Autodesk University 2014

GS5606 AutoCAD Map GIS Source Drawings and Vault

Class Handout

Updated 28th November, 2014

Short Class Description

Maximising the use of AutoCAD Map source drawings in a multi-user CAD environment, with desktop and mobile CAD user.

Background Business Needs @ SA Power Networks

AutoCAD Map 3D has a huge range of features and benefits to the users, and many demonstrated by Autodesk.

Many of the features of the software are revealed by taking training classes and seeing software demonstrations, but none focus directly on integration with GIS systems and Drawing Management systems in an efficient and "fast-to-use" system for CAD users.

The use of the "Source Drawings" feature of AutoCAD Map 3D, when implemented in a very structured manner, with a range of pre-set database fields directly sourced from GIS data, and presented to the CAD users in a native .dwg format, have huge advantages for the productivity of the AutoCAD Map users.

Sa Power Networks has implemented the Autodesk AutoCAD Map3D software in an "easy-to-use" and efficient manner for the AutoCAD user community across our company.

Network project officers (NPO's), Surveyors, Street Lighting Designers, and CBD Facilities Records staff currently utilise the ESRI Decko read-only software to view GIS data, but cannot export this data in a useable CASD format.

AutoCAD Map - Source Drawings Data Set – Features

The AutoCAD Map "Source Drawings" data set distributed every 90 days to all CAD staff across our state on South Australia give the AutoCAD users the following features:

- Geometry is delivered in the correct co-ordinate system and scale
- Geometry is available from a single source
- GIS reference data is automatically refreshed to the user's CAD PC
- All Cadastral data is provided to CAD users in native AutoCAD .dwg format suitable for AutoCAD Map and AutoCAD Civil3D

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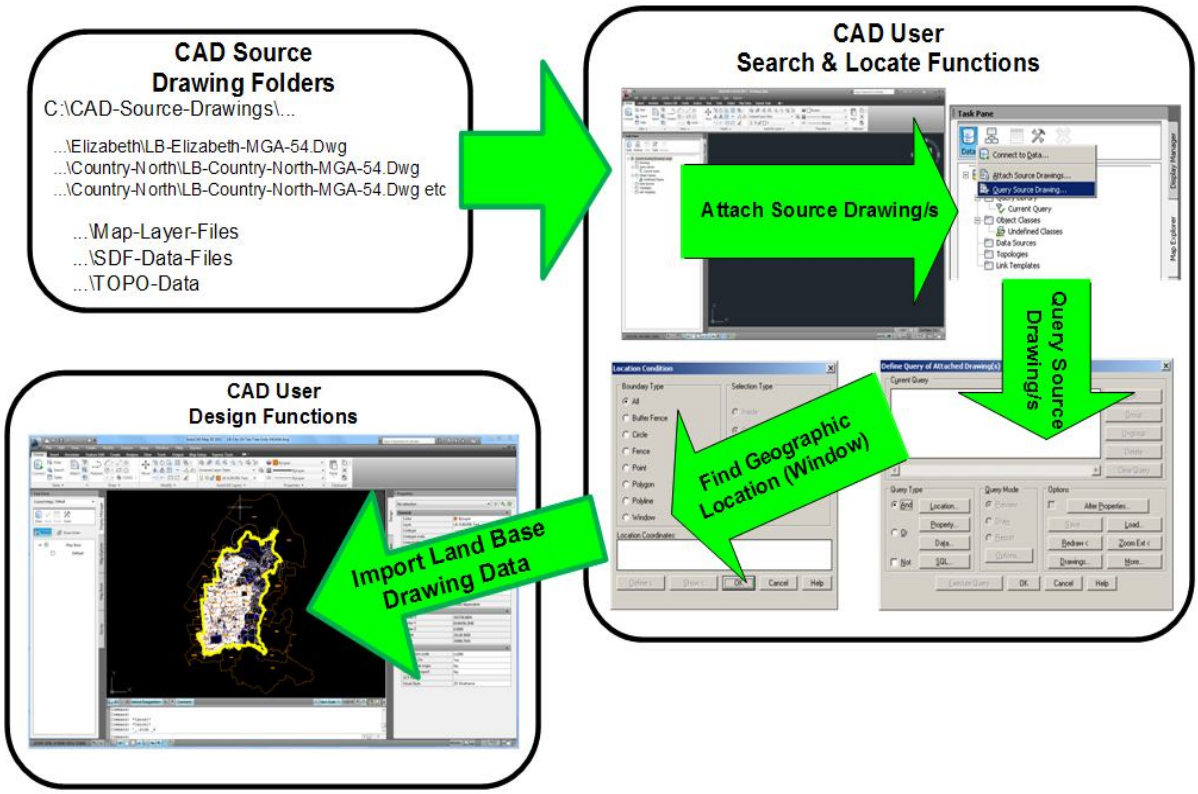
AutoCAD Map - Source Drawings Data Set – Features (cont'd)

