ePlan Handbook

Version 2.2

May 2019

VICTORIA State Government | Environment, Land, Water and Planning

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Contents

1. Introduction

This document provides an overview of ePlan components, and the requirements for creating a valid ePlan file based on the Victorian ePlan LandXML Protocol.

2. Element Naming Conventions

Elements in Victorian ePlans must follow specified naming convention. According to the schema, all ePlan elements must have a unique identifier stored in elements `@name` attribute.

2.1 Parcels

The ePlan parcel identifiers are stored in the @name attribute of the Parcel element and are adapted from Standard Parcel Identifiers (SPI) used currently in Vicmap Property and VOTS[1].

'#' represents a number and '%' represents a numeric or alphabet character.

Parcel Class	Format	Example
Lot	[#] \ [Plan Number]	1\PS123456
	[%] \ [Plan Number]	A\PS123456, AA\PS123456
	[#] [%] \ [Plan Number]	1A\PS123456
	[%] [#] \ [Plan Number]	G101\PS123456
	NOTE – A, E, R and S are not acceptable as % when % is followed by a number (e.g. A1)	
* Balance Lot	BL [#] \ [Plan Number]	BL1\PS123456
* Consolidated Lot	[Plan Number starting with PC/CP]	PC123456
Common property	CM [#] \ [Plan Number]	CM1\PS123456
Reserve	RES [#] \ [Plan Number]	RES1\PS123456
* Reserve Abuttal (@state="existing")	RESERVE – [#]	RESERVE-1
Road and Road Abuttal		
Road (@state="created")	R [#] \ [Plan Number]	R1\PS123456
* Road Abuttal (@state="existing")	ROAD – [#]	ROAD-1
Easement (`@parcelFormat="Standard" / "2D Building"`)	EAS [#] \ [Plan Number]	EAS1\PS123456
* Encumbering Easement (`@parcelFormat="Geometry"`)	E [#]	E1
* Appurtenant Easement (`@parcelFormat="Geometry"`)	A [#]	A1
* Encumbering Easement (Road) (`@parcelFormat="Geometry"`)	R [#]	R1
Restriction	RST [#] \ [Plan Number]	RST1\PS123456
Owners Corporation	OC [#] \ [Plan Number]	OC1\PS123456
Stage Lot	S [#] \ [Plan Number]	S1\PS123456
Depth Limitation	DL [#]	DL1
Crown Parcel		
Crown Allotment	[Allotment %] ~ [Section %] \ PP [Parish or Township Code]	31~2\PP5509
	If there is no Crown Section, [Allotment %] \ PP [Parish or Township Code]	31\PP5509

1. Victorian Online Title System

Crown Portion	[Portion %] \ PP [Parish or Township Code]	1\PP4568
Parcels without SPI	NOSPI – [#]	NOSPI-1
Not in Subdivision	NIS – [#]	NIS-1
Administrative Area Parcels – Code is the Land Use Victoria official identifier, as stored in Vicmap Admin		
LGA	LGA – [VMADMIN Code]	LGA-301
Parish	PSH – [VMADMIN Code]	PSH-355
Township	TWN – [VMADMIN Code]	TWN-23
Special Parcel Usages – Special usages of Parcel element, doesn't represent an actual parcel type		
Part Parcels (`@parcelType="Part"`)	[Prefix] [#] – p [#] \ [Plan Number]	1-p1\PS123456
Exception for Part Geometry Easements (`@parcelType="Part" & @parcelFormat="Geometry" & @class="Easement"`)		E1-p2
and Part Existing Road (`@parcelType="Part" & @state="existing" & @class="Road"`)		Road-1-p2
Nested Parcel for linkages	LNK – [#]	LNK-1

NOTE 1: Parcel identifies can have the check digit following the plan number eg "PS123456X".

NOTE 2: If there is no plan number at the time of ePlan submission for Section 23, 24A, 32 or 32B applications of the *Subdivision Act 1988,* the term 'LV-To-Supply' must be used instead. This value will be replaced in ePlan with a Dealing Number from the Victorian Online Title System (VOTS) after the plan is registered at Land Use Victoria.

NOTE 3: If there is no SPI for a parcel, name it as 'NOSPI – [#]' eg NOSPI-1. These parcels must have a description.

2.2 Geometry, Points and Monuments

Element	Format	Example
CoordGeom	CG – [#]	CG-1
CgPoint	CGPNT – [#]	CGPNT-1
Monument	MON – [#]	MON-1

2.3 Observations and Instruments

Element	Format	Example
ObservationGroup	OBSG – [#]	OBSG-1
ReducedObservation	OBS – [#]	OBS-1

ReducedArcObservation	AOBS – [#]	AOBS-1
RedHorizontalPosition	HP – [#]	HP-1
RedVerticalObservation	VO – [#]	VO-1
InstrumentSetup	IS – [#]	IS-1

2.4 Plan Feature

Element	Format	Example
Building Return (hatched lines in Plan of Subdivision)	BRT – [#]	BRT-1
Masonry Wall (eg brick walls, buildings, etc.)	WALL – [#]	WALL-1
Timber Wall	TWALL – [#]	TWALL–1
Fence	FEN – [#]	FEN–1
Offset	OFF – [#]	OFF–1
Chainage	CHAIN – [#]	CHAIN–1
Kerb	KERB – [#]	KERB–1
Gate	GATE – [#]	GATE–1
Centreline	CNTL – [#]	CNTL–1
No Symbol (eg Not Fenced, Not Defined)	NSMB – [#]	NSMB–1
Railway	RAIL – [#]	RAIL–1
Rockwall	RWALL – [#]	RWALL–1
Hedge	HDG – [#]	HDG–1
Other (eg verandah, roller door, etc.)	OTH – [#]	OTH–1

2.5 Annotation

Type	Format	Example
Annotation	ANNO – [#]	ANNO-1

3. Administrative Information

3.1 Annotations

The `Annotations` element is used to capture various pieces of textual information. This is mainly for the benefit of future surveyors, examiners and auditors where additional textual information about the plan may be required for specific situations.

Depending on the Annotation, the requirements for each field differs. In addition, annotation types have been created for free text annotations that can be used at will by the surveyor.

Attribute	Expected Value
name	ANNO - [#] eg `ANNO-1`
type	See section 3.1.1 Annotation Types below
desc	Textual description
pclRef	Parcel reference

3.1.1 Annotation Types

Textual Annotation Types

The following annotations require the surveyor to qualify the annotation with text in the `@desc` field. The following types do not require `@pclRef`:

- Planning Permit
- Report on Datum
- Instrument and Calibration Details
- Crown Section
- Crown Allotment
- Crown Portion
- Other Crown Description
- Section 12(2) of the Subdivision Act 1988 applies vide this plan
- Section 12(2) of the Subdivision Act 1988 does not apply vide this plan
- Purpose of Plan
- Additional Purpose of Plan
- Grounds for Removal
- Grounds for Variation
- Grounds for Vesting
- Future Plan Number
- Prior Survey

LandXML Example:

```
<Annotation name="ANNO-1"
type="Planning Permit" desc="2002/338" />
```

Textual + Parcel Reference Annotation Types

The following annotations require the surveyor to qualify the annotation with text in the `@desc` field and `@pclRef` to identify which parcel the description applies to:

- Easement Qualification
- Easement Purpose
- Easement Beneficiary
- Easement Width
- Easement Origin
- Building Boundary Notation
  If a line `@desc` attribute contains the value of "Other", the parcel must have a building boundary annotation attached to it.
- Restriction Expiry Date
  A date in valid UTC format to define the expiry date of a restriction. eg "2019-01-10". The `@pclRef` attribute must be used to link to a valid restriction parcel.
- Purpose of The Owners Corporation
- Owners Corporation Notation
- The Basis For Allocation of Lot Entitlement And Liability
- Details Of The Limitations of The Owners Corporation
- Functions or Obligations Referred By The Limited Owners Corporation

Parcel Reference Annotation Types

The following annotation requires `@pclRef` as it is intended to refer to specific parcel. Text in the `@desc` attribute should be a copy of the `@type` attribute.

- Parcel with Area by Deduction

LandXML Example:

```
<Annotation name="ANNO-1"
pclRef="BL1\PS123456"
type="Parcel with Area by Deduction"
desc="Parcel with Area by Deduction" />
```

- Functions or Obligations Referred To The Unlimited Owners Corporation
- Balance Of Existing OC Entitlement
- Balance Of Existing OC Liability
- Section 35 Compulsory
- Section 35 Agreement

LandXML Example:

```
<Annotation name="ANNO-1"
pclRef="1\PS123456"
type="Building Boundary Notation"
desc="The boundary is a party wall" />
```

General Annotation Types

The following annotation types are for general use where the surveyor wishes to annotate information on the plan that is not covered by one of the textual and parcel reference types. `@desc` should be filled in to provide the details of the annotation. `@pclRef` attribute is optional.

- General Plan Notation
- Abstract of Field Records Notation
- Surveyor's Report Notation
- Title Closure Justification
- Supply of Supplementary Field Record Notation
- General Easement Notation
- Section 35 – See Recording of Vesting Table Attached
- Implied Easement Notation

NOTE: `@desc` attribute is mandatory in LandXML therefore text must be inserted into the attribute value. Use the same text as annotation type if user's description is optional.

3.2 General ePlan Information

The complete information on attributes and elements can be found in the Victorian ePlan Protocol. The table below describes the information that is more commonly entered and used by surveyors:

Attribute	Expected Value
date	Date this version of the ePlan was created. ISO 8601 format, eg `2019-01-14`
time	Time this version of the ePlan was created. ISO 8601 format, eg `13:56:48`
Application / name	The name of the software application that created the ePlan. eg LISCAD, Stringer ePlan, ePSALON
Application / version	The version of the software application eg 12.2
Author / createdBy	The name of the person who created the ePlan
FeatureDictionary / name	Set to the name of the jurisdictional ePlan schema. For Victoria the value is: `xml-gov-au-vic-icsm-eplan-cif-protocol`
FeatureDictionary / version	The version number of the Victorian ePlan Protocol Schema as stated in the "version" attribute of schema header.

LandXML Example

```
<LandXML date="2019-01-14" time="22:57:21" version="1.0"
   xmlns="http://www.landxml.org/schema/LandXML-1.2"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.2
                       http://www.landxml.org/schema/LandXML-1.2/LandXML-1.2.xsd">

   <Application name="LISCAD" version="12.2">
         <Author createdBy="John Smith"/>
   </Application>
   <FeatureDictionary name="xml-gov-au-vic-icsm-eplan-cif-protocol" version="1.10"/>
</LandXML>
```

3.3 Coordinate System

The `CoordinateSystem` element defines the coordinate system used for `CgPoint` coordinate system and the datum used for observation bearings and distances. The coordinate system is captured in the `horizontalDatum` attribute and the bearing datum in the `@datum` attribute. Both fields have prescribed values set out in the enumerations schema. The `@desc` attribute is a free text field used to describe the coordinate system if it is "Local".

3.4 Survey Header

3.4.1 Survey Header Attributes

name The plan number with the check digit eg PS123456X. For Staged Subdivisions, the plan number looks like below: PS123456X/S2 And compiled plans as: PS123456X/C2	**surveyorReference** The surveying firms internal reference and version. Format is REF-VerXX, the reference and version are separated by "-Ver".
Type Maps to Survey/Non-Survey notation in the notations panel. ■ `Computed` = Non-Survey; ■ `Surveyed` = Survey; ■ `Compiled` = Partial Survey.	
surveyorFirm The name of the surveying firm. All text from the surveyor's stamp goes here, formatted in the following way: {Trading Name}
 {Company Name}
 {Office Address}
 {Mailing Address}
 {Phone}
 {Fax}
 {ABN}
 {Website URL}	

**NOTE: Each field can contain any characteristics including spaces.
 is the XML code for new line. This is optional but will be used in visualisation of ePlans.**

3.4.2 SurveyHeader Components

Plan administrative components are stored within the `SurveyHeader` element and child elements. These include:

Element	Description
HeadOfPower	`HeadOfPower` specifies the legislation this plan is based on. Several head of power values can be specified. Currently ePlan provides for the following: ■ *Subdivision Act 1988* ■ *Owners Corporation Act 2006* ■ *Transfer of Land Act 1958*
PurposeOfSurvey	`PurposeOfSurvey` captures the application type eg "Section 22-Plan of Subdivision". Multiple purposes can be listed however there are rules about which purposes can be mixed, see ***PurposeOfSurvey***
Personnel	The name of the licensed surveyor who surveyed the plan.
AdministrativeArea	The municipalities (LGA), Parish and Township the plan is in.
AdministrativeDate	"Date of Survey" to be provided if plan is fully or partially surveyed.
Annotation	(Optional) See Section 3-1 Annotations.
Amendments	(Optional) Used to track amendments post registration.

