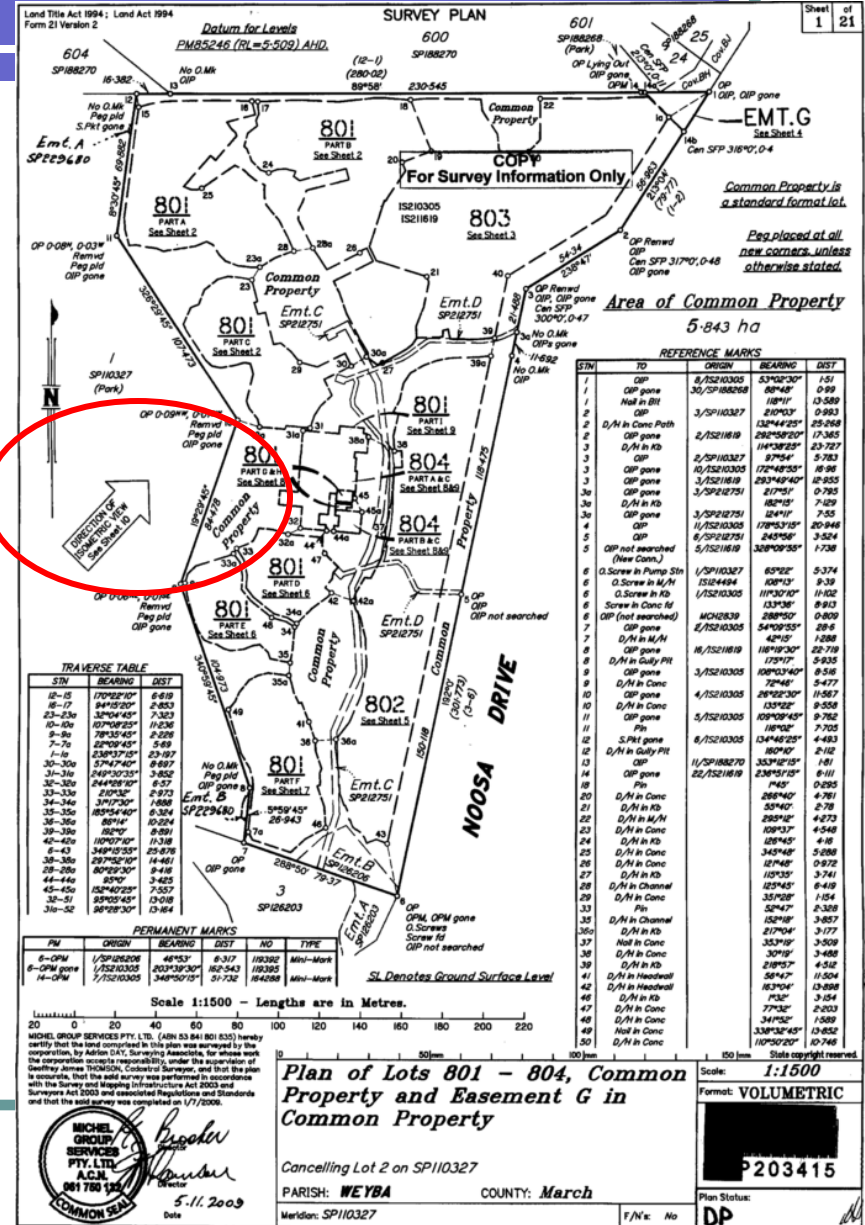
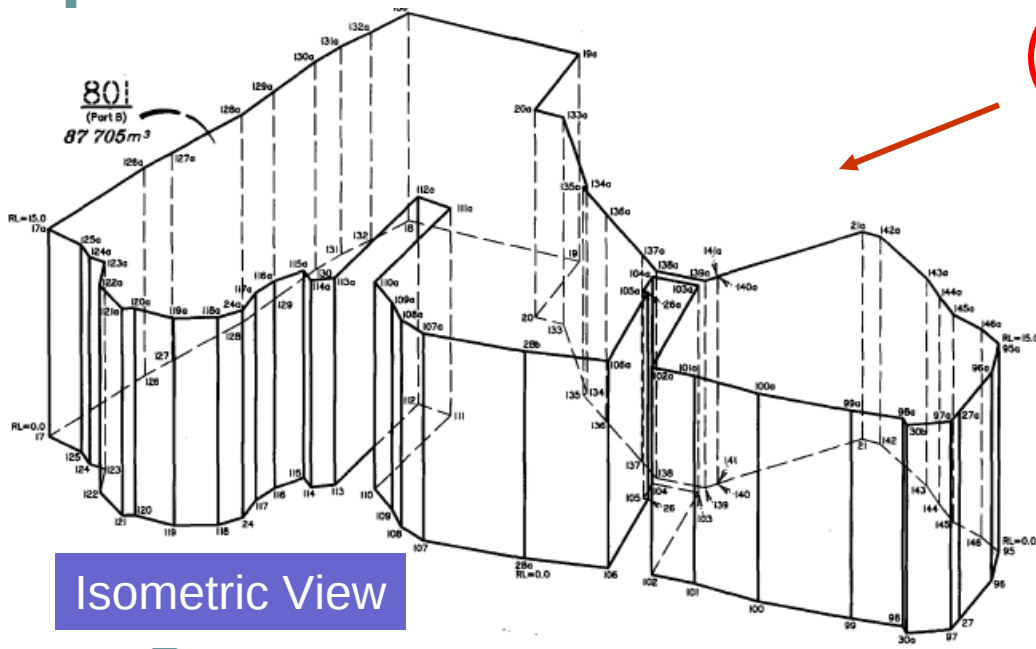
- Introduction
- **Existing 3D Plan Status in QLD, Aus**
- ePlan - LandXML
- Existing Status of ePlan Lodgement
- ISO LADM - ePlan
- 3D Validation Rules

