# ePSALON

# Reference Manual

**Version 1**

**ePlan Services Pty Ltd**

# Contents

# Introduction

# Company and Product Information

ePlan Services Pty Ltd is a surveying information technology company based in Victoria. The company is staffed by practising IT professionals and licensed surveyors with a long history in cadastral surveying and software development.

ePSALON is an off-the-shelf software package developed and distributed by ePlan Services Pty Ltd for the generation of state government compliant ePlan format files. ePSALON works with existing survey drafting and computations packages, such as GeoCivil and AutoCAD, converting their data into ePlan compliant files. This documentation outlines firstly, how to prepare data in third party survey packages such as GeoCivil, and secondly, how to process this data in ePSALON to successfully output ePlan data.

## Copyright Information



## Contact and Company Details

ePlan Services Pty Ltd
ABN 961 514 66 189

PO Box 1193
Camberwell VIC 3124

Tel: +61 3 9809 0011
Fax: +613 9809 0022
Web: www.epsa.com.au

# *Assistance Operating ePSALON*

For assistance with ePSALON:

By phone: +61 3 9809 0011 during business hours

By email: ken@epsa.com.au or geoff@epsa.com.au

Assistance is also available through registered login to our website at www.epsa.com.au

# ePSALON System Requirements

You need to satisfy the following system requirements to be able to effectively use ePSALON:

- Intel® Pentium® III or later processor, or compatible
- Operating System:
    a. Microsoft® Windows 7 (32 bit)
    b. Microsoft® Windows 7 (64 bit)
    c. Microsoft® Vista (XP is preferred)
    d. Microsoft® Windows® XP (Professional, Home Edition, or Tablet PC Edition)
- Minimum 512 MB RAM (1GB recommended)
- 1024x768 VGA with true colour (minimum)
- Microsoft® Internet Explorer 4 (or later version)
- CD-ROM drive
- Mouse or other pointing device

# Licensing ePSALON

## Trial License

ePSALON is shipped with a trial license, which allows unrestricted use of all of ePSALONÕs functionality for the duration of the trial period. After the trial period has ended, the license expires and ePSALON will no longer run without upgrading to a full license.

Contact ePlan Services Pty Ltd (ph: +61 3 9809 0011, web: www.epsa.com.au) to upgrade your license.

# Installing an ePSALON License

ePSALON requires license activation in order to run unrestricted. ePSALON will utilise one of a variety of licensing schemes in order to run:

- Standalone License locked to a USB hardware key (dongle). One license is installed on any computer, and allows ePSALON to run when a specific dongle is plugged into it.
- Standalone License locked to particular computer.
- Trial License. Allows ePSALON to run for a period of time. Will not allow ePSALON to run once the trial period has expired.

# Data Preparation

This chapter describes how to prepare survey data for ePSALON using GeoCivil.

# Data Preparation Using GeoCivil

ePSALON works with existing survey drafting and computations packages, such as GeoCivil and AutoCAD, converting their data into ePlan compliant files. The primary geometry of a subdivision is captured using one of these packages prior to its export to ePSALON. This section of the documentation outlines how to prepare data in GeoCivil prior to its export to ePSALON.

## GeoCivil Usage

GeoCivil is a Windows based application that aids and manages the manipulation and development of three dimensional spatial data used within the land development, surveying, engineering design and planning industries. The toolset that comes with GeoCivil includes generic coordinate and geometric functionality, an integrated drawing environment plus tools that allow data processing to be performed.

GeoCivil commands can be accessed via drop down menu, toolbar buttons and also via option numbers which are typed into the command line at the bottom of the application window. Note that by clicking the main graphic window with the right mouse button (RMB) many of the menu options of particular relevance to ePSALON can be quickly accessed through a pop-up menu.

## GeoCivil Settings

1. In preparing data for ePSALON it is advised that the following toolbars (see image below) are opened. This is done by right clicking on the menu bar at the top of the application window:

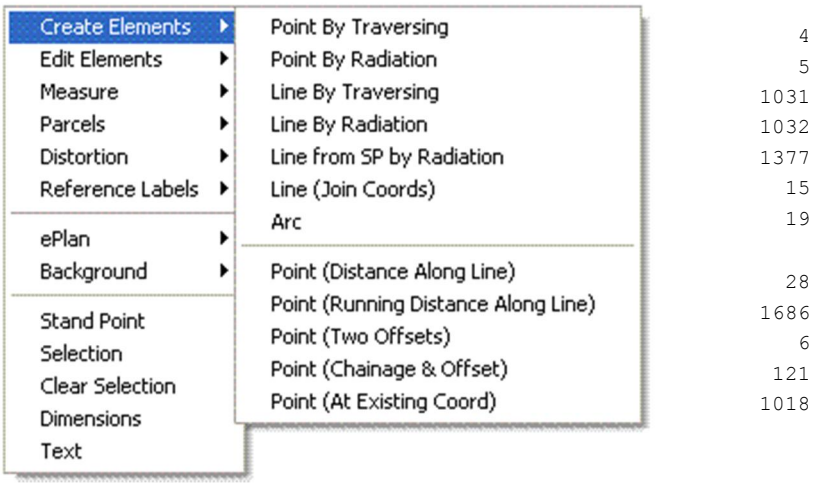

2. On the Level and Feature toolbar at the top of the application window set the Level to CADASTRAL
3. Set the Coordinate System in GeoCivil to MGA Zone xx. At the bottom left of screen, click the second information box from the left and from the ñChange Coordinate Systemò form that appears from the drop-down text box select the correct MGA Zone. Then click the OK button.

# *Relevant GeoCivil Functionality*

Much of the required GeoCivil functionality for generating ePlan compliant data is contained on the GeoCivil Right Mouse Button (RMB) popup menu. A command process can be exited at any time by pressing and holding the ñEscò key. Sometimes this is necessary between commands that expect repeated executions of the same procedure ï just press and hold the ñEscòkey.

The following graphics show which GeoCivil menu options are available through the RMB, and at right shows the command line option number for each function.

Under Create Elements you will find:




*Point By Traversing* - creates a Point element of the current feature by bearing and distance from the current Standpoint. The new Coord becomes the Standpoint.

*Point By Radiation Traversing* - creates a Point element of the current feature by bearing and distance from the current Standpoint. The Standpoint does not change.

*Line By Traversing* - creates a Line element of the current feature, by bearing and distance , connecting the new standpoint to the new Coord, which becomes the current standpoint.

*Line By Radiation* - creates a Line, connecting the ñJoin Coordò (generally last Coord created). The Standpoint remains unchanged.

*Line from SP by Radiation* - creates a Line element of the current feature, from the Standpoint to the new Coord. The Standpoint remains unchanged.

*Line (Join Coords)* - creates a Line element of the current feature, joining two clicked Coords.

*Arc* - creates an Arc element of the current feature, from the Standpoint, defined by radius, arc length and chord bearing

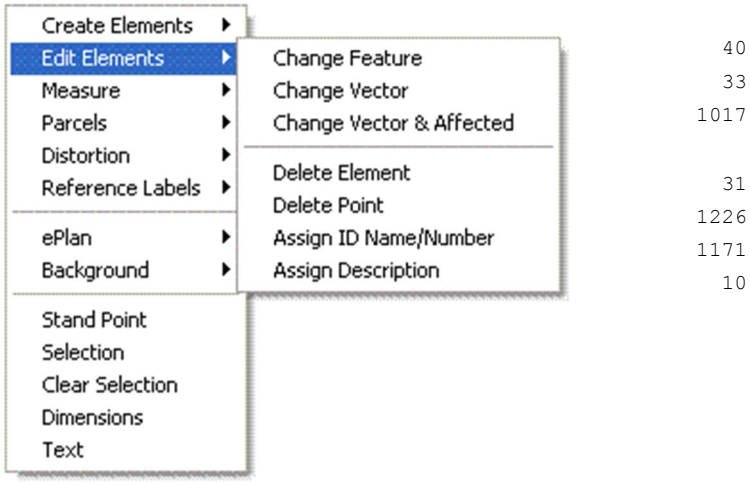
*Point (Along Line)* - creates a Point element of the current feature (or Line if the Join Toggle is ON) a distance along a selected Line (or between two clicked Coords).

*Point (Two Offsets)* - creates a Point of the current feature by square offsets, from two lines or two coordinate pairs.

*Point (Chainage & Offset)* - creates a Point of the current feature by running distance and a square offset.

*Point (At Existing Coord)* - creates a Point of the current feature, adopting the location of an existing Coord.

**Edit Elements** provides:




*Change Feature* - changes the feature of a clicked element to the current feature.

*Change Vector* - changes the bearing and/or distance of a Line or between two clicked Coords.

*Change Vector & Affected* - changes the bearing and/or distance of a Line or between two clicked Coords, and applies the resultant coordinate shift to all subsequently created Coords, linked by Standpoint with the altered Coord.

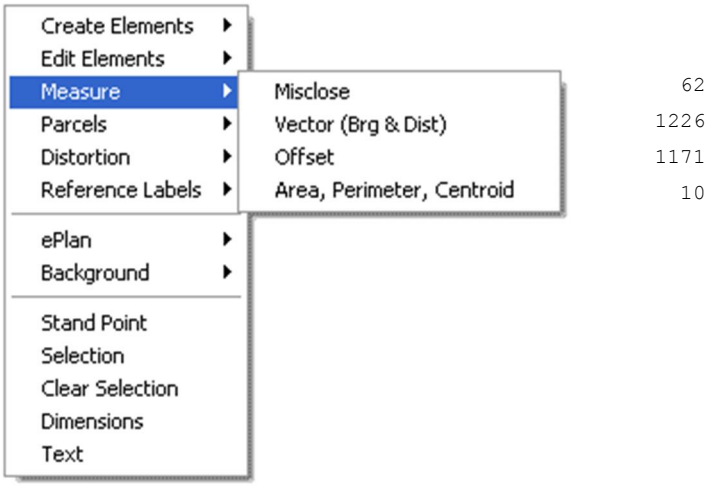
*Delete Element* - deletes a clicked Point, Line or Arc element.

*Delete a Point* - deletes a clicked Point element

*Assign ID Name/Number* - assign a unique alpha/numeric identifier to a clicked Coord

*Assign Description* - assign a description to a clicked Point, Line or Arc element.

**Measure** provides:



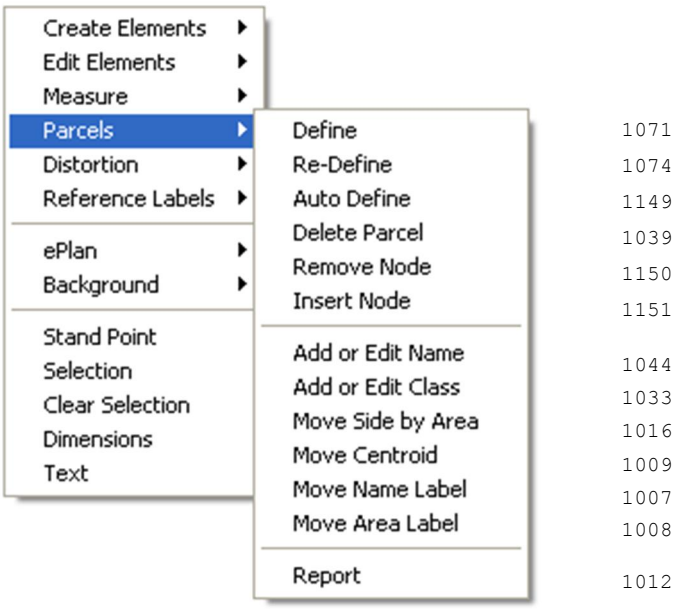

*Misclose* - back-tracks along the current traverse (line sequence) to its commencement and computes the closing vector. An opportunity is given to remove the misclose using a Bowditch adjustment.

*Vector (Brg & Dist)* - computes the bearing and distance of a clicked Line or between two clicked Coords.