PurposeofSurvey

Purpose of Survey in ePlan refers to the sections of the act or application types of the survey plan.

Purpose of Survey
"Section 6(1)(K)"
"Section 22-Plan of Subdivision"
"Section 22-Plan of Consolidation"
"Section 23–Creation of Easement"
"Section 23–Removal of Easement"
"Section 23-Variation of Easement"
"Section 23-Creation and Removal of Easement"
"Section 23-Creation and Variation of Easement"
"Section 23-Removal and Variation of Easement"
"Section 23-Creation and Removal and Variation of Easement"
"Section 23-Variation of Condition in Crown Grant"
"Section 23-Removal of Condition in Crown Grant"
"Section 23-Creation of Restriction"
"Section 23-Removal of Restriction"
"Section 23-Variation of Restriction"
"Section 24a-Vesting of a Reserve"
"Section 24a-Removal of a Reserve (Plan of Subdivision)"

"Section 24a-Removal of a Reserve (Plan of Consolidation)"
"Section 24a-Removal and Vesting of a Reserve (Plan of Subdivision)"
"Section 24a-Removal and Vesting of a Reserve (Plan of Consolidation)"
"Section 26"
"Section 32-Plan to alter land affected by an owners corporation (Plan of Subdivision)"
"Section 32-Plan to alter land affected by an owners corporation (Registered Plan)"
"Section 32-Plan to alter land affected by an owners corporation (Strata Plan)"
"Section 32-Plan to alter land affected by an owners corporation (Cluster Subdivision)"
"Section 32a–Plan of Subdivision of land if an owners corporation is affected"
"Section 32a-Plan of Consolidation of land if an owners corporation is affected"
"Section 32b-Plan to create an owners corporation (Existing Plan)"
"Section 32b-Plan to create an owners corporation (New Plan)"
"Section 35-Acquisition of land by acquiring authority"
"Section 35-Acquisition of land if an owners corporation is affected (Plan of Subdivision)"
"Section 35-Acquisition of land if an owners corporation is affected (Registered Plan)"
"Section 35-Acquisition of land if an owners corporation is affected (Strata Plan)"
"Section 35-Acquisition of land if an owners corporation is affected (Cluster Subdivision)"
"Section 35(8)-Subdivision of land vested or registered in authority"
"Section 35(8)-Consolidation of land vested or registered in authority"
"Section 37-Plan of Subdivision (Staged Plan)"
"Section 37-Acquisition of land (Plan of Subdivision (Staged))"
"Section 37(8)"

All plans must specify one primary purpose and can have additional secondary purposes. In ePlan, primary and secondary purposes are not separately specified. However, it must state one of the primary purposes listed below using the `PurposeOfSurvey` element. The following table shows a combination of secondary purposes that can be used with each of the primary purposes:

Primary Purpose	Additional Secondary Purpose(s)
Section 22	Section 6(1)(K), Section 23, Section 24A, Section 32B, Section 37(8)
Section 23	-
Section 24A	Section 6(1)(K), Section 23
Section 26	-
Section 32	Section 6(1)(K), Section 23, Section 24A, Section 35, Section 37(8)
Section 32A	Section 6(1)(K), Section 23, Section 24A
Section 32B	-
Section 35	Section 6(1)(K), Section 23, Section 24A
Section 35(8)	Section 6(1)(K), Section 23, Section 24A
Section 37	Section 6(1)(K), Section 23, Section 24A, Section 35, Section 37(8)

Personnel

Attribute	Expected Value
name	Full name of the surveyor as registered
role	“Surveyed By”
regType	“Licensed Cadastral Surveyor”
regNumber	Surveyor’s registration board member number

Administrative Area

Attribute	Expected Value
adminAreaType	The administrative area type eg LGA, Parish, Township
adminAreaName	The full name of the administrative area
adminAreaCode	The code or identifier of the administrative area if applicable

4. Point and Line Definition

Every point has coordinate information. However, in Victoria coordinate information on points is used for visualisation purposes only, providing shape to the coordinate geometry. Dimension data attached to lines provide the legal representation of the boundaries (except in the case of building boundaries). See the Victorian ePlan Protocol for full elements and attributes details.

Point

The `CgPoint` element is the basic point container for ePlan. `CgPoints` are referenced from `CoordGeom` and Observation elements to construct lines and dimensions.

```
<CgPoint name="CGPNT-1" pntSurv="boundary" state="existing">northing easting</CgPoint>
```

Line, Curve, Irregular Line

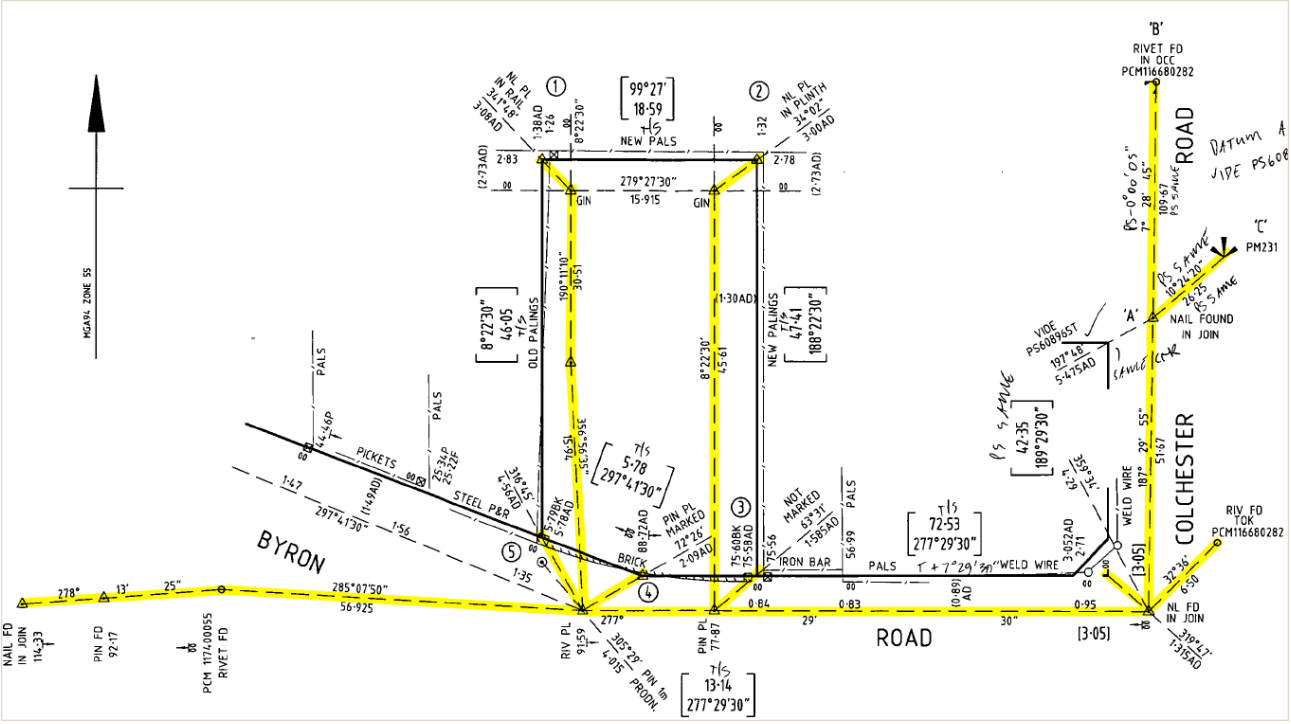
A `Line` is defined with a start and end `CgPoint` reference. `Curves` have a start, end and centre `CgPoint` reference and a `@radius` and `@rot` direction. An `IrregularLine` is used to capture natural boundaries. It consists of a start and end `CgPoint` and a string of coordinates.

```
<Line>
      <Start pntRef="CGPNT-1"/><End pntRef="CGPNT-2"/>
</Line>
<IrregularLine>
      <Start pntRef="CGPNT-1"/><End pntRef="CGPNT-2"/><PntList2D/>
</IrregularLine>
```

Survey information in ePlan encompasses the traverses, radiations, survey marks and reference marks.

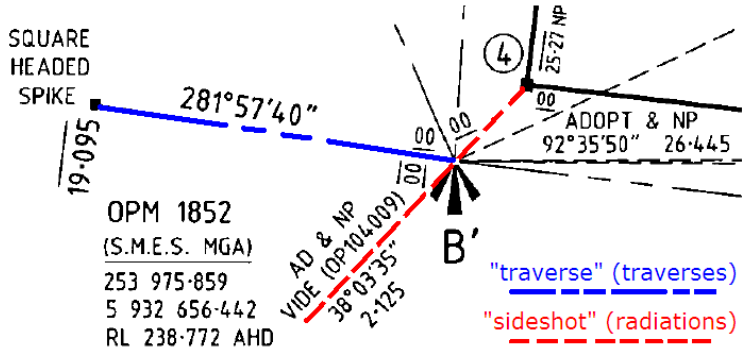
4.1 Traverses and Radiations

The traverse refers to the traversing between survey marks and reference marks. The radiation incorporates all measurements between survey marks/reference marks and boundary corners. The following example from PS624414S shows the traverse and radiations highlighted.



Traverse and radiations are captured as `ReducedObservation` elements. The following gives a description of the expected attribute values.

Attribute	Expected Value
name	OBS - [#] eg `OBS-1`
desc	Not Required
purpose	"traverse" for traverse lines or "sideshot" for radiations
setupID	Start `CgPoint` node
targetSetupID	End `CgPoint` node
azimuth	Bearing of the observation
horizDistance	Ground distance of the observation



Optional Attributes	Expected Value
distanceType	Depending on how a distance is captured, select from ‘Adopt Dimension’, ‘Computed’, ‘Derived’ and ‘Measured’
azimuthType	Depending on how a bearing is captured, select from ‘Adopt Dimension’, ‘Computed’, ‘Derived’ and ‘Measured’
EquipmentUsed	Depending on how a bearing is captured, select from ‘Theodolite and EDM’, ‘GNSS (inc. GPS)’, ‘Level’, ‘Tape’, ‘Theodolite and Steel Band’, ‘Total Station’.

Arcs are captured as `ReducedArcObservation` elements. The following gives a description of the expected attribute values.

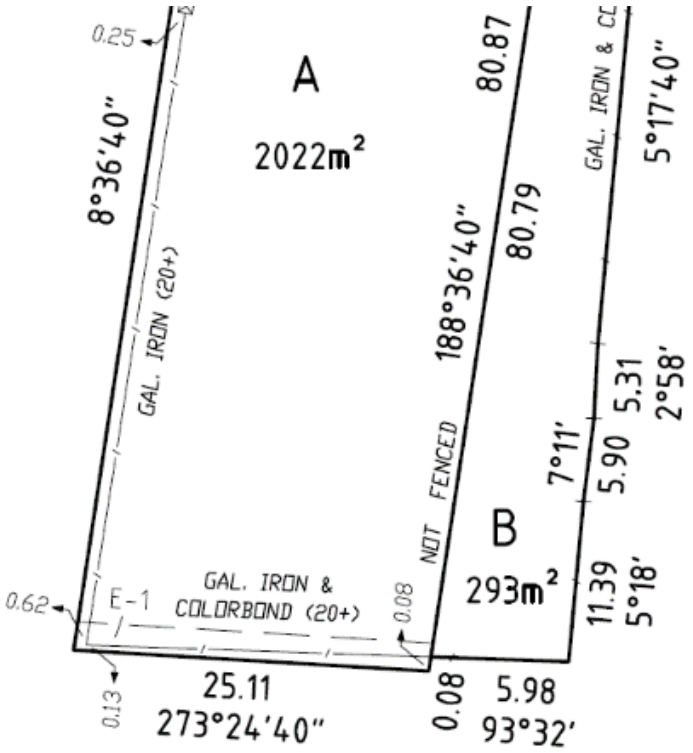
Attribute	Expected Value
name	AOBS - [#] eg `AOBS-1`
desc	Not Required (Optional)
purpose	"normal" for boundary lines or "topo" for boundary lines
setupID	Start `CgPoint` node
targetSetupID	End `CgPoint` node
chordAzimuth	Bearing of the chord
radius	Radius of the arc
length	Reduced horizontal length of the arc
rot	Direction of rotation from the start to the end

Attribute	Expected Value
equipmentUsed	Equipment used for observation (Optional)
arcLengthAccuracy	Chord length (Optional)
arcType	Type of arc which can be Adopt Dimension, Computed, Derived or Measured (Optional)

4.2 Plan Features

Features are captured using the `PlanFeature` element, as shown below:

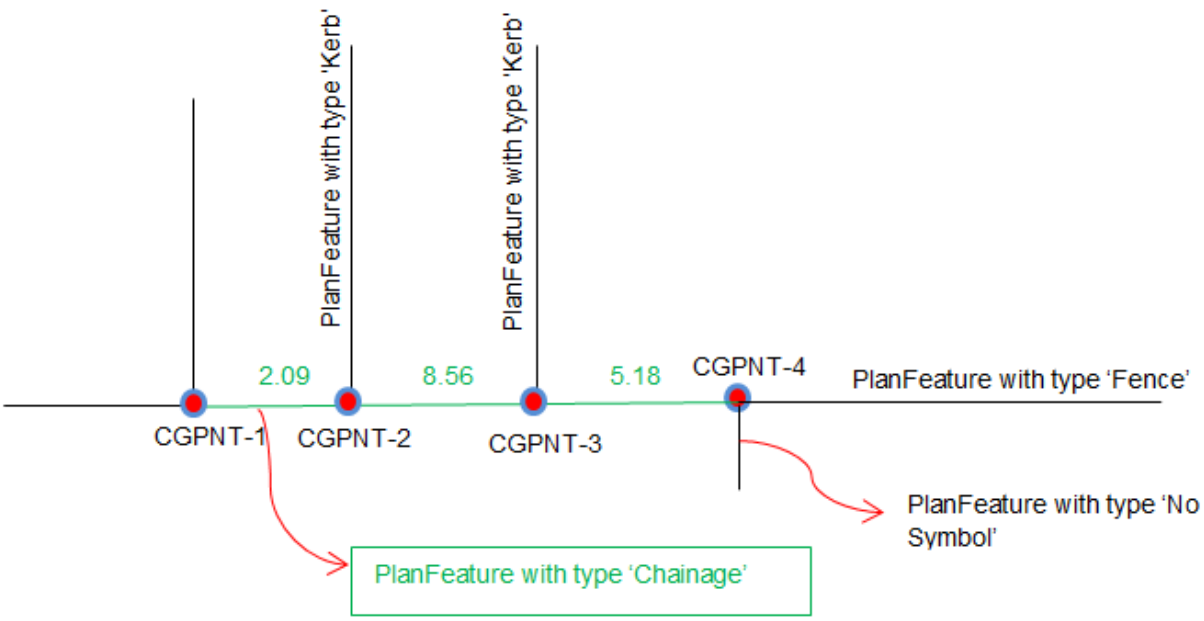
Attributes	Expected Values
name	BRT – [#] eg `BRT-1` (for Building Return - hatched lines in Plan of Subdivision) WALL – [#] eg `WALL-1` (for Masonry Wall eg brick walls, buildings, etc.) TWALL – [#] eg `TWALL-1` (for Timber Wall) FEN – [#] eg `FEN-1` (for Fence) OFF – [#] eg `OFF-1` (for Offset) CHAIN – [#] eg `CHAIN-1` (for Chainage) KERB – [#] eg `KERB-1` (for Kerb) GATE – [#] eg `GATE-1` (for Gate) CNTL – [#] eg `CNTL-1` (for Centreline) NSMB – [#] eg `NSMB-1` (for No Symbol eg Not Fenced, Not Defined, etc.) RAIL – [#] eg `RAIL-1` (for Railway) RWALL – [#] eg `RWALL-1` (for Rock Wall) HDG – [#] eg `HDG-1` (for Hedge) OTH – [#] eg `OTH-1` (for Other eg verandah, roller door, etc.)
desc	Description of the feature eg GAL. IRON (20+), etc.




```
<PlanFeatures>
  <PlanFeature name="FEN-1" desc="GAL. IRON (20+)">
    <CoordGeom>
      <!-- Standard CoordGeom Structure -->
    </CoordGeom>
  </PlanFeature>
</PlanFeatures>
```

NOTE: Among different types of `PlanFeatures`, only the chainage must include the attribute `@desc` within `PlanFeature/GoordGeom/Line`. This attribute includes the distance of line calculated by the software package (eg 2.09).

```
<PlanFeatures>
  <PlanFeature name="CHAIN-1" desc="Road Width">
    <CoordGeom>
      <Line desc="2.09">
          <Start pntRef="CGPNT-1"/>
          <End pntRef="CGPNT-2"/>
      </Line>
      <Line desc="8.56">
          <Start pntRef="CGPNT-2"/>
          <End pntRef="CGPNT-3"/>
      </Line>
      <Line desc="5.18">
          <Start pntRef="CGPNT-3"/>
          <End pntRef="CGPNT-4"/>
      </Line>
    </CoordGeom>
  </PlanFeature>
</PlanFeatures>
```

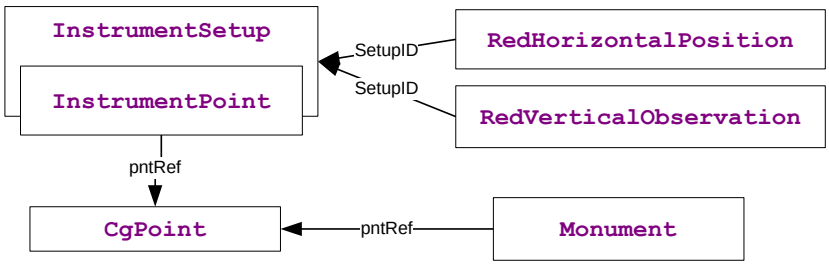


The points included in Plan Features are created based on the table below:

Attribute	Expected Value
Name	CGPNT – [#] eg `CGPNT-1` (sequentially numbered)
State	"Existing"
pntSurv	"monument" ("boundary" for BRT)

4.3 Survey Marks

Survey marks are captured using various elements shown in the diagram below. Some elements are optional as shown in the table below:



	CgPoint @pntSurv	Monument	InstrumentSetup	RedHorizontalPosition and/or RedVerticalObservation
PM	"control"	√	√	√
PCM	"control"	√	√	√
RM	"reference"	√	√	x
IP	"traverse"	√	√	x

The following elements are used to capture the geodetic coordinates of PMs and PCMs.

RedHorizontalPosition

Attribute	Expected Value
name	HP - [#] eg `HP-1`
oID	PM or PCM 9 figure number in SMES
desc	If PM, the official mark name eg “Prahran PM 1”. PCM has no official name, just the 9 figure number.
setupID	Reference to the `InstrumentSetup@Id` that this measurement is based off.
date	Date the coordinates were instated in SMES. New marks use the date of the sketch plan creation.
horizontalDatum	Horizontal datum eg MGA94
latitude	Official (undistorted) northing value. Zone is stored in `CgPoints`.
longitude	Official (undistorted) easting value. Zone is stored in `CgPoints`.
horizontalFix	The method used to determine position of the mark eg GPS (Differential).
currencyDate	Date last used
Order	For PMs and PCMs, valid values are in Victorian Reference Data List

RedVerticalObservation

Attribute	Expected Value
name	VO - [#] eg `VO-1`
oID	PM or PCM 9 figure number in SMES.
desc	If PM, the official mark name eg “Prahran PM 1”. PCM have no official name, just the 9 figure number.
setupID	Reference to the `InstrumentSetup@Id` that this measurement is based off.
date	Date the coordinates were instated in SMES. New marks use the date of the sketch plan creation.
verticalDatum	Vertical Datum eg AHD71
height	The reduced level value for this point. Units are based on the unit specified for `linearUnit` in the `Units` element.
verticalFix	The technique used to determine the height level.
currencyDate	Date last used.
order	For PMs and PCMs, valid values are in Victorian Reference Data List

The following elements are used to capture the mark state, condition, type and source of origin for all types of marks.

Monument

Attribute	Expected Value
name	MON - [#] eg `MON-1`
desc	Surveyor's description of the monument if type does not fully describe the monument. eg "Brass plaque in concrete with beacon".
pntRef	Reference to the `name` attribute of the linked `CgPoint`.
type	See Victorian Reference Data List
state	See Victorian Reference Data List
condition	See Victorian Reference Data List
originSurvey	Record plan number for reference marks found from previous plan. Refer to the current Plan Number if this is a new mark.

InstrumentSetup

Attribute	Expected Value
id	IS - [#] eg `IS-1`
stationName	Same as `id`
instrumentHeight	Not used in Victoria, default to 0

InstrumentPoint

Attribute	Expected Value
pntRef	Reference to the `CgPoint` for this `InstrumentPoint`

The following table shows the types of survey marks:

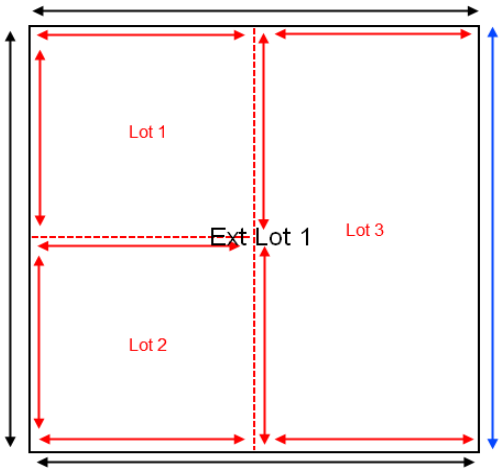
```
<CgPoints zoneNumber="55">
   <CgPoint name="CGPNT-1" pntSurv="control" state="existing" oID="355206260" desc="
TARNEIT PM 626">5809834 297734</CgPoint>
   <CgPoint name="CGPNT-2" pntSurv="control" state="existing" oID="112340524" desc="
PCM112340524">5809482 297556</CgPoint>
   <CgPoint name="CGPNT-3" pntSurv="reference" state="existing">5809516
297562</CgPoint>
   <CgPoint name="CGPNT-4" pntSurv="traverse" state="existing">5809517
297763</CgPoint>
</CgPoints>
<Survey>
   <InstrumentSetup id="IS-1" stationName="IS-1" instrumentHeight="0">
      <InstrumentPoint pntRef="CGPNT-1"/>
   </InstrumentSetup>
   <InstrumentSetup id="IS-2">...@pntRef="CGPNT-2"...</InstrumentSetup>
   <InstrumentSetup id="IS-3">...@pntRef="CGPNT-3"...</InstrumentSetup>
   <InstrumentSetup id="IS-4">...@pntRef="CGPNT-4"...</InstrumentSetup>
   <ObservationGroup id="OG-1">
      <RedHorizontalPosition name="HP-1" setupID="IS-1" oID="355206260" desc="TARNEIT
PM 626"
                date="2008-12-12" latitude="5809834" longitude="297734"
horizontalFix="Transformed"
                order="99" horizontalDatum="MGA94_Zone55"/>
      <RedHorizontalPosition name="HP-2" setupID="IS-2" oID="112340524"
desc="PCM112340524"
                date="2005-05-18" latitude="5809482" longitude="297556"
horizontalFix="Transformed"
                order="99" horizontalDatum="MGA94_Zone55"/>
   </ObservationGroup>
</Survey>
<Monuments>
   <Monument name="MON-1" pntRef="CGPNT-1" desc="TARNEIT PM 626" type="Plaque"
state="Existing" condition="OK" originSurvey="PS536638"/>
   <Monument name="MON-2" pntRef="CGPNT-2" desc="PCM112340524" type="Rivet"
state="Existing" condition="OK" originSurvey="BP1532"/>
   <Monument name="MON-3" pntRef="CGPNT-3" type="Spike" state="Existing"
condition="Found" originSurvey="PS536638"/>
</Monuments>
```

5. Parcel Definition

Generally, a parcel polygon is constructed using the points from its corners. Each line must have an equivalent boundary dimension/observation.

ePlan requires that all parcels being subdivided are captured as “Extinguished” parcels with their full spatial extent. Extinguished parcels should always share outer boundary points with created parcels where there is a change in bearing.

The diagram below shows all the required dimensions (`ReducedObservations`) for this scenario marked by arrows. The red arrows are dimensions required for a created parcel boundary. The black arrows are required for the extinguished parcel boundary. The blue arrow is a boundary used by both the extinguished and created parcels.



Parcels (eg lots, geometry easements) in ePlan are captured using CoordGeom element in LandXML. It consists of a structured organisation of points, lines and polygons linked together to describe the spatial extent of each parcel.

Polygon

The `CoordGeom` sub-element of `Parcel` contains the polygon structure of the object. It contains 3 types of line elements - `Line`, `Curve` and `IrregularLine`.

`Center` is required for parcels with `CoordGeom`.

The LandXML Structural Requirements document provides further explanation of all structure spatial elements, available at http://www.icsm.gov.au/sites/default/files/ePlan-Protocol-LandXML-Structural-Requirements-v1.0.pdf

5.1 Primary Parcels

Primary parcels are base level parcels that form the continuous cadastral fabric. They consist of lots, roads, reserves, common property, crown parcels and staged lots. In ePlan, they are captured using the Parcel element and must conform to the principles described in this document.