- Building Format Plan



# 3D Survey Plans - VFP

## ● Volumetric Format Plan

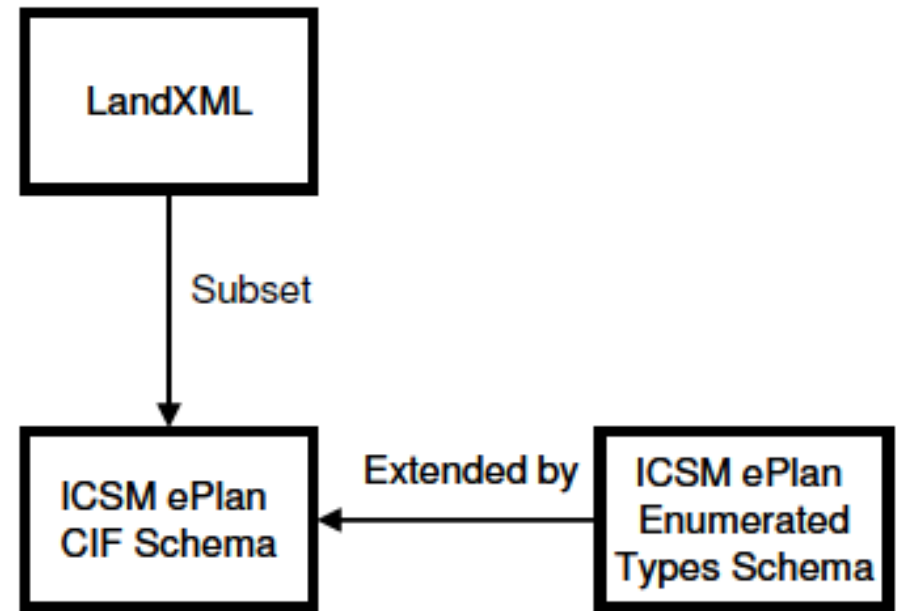


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# ePlan Schema

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

- Jurisdictional schemas exists 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

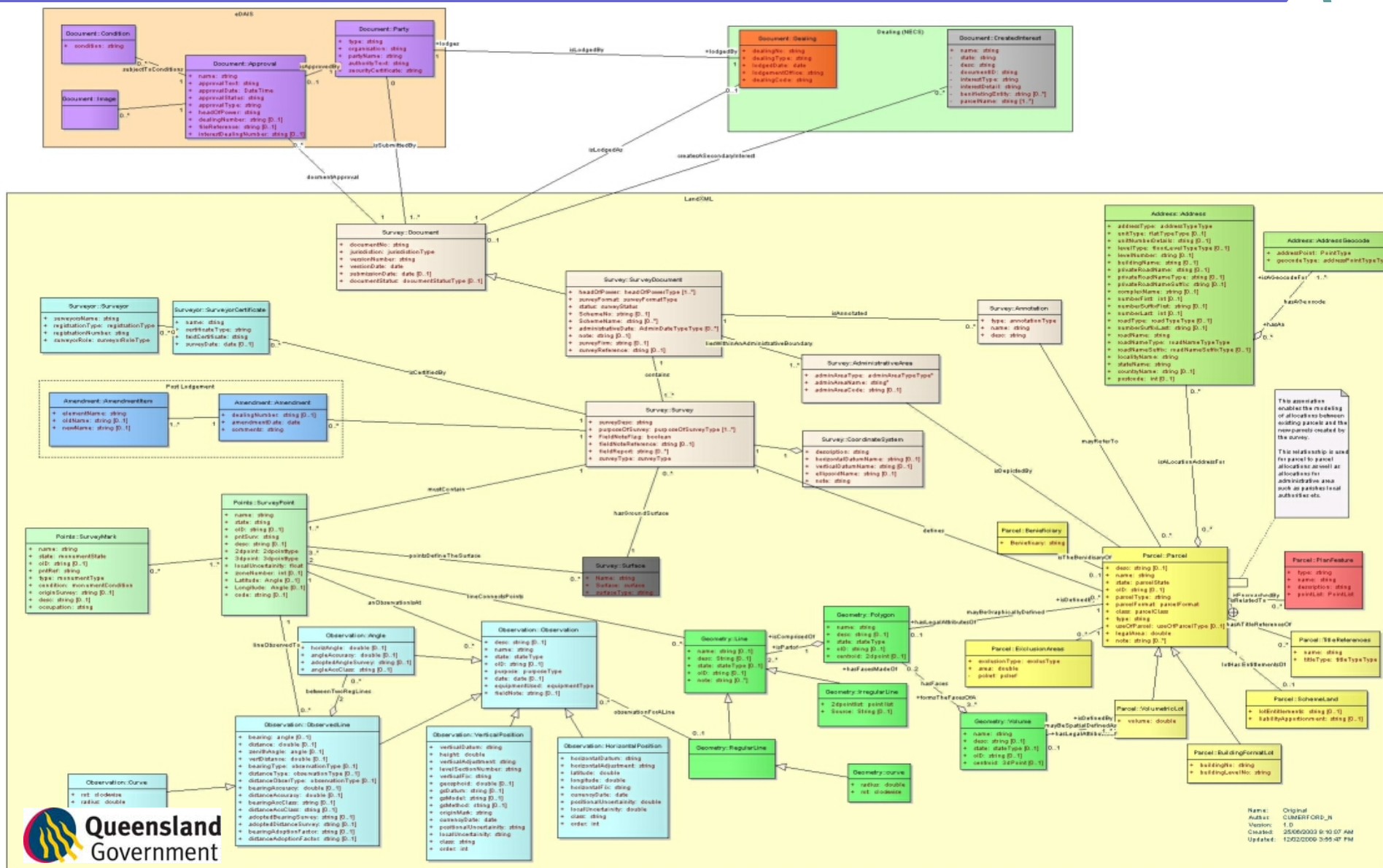
```
0190 </ns1:Feature>
0191 </ns1:Parcel>
0192 <ns1:Parcel buildingLevelNo="B" useOfParcel="Main" class="Lot" buildingNo="A" parcelFormat="Building" state="created" p
0193 <ns1:CoordGeom name="CG-47-SP185407" />
0194 </ns1:Parcel>
0195 <ns1:Parcel useOfParcel="Main" class="Lot" parcelFormat="Building" 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"/>
```