- Full CAD Layer support
- Improved Parcel geometry with AutoCAD Closed Polylines
- Reference Data (Bush Fire risk areas etc) available as native CAD Data
- All Network AutoCAD designs will be fully geo-referenced

GIS Data for AutoCAD Map – Process

The illustration below shows the manner in which the data is captured by an AutoCAD Map 3D user, to create a drawing using GIS data, from the "CAD-Source-Drawings" dataset, distributed to each CAD Workstation:



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AutoCAD Map - Source Drawings Data Set - Asset Manager Zones & Data Sets

The state of “South Australia” is broken up into a series of grid coordinate zones across from west to east, based on the “Map Grid of Australia” (MGA) system.

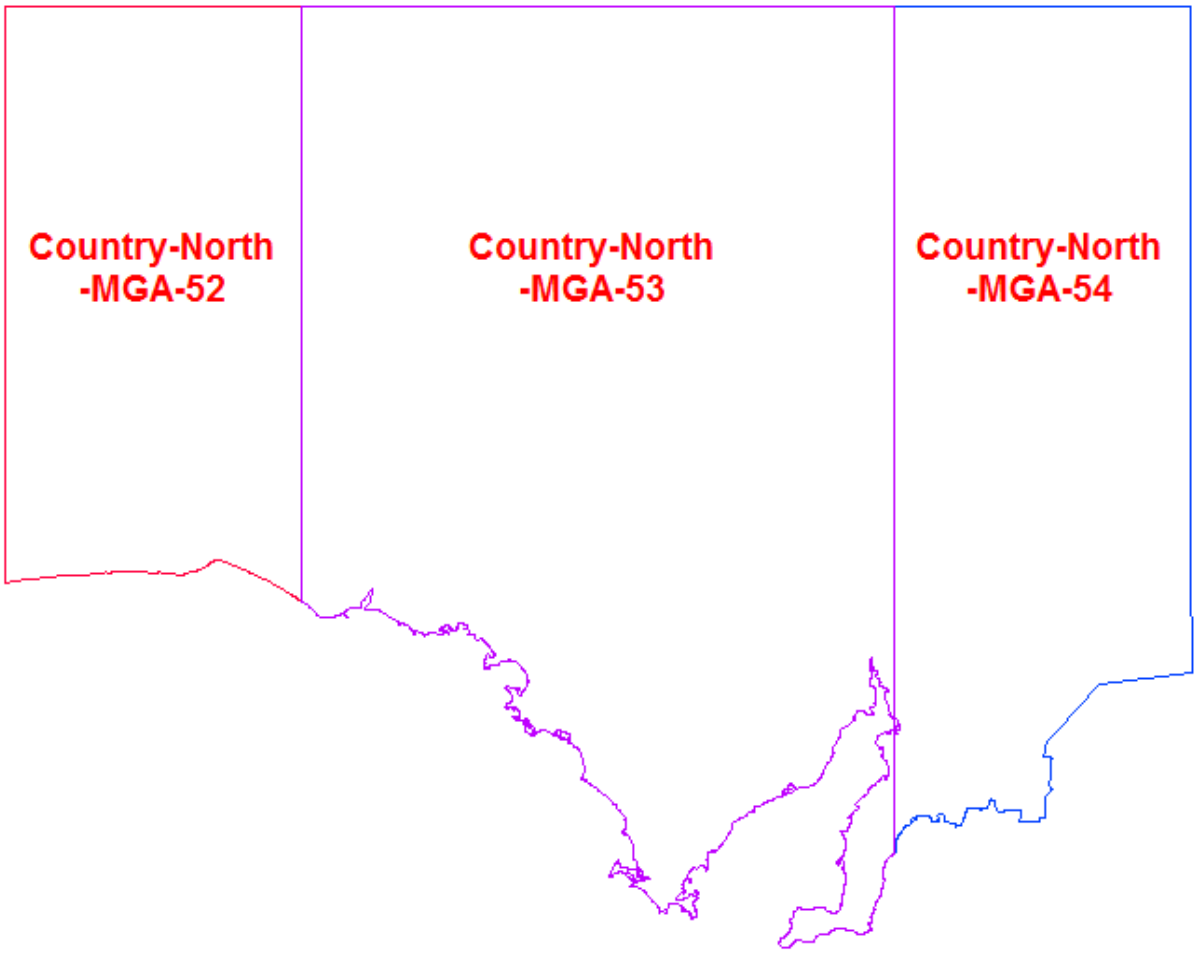
Each geographical area is broken up for the purposes of our field staff, based out of field depots, and illustration below shows the zones across our large state of South Australia.