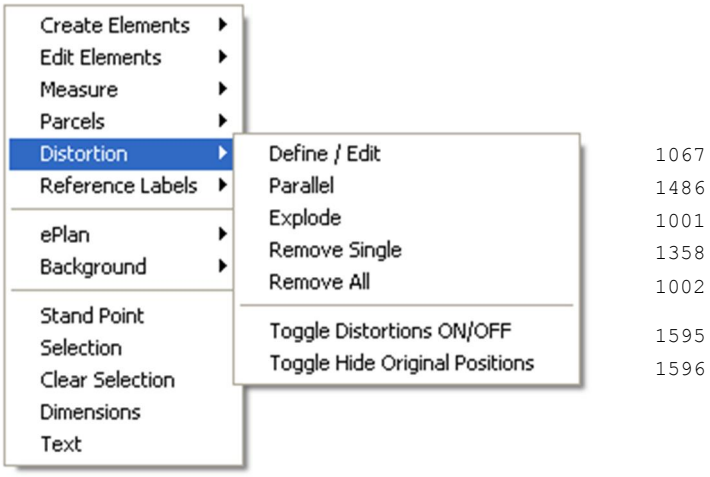
*Offset* - computes the distance from a clicked Coord, square to a clicked Line.

*Area, Perimeter, Centroid* - computes the area, perimeter length and centroid coordinates of the current polygon.

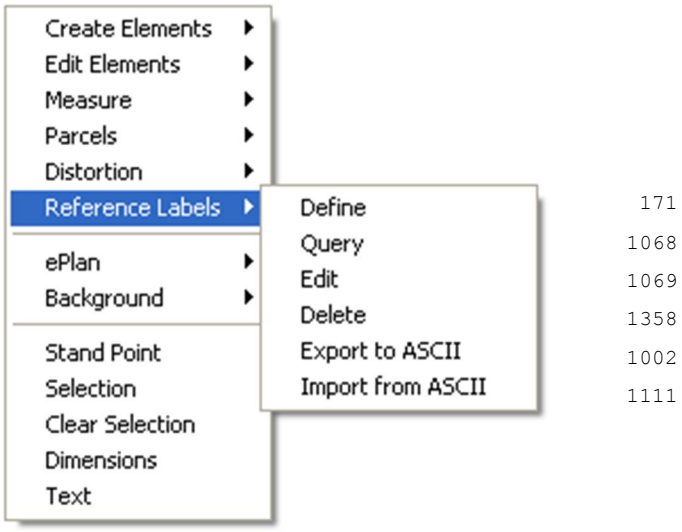
**Parcels** provides:



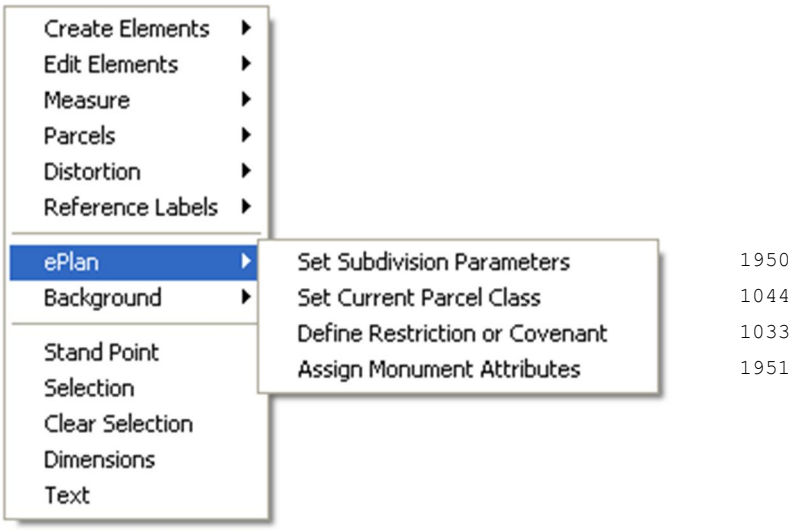

**Distortion** provides:



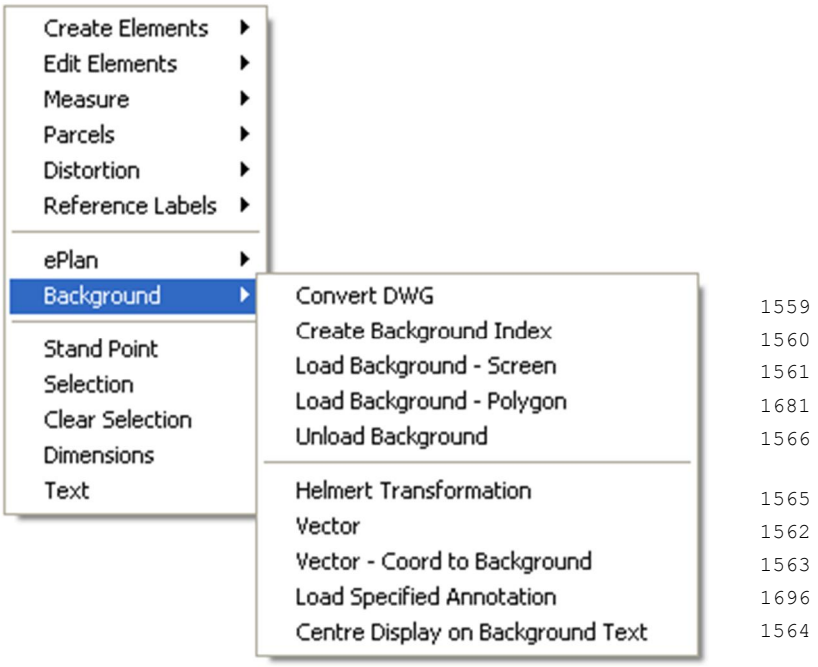
**Reference Labels** provides:




**ePlan** provides:



**Background** provides:




Note: The **Background** functionality is setup to display the Victorian cadastre as background to your project data. It converts the DWG format tiles to a GeoCivil format and displays the relevant tiles. This can be readily modified to accommodate any form of background graphics.

# *Feature Capture*

The key features to be captured in GeoCivil are:

- Traverses and Radiations connecting Monuments and other survey marks
- Boundary Lines defining the edges of Title, Roads, Lots, Reserves, Easements and the like
- Monuments comprising PSMs, PCMs, RMs, Title Pegs and the like
- Parcels (or polygons) representing Title being subdivided, Roads, Lots, Reserves, Easements and the like
- Abutting parcels (roads and crown allotments, etc)
- Connection to a road intersection, a bend in a road or crown boundary
- Plan features (optional)

The next sub-sections describe how these various features should be captured using GeoCivil.

Note: Although GeoCivil supports working directly on MGA, it is common practice to create or capture survey traverses and subdivision boundaries on an arbitrary coordinate system and transform onto MGA at a later stage. Cadastral data is generally represented by Line and Arc elements, with Point elements being created at node Coords as appropriate (e.g. survey mark, title peg, etc)

### *Traverse and Radiation Capture*

In this section traverses and radiations referenced in the Abstract of Field Notes are captured.

1. After setting the current feature (e.g. ñSurvey Mark - Placedòor ñPCM ï Foundò), create a starting Coord of known coordinate value (e.g. a PM) or simply commence ótraversingôin which case a default starting Coord will be created at E=1000, N=2000.

2. If creating a point element by coordinate input: a Point of the current Level and Feature will be created by mouse click or keyboard entry of X,Y coordinates

   *Procedure:*
   a. *From the Insert menu, choose Point > X, Y Coordinates; or click icon ; or key in command line option 3*
   b. *Enter easting, northing OR click spot.*
3. Set the Feature to ñTraverseò
4. Create a line element by bearing and distance input: a Line of the current Level and Feature will be created by bearing and distance, the new Coord becoming the next stand point.

   *Procedure:*
   a. *Use RMB (Right Mouse Button) > Create Elements > Line By Traversing; or click icon ; or key in command line option 1031*
   b. *Select the current stand point, if it is not already selected (this will be the monument point just previously keyed in – select it using the mouse cursor)*
   c. *Enter bearing from the current stand point for the traverse line to be created. Enter ] to add 90 degrees to last bearing. Enter [ to subtract 90 degrees from last bearing. Click on a Line or pair of points to adopt that bearing. Add + or - to the end of the bearing to reverse it.*
   d. *Enter the distance. Click on a Line or pair of points to adopt that distance.*
   e. *Repeat the process with the stand point advancing to the created point.*

   *Note: Just press **Enter** key to accept the bearing from the previous entry*

   *Note that the Define Stand Point command ( , command option 7) can be used to return to an existing start point from which to traverse in another direction. First press the Esc button to exit the current "Create Element" mode then Define the Stand Point.*

   *The Pan and Zoom buttons can be used to better show those parts of the data of importance at any particular stage.*
5. Create radiation elements in a similar fashion but using the ñCreate Lines ï Radiationsò tool - by bearing and distance input: a Line of the current Level and Feature will be created by bearing and distance, radiating from a fixed stand point.

   *Procedure:*
   a. *Set the Feature to "Radiation to Adopt", "Radiation to Occupation" or "Radiation to Survey Mark" as appropriate.*
   b. *Use RMB > Create Elements > Line from SP by Radiation; or key in command line option 1377*
   c. *Enter bearing from the current stand point for the radiation line to be created. Enter ] to add 90 degrees to last bearing. Enter [ to subtract 90 degrees from last bearing. Click on a Line or pair of points to adopt that bearing. Add + or - to the end of the bearing to reverse it.*
   d. *Enter the distance. Click on a Line or pair of points to adopt that distance.*
   e. *Repeat the process*

Note: At any stage of the traverse and radiation creation process a Point element may be created at a traverse or radiation node by setting the current feature as appropriate (e.g. Survey Mark) and then using RMB > Create Elements > Point at Existing Coord; or key in command 1018, Create a Point at an Existing Coord.

### *Boundary Line Capture*

In this section the lot boundary lines of the subdivision are captured.

As a general rule the outer boundary of a subdivision should be captured first and is generally created by the entry of bearings and distances. After entering the bearing and distance for the closing line, the ñmiscloseò should be analysed and, if within an acceptable tolerance, removed by applying a Bowditch adjustment. The results of the adjustment are reported to a log file. Use the Misclose command:

RMB > Measure > Misclose (Option 62)

The internal boundaries of a subdivision should then be captured (roads, lots and reserves). They are created by a combination of bearing and distance entry and a range of coordinate geometry routines. Similarly to the subdivision outer boundary, small misclosures should be identified and removed using the ñMiscloseò Option 62.

The capture of the subdivision boundary lines is fundamentally the same as the capture of the traverse and radiations, as follows:

1. Start from an existing Coord. This could be the end of a ñRadiation to Adoptò line already digitised ï set the Standpoint to this location. Alternatively create a point element of appropriate feature type (such as ñPeg ï Placedò) by coordinate input: a Point of the current Level and Feature will be created by mouse click or keyboard entry of X,Y coordinates:

   *Procedure:*
   c. *From the Insert menu, choose Point > X, Y Coordinates; or click icon ; or key in command line option 3*
   d. *Enter easting, northing OR click spot.*
2. Then set the Feature to ñCrown Boundaryò or ñLot Boundaryò, or a similarly appropriate feature type.
3. Create a line element by bearing and distance input: a Line of the current Level and Feature will be created by bearing and distance, the new Coord becoming the next stand point.

   *Procedure:*
   a. *Use RMB (Right Mouse Button) > Create Elements > Line By Traversing; or click icon ; or key in command line option 1031*
   b. *Select the current stand point, if it is not already selected (this will be the monument point just previously keyed in – select it using the mouse cursor)*
   c. *Enter bearing from the current stand point for the traverse line to be created. Enter ] to add 90 degrees to last bearing. Enter [ to subtract 90 degrees from last bearing. Click on a Line or pair of points to adopt that bearing. Add + or - to the end of the bearing to reverse it.*
   d. *Enter the distance. Click on a Line or pair of points to adopt that distance.*
   e. *Repeat the process with the stand point advancing to the created point.*

*Note: Just press **Enter** key to accept the bearing from the previous entry*

*Note that the Define Stand Point command (  , command option 7) can be used to return to an existing start point from which to traverse in another direction. First press the Esc button to exit the current "Create Element" mode then Define the Stand Point.*

*The Pan and Zoom buttons can be used to better show those parts of the data of importance at any particular stage.*

4. After completing the surround boundary line of the subdivision check the polygon misclose with the Misclose command. This will perform a Bowditch adjustment on the last sequence of Lines. The sequence is created automatically commencing at the most recently created Line and progressing back through the Line elements until a discontinuity is encountered (i.e. until we reach the end of a Line which does not connect to another line).