5.1.1 Lots

Lots can be captured as "single", “part” or "multipart" parcels. They are identified by Standard Parcel Identifier (SPI). Expected attribute values are shown in the table below.

Attribute	Expected Value
name	[#] \ [Plan Number] eg `1\PS123456`
class	"Lot", “Stage Lot”
state	"created", "affected", "extinguished", "existing", "referenced", "proposed"
parcelFormat	"Standard", "2D Building"
parcelType	"Single", "Multipart", "Part"
area	In m^2
Address	Extinguished, affected and existing lots (only for Boundary Plan) must provide the current street address in the `LocationAddress` element as it appears in Vicmap Address. Attributes and child elements are described in the Victorian ePlan Protocol.
	NOTE – A Locality needs to be selected as the `@adminAreaType` of the `LocationAddress`.
Title	Extinguished, affected and existing (only for Boundary Plans) lots must specify a `Title` reference. `<Title name="610/848" titleType="Freehold"/>`

5.1.2 Stage Lots

Stage lots can be captured in Staged Subdivisions similar to lots.

5.1.3 Roads

Roads in ePlan are represented by a `Parcel` element with a class of "Road". The common states for a Road are:

1. New: a road parcel created by the survey. Must have closed geometry.
2. Existing: an abutting or adjoining road used to fix the subdivision or provide reference. Geometry does not need to close.

The following guidelines apply to road parcels:

- The `@name` attribute of a road parcel must be unique in the file. Where available, an existing SPI should be used for existing roads. If a SPI is not available, the generic name of "ROAD-#" can be used. New roads must use a SPI. In addition, roads must specify an official or gazetted name (eg "Bourke Street") in the `@desc` attribute.
- Roads can be "single", "part" or "multipart" parcels. Each parcel should be associated with one road name (`@desc`). Where the road name changes at an intersection, a separate parcel should be used for the adjoining road. In situations where the road is split across several intersections, multipart parcels should be used each with their own SPI showing the part number (eg R1-p1), but the `@desc` value can be the same. The part parcels should be associated to a multipart parcel.
- All "created" and "affected" roads must contain the vesting authority in the `@owner` attribute.
- If the road is an abuttal, it must follow the guidelines outlined for title connections in Section 5.3.1.

Attribute	Expected Value
name	New - R [#] \ [Plan Number] eg `R1\PS123456` Existing - ROAD-[%] eg `ROAD-1`
class	"Road"
state	"created", "affected", "extinguished", "existing", "referenced", "proposed"
parcelFormat	"Standard", "2D Building"
parcelType	"Single"
area	In m^2
owner	Vesting Authority ("created" and "affected" roads)

5.1.4 Reserves

Reserves can be "single", “part”, or "multipart" parcels. All "created" and "affected" reserves must contain the vesting authority in the `@owner` attribute. "affected" and "extinguished" reserves must specify "Section 24A" in the ePlan's `PurposeOfSurvey` in the `SurveyHeader`.

Attribute	Expected Value
name	RES [#] \ [Plan Number] eg `RES1\PS123456`
class	"Reserve"
state	"created", "affected", "extinguished", "existing", "referenced"
parcelFormat	"Standard", "2D Building"
parcelType	"Single", "Multipart", "Part"
area	In m^2
owner	Vesting Authority

5.1.5 Common Property

Common Property parcels can be "single", “part”, or "multipart" and must be accompanied by an Owners Corporation.

Attribute	Expected Value
name	CM [#] \ [Plan Number] eg `CM1\PS123456`
class	"Common Property"
state	"created", "affected", "extinguished", "existing", "referenced"
area	In m^2
parcelFormat	"Standard", "2D Building"
parcelType	"Single", "Multipart", "Part"

5.1.6 Crown Parcels

Crown Parcels refer to crown allotments and crown portions.

Attribute	Expected Value
name	For Crown Allotments: [Allotment %] ~ [Section %] \ PP [Parish or Township Code] eg `31~2\PP5509` For Crown Portions: [Portion %] \ PP [Parish or Township Code] eg `1\PP4568`
class	"Crown Allotment" or "Crown Portion"
parcelFormat	"Standard"
state	"affected", "extinguished", "existing", "referenced"
parcelType	"Single", "Multipart", "Part"
area	In m^2

- Subdivision of Crown Parcels

When crown parcels are subdivided, they follow the same rules as Lots. They must contain a closed geometry. They must also contain a Title reference. Subdivided crown parcels will have `@state` of "extinguished" or "affected".

- Crown Abuttals

Crown abuttals are captured according to Section 5.3.1. Crown abuttals will have `@state` of either "existing" or "referenced".

5.2 Secondary Interest

Secondary interests in cadastral survey plans provide benefits and/or pose restrictions on primary cadastral parcels. These include easements, and restrictions. In ePlan, they are presented as special 'Parcels' that must conform to the principles described below.

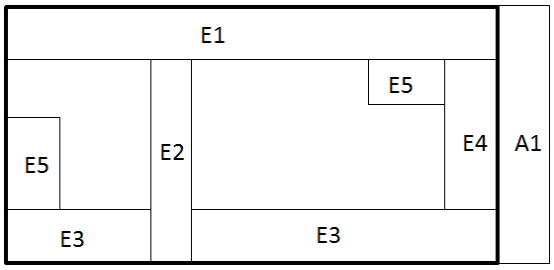
5.2.1 Easements

In ePlan, the following two steps must be carried out for creating easements:

1. Create a "Geometry" easement for each geometry segment on diagram, and
2. Create a "Standard"/"2D Building" easement for each unique combination of "purpose/origin/land benefitted" that includes the references to the geometry segments created in Step 1.

In **Step 1**, the geometry segments of easements must be drawn on the diagram as they currently appear on the PDF Plans (see figure A below).

NOTE: **The overlapping easements are labelled by the ePlan visualisation service (a random label is assigned to each part, eg E*4). However, it is recommended that the overlapping easements be drawn as Geometry easements and labelled by the surveyor if random labels make confusion.**



Geometry Identifiers:
E1: Standard Single + Multiple purpose
E2: Standard Single + Multiple purpose
E3: Standard Multipart + Single purpose
E4: Standard Single + Multiple purpose
E5: Standard Multipart + Single purpose
A1: Standard Single Appurtenant + Single purpose

Figure A - Geometry segments (one parcel per geometry)

Attribute	Expected Value
name	Encumbering - E [#] eg `E1` Appurtenant - A [#] eg `A1` Encumbering (Road) - R [#] eg `R1`
class	"Easement"
parcelFormat	"Geometry"
state	"existing"
parcelType	"Single", "Multipart", "Part"
area	In m^2

Geometry easements can be "Single", "Multipart" or "Part" parcels and must have "Geometry" in the `@parcelFormat` field. They must indicate the area in `@area` field. Regardless of the state of easement on the plan, Geometry easements can have "existing" state.

Geometry easements must be fixed to cadastral parcels by one of the following means:

- Connection to a point in the primary subject parcel
- Abut at least one primary subject parcel
- Fix to the corner of a primary subject parcel
- Fix to a primary subject parcel using at least two offsets

- Share corner or boundary with another non-extinguished easement that is connected via one of the above methods

LandXML Example for Geometry Easements Shown in Figure A (one parcel per geometry)

```
<Parcel name="E1" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Single" area="60">
<!-- Center & Polygon  --></Parcel>
<Parcel name="E2" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Single" area="24">
<!-- Center & Polygon --></Parcel>
<Parcel name="E3" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Multipart" area="50">
          <Parcels>
                <Parcel name="LNK-1" pclRef="E3-p1"/>
                <Parcel name="LNK-2" pclRef="E3-p2"/>
       </Parcels>
</Parcel>
<Parcel name="E3-p1" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Part" area="30">
<!-- Center & Polygon --></Parcel>
<Parcel name="E3-p2" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Part" area="20">
<!-- Center & Polygon --></Parcel>
<Parcel name="E4" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Single" area="20">
<!-- Center & Polygon --></Parcel>
<Parcel name="E5" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Multipart" area="35">
<!-- pclRefs to parts  similar to E3 --></Parcel>
<Parcel name="E5-p1" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Part" area="20">
<!-- Center & Polygon --></Parcel>
<Parcel name="E5-p2" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Part" area="15">
<!-- Center & Polygon --></Parcel>
<Parcel name="A1" class="Easement" state="existing" parcelFormat="Geometry"
parcelType="Single" area="50">
<!-- Center & Polygon --></Parcel>
```

Once the geometry easements are created, in **Step 2** for each unique combination of “purpose/origin/land benefitted” an easement with `@parcelFormat` "Standard" or "2D Building" must be created that includes the references to the geometry segments through `@pclRef` (see figure B and LandXML example below). Standard/2D Building easements can be "Single" or "Multipart" and have "existing", "created", "affected" or "extinguished" states.

Attribute	Expected Value
name	EAS [#] \ [Plan Number] eg `EAS1\PS123456`
class	"Easement"
parcelFormat	"Standard", "2D Building"
state	"existing", "created", "affected", "extinguished"
parcelType	"Single", "Multipart"
useOfParcel	See Section 6- Victorian Reference Data List

XML Parcel Name	Subject Land	Purpose	Width (m)	Origin	Land Benefited/In Favour Of
EAS1/PS700472	E1 & E4	Sewerage	See Diagram	This plan	City West Water Ltd
EAS2/PS630826		Carriage Way	See Diagram	PS630826H	Maribyrnong City Council
EAS3/PS630826		Transmission of Telecommunication Signals	See Diagram	PS630826H	Vol. 5489 Fol.726
EAS4/PS700472		Gas Pipeline	See Diagram	PS630826H - Section 146 of the Gas Industry Act 2001	SPI Networks (Gas) Pty Ltd
EAS5/PS700472	E2	Carriage Way	2	This plan	Maribyrnong City Council
EAS6/PS700472		Carriage Way	2	This plan	Lot 2 PS630826H
EAS7/PS700472		Carriage Way	2	This plan	Lot 1 & Lot A on this plan
EAS8/PS700472		Gas Pipeline	2	This plan - Section 146 of the Gas Industry Act 2001	SPI Networks (Gas) Pty Ltd
EAS9/PS700472	E3	Carriage Way	3	This plan	Lot 1 & Lot A on this plan
EAS10/PS700472	E4	Drainage	3	This plan	City West Water Ltd
EAS11/PS700472	E5	Carriage Way	See Diagram	This plan	Lot 1 & Lot A on this plan
EAS12/PS630826	A1	Carriage Way	3	PS630826H	Maribyrnong City Council

Figure B - Easements information (one Standard/2D Building parcel per easement purpose/origin/land benefitted)

LandXML Example for Standard/2D Building Easements Shown in Figure B (Geometry easements in figure A are linked to Standard/2D Building easements)

```
<Parcel name="EAS1\PS700472" class="Easement" state="created" parcelFormat="Standard"
parcelType="Multipart" useOfParcel="Sewerage" owner="City West Water Ltd">
        <Parcels>
               <Parcel name="LNK-1" pclRef="E1"/>
               <Parcel name="LNK-2" pclRef="E4"/>
        </Parcels>
</Parcel>
<Parcel name="EAS2\PS630826" class="Easement" state="existing" parcelFormat ="Standard"
parcelType="Multipart" useOfParcel="Carriage Way" owner="Maribyrnong City Council">
        <Parcels>
              <Parcel name="LNK-3" pclRef="E1"/>
              <Parcel name="LNK-4" pclRef="E4"/>
        </Parcels>
</Parcel>
<!-- EAS3 & EAS4 similar to EAS2 -->
<Parcel name="EAS5\PS700472" class="Easement" state="created" parcelFormat ="Standard"
parcelType="Single" useOfParcel="Carriage Way" owner="Maribyrnong City Council">
        <Parcels>
              <Parcel name="LNK-5" pclRef="E2"/>
        </Parcels>
</Parcel>
<!-- EAS6 - EAS8 similar to EAS5 -->
<Parcel name="EAS9\PS700472" class="Easement" state="created" parcelFormat ="Standard"
parcelType="Single" useOfParcel="Carriage Way" owner="Lot 1 & Lot A on this plan">
        <Parcels>
              <Parcel name="LNK-6" pclRef="E3"/>
        </Parcels>
</Parcel>
<Parcel name="EAS10\PS700472" class="Easement" state="created" parcelFormat ="Standard"
parcelType="Single" useOfParcel="Drainage" owner="City West Water Ltd">
        <Parcels>
              <Parcel name="LNK-7" pclRef="E4"/>
        </Parcels>
</Parcel>
<Parcel name="EAS11\PS700472" class="Easement" state="created" parcelFormat ="Standard"
parcelType="Single" useOfParcel="Carriage Way" owner="Lot 1 & Lot A on this plan">
        <Parcels>
               <Parcel name="LNK-8" pclRef="E5"/>
        </Parcels>
</Parcel>
<Parcel name="EAS12\PS630826" class="Easement" state="existing" parcelFormat ="Standard"
parcelType="Single" useOfParcel="Carriage Way" owner="Maribyrnong City Council">
        <Parcels>
               <Parcel name="LNK-9" pclRef="A1"/>
        </Parcels>
</Parcel>
```

Below there is a sample Easement Information table. The following summarises the mapping of the Easement Table to LandXML.