Facts about “South Australia”

South Australia covers some of the most arid parts of the continent, and is the fourth-largest of Australia's States and Territories, spreading across 983 482 km2. It is bordered to the north by the Northern Territory, to the east by Queensland, New South Wales and Victoria, to the west by Western Australia and along the south by the Great Australian Bight and the Southern Ocean. South Australia's coastline length is 5067 km, while its border length is 3185 km.

South Australia spreads across 983,482 km2. Its land border is 3185 km and coastline 5067 km. South Australia is almost the same size as Egypt, one and a half times bigger than Texas, and five times the size of the UK.

The size of these zones from west to east is approximately 1,850km.



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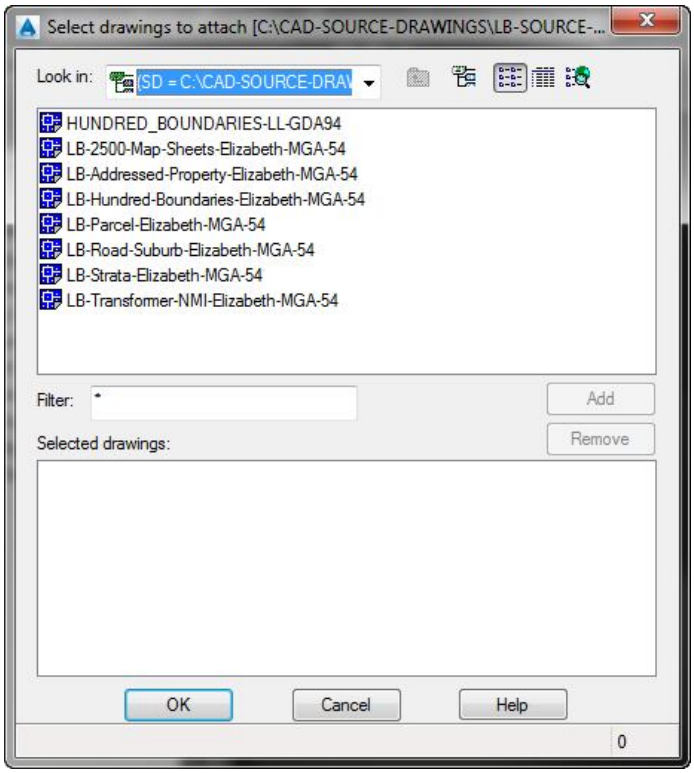
AutoCAD Map – Workspace & Drive Alias

To connect to the source drawing of any of these geographical zones, we setup what is known to AutoCAD Map 3D as a "Drive Alias".

When a "Drive Alias" has been setup the AutoCAD Map 3D software provides a fast and efficient way of accessing these drawings through an interfaces which is "fit-for-purpose" as shown below:



Process Overview to Access GIS Land Base Data

The following steps provide a basic overview to accessing Cadastral GIS land base reference data for use within AutoCAD:

1. User creates a new Drawing based on a template
   E.g: "LD-Template.Dwt"
2. The Drawing is saved into a Vault Drawing folder area, ready for Check-In
3. Select a correct geo-referenced Coordinate System for the current project Drawing
4. A GIS land base source drawing is now Attached from the master CAD Source Drawing Folders
5. Run a Search function that is known as a Query of attached drawings, to locate the land base geometry required
6. Perform a Data Preview to review the area of data to be imported using the Quick View feature of AutoCAD Map

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7. Extract the data from the source drawing into the current drawing using a Selection Window