   *Procedure:*
   a. *Use RMB (Right Mouse Button) > Measure > Misclose; or key in command line option 62*
   b. *Use the screen cursor to identify the closing point. This is often the first Coord in the sequence but may be any other Coord*
   c. *Name the Adjustment, for instance "outer boundary"*
   d. *An option is given to remove the angular misclose, if a closing angle has been observed – more likely to be the case when closing a traverse*
   e. *A form appears listing the misclose and asking whether to make the adjustment. If the misclose is within an acceptable tolerance the adjustment should be made.*
   f. *If the adjustment is made a report listing the adjustments made and associated parameters is saved to the work directory and also listed to the screen. The end point of the lot polygon is closed onto the start point.*

5. Now repeat step 3 to create the internal lot boundaries of the subdivision, moving the Standpoint and changing the Feature setting as required. To close onto an existing point in the surrounding lot boundary exit the Line By Traversing tool (use Esc button) and use the ñJoin Coords with Line Elementsòoption: Lines are created by joining selected Coords.

   *Procedure:*
   a. *Use RMB (Right Mouse Button) > Create Elements > Line (Join Coords); or click icon  ; or key in command line option 15*
   b. *Using the cursor select the points to be joined*
   c. *On completion, hit the return key on the keypad to exit the function*

*Note that ePlan requires that existing lots – those being subdivided – are captured as "Extinguished" lots, and that their full spatial extent is shown – so these will need to be captured at this stage in a similar fashion.*

### *Monument Capture*

In this section monuments found, placed and otherwise referenced in the Abstract of Field Notes are captured. This is a two-step process starting with the placement of the point feature followed by its attribution.

Monuments are permanent marks, primary cadastral marks, reference marks, boundary marks, instrument points, and occupation such as fences and walls.

ePlan requires that monuments have the following attributes attached: type, state, condition, origin survey, ID number, description, and date, where these refer to:

**type**: the nature of the mark, whether peg, pipe or the like
**state**: whether found or placed or the like
**condition**: whether damaged or the like
**origin survey**: the record plan number for the survey in which the mark was placed (not required for new marks)
**ID number**: the PM unique 9 digit number, if relevant, for example, 355206260
**description**: the PCM number, PM name, or RM number, if relevant, for example, TARNEIT PM 626, PCM114450256, RM 12, or further clarifying remarks about the nature of the monument, such as ñBrass plaque in concrete with beaconò
**date**: the date on which the mark was registered in the state database

The following are valid monument types:

| | | | |
|---|---|---|---|
| *Occupation* | *Etch* | *Peg* | *Screw* |
| *Bolt* | *G.I. Nail* | *Peg and Trench* | *Spike* |
| *Bottle* | *HSM* | *Pin* | *Star Picket* |
| *Chisel Cut* | *Nail* | *Pipe* | *Star Picket with Collar* |
| *Cross Head Nail* | *Nail in Peg* | *Plaque* | *Star Steel Post* |
| *Deep Driven Rod* | *Nail in Rail* | *Plug* | *Steel Star Picket* |
| *Drill Hole* | *Not Marked* | *Rivet* | *Survey Nail* |
| *Drill Hole with Wings* | *Offset Nail* | *Rod* | *Survey Post* |
| *Dumpy Peg* | | *Reference Tree* | *Unknown* |

The following are valid monument states:

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

The capture and attribution of monuments is as follows:

1. Set the Feature to the appropriate type for the monument to be captured, such as ñSurvey Mark ï Placedò, ñPSM ï Foundò, ñPeg ï Placedò or the like. Occupation features are also considered monuments and should be captured as part of this process.
2. Create a Point of the current Feature at an existing Coord: a Point of the current Level and Feature will be created by mouse click on the screen

*Procedure:*

*a. Use RMB (Right Mouse Button) > Create Elements > Point (At Existing Coord); or click icon ; or key in command line option 1018 (or if the Coord does not yet exist from the Insert menu, choose Point > X, Y Coordinates; or click icon ; or key in*

*command line option 3 and then Enter easting, northing OR click the relevant spot on the screen)*

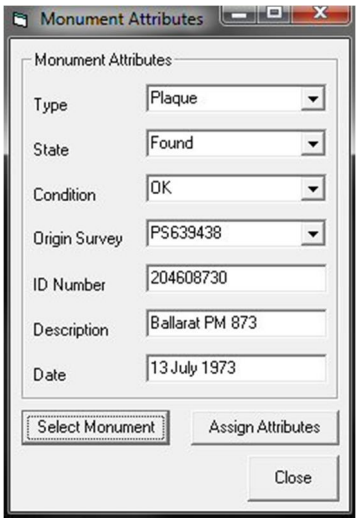
b. *Select the Coord on the screen where the new monument is to be created – for instance at the intersection of traverse lines or boundary lines*

3. Assign the attributes to the monument.

*Procedure:*

a. *Use RMB (Right Mouse Button) > ePlan > Assign Monument Attributes or key in command line option 1951*

b. *Use the following form to enter the attributes. Drop down menus are provided for the type, state, condition and origin survey fields. The monument to be attributed should first be selected using the "Select Monument" button and then attributed with the "Assign Attributes" button. If the Monument Attributes form does not reappear after selecting the point feature – the feature failed to be selected – and it is necessary to repeat the command in section "a" above. If more than one feature is selected a "tooltip" window appears listing all the possible selections and it will be necessary to select from this form the intended feature.*




*Note that to check that a feature has been correctly attributed hover the cross hair over the feature so that a temporary popup appears showing the features attributes. The right arrow key on the keyboard can be used to scroll through other features in the vicinity of the curser.*

4. Repeat this process until all the monuments are captured and attributed.

### *Parcel Capture*

In this section the capture of ñparcelsò is described. Parcels are Lots, Roads, Reserves, Easements and the like ï each of which are different ñclassesòof parcel. The following is the complete list of valid parcel classes:

| | | | |
|---|---|---|---|
| Lot | Easement | Crown Parcels | Township |
| Consolidated Lot | Restriction | Crown Allotments | Part Parcels |
| Common property | Owners Corporation | Crown Portions | Nested Parcel for linkages |

| | | |
|---|---|---|
| Reserve | Stage Lot | LGA |
| Road | Depth Limitations | Parish |

ePlan recognises two general types of parcel: Primary and Secondary. Primary parcels (lots, roads, common property, reserves and crown parcels) are constructed from the boundary lines already captured, secondary parcels (easements, restrictions and depth limitations) are not constrained to this degree but must connect to existing features already captured.

The following section describes in greater detail the capture requirements of the most common parcel classes. Note that Multi-part parcels are identified by the addition of -p1, -p2, etc to the primary parcel name.

A. Lots

Lots can be single or multi-part and must be closed polygons. Parcels being subdivided (extinguished parcels) are also required to be captured. Lots have the following attributes which should be populated:

| | |
|---|---|
| **name** | 1, 2, 3, etc |
| **class** | Lot |
| **state** | created<br>affected<br>extinguished OR<br>existing |
| **parcelType** | Single<br>Multipart OR<br>Part |
| **area** | in square metres |

B. Roads

Roads can be new or existing. ePSALON captures existing roads as part of Abuttals in a section described later in this document. New roads have the following attributes which should be populated:

| | |
|---|---|
| **name** | R1, R2, R3, etc |
| **class** | Road |
| **state** | created<br>affected<br>extinguished OR<br>existing |
| **parcelType** | Single |
| **area** | in square metres |
| **owner** | (the vesting authority) |

C. Reserves

There are numerous types of reserve, such as recreation reserves, municipal reserves and so on. Reserves have the following attributes which should be populated:

| | |
|---|---|
| **name** | RES1, RES2, etc |
| **class** | Reserve |
| **state** | created<br>affected<br>extinguished OR<br>existing |
| **parcelType** | Single<br>Multipart OR<br>Part |
| **area** | in square metres |
| **owner** | (the vesting authority) |

D. Common Property

Common Property has the following attributes which should be populated:

| | |
|---|---|
| **name** | CM1, CM2, etc |
| **class** | Common Property |
| **state** | created<br>affected<br>extinguished OR<br>existing |
| **parcelType** | Single<br>Multipart OR<br>Part |

E. Crown Parcels (allotments and portions)

Crown Parcels have the following attributes which should be populated:

| | |
|---|---|
| **name** | 12~3 (for CA12, Sec3 for example), 5 (for Portion 5,for example) |
| **class** | Crown Allotment OR Crown Portion |
| **state** | affected<br>extinguished<br>existing OR<br>referenced |
| **parcelType** | Single |
| **area** | in square metres |

F. Easements

Easements can have independent geometry from the boundary line features but nevertheless must be located relative to the boundary line features by abuttal to a boundary line or radiation from a cadastral corner.

Easements have the following attributes which should be populated:

| | |
|---|---|
| **name** | E1, E2, etc |
| **class** | Easement |
| **state** | created<br>affected OR<br>extinguished |
| **parcelType** | Single<br>Multipart OR<br>Part |
| **useOfParcel** | the type or use of the easement |

The following are valid useOfParcel entries:

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

| | |
|---|---|
| Footway | *location(* |
| Gas Distribution Pipeline | Waterway |
| Gas Transmission Pipeline | Waterway Management |
| Supply of Gas | Way |

The following are valid useOfParcel entries ï but require further qualification:

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

Note that there are some additional useOfParcel entries that should be referred to Land Registry for an opinion prior to use, and some õone-offòtype entries.

The relevant GeoCivil command option numbers and icons for the creation of parcels are from the following options.

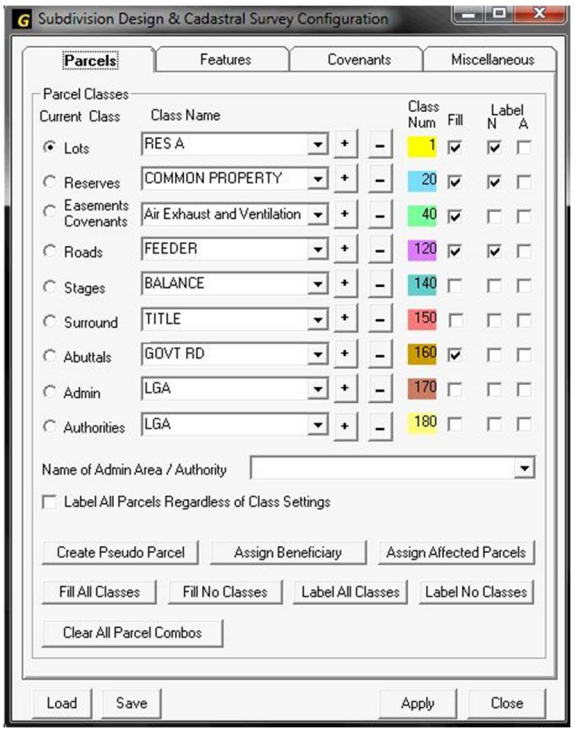
| | |
|---|---|
| Options ï Estate Design Configuration | Option 3000 |
| Define Parcel by Node Coords | Option 1071 |
| Create Polygon Enclosing Mouse Click | Option 1149 |
| Delete Parcel Node | Option 1150 |
| Insert Parcel Node | Option 1151 |
| List Parcel Coords | Option 1238 |
| Re-define Land Parcel Coords | Option 1074 |
| Add or Edit Parcel Name | Option: 1044 |
| Add or Edit Parcel Class | Option 1033 |
| Move Parcel Boundary to Achieve Area | Option 1016 |
| Re-compute Area of Parcel | Option 1042 |
| Re-compute Area of All Parcels | Option 1043 |
| Subdivision Lot Check | Option 75 |
| Parcel Report | Option 1012 |
| Re-locate Parcel Name/Number | Option 1007 |
| Re-Locate Parcel Area | Option 1008 |
| Re-locate Parcel Centroid | Option 1009 |
| Delete a Parcel | Option 1039 |
| Delete All Parcels | Option 1082 |
| Delete Parcel by Array Position | Option 1578 |
| Re-instate a Parcel | Option 1147 |
| Define Parcel Fill Range and Colour | Option 465 |
| Hatch All Parcels | Option 1019 |
| Display Parcel Info On Grid | Option 1003 |

The capture and attribution of parcels is as follows.

1. Set the Class of the Parcel to the appropriate type such as ñLotò ñRoadò or the like. In GeoCivil the Class of the parcel is set prior to its capture using the Subdivision Design form.