EASEMENT INFORMATION

LEGEND E-Encumbering Easement, Condition in Crown Grant in the Nature of an Easement or Other Encumbrance
A-Appurtenant Easement R-Encumbering Easement (Road)

Subject Land	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of
E - 1	PIPELINES OR ANCILLARY PURPOSES	SEE PLAN	THIS PLAN SEC 136 WATER ACT 1989	GOULBURN VALLEY REGION WATER AUTHORITY
E - 2	DRAINAGE	2.50	THIS PLAN	SHIRE OF MURRINDINDI AND LAND IN THIS PLAN
E - 3	PIPELINES OR ANCILLARY PURPOSES	SEE PLAN	THIS PLAN SEC 136 WATER ACT 1989	GOULBURN VALLEY REGION WATER AUTHORITY
	DRAINAGE	SEE PLAN	THIS PLAN	SHIRE OF MURRINDINDI AND LAND IN THIS PLAN
E - 4	FOOTWAY	SEE PLAN	THIS PLAN	LAND IN THIS PLAN
E - 5	PIPELINES OR ANCILLARY PURPOSES	SEE PLAN	THIS PLAN SEC 136 WATER ACT 1989	GOULBURN VALLEY REGION WATER AUTHORITY
	FOOTWAY	SEE PLAN	THIS PLAN	LAND IN THIS PLAN
E - 6	DRAINAGE	2.50	THIS PLAN	SHIRE OF MURRINDINDI AND LAND IN THIS PLAN
	FOOTWAY	2.50	THIS PLAN	LAND IN THIS PLAN
E - 7	DRAINAGE	SEE PLAN	THIS PLAN	SHIRE OF MURRINDINDI AND LAND IN THIS PLAN

Table Field	LandXML	Mapping Details
Subject Land	`Parcel[@class="Easement" and @parcelFormat="Geometry"]/@name`	Name(s) of Geometry easement(s) linked to a Standard/2D Building easement.
Purpose	`Parcel[@class="Easement" and @parcelFormat="Standard" or "2D Building"]/@useOfParcel` `Survey/SurveyHeader/Annotation[@type="Easement Purpose"]/@desc`	Purpose of the easement according to Section 6.1. If the intended purpose is not in the predefined list of purposes, 'Other' purpose can be picked from the list and an Annotation with type "Easement Purpose" can be created and linked to Standard/2D Building easement (through `@pclRef`).
Width	`Survey/SurveyHeader/Annotation[@type="Easement Width"]/@desc`	An annotation with type "Easement Width" can be created and linked to Geometry easement (through `@pclRef`).
Origin	`Parcel[@class="Easement" and @parcelFormat="Standard" or "2D Building"]/@name` `Survey/SurveyHeader/Annotation[@type="Easement Origin"]/@desc`	If origin is a Plan Number, it is captured in the parcel name (eg EAS1\PS123456, origin is PS123456). If origin is a dealing or instrument number (anything other than a Plan Number), an annotation with type "Easement Origin" can be created and linked to Standard/2D Building easement (through `@pclRef`).
Beneficiary	`Parcel[@class="Easement" and @parcelFormat="Standard" or "2D Building"]/@owner`	Captured in the parcel owner attribute.

5.2.2 Restrictions

Restrictions are a form of covenant that defines an area on one or more lots where limitations on the use of the land apply. There are 3 components of a restriction definition as highlighted by the example below:

1. Benefit and Burdened land
2. Textual description
3. Spatial extent (optional) – captured by `CoordGeom`

Attribute	Expected Value
name	RST [#] \ [Plan Number] eg `RST1\PS123456`
desc	Textual description of the restriction
class	"Restriction"
state	"created", "affected", "extinguished"
parcelFormat	"Standard", "2D Building"
parcelType	"Single", "Multipart", "Part"

Where the spatial description consists of multiple polygons, multipart parcels are used. The textual description resides in the parent parcel and is not duplicated to the parts.

If a restriction specifies an expiry date, the date is stored in a linked annotation with a type of:

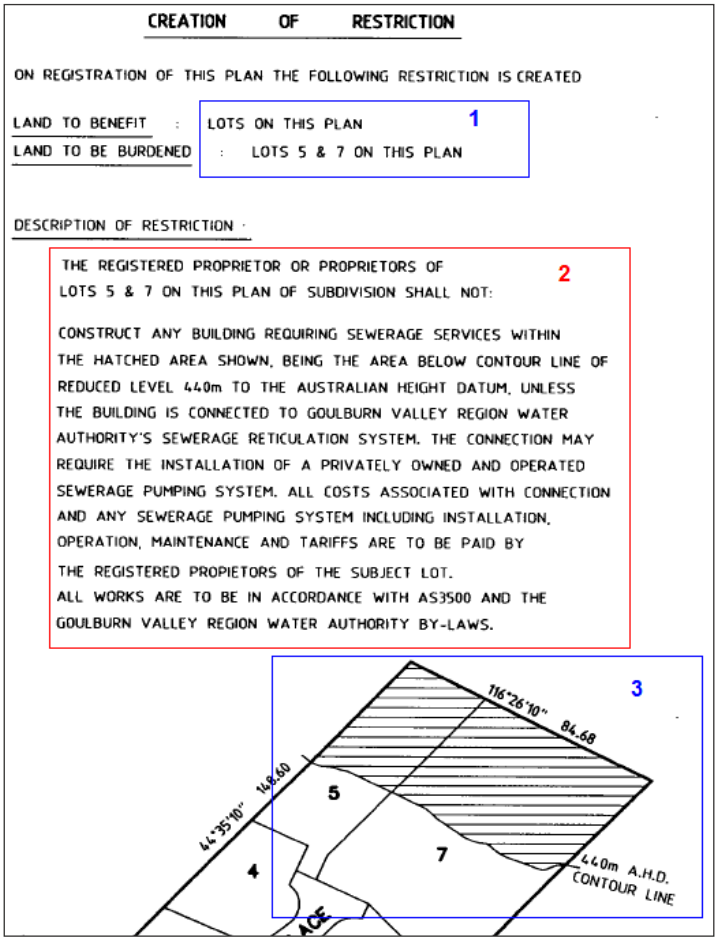
"Restriction Expiry Date"

The annotation must be linked to the restriction parcel using the `@pclRef` attribute. The following is an example:

```
<Annotation name="ANNO-1" type="Restriction Expiry Date" desc="2020-01-01"
pclRef="RST1\PS513165"/>
```

Restriction benefits and burdens are captured as title references. The `Title` element with type of "Restriction Benefit" or "Restriction Burden" is associated with the lot the restriction is benefitting/burdening. The LandXML Example is shown below.

For multipart restrictions, the benefit and burden can be allocated to individual "part" parcels. This is used in situations with several repeating footprints where the benefit or burden is the adjoining lots.



LandXML Example

```
<Parcels>
    <Parcel name="RST1\PS513165" desc="The registered proprietor or proprietors of lots 5 and 7 on this plan of subdivision shall not: etc..." class="Restriction" state="created" parcelType="Single">
        </Parcel>
        <Parcel name="5\PS513165" class="Lot" parcelType="Single" state="created" area="1000">
         <!-- Centre and CoordGeom Omitted -->
               <Title name="RST1\PS513165" titleType="Restriction Benefit" />
               <Title name="RST1\PS513165" titleType="Restriction Burden" />
         </Parcel>
         <Parcel name="7\PS513165" class="Lot" parcelType="Single" state="created" area="1000">
         <!-- Centre and CoordGeom Omitted -->
               <Title name="RST1\PS513165" titleType="Restriction Benefit" />
               <Title name="RST1\PS513165" titleType="Restriction Burden" />
         </Parcel>
</Parcels>
```

5.2.3 Depth Limitation

Depth limitation is a type of restriction that originates from the original crown grant. It is classically captured as a notation on the plan but in ePlan is captured as a non-spatial parcel.

Attribute	Expected Value
name	DL[#] eg `DL1`
desc	Depth of the depth limitation eg 15 metres
class	"Depth Limitation"

state	"Existing" (cannot be "Created")
parcelFormat	"Standard"
parcelType	"Single"

LandXML Example

```
<Parcels>
       <Parcel name="DL1" desc="15 metres" class="Depth Limitation" state="existing"
parcelType="Single"/>
</Parcels>
```

5.2.4 Owners Corporation

An Owners Corporation Schedule is captured using a non-spatial `Parcel` element. It does not require coordinate geometry or title references. The table below shows the expected attribute values for an Owners Corporation `Parcel`.

Owners Corporations must be linked to their member lots and common property.

Attribute	Expected Value
name	OC [#] \ [Plan Number] eg `OC1\PS123456`
class	"Owners Corporation"
state	"created", "affected", "extinguished", "existing"
parcelType	"Single"
useOfParcel	"Unlimited", "Limited to CP", "Limited"

The following rules apply when capturing Owners Corporations:

- All plans with Owners Corporations must specify "Owners Corporation Act 2006" in the `HeadOfPower` element.
- If lots or common property affected by an existing Owners Corporation are being varied ("affected") or "extinguished", "Section 32" or "Section 32A" must be shown as a `PurposeOfSurvey` value.
- "Section 32" plans must have at least one Owners Corporation with `@state` of "affected" or "extinguished".
- "Section 32A" plans must have an owners Corporation with `@state` of "extinguished".
- "Section 32B" plans must have an Owners Corporation with `@state` of "created".
- "Unlimited" and "Limited" Owners Corporation must be linked to at least two lots. "Limited to CP" Owners Corporations be linked to at least two lots and a common property.
- A "created" Common Property `@parcel` must be linked to a "created" Owners Corporation with a `@useOfParcel` of "Limited to CP" or "Unlimited".
- A lot cannot be linked to more than one Owners Corporation unless one is "Unlimited" and all the others linked to the lot are "Limited" or "Limited to CP".
- Liability and entitlement values must be recorded against all linked parcels. Entitlement and liability values for lots must be greater than 0 and for common property must be 0.
- Address must be assigned to Owners Corporation.
- Some annotations are required once an Owners Corporation is included in a plan.
- Member lots and common property are linked in the Owners Corporation `Parcel` using nested `Parcels`. Each nested `Parcel` contains a parcel reference (`@pclRef`) to the linked `Parcel` and values for `@lotEntitlement` and `@liabilityApportionment` values.

LandXML Example

```
<!-- Owners Corporation Schedule -->
<Parcel name="OC1\PS616582" desc="Owners Corporation 1 on PS616582X" class="Owners
Corporation" useOfParcel="Unlimited" parcelType="Single" state="created">
    <Parcels>
        <Parcel name="LNK-1" pclRef="CM1\PS616582" liabilityApportionment="0"
lotEntitlements="0"/>
        <Parcel name="LNK-2" pclRef="1\PS616582" liabilityApportionment="50"
lotEntitlements="50"/>
        <Parcel name="LNK-3" pclRef="2\PS616582" liabilityApportionment="50"
lotEntitlements="50"/>
        </Parcels>
</Parcel>
<Parcel name="CM1\PS616582" class="Common Property" parcelType="Single" state="created"
area="106"/>
<Parcel name="1\PS616582" class="Lot" parcelType="Single" state="created" area="168"/>
<Parcel name="2\PS616582" class="Lot" parcelType="Single" state="created" area="60"/>
```

5.3 Considerations in ePlan Creation

In order to create a valid ePlan these sections must be considered.

5.3.1 Title Connection for Primary Parcels

The title connection refers to the abuttals used to fix the subdivision to the surrounding land.

Abuttals are captured using Parcel elements. There are different methods for fixing a primary parcel. The following are two examples:

1. Road Abuttal Parcel
2. Crown Abuttal Parcel

The expected attribute values for unclosed Road abuttal parcels are shown below:

Attributes	Expected Value
name	ROAD-1
desc	The name of the road
class	“Road”
state	“Existing”
parcelType	“Single”
parcelFormat	“Standard”

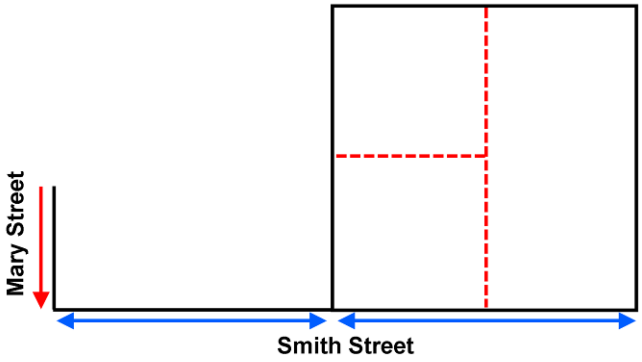
NOTE: An abutting Road can be a multipart unclosed Road. See Section 5.3.4 for more details about multipart parcels creation.