8. Detach the source drawing from the current drawing, and continue with project design work

CAD Source Drawing Folder Structure

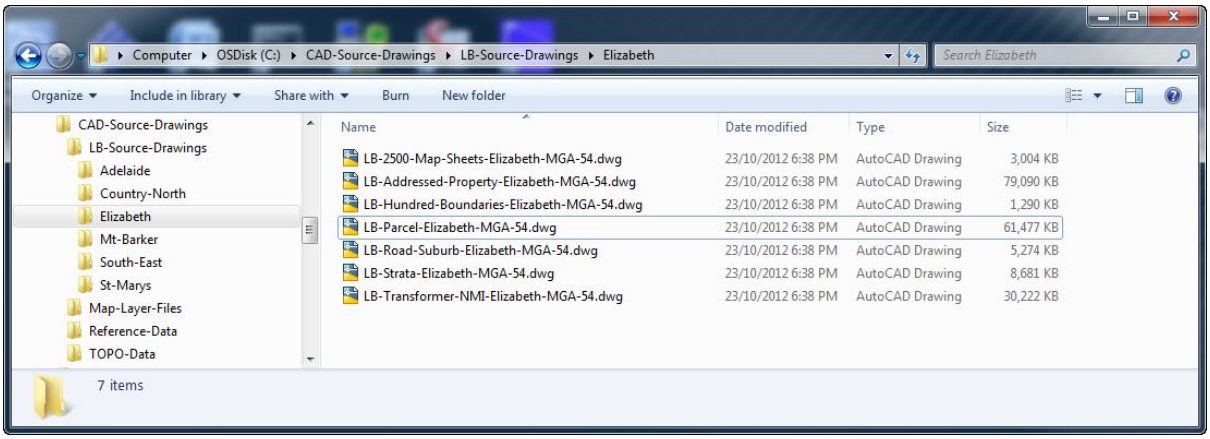
The CAD Source Drawing Folders is a folder structure of master data distributed to each CAD user, for access as needed.

This is the complete data set of "GIS Reference Data for AutoCAD".

Most of the data is provided in AutoCAD .Dwg format, but other data sets for smart Road names, Topographical Data and other reference data are provided in other vector and raster formats, as described later in the course material.

The basic cadastral source drawings that CAD Users will connect to will be provided in geographical areas based on SA Power Networks Asset Manager areas.

The illustration below shows the complete folder structure of the "CAD Source Drawings" folders containing all the GIS reference data for AutoCAD access:



The illustration shows the top level folder structure for the GIS reference data for AutoCAD, which is as follows:

"C:\CAD-Source-Drawings"

The specific folder which is currently open is the following:

"C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth"

This folder contains all the Cadastral GIS reference data for AutoCAD for the ***Elizabeth*** asset manager area.

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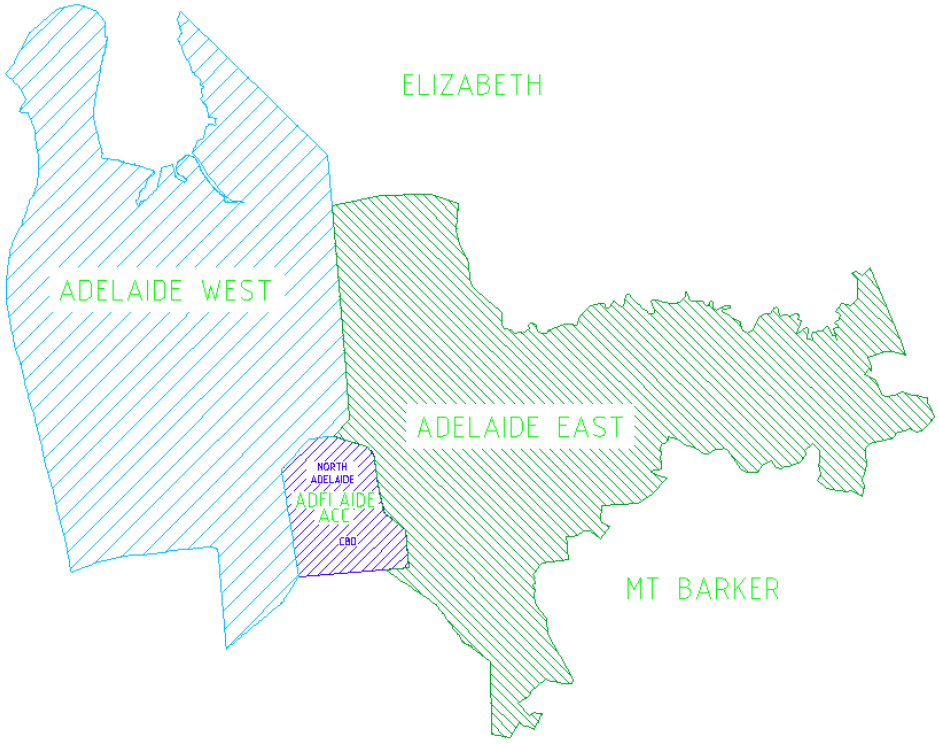
Adelaide Data Set