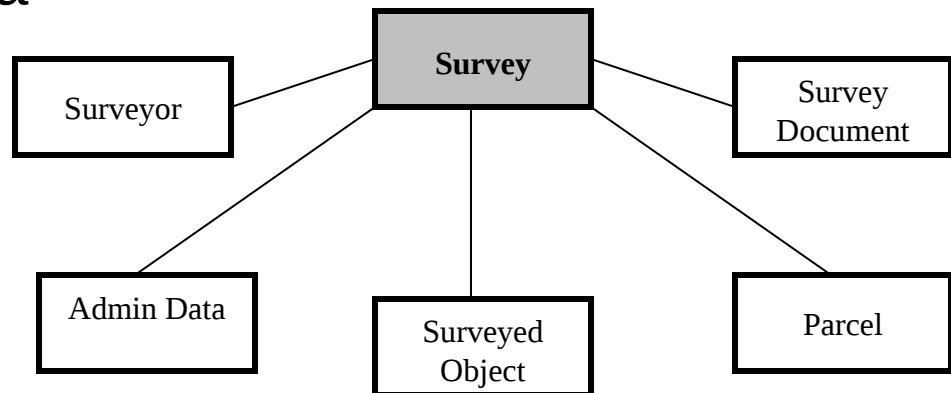
Volumetric Format Plan

# ePlan Model



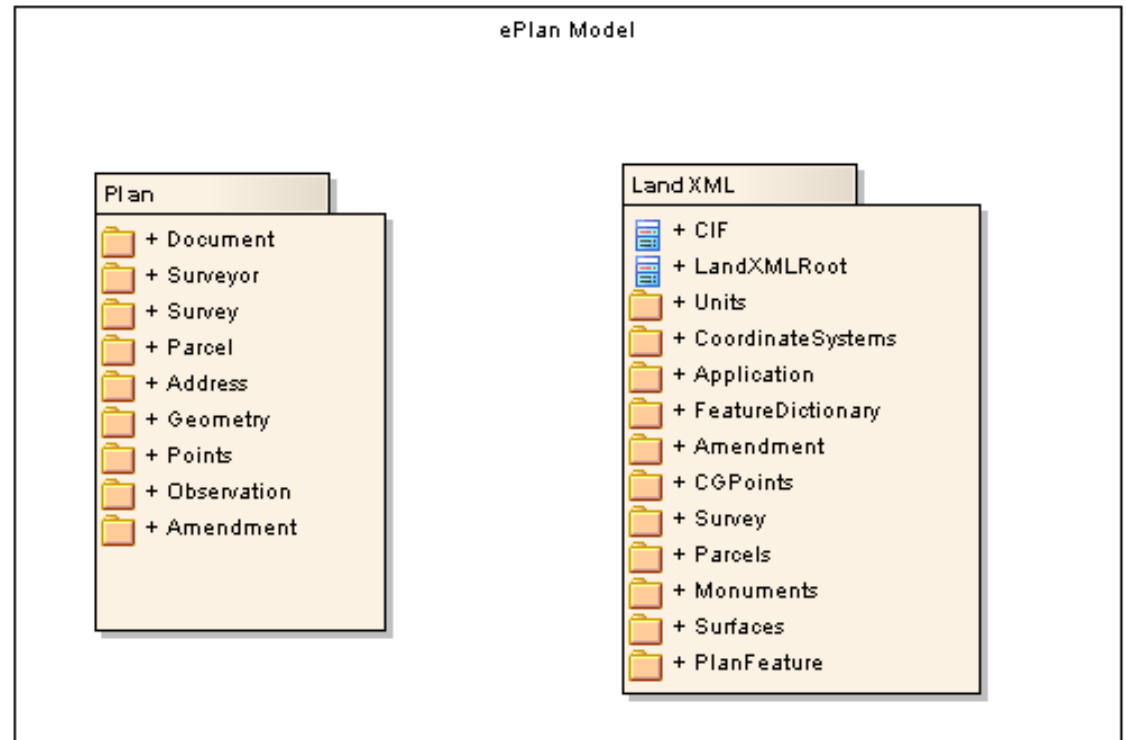