The expected attribute values for unclosed Crown abuttal parcels are shown below:

Attribute	Expected Value
name	Crown SPI eg `6~3\PP1234`
class	“Crown Allotment” or “Crown Portion”
state	“Existing” or “Referenced”
parcelType	“Single”
parcelFormat	“Standard”

Connection to Road Corner

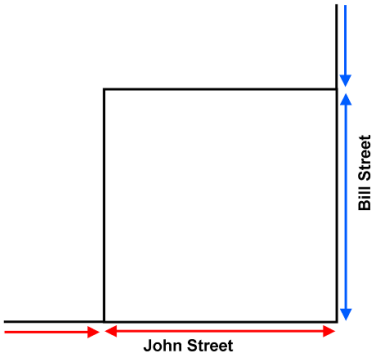
The coordinate geometry of the abuttal parcel does not require a closed polygon. Instead, only the abutting boundary line and observations are required. In this example, the Smith Street abuttal consists of two lines with two associated observations. Mary Street consists of one line that starts at the corner. Because only the bearing is important to Mary Street, the length can be based on visual appeal. A `Center` point must be used to correctly position the road names and indicate the correct side of the boundary for the road.



Corner Lot

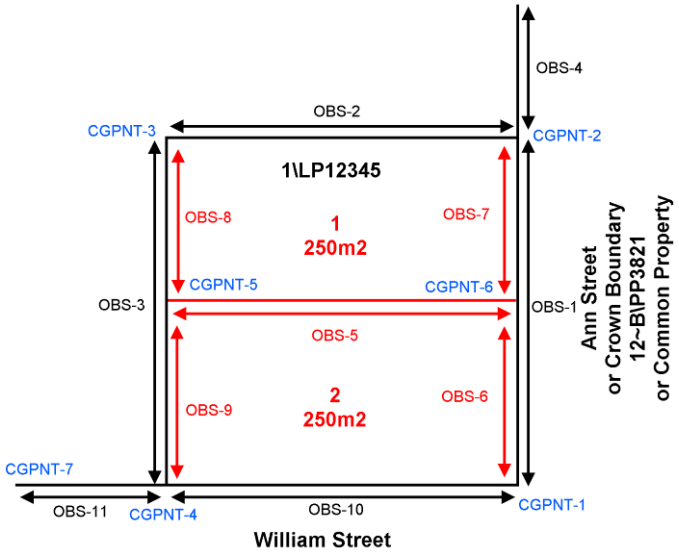
This scenario requires the subdivision to be fixed to a corner where one abuttal is a road and the other is either a road or crown boundary.

In the corner lot scenario, John Street and Bill Street consist of two lines and two observations. The continuation lines are an arbitrary length chosen for visual appeal.



In all scenarios, abuttal parcels share corners with the subdivision and therefore share corner points. There should only be one point at each corner, but it is referenced by all the parcels that share that corner. If this is not the case, the plan is not correctly connected and will fail validation.

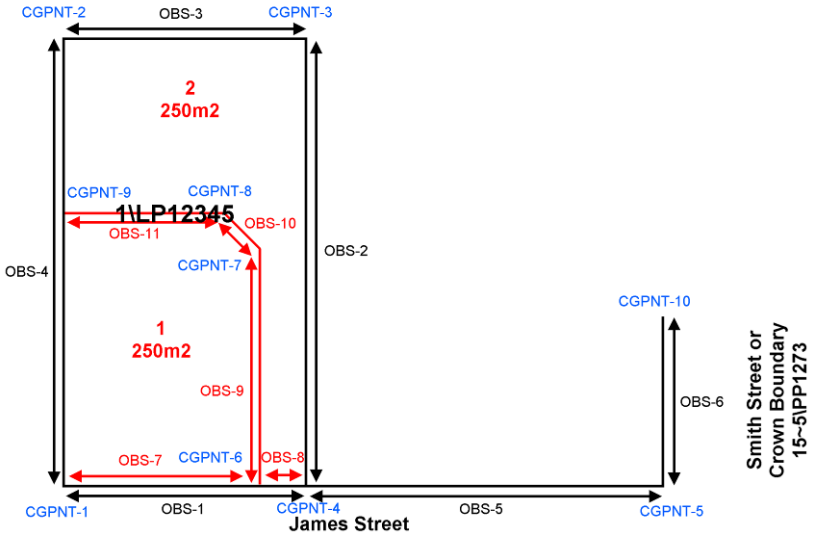
Any road or crown parcel used as an abuttal must have a Centre point element placed on the side of the boundary where the road name should be displayed. This indicates the side of the boundary occupied by the road/crown parcel.



The following section outlines valid scenarios for title connections in ePlan:

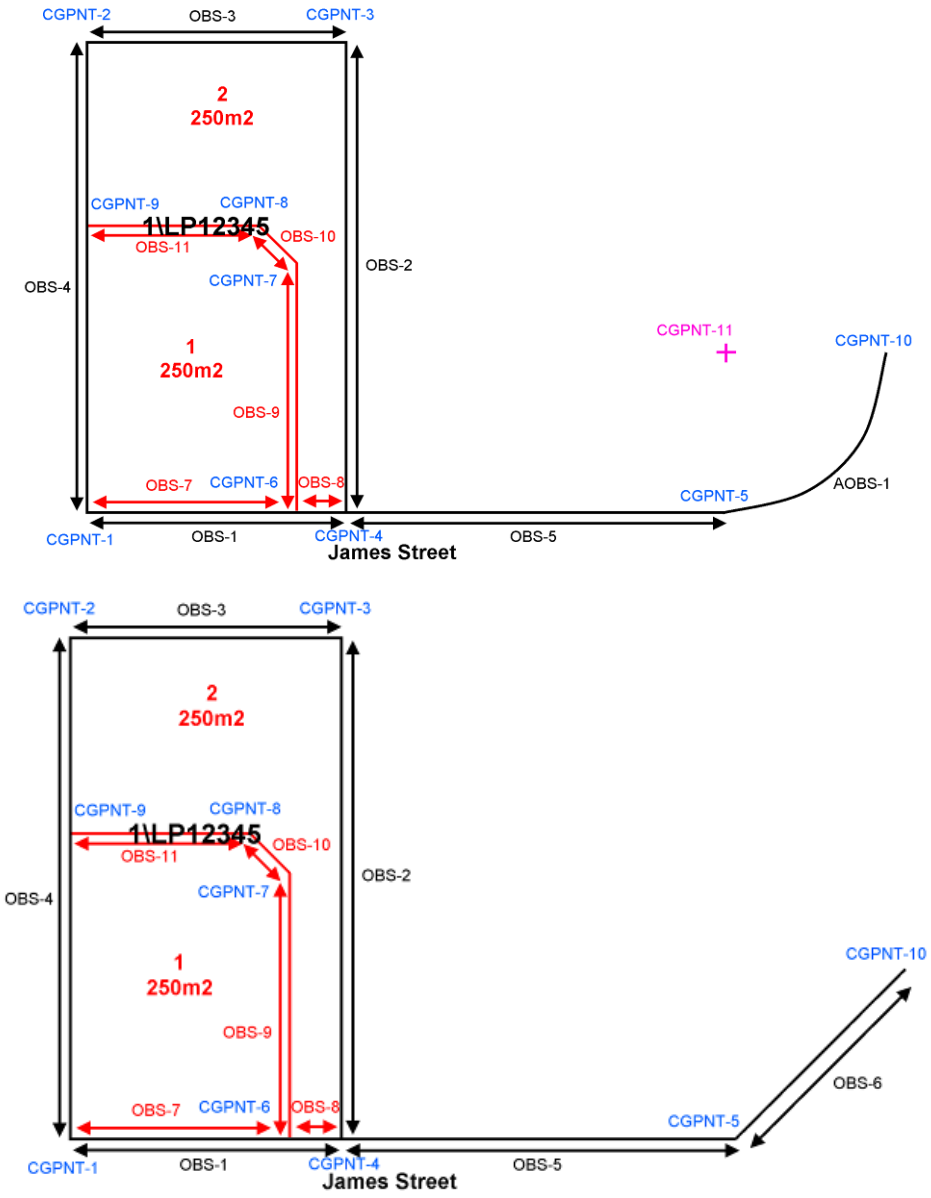
Standard Connection to road intersection or crown boundary

In this scenario, James Street consists of 2 lines. The connecting corner can be an intersecting road or a crown boundary belonging to either a current or historic crown allotment or portion.



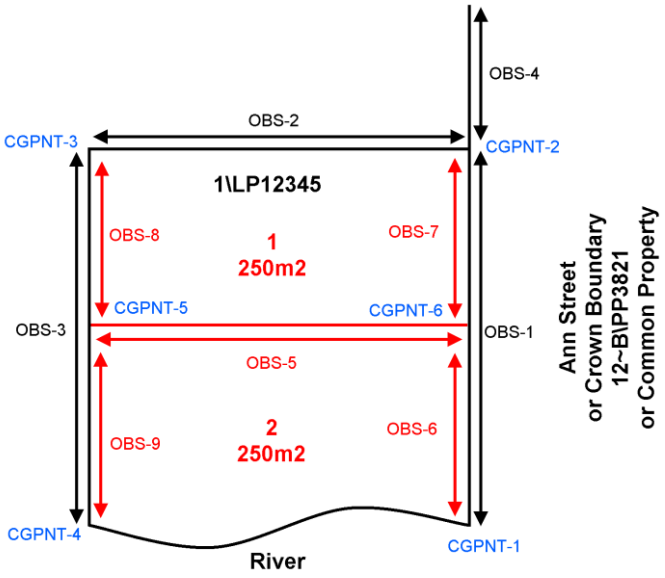
Connection to Road Bend or Curve

Where the connection is to a road curve or bend, the curve or bend must be shown in the coordinate geometry of the abutting road Parcel.



Fixed to Natural Boundary

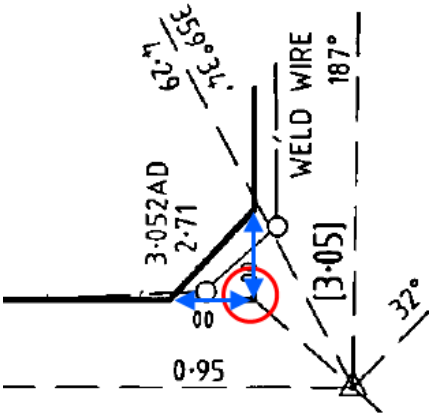
Where a natural boundary is used to fix the subdivision, the natural boundary must run along one side of the subdivision and intersect with the boundary of an abutting road, reserve, common property or crown boundary.



5.3.2 Road Splays

Road splays are captured using a `ReducedObservation` with `@purpose` of "topo". The splay point is represented as a "sideshot" point type. In the diagram below, the splay point is circled in red and the blue arrows represent the observations to the road corners.

Attribute	Expected Value
Name	CGPNT – [#] eg `CGPNT-1` (sequentially numbered)
State	eg “Existing”
	eg “sideshot”



5.3.3 Secondary Interest Geometry Rules

Secondary interests are captured using Parcel elements that float over base cadastral parcels. They are free to overlap any base parcels or other secondary interest parcels.

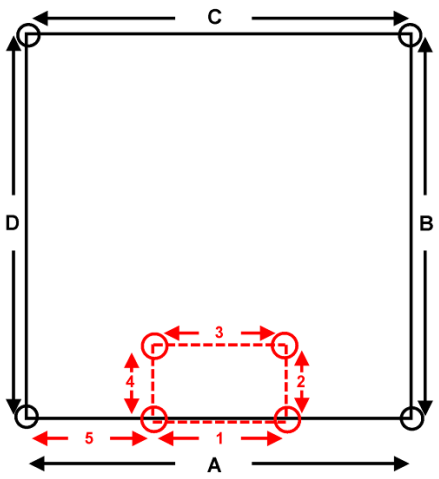
- Polygon Construction with Secondary Interests

Because secondary interests float over one or several other polygons, specific rules must be used in their construction. There are two valid methods in ePlan. The first keeps points and observations separate and the second combines them.

While both methods described below are technically valid, the preferred method in Victoria is the Structural Combining method. This is because it is easier for ePlan visualisation and the update of a survey accurate cadastre and other spatial databases.