   *Procedure:*

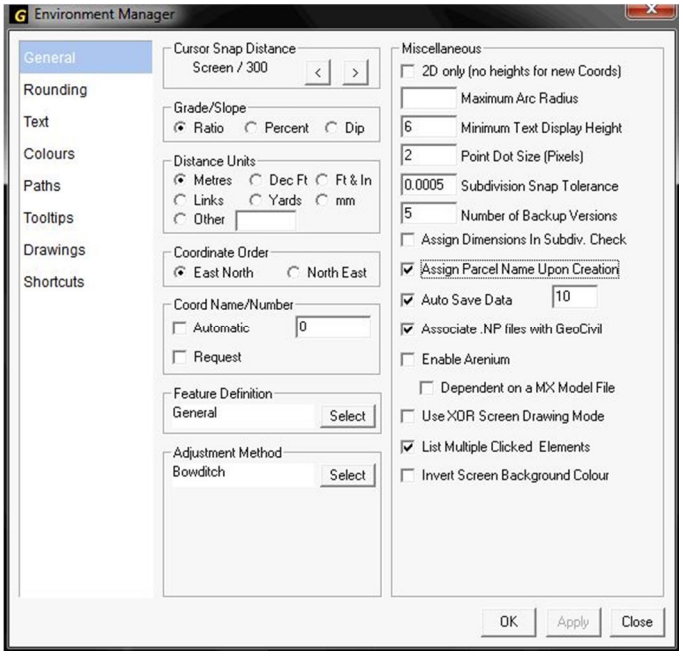
   a. *Use RMB (Right Mouse Button) > ePlan > Set Subdivision Parameters; or Set Current Parcel Class; or key in command line option 1950. The following form appears.*




*b. Select the Parcels tab*

*c. Select the Class (radio button) that is to be current, for instance "Lots". Click the "Apply" button and then Close the form.*

*Note that Parcel names/numbers may be assigned at the time of parcel creation by ticking Assign Parcel Name Upon Creation on the Environment Manager, General tab. Alternatively the name/number can be assigned retrospectively using RMB > Parcels > Add or Edit Name ; or keying in command line option 1044. The Environment Manager is found under the Tools drop down menu. The following is the Environment Manager form.*



d. *Use RMB (Right Mouse Button) > Parcels > Define; or click the icon (see above) ; or key in command line option 1071. The following form appears.*

e. *Select the parcel coords with a LEFT mouse button click. The following key / mouse button combinations can be used:*

*RIGHT – Close polygon*

*SHIFT LEFT – Arc centre, or click on the arc*

*SHIFT RIGHT – Remove last node*

*CTRL LEFT – Start Irregular Boundary*

*ALT LEFT – End Irregular Boundary*

*After closing the parcel, enter the parcel name if requested. Note that the pan/zoom buttons can be used during the coord selection process to ensure that the correct coord is selected.*

f. *Return to step (d) to complete capturing all the parcels of the current Class.*

g. *Return to step (a) to change the parcel Class and then capture instances of that Class.*

*Note that the State, parcelType and useOfParcel fields are populated with the ePSALON application, later in the data capture process.*

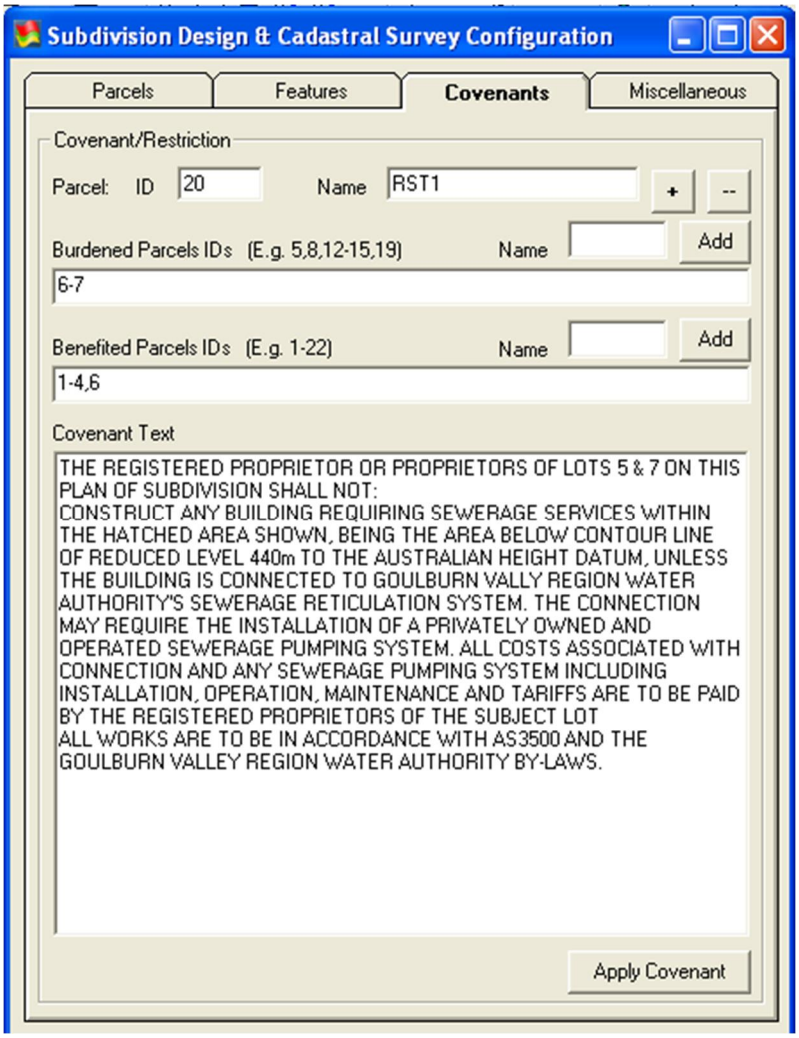
When capturing Secondary parcels, such as easements, the following should be noted.

A. Easements

- Easements are captured with one parcel for each interest (e.g. drainage, pipeline, etc) with a naming convention of E1, E2, and so on as previously noted, plus with the addition to the primary parcel name of -p1, -p2, etc for multi-part parcels (comprising more than one polygon).
- The easement beneficiary may be an *Authority* (owner) OR *Land on the plan* (title reference) and must be either *Appurtenant* or *Encumbering*.
- Implied easements do not require a parcel reference.

B. Restrictions/Covenants

- A restrictive covenant is created as a parcel to which attributes are assigned on the Covenants tab of the *Subdivision Design & Cadastral Survey Configuration* form; or *RMB> ePlan > Define Restriction or Covenant*. The following form appears.




- Restrictions or covenants should be named RST1, RST2, etc.
- Each Restriction parcel needs to be assigned the Burdened Parcels and Benefited Parcels ï these are entered into the form (above) using the Names of the parcels.
- The covenant details are assigned as a block of text entered in the form (above).

C. Common Property and Owners Corporation

- Common Property parcels can be single or multi-part and must be accompanied by an Owners Corporation.
- When capturing the spatial extent set the parcel class to Reserves > COMMON PROPERTY and then fully define the polygon nodes. Assign a parcel name of the form CM#.
- Then set the parcel class to Admin > OWNERS CORPORATION and create a Pseudo Parcel.

D. Depth Limitation

- Depth Limitation parcels adopt a name based on its origin, which is generally the original crown allotment parcel(s) e.g. DL-13~3\PP1234 with 50 feet commonly being the depth.
- In GeoCivil a parcel has a Z value attribute. If this field holds a negative value it is assumed to be a depth limitation.

- Use the command RMB > Parcels > Add or Edit Depth Limit (Option 1137) to assign a depth limitation to the parcel.

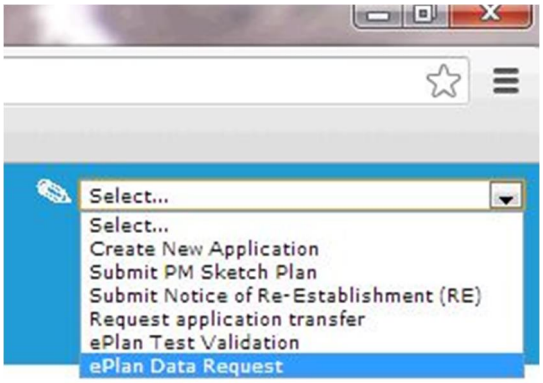
### *Abuttal Capture*

In this section the capture of abutting detail such as roads and crown allotments, and the capture of a connection to the subdivided land, such as a connection to a road intersection, a bend in a road or crown boundary are described.

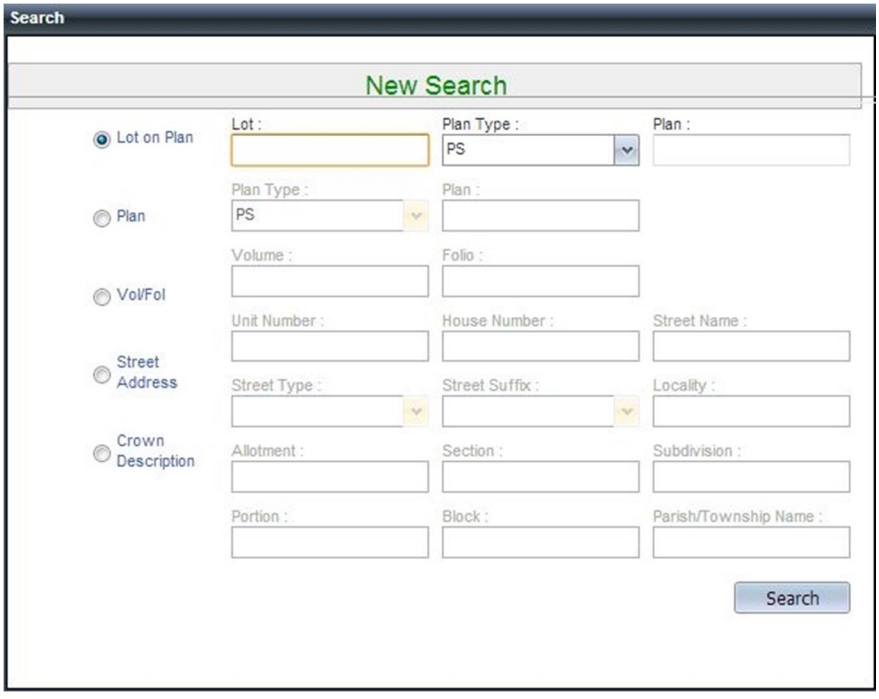
Most, but not all, of the abutting information required for ePlan can be downloaded through the SPEAR application.

*Procedure:*

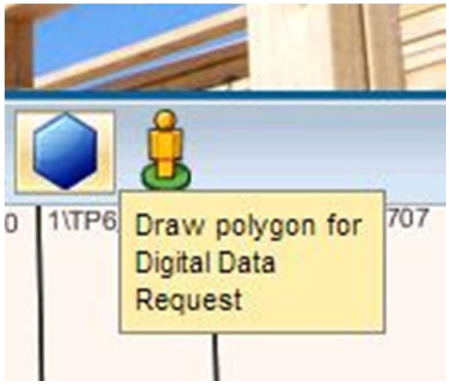
a. *Start and login to the SPEAR application. At the top right of the main application window click the dropdown and select the "ePlan Data Request" option, as illustrated below.*




b. *In the search window that appears (see below) key in the property details.*

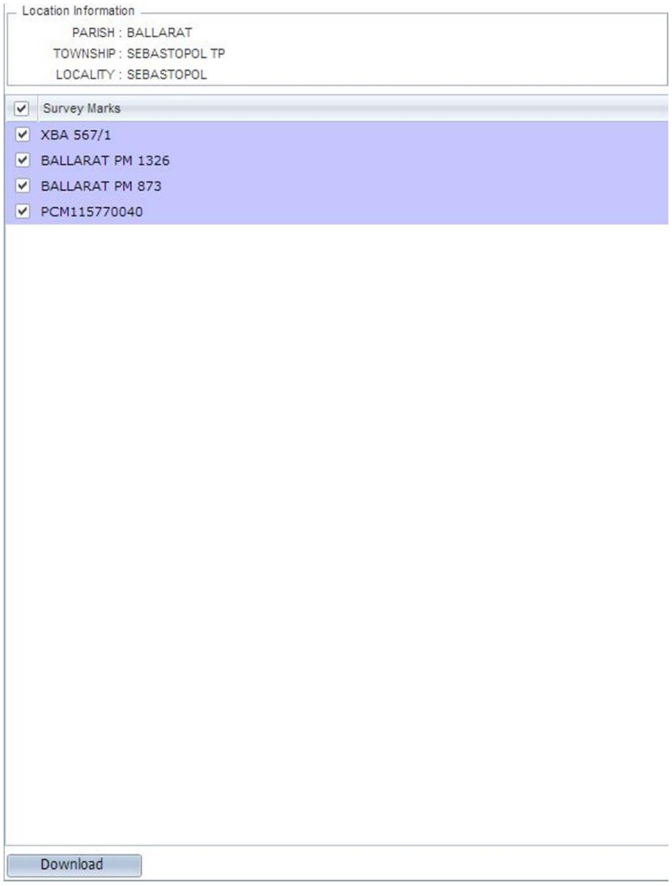


c. *Select the "Draw polygon for Digital Data Request" icon (see below) on the menu bar of the application.*




d. *Draw a polygon around the entire land area in the subdivision (see below). Extend the polygon onto the adjacent roads and parcels as these abutting parcels need to be included in the extracted data file.*


e. *Select the survey marks listed under the Digital Data tab in the frame to the right of the application window and then press the download button (see below). This file contains the abuttal information. The file should be saved and later, using ePSALON, will be included and meshed with the output from GeoCivil.*




### *Connection Capture*

In this section the capture of connection detail is described. This section is still being compiled and will appear here in full soon. TO BE COMPLETED.