This data set is relatively large, and for ease of management within AutoCAD has been split into three areas, as follows:

- Adelaide CBD including North Adelaide
- (Adelaide City Council LGA)
- Adelaide East
- Adelaide West

These areas are illustrated below:



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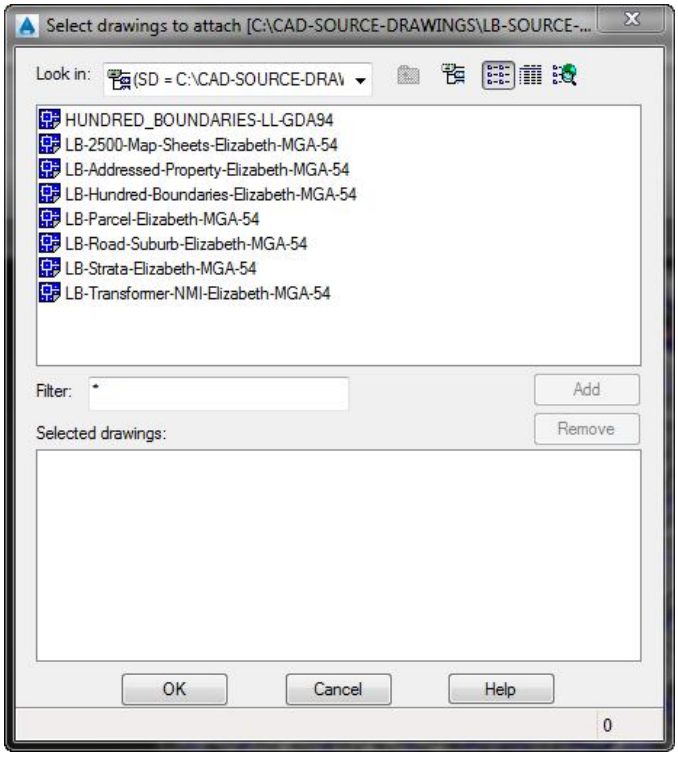
Setting Up an AutoCAD Map 3D "Drive Alias"

To access the Cadastral GIS reference data for AutoCAD use, we need to setup an interface within the AutoCAD Map software known as a Drive Alias.

The purpose of a drive alias is to direct the AutoCAD software to search for GIS Cadastral Data in a specific folder area, completely separate from our Project working folder area.

The following illustration shows a drive alias connection to the Elizabeth asset manager area master source drawings:



In our AutoCAD Map 3D user training we show our users that to configure a drive alias to connect to the ***Elizabeth*** asset manager area master source drawings similar to that shown, for our subsequent exercises.

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Exercise: Creating a *Drive Alias* for Source Drawing Access

In this exercise we will configure a drive alias to connect to the ***Elizabeth*** asset manager area master source drawings, and then use this drive alias to access the cadastral data needed for a project in the Elizabeth Downs area.

When creating a drive alias, we need to plan to designate the following two items:

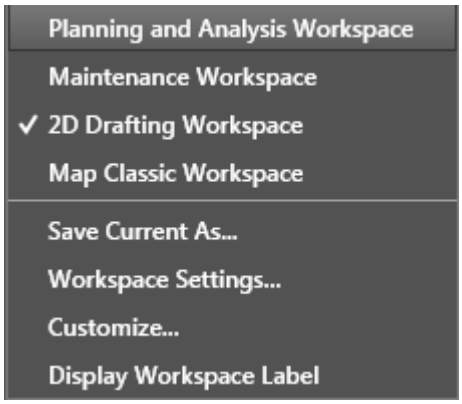
- Drive Alias Name
- Drive Alias Path

We will designate the following:

Drive alias name: ***SD*** (Source Drawings)