# ePlan Model

- 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

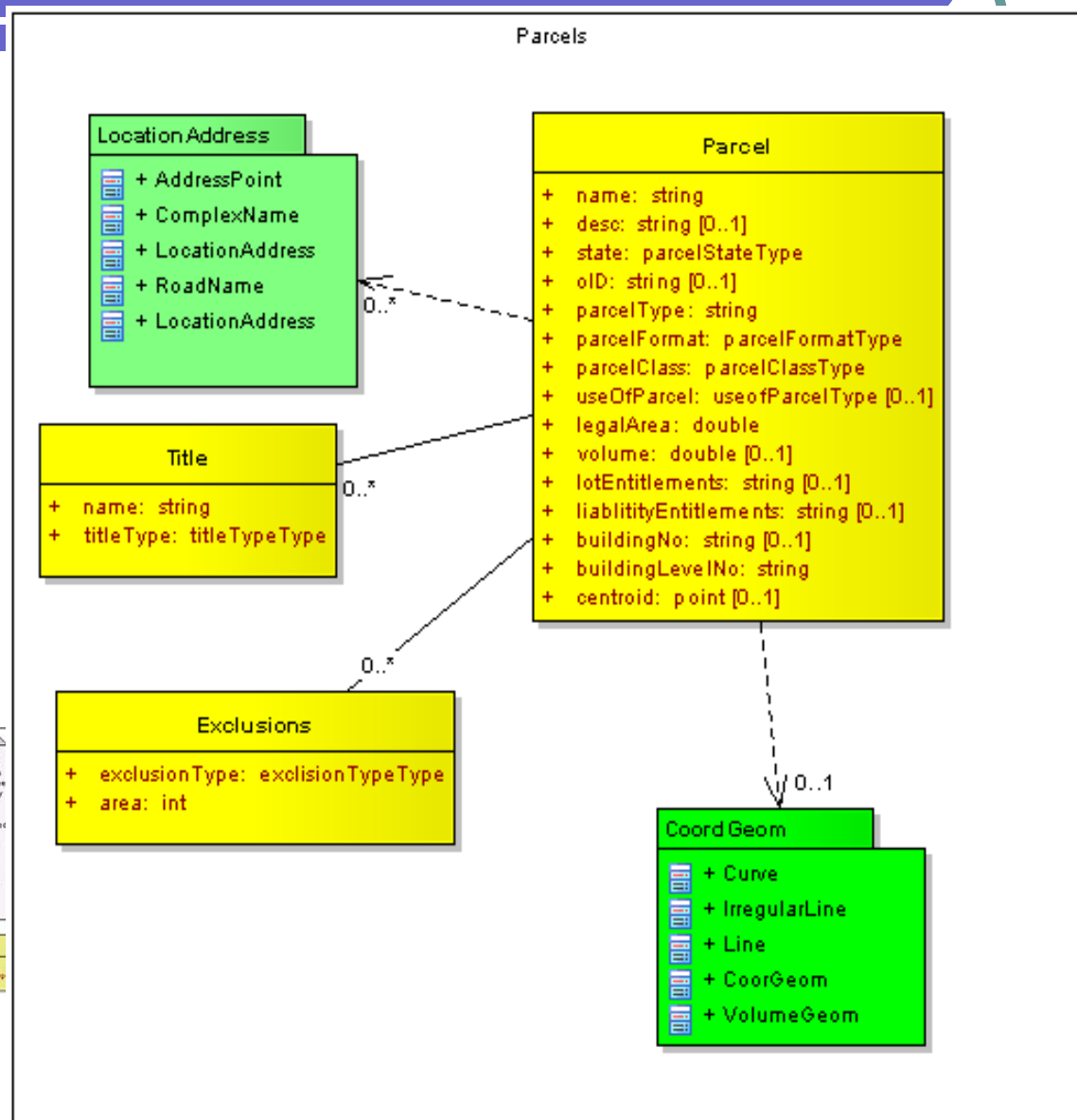
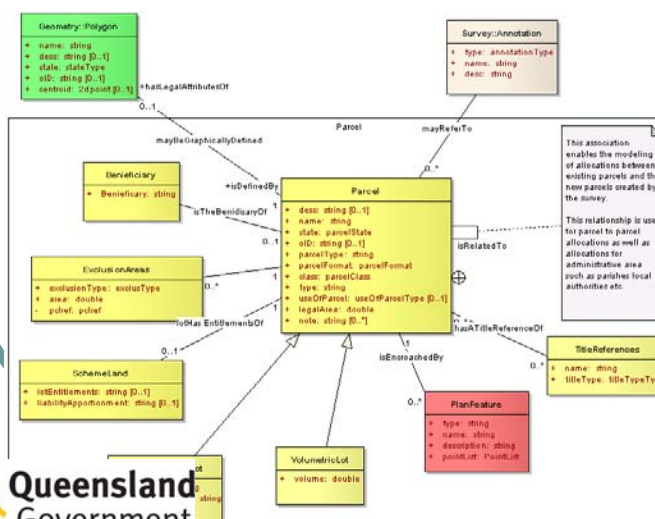