## *Subdivision Plan Generation*

In this section the automated generation of a Plan of Subdivision from the completed GeoCivil file is described. This section is still being compiled and will appear here in full soon. TO BE COMPLETED.

# Field Notes Generation

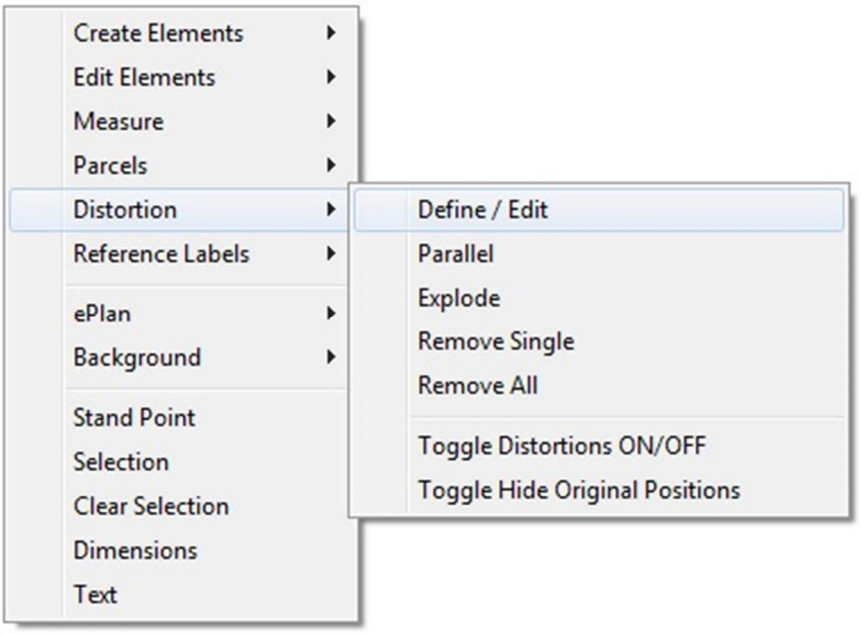
In this section the automated generation of an Abstract of Field Notes from the completed GeoCivil file is described.

GeoCivil includes tools specifically aimed at structuring the survey and cadastral data to enable the integration of a ódistortedôview of traverses and radiations. Individual or a selection of Coords can be moved to enhance clarity of viewing. The displayed bearings and distances being computed from the ótrueôcoordinates.

Road names can be referenced to the centreline and displayed where the current view window cuts these reference polylines.

## Distortions

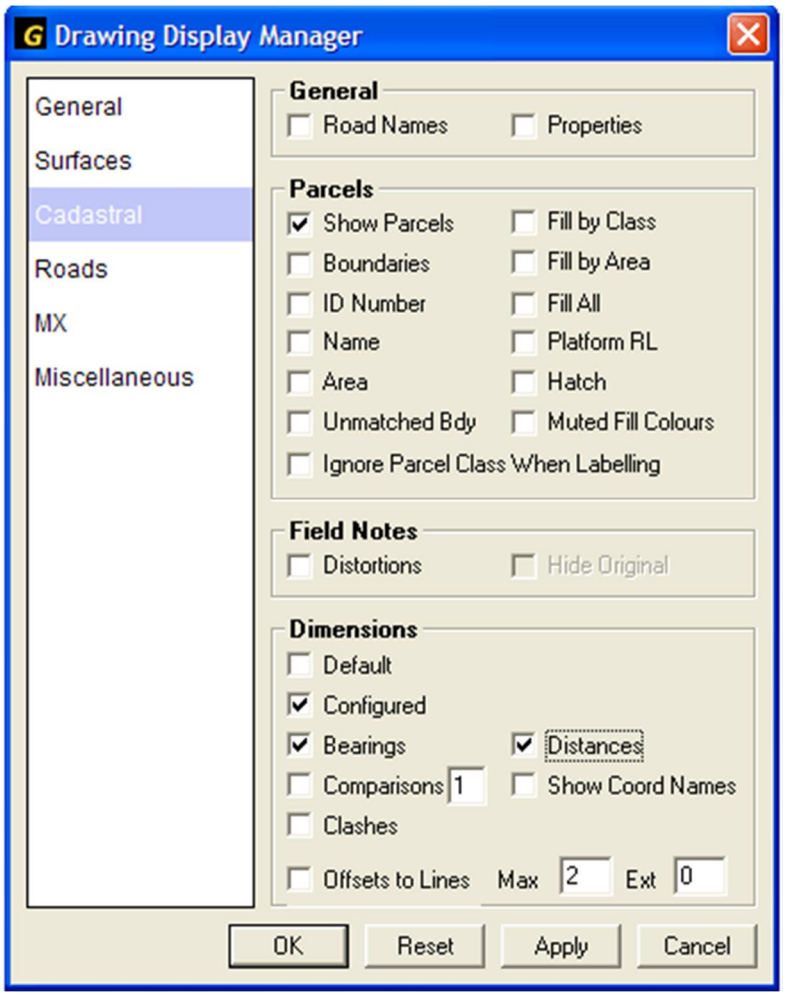
Most of the relevant functionality to create a ódistortedôfield notes view of the data may be accessed through the RMB (right mouse button) menu.




GeoCivil contains a data structure which enables elements to have multiple locations; a true position and a distorted position. This is particularly useful in creating "surveyor's fieldnotes" for lodgement at the Land Titles Office, etc. In situations where a plan drawn to scale is crowded, elements can be moved to provide more "white space". GeoCivil will draw the elements in their distorted positions but adopt the dimension of the true positions.

### Displaying Distortions

The display of distortions is controlled from the **Cadastral** tab of the **Drawing Display Manager** form. In the **Field Notes** panel, click **Distortions** and optionally **Hide Original** if only distortions are to be displayed.


Drawing Display Manager
General
Surfaces
Cadastral
Roads
MX
Miscellaneous
General
Road Names
Properties
Parcels
Show Parcels
Boundaries
ID Number
Name
Area
Unmatched Bdy
Ignore Parcel Class When Labelling
Fill by Class
Fill by Area
Fill All
Platform RL
Hatch
Muted Fill Colours
Field Notes
Distortions
Hide Original
Dimensions
Default
Configured
Bearings
Distances
Comparisons 1
Show Coord Names
Clashes
Offsets to Lines
Max 2
Ext 0
OK
Reset
Apply
Cancel

### *Creating or Editing Distortions*

From the **Insert** menu, choose **Distortion**; or click an icon from the **Distortions** toolbar. Available distortion actions are:


| | |
|---|---|
| Define/Edit | Option 1067 |
| Parallel | Option 1486 |
| Explode | Option 1001 |
| Remove Single | Option 1358 |
| Remove All | Option 1002 |
| Toggle Distortions ON/OFF | Option 1595 |

#### Define Edit

A distorted position is created for a clicked Coord at the location of a second Click. If ñToggle Hide Originalsòis OFF, the true position will be shown in addition to the newly distorted position

#### Parallel

A sequence of Lines, identified by a mouse click, is distorted parallel to the original positions by clicking the start and end of the distortion vector.

#### Explode

All Coords within a specified distance are distorted radially from a clicked location

#### Romove Single

The distortion is removed from a clicked Coord.

#### Remove All

All distortions within the current project are removed

#### Toggle Distortions ON/OFF

Toggles On or Off the display of distorted Coord positions.

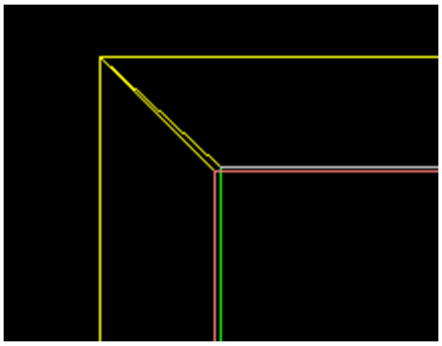
#### Toggle “Hide Originals” ON/OFF

If Distortions are currently displayed, this toggles On or Off the display of the true locations.

### *Distortion Example*

If we consider a typical cadastral survey situation, where we have a traverse around a block bounded by roads:

If we zoom in on the NW corner we see the detail.



To see this more clearly and enable us to place dimensions this detail requires distortion. This distortion can be effected by one of three methods:

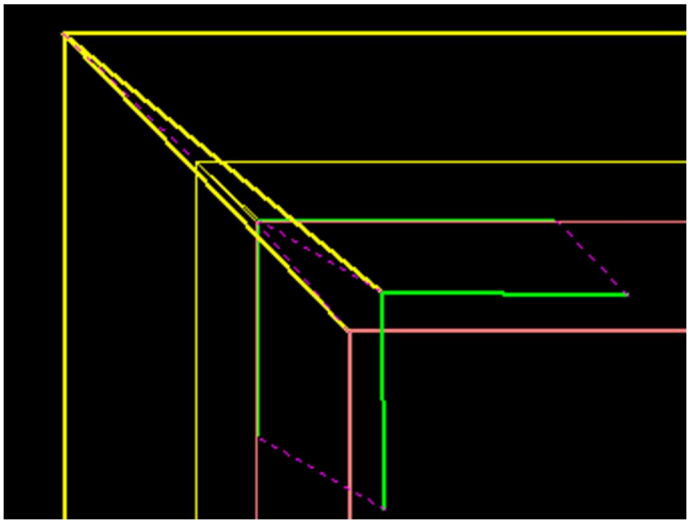
- Dragging a single Coord
- Dragging all selected Coords
- Exploding all Coords within a specified radius of a clicked location

To differentiate the distorted lines from their undistorted locations, the undistorted lines are shown dashed.

### *Distorting a Selection*

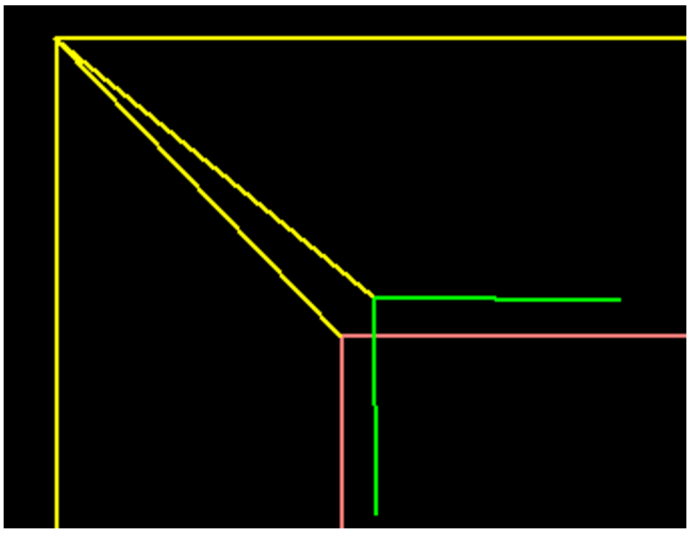
Using the Selection tool a group of elements can be selected (for example within a box or polygon) and then distorted; see Option 1315 ï Distort Selected Elements.