  - Structural Separation

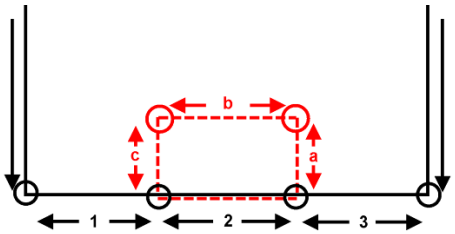
The Structural Separation method separates the spatial structure of underlying primary parcels from the floating secondary interests so that neither influences the structure of the other. The diagram below shows this in action. Black sections indicate the primary parcel. Red sections indicate the secondary interest. Circled corners indicate `CgPoints`. Polygon lines indicate `CoordGeom`. Arrows with labels indicate observations. The line marked with observation '5' is a radiation to a primary parcel corner for fixing and is not part of the secondary interest's `CoordGeom`.



Structurally, the secondary interest does not influence the shared boundary of the primary parcel. Observations and `CgPoint` are used specifically for 1 interest. The exception is the fixing observation which is not considered part of either interest's polygon.

– Structural Combining

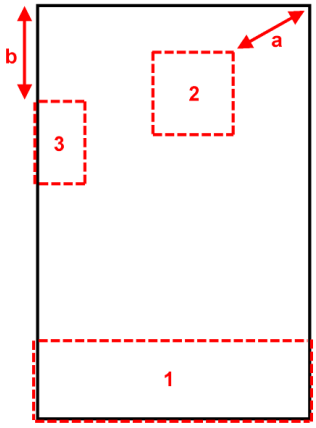
The same scenario using the Structural Combining approach splits the bottom boundary of the primary parcel into 3 segments where the secondary interest intersects. Observations 1 and 2 are shared between the 2 interests. Observation 1 acts as the fixing dimension for the secondary interest but also define the segment of the primary parcel boundary. There is no through dimension such as ‘A’ in the previous diagram. The `CgPoints` are also shared between the primary and secondary interests. The 2 black `CgPoints` at the ends of observation 2 are also used by the `CoordGeom` of the secondary interest.



- Secondary Interest Fixing

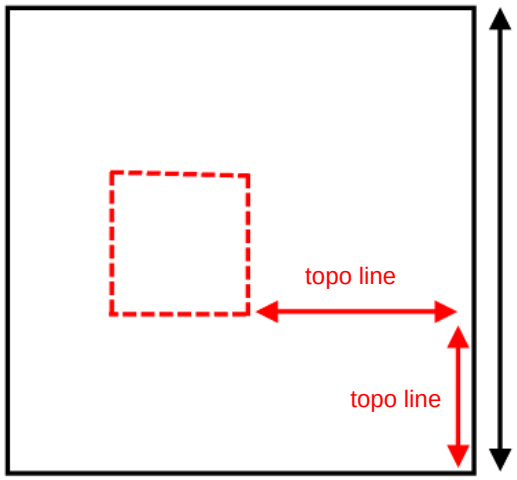
Secondary interests (eg easements, and restrictions) must be fixed to primary parcels (eg lots, roads, reserves, common property). This means, they must either share a corner with a primary parcel or be connected from a corner to a primary parcel corner using a special observation `@purpose` value of "topo". In all following examples, red arrows are "topo" observations, and black arrows are regular "normal" observations.

The diagram below shows the possible scenarios - Object 1 is the simplest scenario. The polygon shares the bottom 2 corners of the primary parcel and is therefore spatially fixed. Object 2 is floating inside the primary parcel and requires a radiation from one of its corners to a primary parcel corner to fix it. An observation at ‘a’ achieves this. Object 3 is floating on the boundary of the primary parcel but does not share a corner. Therefore, an observation at ‘b’ (topo line) is required between a corner of Object 3 and the primary parcel.

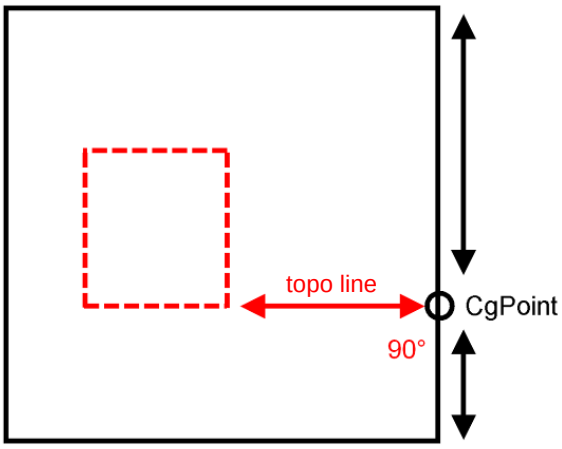


Secondary interest can also be fixed using offsets. In offsets, all 90 degree offsets must be converted to dimensions and captured with observations. Three methods can be used to achieve this.

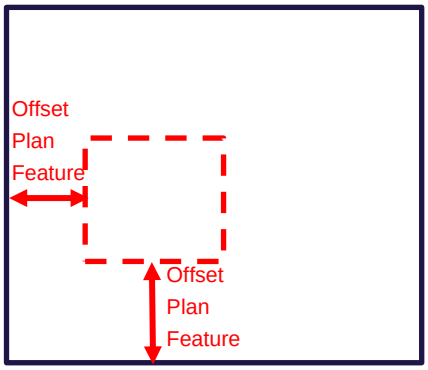
The first is to use 2 dimensions starting from the corner of the base lot and turning 90 degrees to hit the corner of the secondary interest polygon. This method follows the structural separation principle (See ***Structural Separation***) and avoids the boundary of the base lot being split.



The second method is to split the base lot boundary at a point, 90 degrees to the corner of the secondary interest polygon. This results in 2 or more observations for the base lot boundary with the same bearing. This method follows the structural combination principles (See ***Structural Combining***) and is more preferable.

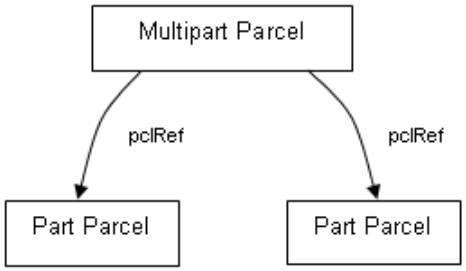


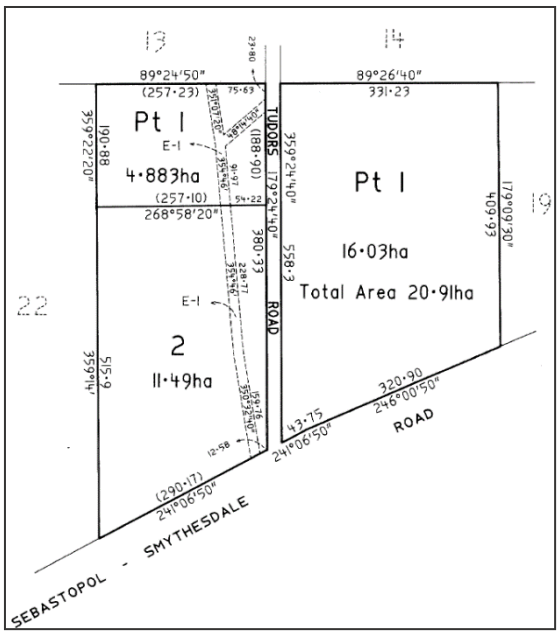
The third method is connecting the secondary interest polygon to primary parcel using at least two Plan Features with type “Offset”.



5.3.4 Multipart Parcels

A Multipart parcel is a parcel that consists of multiple closed (and unclosed for road connections) polygons. It is represented using a parent "multipart" parcel linked to 2 or more child "part" parcels which contain the coordinate geometry of each polygon.





NOTE: "Part" parcels have a different naming convention to regular lots to ensure they are unique in the file. [Prefix] [#] – p [#] \ [Plan Number] eg 1-p1\PS123456

NOTE: Exception for Part Geometry Easements (`@parcelType="Part" & @parcelFormat="Geometry" & @class="Easement"`), eg E1-p2 and Part Existing Road (`@parcelType="Part" & @state="existing" & @class="Road"`), eg Road-1-p1

Multipart parcels have the following features:

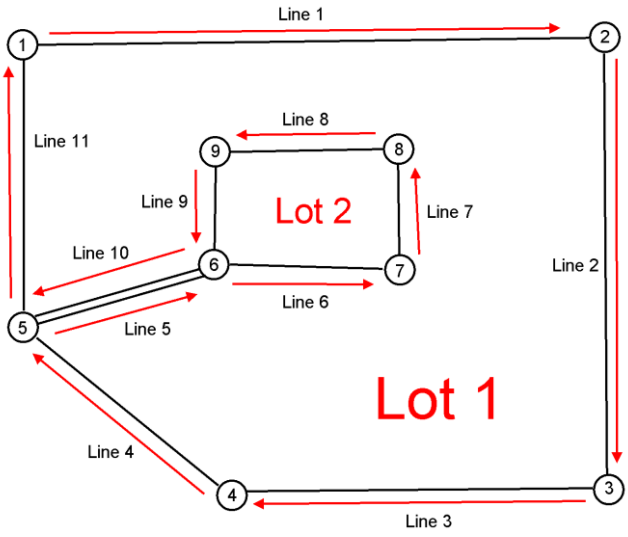
- The parent multipart parcel contains a `@parcelType` attribute value of "multipart". The child part parcels contain a `@parcelType` attribute value of "part".
- The "multipart" parcel contains parcel linkages to all the "part" parcels.
- `CoordGeom` and `Center` are required sub-elements of "part" parcels but not the parent "multipart" parcel.
- `@area` attribute is required for either all the "part" parcels or the "multipart" parcel, unless the "part" parcel contains a building boundary. If area is specified for both, then the "multipart" area must equal the sum of its "parts".
- The parent/child LandXML structure is created using parcel linkages in the "multipart" parcel element that links to each "part" parcel element. Parcel linkages are done using nested `Parcel` elements as shown in the example below.

LandXML Example

```
Parcel name="1\PS123456" class="Lot" state="created" parcelType="multipart"
parcelFormat="Standard" area="1000">
    <Parcels>
        <Parcel name="LNK-1" pclRef="1-p1\PS123456"/>
        <Parcel name="LNK-2" pclRef="1-p2\PS123456"/>
    </Parcels>
</Parcel>
<Parcel name="1-p1\PS123456" class="Lot" state="created" parcelType="part"
parcelFormat="Standard" area="500">...</Parcel>
<Parcel name="1-p2\PS123456" class="Lot" state="created" parcelType="part"
parcelFormat="Standard" area="500">...</Parcel>
```

5.3.5 Donut Parcels

Donut parcels are polygons that contain holes and are commonly used for surrounding common property and island parcels. Donut parcels are captured in LandXML as a single continuous simple polygon. ePlan supports all types of donut parcels including donuts within donuts. Donut parcels are captured in LandXML `CoordGeom` using an ordered continuous sequence of lines beginning and ending on the outer ring of the donut. The start point of the first Line element must be the same as the end point for the last Line element. Every Line's start point must be the same as the end point of the proceeding Line element. The implication of this method is the addition of "double lines" that connect to inner rings of the donut. O0ne line traces into the inner rings and the other line traces out.



- Principles of Donut Construction

The following principles apply to donut parcels in ePlan:

– The start and end points of a donut `CoordGeom` must reside on the outer ring.

- All CgPoint nodes must be referenced an even number of times by the donut `CoordGeom` for the donut to close.
- If a node is used more than twice (eg 4 or 6 times), it indicates the presence of a connection line(s) to an inner ring.
- The direction of inner rings reverses with each level of internal ring. If the outer ring is clockwise, then the first level internal ring will be anticlockwise, the second level internal ring will be clockwise, and so on.

•

• Example Donut Construction Algorithm

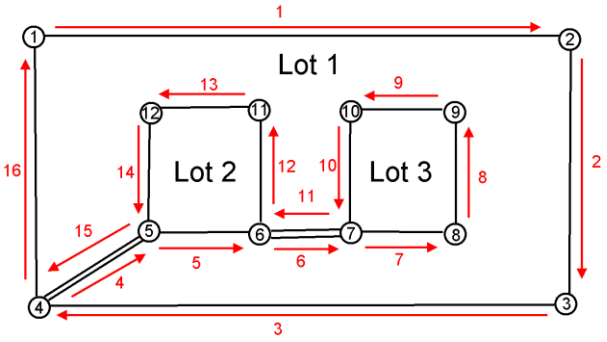
This algorithm is an example of how to approach constructing a donut `CoordGeom` from raw line work. It is by no means the only way and should serve as a guide only. To commence follow the steps below:

4. Set the rotation flag to clockwise.
5. Set the starting point to the north of the most westerly point, referenced by a max of 2 lines.
6. From the start point, follow the line that is the first line to the east of north (i.e. clockwise from North).
7. For each next line
    a. If one or more double line leaves the end point, follow each in order of "rotation" from the current line's bearing.
        i. If another double line leaves the end point, repeat a.
        ii. (After all double lines have been followed) If single lines leave the end point of the double line, mark this point as the point of inflection and reverse rotation flag. Then follow the first line in the direction of the rotation flag from the current line's bearing.
        iii. Reverse the direction of rotation flag when the last line from a point of inflection has been followed.
    b. (After all double lines have been followed) If a single line leaves the end point, follow it. If there is more than one single line, then follow the first line in the direction of rotation.
    c. Continue until all lines have been followed once. Do not follow lines more than once except double lines.