Drive alias path:***C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth***

1. Launch AutoCAD, and ensure the ***Planning and Analysis Workspace*** is selected as shown below:



2. Ensure the ***Map Task Pane*** is visible, by selecting the ***View > Task Pane*** option as shown below:

The Map Task Pane is a separate window within AutoCAD Map which will appear similar to the illustration below:

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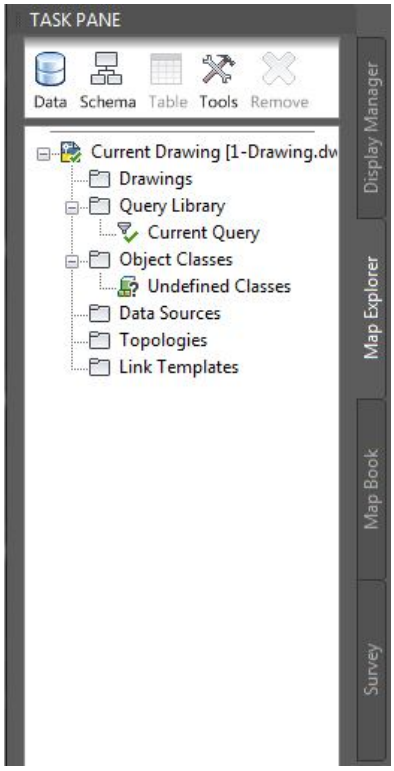
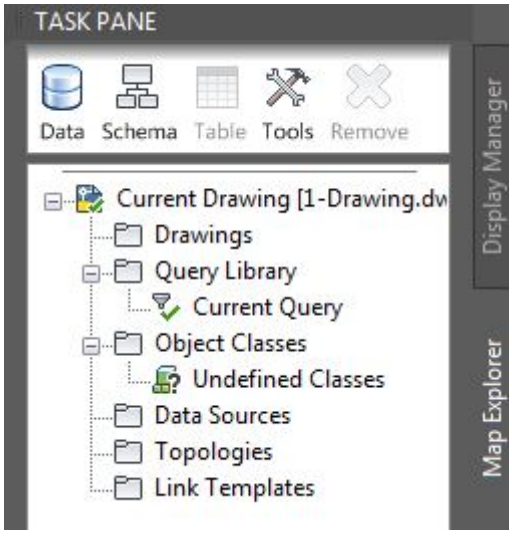


3. Select the ***Map Explorer Tab*** on the side of the Task Pane, to be able to access the ***Source Drawings*** functionality within AutoCAD Map.

*The **Map Explorer** Tab of the Task Pane should appear similar to that shown below:*



We will now use the Map task Pane to create our drive alias needed.

4. Select the ***Data*** button, and select the ***Attach Source Drawings*** option as shown below:

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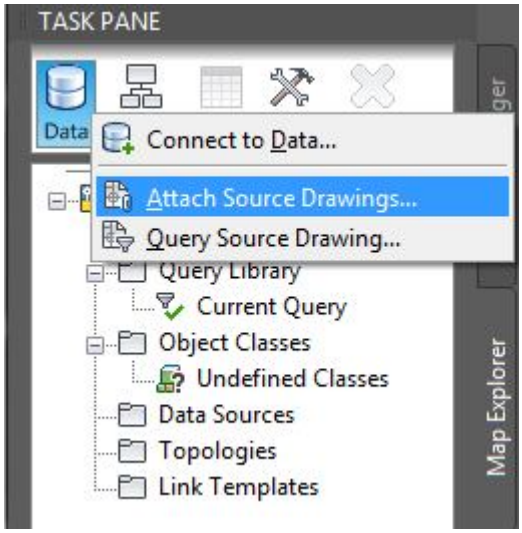
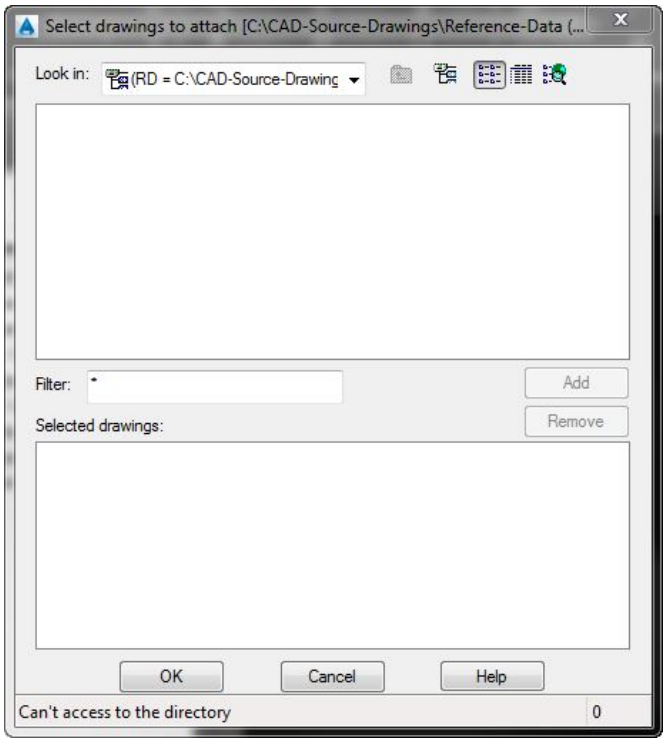