The Selection tool also facilitates the parallel distortion of an element series; see Option 1486 ï Distort Line Sequence Parallel.

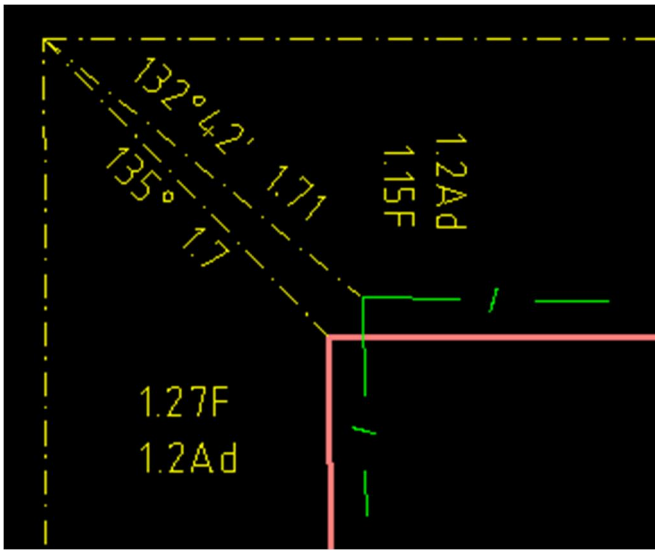


The above screen grab shows the distorted NW corner achieved by first "exploding" the related Coords by a factor of 5 then individually dragging some Coords. The dashed lines show the individual distortions; the thicker lines being the distorted positions. The display of distortions is controlled from the **Configure Display** tool.

In the **Field Notes** panel checking the **Distortions** box will turn the distortions ON. Checking the **Hide Original** box will leave only the distorted elements displayed (as is seen below).



With dimensions added the distorted drawing is produced.

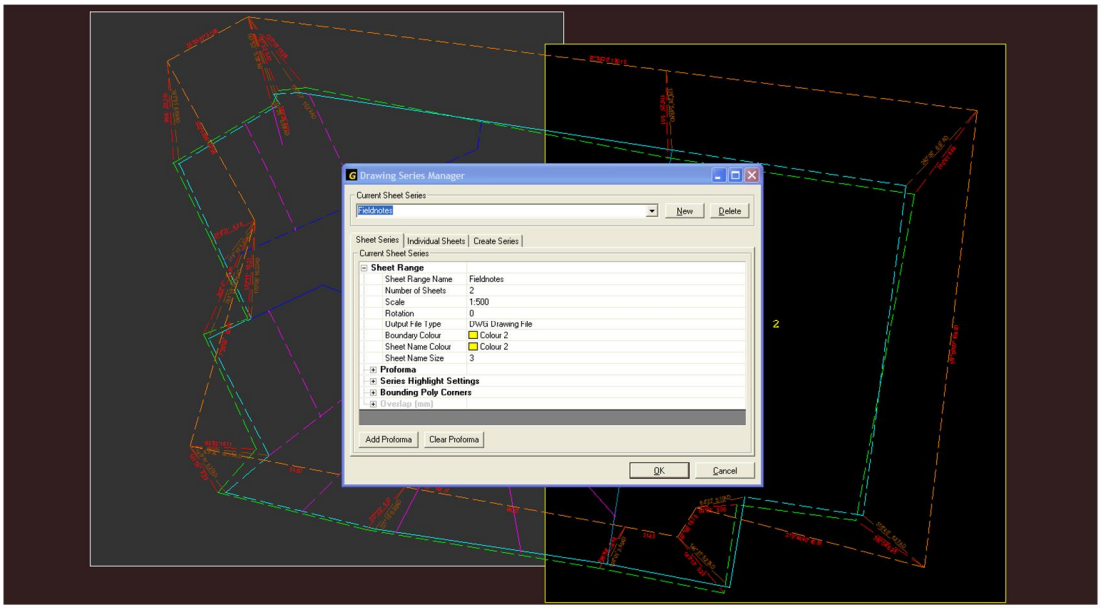



NOTE:

From the Distortions toolbar you can toggle the display of Distortions ON or OFF (see option 1595) or toggle the display of the original elements (see option 1596).

### *Multi-Sheet Distortions*

If multiple drawing sheets are defined, different distortions can be applied to the Coords on each sheet if required. If a distortion is made when a ñcurrent sheetò exists, the distortion will only apply to that sheet.



## Data Preparation Using AutoCAD

If a subdivision is created in AutoCAD, endeavour to follow the conventions of GeoCivil where possible and then save the data in DWG or DXF format (version 2004 or earlier).

In GeoCivil, import the AutoCAD created subdivision using Import > DWG / DXF. Using a translation table it is possible to match the AutoCAD layer names to those of the GeoCivil CADASTRAL level, but this is not essential as through the GeoCivil Selection tools you can make a selection of elements and assign them to the current GeoCivil feature.

GeoCivil also allows the easy assignment of ePlan parcel classes to AutoCAD polygons; or simply create the parcels in GeoCivil.

Note: Geocomp Consulting can provide guidance as to how best to structure your AutoCAD data and to most efficiently transition it to create an ePlan CIF.

## Data Preparation Using Civilcad

If a subdivision has been created in Civilcad, endeavour to follow the conventions of GeoCivil where possible and then export the data in AS5 format.

In GeoCivil, import the Civilcad created subdivision using Import > Civilcad AS5. Using a translation table it is possible to match the Civilcad layer names to those of the GeoCivil CADASTRAL level, but this is not essential as through the GeoCivil Selection tools you can make a selection of elements and assign them to the current GeoCivil feature.

GeoCivil also allows the easy assignment of ePlan parcel classes to Civilcad polygons; or simply create the parcels in GeoCivil.

# ePSALON Data Finalisation

This chapter describes how to generate the finalised ePlan format data from that created in the third party packages addressed in the previous sections.

*Note: Currently we are working on translations from AutoCAD and CivilCad packages. For the interim the examples and instruction given in this chapter addresses GeoCivil generated data only.*

# ePlan Data Generation

**Required:**

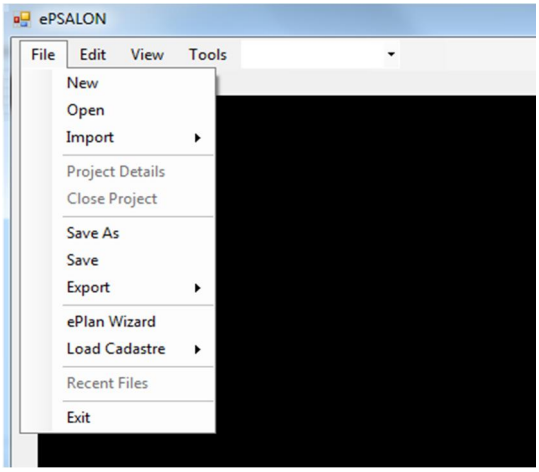
- GeoCivil .NP containing ePlan relevant data.
- Digital Base Data taken from SPEAR website. Take care to only select what is needed.
- Plan information (Face sheet and notes)

**Process:**

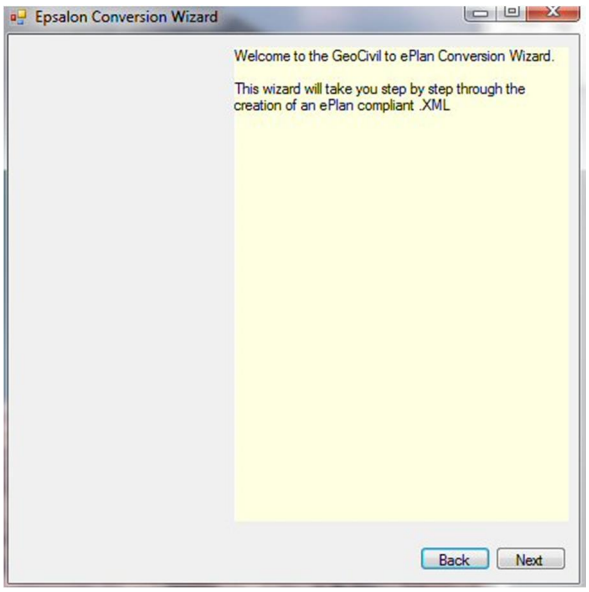
1. Start ePSALON by double clicking its shortcut icon, 
2. Start the ePSALON ePlan generation Wizard

*Procedure:*

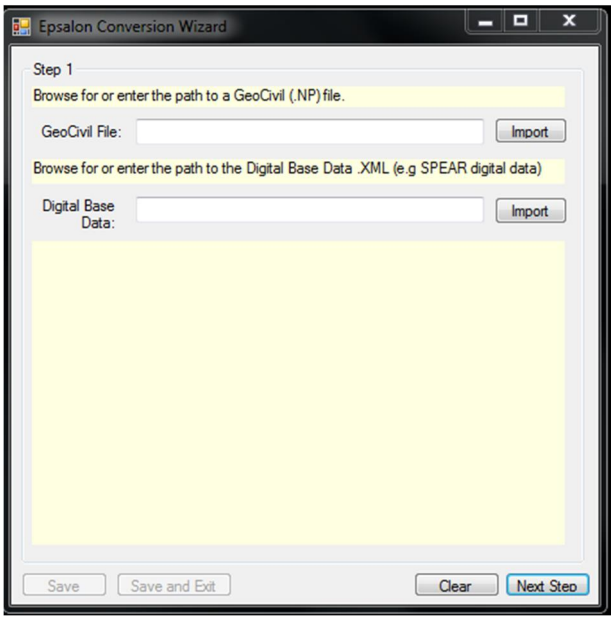
1. *From the File menu, choose ePlan Wizard*



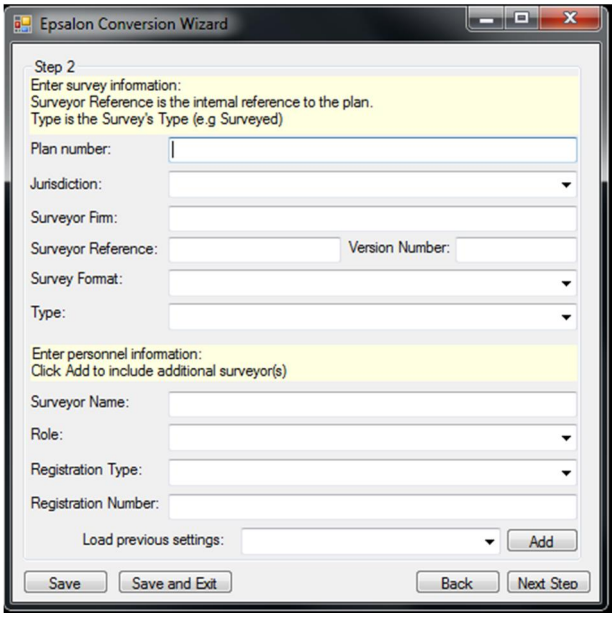

2. *A welcome screen is shown – click the "Next" button*



3. *Click the "Import" buttons to enter the GeoCivil and the SPEAR base data files. As the files are imported they will be converted to a ePlan or CIF format file. Then click the "Next Step" button. Clicking the Save button throughout the wizard process will save a file containing the process done so far. Save and exit will do the same, as well as exit the application.*

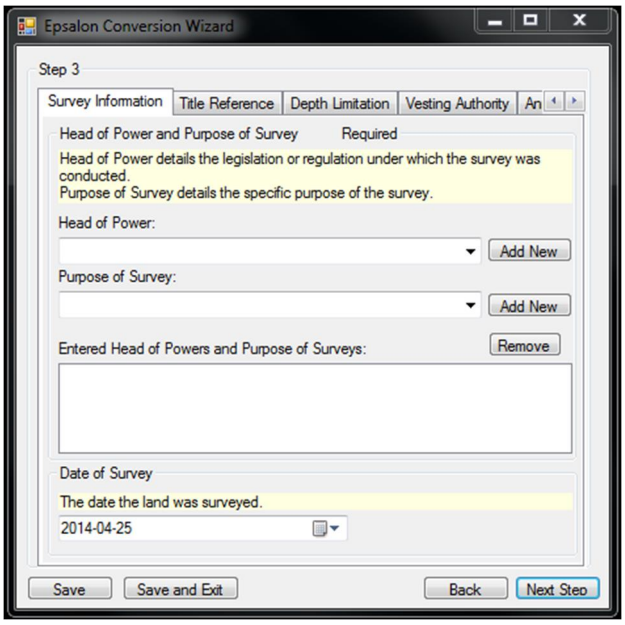



4. *Add the Surveyor and Survey Firm details into the form text boxes. Drop down lists are provided for some entries. The surveyor details can be saved for later use by giving a name to the entries and clicking the Add button. When ready to proceed click the "Next Step" button.*