Current Exceptions:

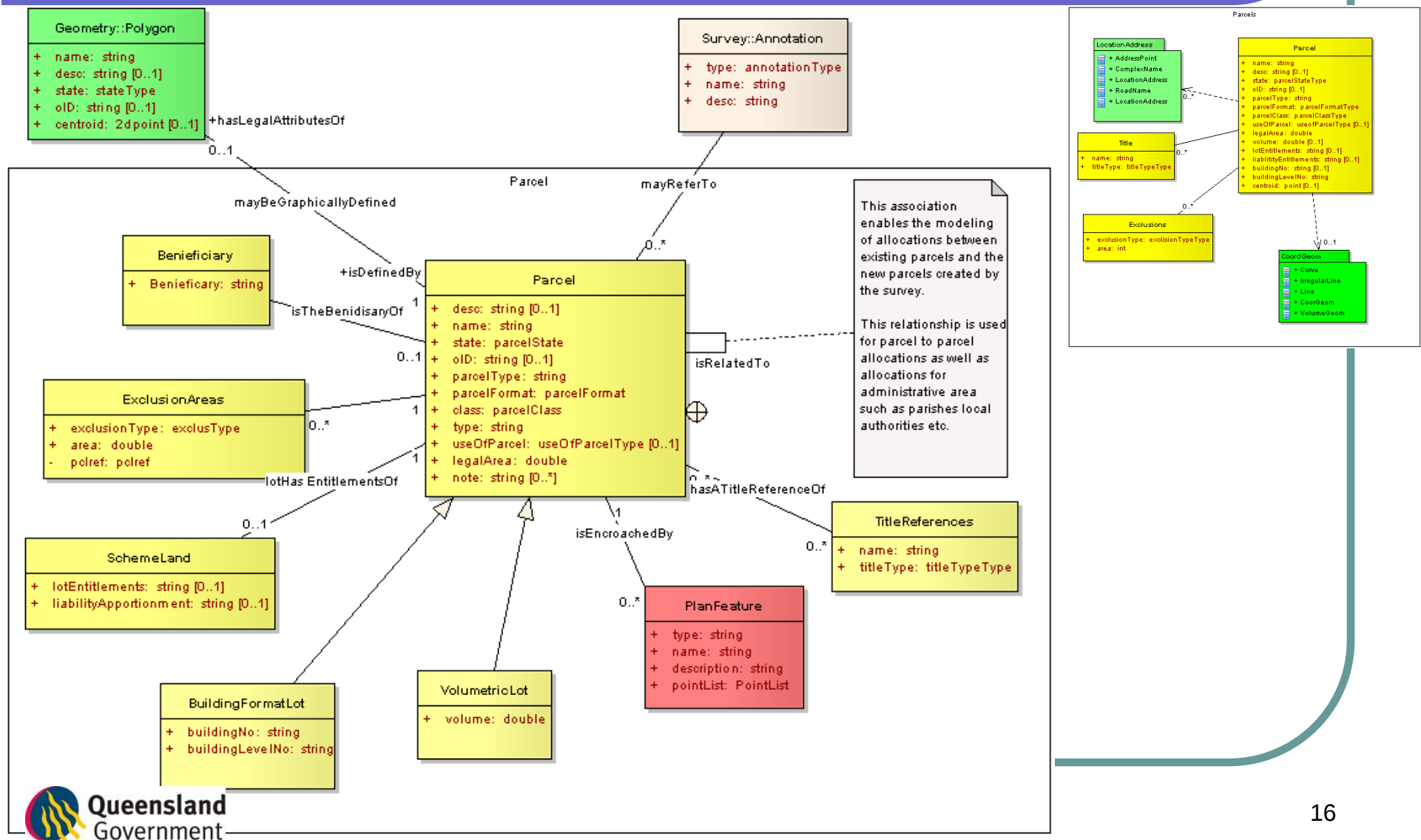
Reference Marks, Scale, Statements on Plan, Allocations, Replacement Marks, Station Info, New Conn, New Ref etc.