When the attached source drawings option has been selected a dialog box similar to that shown below will be activated:



At this point the software has not been configured to point to the ***C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth*** folder, as we have no drive alias settings.

5. On the above dialog box named ***Select drawings to attach***, select the ***Create / Edit Aliases*** button, which is illustrated below:

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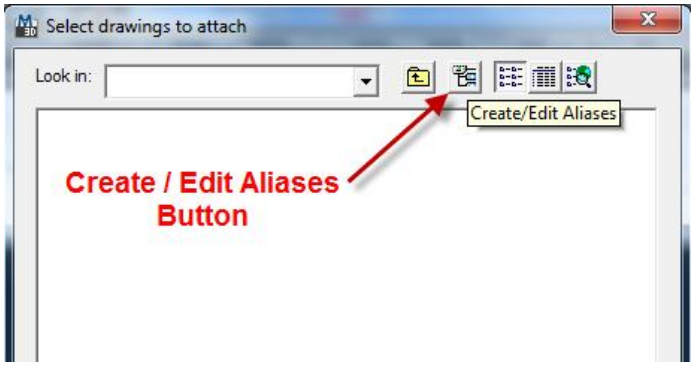
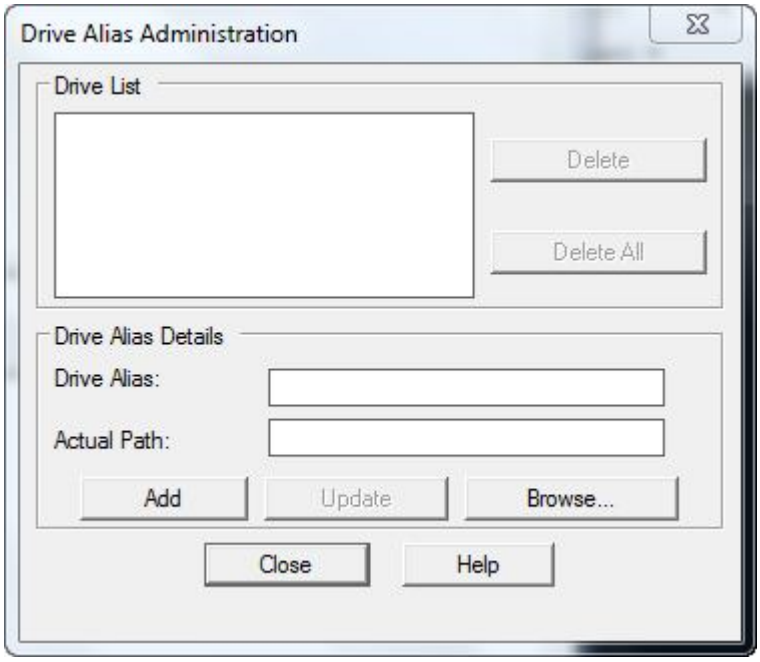


*This will activate the **Drive Alias Administration** dialog box as shown below:*



Now provide the following:

Drive Alias Name: SD

Actual Path: C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth

1. Enter ***SD*** for the drive alias name
2. Then select the ***Browse*** option to browse to the ***C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth folder***.