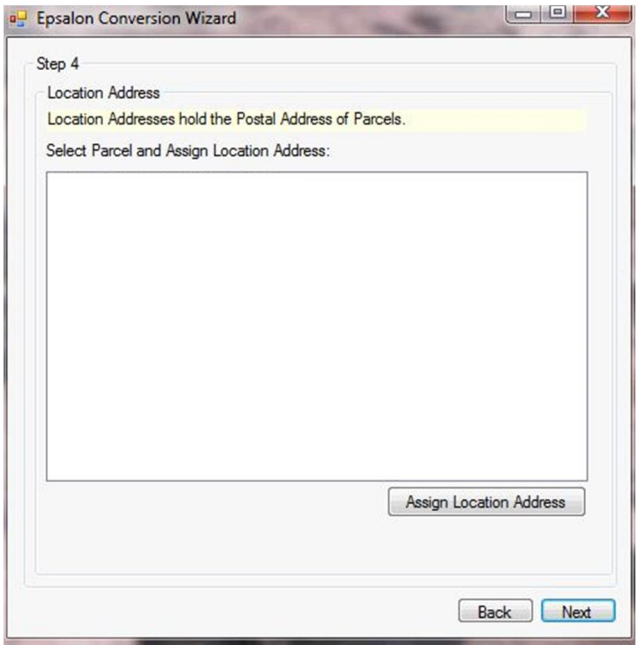


5. *Add the survey information such as the survey purpose, depth limitation, title reference and the like. Proceed through the Tabs at the top of the form completing the details as required. Use the drop down options where provided.*
    i. *For the Survey Information tab: after selecting the appropriate head of power and purpose of survey, click add new to add another. Select the date it was surveyed from the calendar.*
    ii. *For the Title Reference tab: after entering the Surround Parcel and the Title Reference click the Add button. If needed, select one from the Entered Title References list and click remove.*
    iii. *For the Depth Limitation tab: after entering the Origin Parcel click the Add button and on the form that appears select those new parcels that inherit the depth limitation, then click the Ok button. If a Depth Limitation parcel was created in GeoCivil, enter the depth after selecting the Depth Limitation parcel. Then click the Ok button.*
    iv. *For the Easement tab: after selecting the Easement, click Assign Beneficiary. In the window that pops up either select a parcel from the list as land benefitted or manually enter a beneficiary then click the Ok button.*
    v. *For the Vesting Authority tab: Select the Parcel and enter the Vesting Authority, then click the Add button.*
    vi. *For the Annotation tab: Enter the details of the Annotation, select a Parcel Reference if needed and click the Add button.*
    vii. *For the Restriction tab: after entering the Restriction Parcel click the Add button, edit the descriptive text, select the Benefited and Burdened parcels, and click the Save button.*
    viii. *For the Owners Corporation tab: enter the Entitlements and Liabilities, the State, the Use of Parcel and the Owners Corporation notation.*
    ix. *For the Amendment tab: enter the Dealing Number, Comments and Amendment Date and click the Add button.*
    x. *For the Control Points tab: This tab shows the Horizontal and Vertical Control Point Information, if a value is incorrect, you can edit it by clicking on the value and changing the text.*

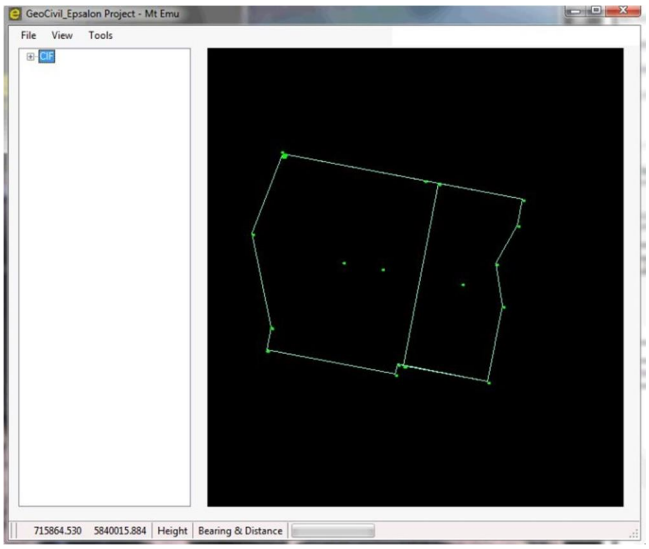
    *When ready to proceed click the “Next Step” button.*




6. Add the Location Address details. Select each parcel list in the text box on the form and assign an address. When ready to proceed click the ñNextòbutton.

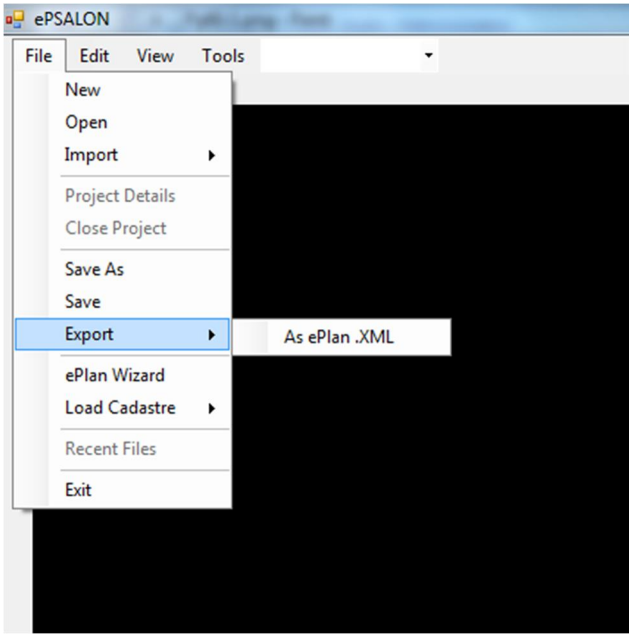



A CIF file viewing application window appears showing at left, in an expandable tree structure, the completed CIF format file, and at right the related subdivision graphics (see below).




Under the File drop down menu of this application the CIF file can be saved or another CIF file opened and viewed. The View drop down menu can be used to zoom in and out of the graphics pane, to turn on and off different graphic features, and to view the same file in XML format. The Tools menu can be used to edit the CIF file, for instance if data was omitted from or incorrectly entered during the previous Wizard phase of data entry. Ticking the Info option under the tools menu enables the user to select features in the graphic window and have their corresponding entry in the CIF file found and expanded. By right clicking on some of the directory or tree structure headings and then clicking the edit option in the menu that appears it is possible to edit the contents of the CIF file.

When satisfied with the file this window can be closed and then in the main ePSALON application window the file exported to ePlan XML format (see below). This generated XML file can then be submitted to SPEAR for validation.



# Frequently Asked Questions

This chapter answers frequently asked questions regarding the use of the GeoCivil and ePSALON for ePlan data generation.

This section is currently being developed.

# Glossary

This chapter lists and defines commonly used terms in this document and the broader land survey industry.

# A

**accuracy:** Conforming to a recognizable standard. If applied to paper maps or map databases, degree of conformity with a standard or acceptable value. The statistical meaning of accuracy is the degree with which an estimated mean differs from the true mean.

**adjustment:** Term for the process of corrections applied to a measurement or set of measurements.

**AGD:** Australian Geodetic Datum. The framework used for coordinates in Australia since 1966. It has been superseded by the Geocentric Datum of Australia (GDA).

**AGD66/84:** Australian Geodetic Datum 1966/1984. See AGD.

**AHD:** Australian Height Datum. The datum used for the determination of elevations in Australia. The determination used a national network of bench marks and tide gauges, and set mean sea level as zero elevation.

**altitude:** The vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

**AMG:** Australian Map Grid. A Cartesian coordinate system based on the Universal Transverse Mercator projection and the Australian Geodetic Datum. The unit of measure is the metre.

**AMG Grid:** Grid derived from AMG coordinates.

**annotation:** A text based graphic element.

**arc:** An element defined by up to four Coords (start and end tangent points, centre point, optional circumference point if a "three point arc") and possessing element properties.

**area:** A fundamental unit of geographical information.

**ASCII:** The American Standard Code for Information Interchange. A standard that maps commonly used characters such as the alphabet onto one byte long sequences of bits.

**attribute:** A user definable property inserted into drawings

**Australian Geodetic Datum:** The framework used for coordinates in Australia since 1966. It has been superseded by the geocentric datum of Australia (GDA).

**Australian Map Grid:** A Universal Transverse Mercator Map Projection.

**azimuth:** Geographic orientation of a line given as an angle measurement in degrees clockwise from north.

# B

**base mapping:** Usually associated with topographic mapping covering country or region at different scales.

**block:** A grouping of drawing elements stored with the drawing and referenced from the drawing itself.

**BMP:** An abbreviation for Windows Bitmap. BMP is a common raster data format supported by many Microsoft Windows products and applications.

# C

**CAD:** Computer Aided Drafting.

**cadastral map:** A map showing the precise boundaries and size of land parcels.

**cadastral survey:** A survey of the boundaries of land parcels.

**cadastre:** A record of interests in land, including both the nature and extent of interests. Usually this means maps and other descriptions of land parcels as well as the

identification of who owns certain legal rights to the land. Cadastral information often includes other descriptive information about land parcels.

**calibration:** The act or process of comparing certain specific measurements in an instrument with a standard.

**Cartesian coordinate system:** A system of two or three mutually perpendicular axes along which any point can be precisely located with reference to any other point, often referred to as x, y and z coordinates. Relative measure of distance, area and direction are constant throughout the system.

**circle:** An element defined by a centre point Coord plus radius and possessing element properties.

**COGO:** Coordinate geometry

**command window:** Dockable toolbar for entering numeric commands and for viewing command instructions.

**contour:** A line connecting points of equal value (e.g. elevation), often in reference to a horizontal datum such as mean sea level.

**contour interval:** The vertical difference in measurement units such as meters or feet, between successive contour lines on a contour map.

**control:** A system of points which are used as fixed references for positioning other surveyed features.

**coordinate:** The position of a point n space with respect to a Cartesian coordinate system (x, y and/or z values). In a GIS, a coordinate often represents locations on the earthôs surface relative to other locations.

**coordinate name / number:** Each coord can be assigned a unique name (e.g. PSM101, 2345, ETCH01, etc). An automatically assigned incrementing number may also be assigned.

**coordinate system:** A systems used to measure horizontal and vertical distances on a plan metric map. In a GIS, it is the system whose units and characteristics are defined by a map projection. A common coordinate system is used to spatially register geographic data for the same area.

**coordinate, geographic:** A system of spherical coordinates for describing the positions of points on the earth. The declinations and polar bearings in this system are the latitudes and longitudes respectively.

# D

**data capture:** The process of encoding data. In terms of mapping this involves digitising of analogue maps or capture of field data using electronic instruments and associating this with encoded attribute data.

**database:** An organised, integrated collection of data stored so as to be usable for a variety of purposes.

**datum:** Fixed starting point for field survey, from which other survey data may be accurately compiled. Generally facts known or granted, a premise from which inferences may be drawn.

**digitising:** The process of converting analogue etc to a computer readable form.

**dimension:** A bearing and/or distance descriptor attached to lines, arcs or points in a dataset.

**drawing:** A hardcopy ready, CAD representation of the current dataset.

**Drawing Editor:** A CAD style tool within GeoCivil, for creating, editing, manipulating, exporting, or printing DWG format drawings.

# E

**EDM:** Electronic Distance Measurement. Measurement of distance by means of electromagnetic transmissions, including radio, visible high, laser and infrared light.

**element:** Point, Line, Arc or Circle possessing properties of Level, Feature, Description, Surface(s) and Status (Deletion flag).