# Plan – LandXML (E Plan Parcel)

- Example of Plan–LandXML relationship for Parcel



# Plan – LandXML Parcel



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- 3D Validation Rules

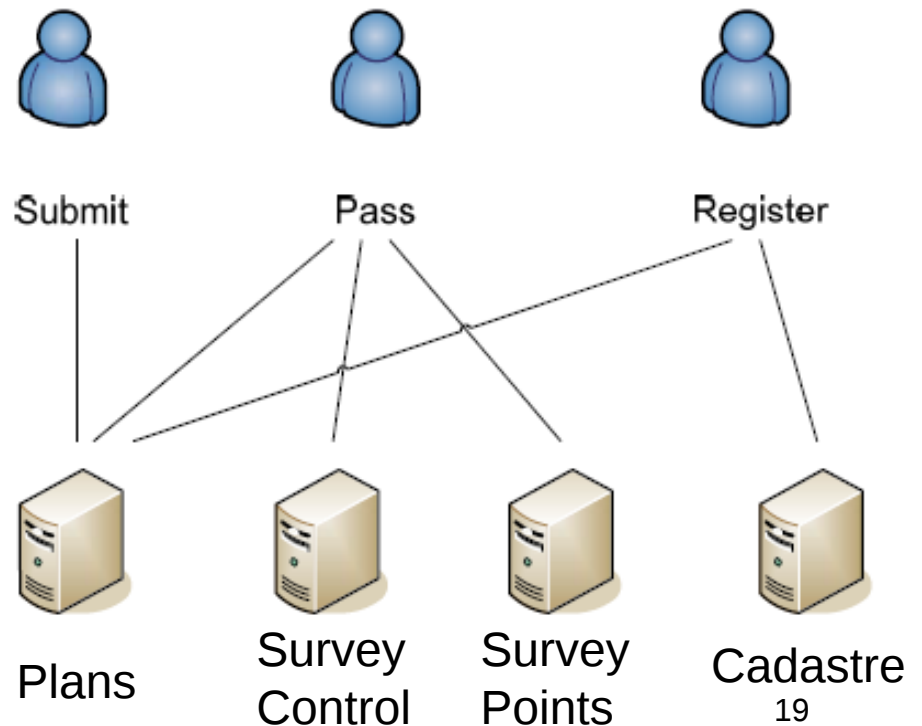
# eLodgement - EARL

(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

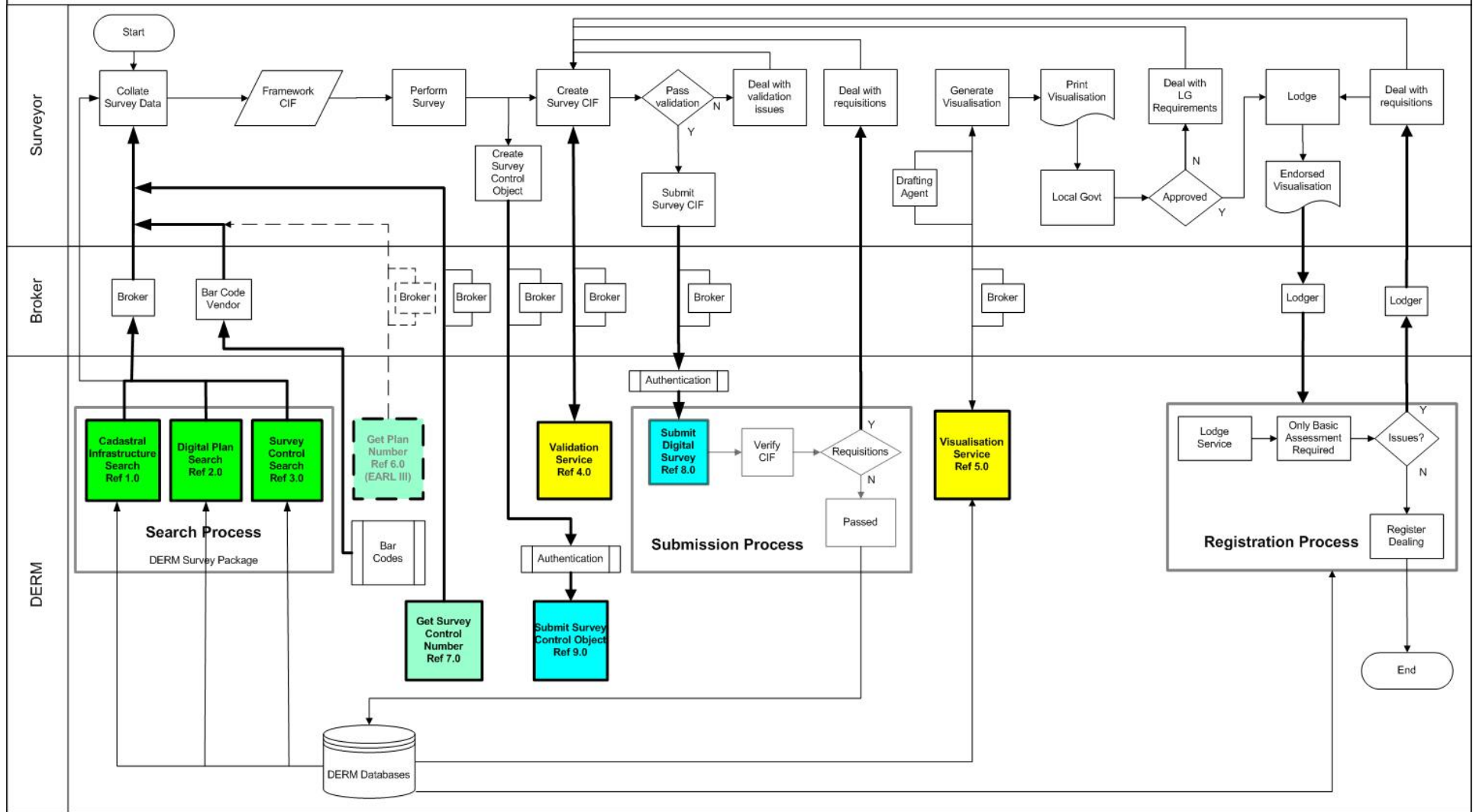
- SIP – Part of EARL I
- Capture Team enters survey & admin data (~9000/yr)
- Plan auditors verify and pass plans which automatically updates plan database, survey control and survey points databases
- Titles team register it
  - Information updated
  - Cadastral database updated manually from CIF