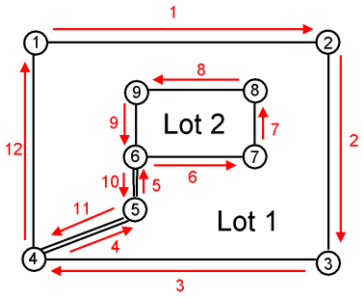
• Examples of complex donut constructions

In the examples below, numbered circles represent `CgPoints` and numbered red lines indicate `CoordGeom` Lines. The arrow head represents the end point of the line. Only the line numbering for Lot 1 has been shown. XML examples can be provided by contacting the ePlan support team.

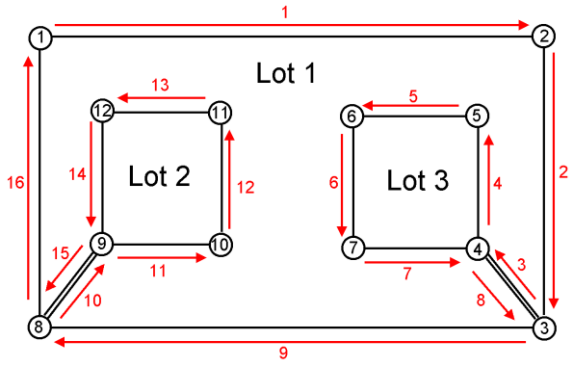
Daisy Chained Donut



Multiple connection lines

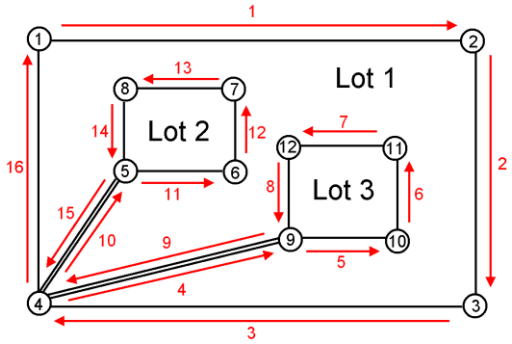


Multiple connections from different points

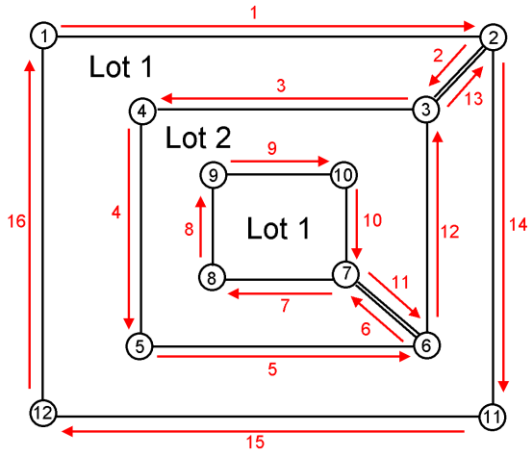


Multiple connections from the same point

This can be done in any order provided all the double lines are followed before the single line.



Donut within donut



5.3.6 Closure

All `Lines`, `Curves` and `IrregularLines` used in parcel's `CoordGeom` must close to form a polygon. This is achieved with the following rule:

- Each line, except the first, must have a `Start` point identical to the `End` point of the previous line.
- The `End` point of the last line must be identical to the `Start` point of the first line.

All parcel dimensions are expected to close within the allowable tolerances defined in Regulation 7 of the Survey Regulations 2015. This applies to all parcel classes but does not apply to parcels containing irregular lines or building boundaries. The misclosure tolerance specified in Regulation 7 is calculated as follows:

- The misclosure vector is determined as $\sqrt{a^2 + b^2}$ where “a” is the easting misclosure and “b” is the northing misclosure.

- Length of the misclosure vector must not exceed 15 millimetres + 100 parts per million of the perimeter. For example, the misclosure tolerance for a parcel with perimeter of 600m is calculated as 15 mm + 100 x 600 x 1000 / 1000000 = 75 mm

6. Victorian Reference Data List

6.1 Easement Purposes

Group 1 - Easements that can be accepted without further qualification

- Air Supply
- Flow of Air
- Passage of Air
- Air Exhaust and Ventilation
- Carriageway
- Drainage
- Drainage and Floodway
- Drainage and Sewerage
- Drainage and Waterway
- Erosion
- Fire Access
- Fire Escape
- Fire Egress
- Floodway
- Flooding
- Flow of Light and Air
- Footway
- Gas Distribution Pipeline
- Gas Transmission Pipeline
- Supply of Gas
- Flow of Light
- Passage of Light
- Other????
- Overhanging Eaves
- Overhanging Spouting
- Overhanging Balcony
- Party Wall
- Chimney
- Passage of Light and Air
- Pipeline or Ancillary Purposes
- Powerline
- Right of Entry
- Sewerage
- Soakage by Water
- Submergence
- Walkway
- Walkway in the event of '*activity*' in '*specific location'*
- Waterway
- Waterway Management
- Way

Group 2 - Easements that can be accepted with further qualification

- Channel
- Data Transmission
- Supply of Electricity
- Transmission of Electricity
- Ground Water Monitoring
- Irrigation
- Loading and Unloading Heavy Equipment
- Mail Collection
- Overhanging Projections
- Sanitary Convenience
- Supply of Recycled Water
- Supply of Water
- Support
- Telecommunications
- Underground Effluent Disposal
- Use of Stairway
- Vehicle Parking
- Waste Disposal
- Wetland

Group 3 - Easement purposes that should be referred to Legal Branch for opinion

- Bore, Windmill and Tank
- Garbage Collection/Garbage
- Laying Water Pipes
- Nuisance or Annoyance
- Public Conveniences
- Public Highway
- Quarrying and Blasting
- Recreation and Garden
- Signboard, Signage
- Tree Planting

Group 4 - One off type easements

- Air Exhaust, Ventilation and Access
- Vehicle Parking
- Carriageway (with Limitation and Obligation)
- Right of Access

NOTE: When easement purposes in groups 2, 3 or 4 are used in an ePlan, they will be flagged for attention during validation to indicate further qualification, notations or clarification may be required.

For more information also see this link.

6.2 Road Type

A
- Access
- Alley
- Alleyway
- Amble
- Anchorage
- Apartments
- Approach
- Arcade
- Arch
- Arterial
- Artery
- Avenue

B
- Banan
- Bank
- Basin
- Bay
- Beach
- Belt
- Bend
- Block
- Bluff
- Boardwalk
- Boulevard
- Boulevarde
- Bowl
- Brace
- Brae
- Branchline
- Break
- Bridge
- Broadway
- Brow
- Bypass
- Byway

C
- Causeway
- Centre
- Centreway
- Chase
- Circle
- Circlet
- Circuit
- Circus
- Claim
- Close
- Cluster
- Colonnade
- Common
- Concourse
- Connection
- Connector
- Copse
- Corner
- Corseo
- Corso
- Course
- Court
- Courts
- Courtyard
- Cove
- Crescent
- Crest
- Crief
- Crook
- Cross
- Crossing
- Crossroad
- Crossway
- Cruiseway
- Cul
- Cul-De-Sac
- Cutting

D
- Dale
- Dash
- Dell
- Dene
- Deviation
- Dip
- Distributor
- Divide
- Dock
- Domain
- Down
- Downs
- Drift
- Drive
- Driveway

E
- Edge
- Elbow
- Elm
- End
- Entrance
- Esplanade
- Estate
- Expressway
- Extension

F
- Fairway
- Fall
- Fare
- Farms
- Fen
- Fern
- Firebreak
- Fireline
- Firetrack
- Firetrail
- Flat
- Flats
- Follow
- Footway
- Ford
- Foreshore
- Fork
- Formation
- Freeway
- Front
- Frontage

G
- Gap
- Garden
- Gardens
- Gate
- Gates
- Gateway
- Glade
- Glades
- Glen
- Grange
- Green
- Ground
- Grove
- Gully

H
- Haven
- Head
- Heath
- Heights
- Highroad
- Highway
- Hill
- Hollow
- Hub

I
- Interchange
- Intersection
- Island

J
- Junction

K
- Key
- Keys
- Knob

L
- Ladder
- Lagoon
- Landing
- Lane
- Laneway
- Lea
- Leader
- Lees
- Leigh
- Line
- Link
- Lookout
- Loop
- Loops

M
- Mall
- Manor
- Mead
- Meander
- Mew
- Mews
- Mile
- Motorway
- Motu
- Mount

N
- Neaves
- Nook

O
- Oaks
- Outlet
- Outlook
- Overbridge

P
- Paddock
- Paku
- Parade
- Park
- Parklands
- Parkway
- Part
- Pass
- Passage
- Path
- Pathway
- Piazza
- Place
- Plateau
- Plaza
- Pocket
- Point
- Port
- Priors
- Promenade
- Pursuit

Q
- Quad
- Quadrangle
- Quadrant
- Quay
- Quays

R
- Ramble
- Ramp
- Ranae
- Range
- Reach
- Reef
- Reserve
- Rest
- Retreat
- Return
- Ride
- Ridge
- Ridgeway
- Right Of Way
- Ring
- Rise
- Rising
- River
- Riverway
- Riviera
- Road
- Roads
- Roadside
- Roadway
- Ronde
- Rosebowl
- Rotary
- Round
- Route
- Row
- Rua
- Rue
- Run

S
- Serviceway
- Shore
- Shunt
- Siding
- Slope
- Sound
- Spa
- Spur
- Square
- Stairs
- State High
- Steep
- Steps
- Straat
- Straight
- Strand
- Street
- Strip
- Subway

T
- Tarn
- Tee
- Terrace
- Throughfair
- Throughway
- Tollway
- Top
- Tor
- Tower
- Towers
- Track
- Trail
- Trailer
- Tram
- Tramway
- Traverse
- Trees
- Triangle
- Trunkway
- Tunnel
- Turn
- Twist

U
- Underpass

V
- Vale
- Valley
- Venus
- Viaduct
- View
- Views
- Village
- Villas
- Vista
- Vue

W
- Wade
- Walk
- Walkway
- Waters
- Waterway
- Way
- Wharf
- Whenua
- Wood
- Woods
- Wynd

XYZ
- Yard

6.3 Road Name Suffix

- A
- B
- Branch
- C
- Central
- Deviation
- East
- Extension
- Inner
- Lower
- Mall North
- North East
- North West
- Off
- On
- Outer
- South
- South East
- South West
- Upper
- West

6.4 Survey Mark Type

ePlan Element: `monumentType`

- Bolt
- Chisel Cut
- Cross Head Nail
- Deep Driven Rod
- Drill Hole
- Drill Hole with Wings
- Dumpy
- G.I. Nail
- Nail in Peg
- Nail in Rail
- Not Marked
- Peg
- Peg and Trench
- Pin
- G.I. Pipe
- Plaque
- Rivet
- Rod
- Reference Tree
- Screw
- Spike
- Star Picket
- Survey Nail
- Other
- SSM (Standard Survey Mark)
- Square Post
- Round Post
- Split Post
- Nail in Join
- Tree

6.5 Survey Mark Condition

ePlan Element: `monumentCondition`

- Abandoned
- Damaged
- Destroyed
- Disturbed
- Found
- Leaning
- Loose
- Nipple Damaged
- Not Found
- Not Used
- OK
- Origin
- Placed
- Plaque Missing
- Removed
- Replaced
- Suspect
- Unknown
- Unstable

6.6 Survey Mark State

ePlan Element: `monumentState`

- Existing
- New

6.7 Observations

Horizontal Order
`horzOrderType`

- 0
- 1
- 2
- 3
- 4
- 5
- 99

Horizontal Fix
`horzFixType`

- Adjustment
- Cadastral
- Digitised
- GPS (Differential)
- GPS (Kinematics)
- GPS (Single Point)
- Intersection
- Plot
- Radiation
- Resection
- Transformed
- Traverse
- Triangulation
- Unchecked Radiation
- Unknown

Vertical Order
`vertOrderType`

- 0
- 1
- 2
- 3
- 4
- 5
- 99

Vertical Fix
`vertFixType`

- Zeroth Order
- 2nd Order
- 3rd Order
- 4th Order
- GPS
- Trig Heighting
- Unknown
- Vertical Angles