**elevation:** The vertical distance from a datum, usually mean sea level, to a point or object on the earth's surface.

**engineering surveying:** Surveying associated with the setting out and monitoring of engineering or construction works.

**entity:** A unique numeric identifier assigned to a feature.

# F

**feature:** A representation of a real world object in the data.

**Feature Definition:** A Feature Definition contains the current Features and Feature Settings. It allows the user to set a different Feature Definition (and thus different Features and Feature Settings) for different projects.

# G

**GDA:** Geocentric Datum of Australia. A new coordinate framework for Australia which is compatible with the Global Positioning System (GPS). The GDA was adopted in 1994 and officially implemented in the year 2000.

**geocentric datum:** A datum based on the earth's centre of mass (or geocentre).

**Geocentric Datum of Australia:** A coordinate framework for Australia which is compatible with the Global Positioning System (GPS).

**geodesy:** The study of the size and shape of the Earth's surface, the measurement of the position and motion of points on the surface and the configuration and area of large portions of its surface.

**geodetic control:** A network of sites for which precise positions and/or heights are known and for which the shape and size of the Earth are taken into account.

**geodetic surveying:** The determination of the position of points on the earthôs surface accounting for its curvature, rotation and gravitational field.

**geographic information:** Also land information and spatial information - information that can be related to a location on, above or beneath the earthôs surface, including water surfaces.

**geographic information system:** An organized collection of computer hardware, software, geographic data and personnel designed to efficiently capture, store, update, manipulate, analyse, and display forms of geographically referenced information. A system for capturing, storing and using data which is spatially referenced. Often the term is associated with a specific set of information technology components.

**geographical coordinates:** A position given in terms of latitude and longitude.

**geographical data:** Data that record the location and a value characterizing the phenomenon.

**geographical grid:** Grid derived from geographical coordinates (commonly referred to as longitude and latitude).

**GIS:** Geographic Information System. A computer based system used to capture, create, maintain, display and analyse spatially related information.

**GPS - Global Positioning System:** A satellite based navigation system developed by the United States Department of Defense and now widely used for civilian navigation and positioning.

**graticule:** A grid of parallels and meridians on a map.

**grid:** 1. a set of regularly spaced sample points. 2. In cartography, an exact set of reference lines over the Earthôs surface.

**grid convergence:** The angular difference in direction between Grid North and True North. It is measured east or west from True North.

# J

**join toggle:** Allows new Coords to be strung as Lines as they are created.

# L

**land:** Includes the space above and below the surface.

**land information management:** The activity of capturing, organising, integrating, managing and distributing digital land related information and derived products for use by government and the community.

**Land Information System:** A system for capturing, storing and using spatially referenced data. Usually not associated with specific technologies and used as the generic term for land / geographic / spatial information systems including the institutional framework and standards established to create and manage the LIS across the government and community.

**land parcel:** An area of land that is uniquely defined for ownership or land use purposes. Each parcel has a unique location, lot and plan identifier.

**latitude:** The latitude of a place is its angular distance on a meridian, measured northwards or southwards from the terrestrial Equator.

**legend:** The part of a map that is used to explain the meaning of the symbols used to depict geographical information and to provide the user with other information on the information depicted.

**level:** A grouping of features by type.

**line:** An element defined by a pair of Coords and possessing element properties.

**LIS:** Land Information System. Synonymous with GIS although more often associated with cadastral based systems.

**longitude:** A method of measuring the earth representing angles of a line extending from the centre of the earth to the earthôs surface. A line extending from the north to the south pole through Greenwich, England, represents 0 degrees. Each line of longitude runs north and south and measures the number of degrees east or west of the Prime Meridian. Values range from positive 180 to negative 180 degrees. Lines of longitude are often called ómeridiansô

# M

**map:** A record, either in analogue or digital form that describes the spatial distribution of geographical features in a specified area.

**Map Grid of Australia 1994 (MGA94):** A Cartesian coordinate system based on the Universal Transverse Mercator projection and the Geocentric Datum of Australia 1994. The unit of measure is the metre.

**map projection:** A mathematical model for converting locations on the earthôs surface from spherical to planar coordinates, allowing flat maps to depict three-dimensional features. Some map projections preserve the integrity of shape, others preserve accuracy of area, distance or direction. All map projections distort shape, area, distance or direction to some extent.

**map units:** The coordinate units in which the geographical data are stored, such as meters, or degrees, minutes and seconds.

**Mercator projection:** The conformal cylindrical projection tangential to the Equator, possessing the additional valuable property that all rhumb lines are represented by straight lines. Used extensively for hydrographic and aeronautical charts.

**meridian:** A line running vertically from the north pole to the south pole along which all locations have the same longitude. The prime meridian (0 degrees) runs through Greenwich, England. Moving left or right of the prime meridian, measures of longitude are negative to the west and positive to the east, up to 180 degrees (half-way around the globe).

**mining surveying:** Associated with the construction, monitoring and mapping of mines and associated works.

# N

**nautical mile:** A measure of distance equal to one minute of arc of a great circle on the earth's surface. The International Nautical Mile is equal to 1852 metres.

**northings:** The y-coordinates in a plane-coordinate system.

# O

**orthographic projection:** The projection by parallel rays onto a plane at right angles to the rays.

# P

**photogrammetry:** A series of techniques for measuring position and altitude from aerial photographs or images using stereo viewing.

**pixel:** One picture element of a uniform raster or grid line. Often used synonymously with cell.

**plan:** A hardcopy representation of a dataset viewed perpendicular to the XY plane.

**point:** A single x, y coordinate that represents a geographical feature too small to be displayed as a line or area, e.g. a power pole.

**polygon:** A vector representation of an enclosed region, described by a sequential list of vertices.

**positional accuracy:** statistical estimate of the degree to which planimetric coordinates and elevations of features agree with their real world values.

**precision:** If applied to paper maps or map databases, it means the accuracy of definition; (2) if applied to data collection devices such as digitisers, it is the exactness of the determined value; (3) the number of significant digits used to store numbers. Note: precision is not the same as accuracy - a large number of significant digits doesn't necessarily indicate that the measurement is accurate.

**property:** A general term describing a personôs possessions. "real property" refers to a piece of land owned by a person.

# R

**raster image:** A cellular data structure composed of rows and columns. Each cell has a value which represents an attribute value for the feature represented by that image.

**RDBMS:** A database management system with the ability to access data organized in tabular files that may be related together by a common field (item). An RDBMS has the capability to recombine the data files from different files, providing powerful tools for data usage.

**rectify:** The process by which an image or grid is converted from image coordinates to real-world coordinates. Rectification typically involves rotation and scaling of grid cells and thus requires re-sampling of values.

**relational database management system:** A database management system with the ability to access data organized in tabular files that may be related together by a common field (item). An RDBMS has the capability to recombine the data files from different files, providing powerful tools for data usage.

**remote sensing:** The technique of obtaining data about the environment and the earth from a distance - e.g. from aerial photography or satellites.

**resolution:** 1. The size of the smallest feature that can be represented in a surface. 2. The accuracy at which the location and shape of map features can be depicted for a given map scale. In a large scale map (e.g. a map scale of 1:2500) there is less reduction of features than those shown on a small scale map (e.g. 1:1,000,000). On a larger scale map feature resolution more closely resembles real-world features. As map scale decreases, resolution also diminishes as feature boundaries must be smoothed, simplified or not shown at all.

# S

**satellite imagery:** Images of the earth taken from orbiting satellites. Images can be taken in a variety of forms so as to detect specific information about the earth, vegetation and other types of land cover.

**scale:** The relationship existence between distance on a map and the corresponding distance on the earth. It is usually expressed in the following form 1:10,000, meaning that 1 unit of measurement on the map represents 10,000 of the same units on the earthôs surface. A ólargeôscale map is one in which a given part of the Earth is represented by a large area on the map. Large scale maps generally show more detail than small scale maps because at a large scale there is more space on the map in which to show features. Large scale maps are typically used to show site plans, local areas, neighbourhoods, towns etc. 1:2,500 is an example of a large scale. A ósmallôscale map is one in which a given part of the Earth is represented by a small area on the map. Small scale maps generally show less detail than large scale maps, but cover large parts of the Earth. Maps with regional, national, and international extents typically have small scales, such as 1:1,000,000. Large scale maps typically show more detail than small scale maps, whereas on smaller scale maps there is simply not enough room to show all the available detail, so features such as streams and roads often have to be represented as single lines, and area features like cities, have to be shown as points. This is called generalization.

**selection:** Group of elements or texts selected by the user and available for many manipulations by the user.

**spatial information:** Information which includes a reference to a two or three dimensional position in space as one of its attributes.

**subdivision:** The process whereby a parcel of land is divided into two or more parcels or alternatively multiple parcels are consolidated into one or more parcels.

**surface:** A grouping of related contourable elements. Up to fifteen surfaces can be defined for a particular dataset.

**survey plan:** A plan prepared by a surveyor from field survey data and previous survey plan data according to standards and directions of the governing body.

**surveying:** The measurement of dimensions (contour, position, boundaries, area, height etc.) of any part of the earth's surface (land or water) or any cultural feature. Depending on the type of survey undertaken and the degree of accuracy required, "surveys" may involve the application of the theory, principles and techniques of geodesy, photogrammetry and cartography.

# T

**tile:** A part of a geographic data base that depicts a specific area of the earthôs surface. Many geographic data bases are arranged in tiles or digital map sheets to enhance computer performance and easy of use. Increasingly geographical data bases are arranged in "seamless" form so that tiles become irrelevant.

**title:** The evidence of a person's right to land.

**topographic data base:** A data base in which data relating to the earthôs physical features on the earthôs surface are held and managed.

**topographic map:** A map showing the features on the earth's surface in accuracy and details appropriate to the map scale. A standard topographic map will show a number of different themes of data - e.g. contours, water features, cultural features (roads, buildings, etc).

**topographic surveying:** Involves establishing the contour level and interval of the earth's surface above and below sea level based on a particular control survey system. These surveys may be done by aerial, photogrammetric and ground survey and involves recording of natural features such as hills, streams, valleys and cultural features, such as roads, bridges, railways, etc. These surveys are used to produce topographic maps.

**topography:** Description or representation on a map of the physical and cultural surface features.

**topology:** A term used to refer to the continuity of space and spatial properties, such as connectivity, that are unchanged after distortion. In GIS, this term refers to the way in which geographical elements are linked together. For example the topology of a line includes all of its to- and from- nodes, and its left and right polygons. Topology is useful in GIS because some spatial modelling operations do not require coordinates, only topological information.

**transformation:** The process of converting data from one coordinate system to another through translation, projection, rotation and scaling.

**Translation Table:** Used to match GeoCivil Features to other types of data grouping identifiers, eg. AutoCAD DWG Layers, Survey Codes, MX string codes, etc.

**Transverse Mercator projection:** A conformal cylindrical map projection, originally devised by Gauss, also known as the Gauss Kruaer projection. As its name implies, its construction is on the same principle as the Mercator projection, the only difference being that the great circle of tangency is now any nominated meridian. Meridians and parallels are curved lines, except for the central meridian or a specified zone (meridian of tangency), which remains a straight line. Projection zones are established about the central meridian and vary in width from two degrees to six degrees of longitude, with some overlap between zones. The amount of scale distortion may become unacceptable at distances greater than about 1.5 degrees in longitude from the central meridian. In a modified form the projection is in general use for topographic mapping at scales of 1:250 000 and larger. See Universal Transverse Mercator projection.

# U

**Universal Transverse Mercator:** A widely used planar coordinate system, extending from 84 north to 80 south latitude and based on a specialised application of the Transverse Mercator projection. The extent of the coordinate system is broken into 60, 6 degrees (longitude) zones. Within each zone, coordinates are usually expressed as meters north or south of the equator and east from a reference axis. For locations in the Northern Hemisphere, the origin is assigned a false easting of 500,000 and a false northing of 0. For locations in the Southern Hemisphere, the origin is assigned a false easting of 500,000 and a false northing of 10,000,000.

# V

**vector data:** Positional data in the form of coordinates of the ends of line segments, points, text position, etc.

# W

**WGS84:** World Geodetic System 1984. A geocentric geodetic datum used for the determination of geographical coordinates developed by the United States Department of Defence. For all practical purposes, GDA94 approximates to WGS84.

# Index

This section is currently being developed. TO BE COMPLETED.