# EARL – II

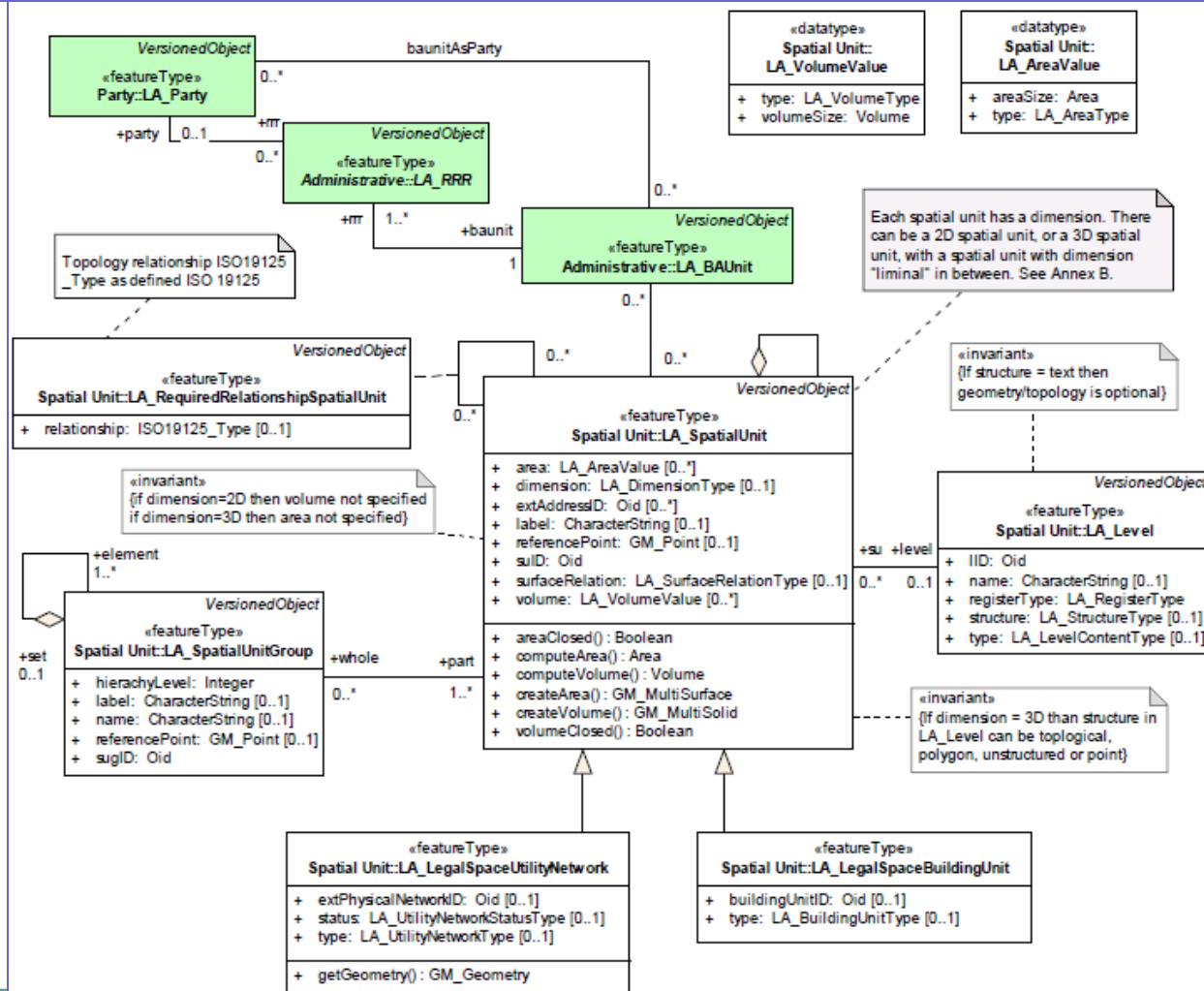
## EARL II Web Enabled Survey Plan Life Cycle

Version 2.0 - 05.06.2009

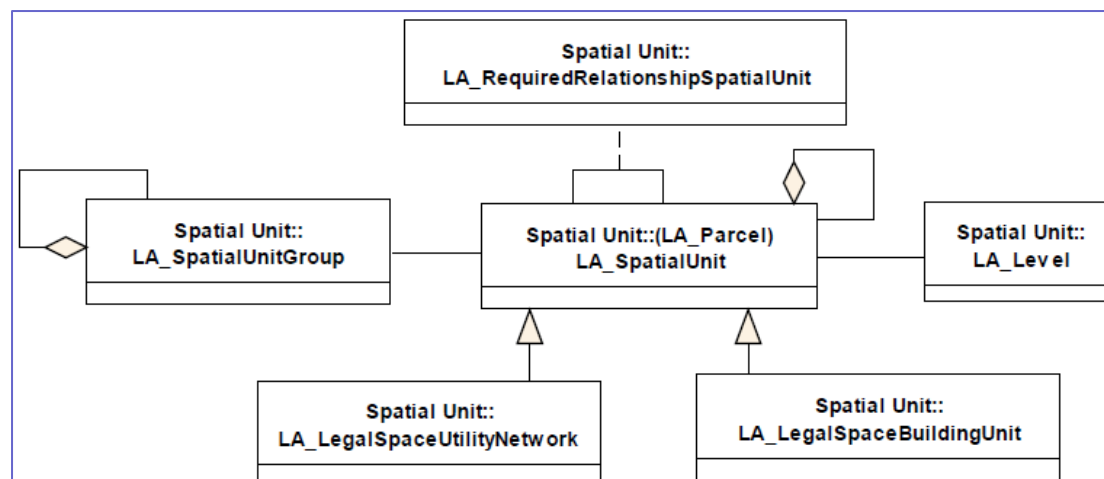
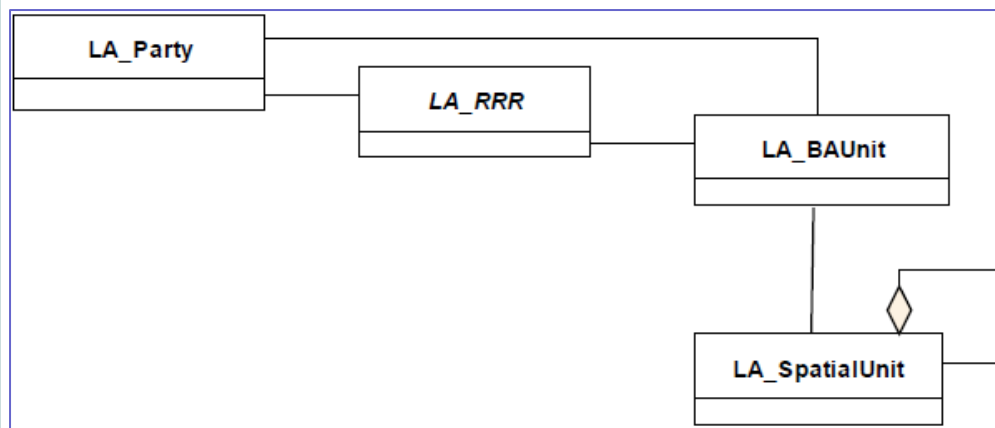


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# LADM – 3D Cad.

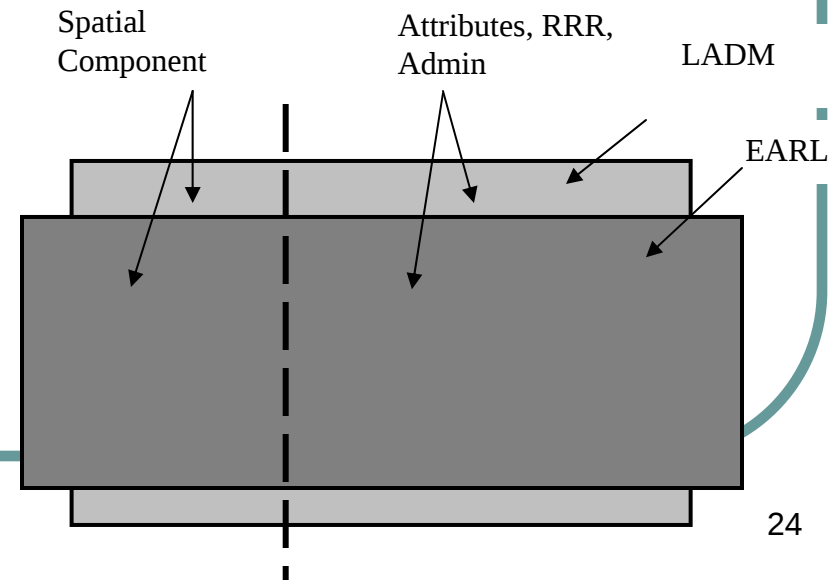


# LADM – 3D Cad.



# 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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- **3D Validation Rules**

# 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> |
|-----------------------|------------------|---------------------|-------------------|-------------------|
| Validation            | Y                | Y                   | Fatal             | —                 |

# 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 Footprint                | VR153 | ExtentOfVolumetricLot              |
|          |                              | VR154 | AreaOfVolumetricLotFootprint       |
| CAD13197 | VP Annotations               | VR160 | VolumetricAnnotation               |
|          |                              | VR169 | VolumetricAnnotation               |
| CAD13199 | VFP - Datum and Origin       | VR164 | CoordinatesOrigin                  |
|          |                              | VR166 | CoordinatesDatum                   |
| 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 ?