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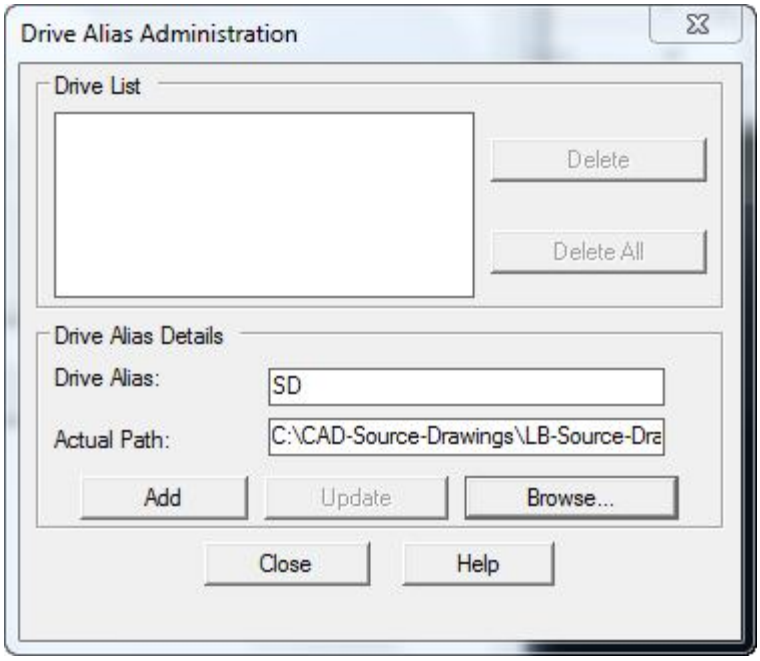
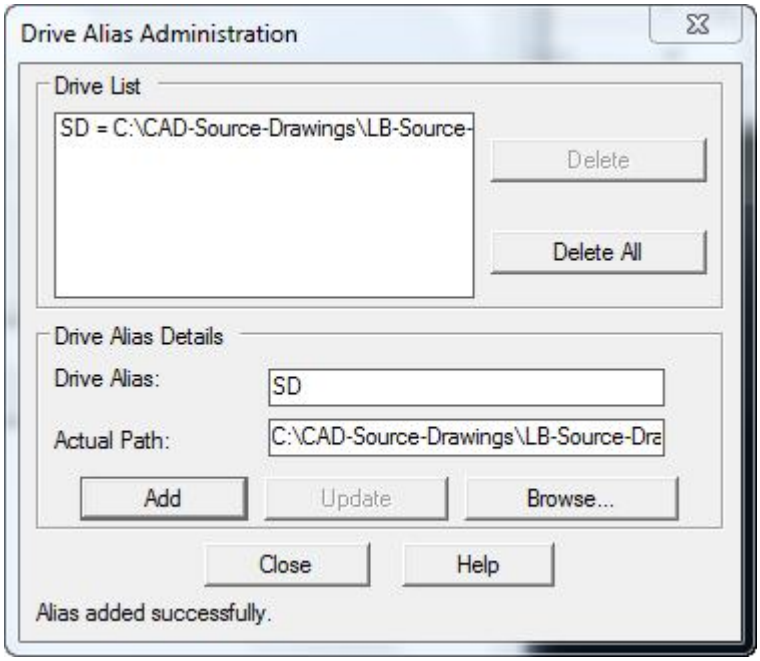
*The **Drive Alias Administration** dialog box should now appear as shown below:*



3. Select the ***Add*** option to save this drive alias configuration.

*The **Drive Alias Administration** dialog box should now appear as shown below:*



4. The ***Drive Alias Administration*** dialog box can now be closed using the ***Close*** button, and is now ready for use.

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Note: If you need to access GIS Cadastral data regularly from more than one folder area, such as:

- *Adelaide*
- *Elizabeth*
- *St Marys*

Suggested Drive Alias Names

For consistency across CAD users, the following naming convention is suggested for the naming of AutoCAD Map drive aliases:

- *SDA (Source Drawings Adelaide)*
- *SDE (Source Drawings Elizabeth)*
- *SDSM (Source Drawings St Marys)*
- *SDMB (Source Drawings Mt Barker)*
- *SDSE (Source Drawings South East)*
- *SDCN (Source Drawings Country North)*
- *RD (Reference Drawings)*

Best Practice	Creating Drive Alias Settings
	When creating drive alias settings, it is best practice to observe the following: • Keep the Drive Alias name as short as possible • Direct the path to the actual folder containing the relevant .dwg files, but to a folder above these files. This simplifies the display of the file names within the Map Explorer Task pane

Setting the Correct Coordinate System

The next important step is to establish the appropriate ***Coordinate System*** for the current project Drawing.

This defines the correct geo-referencing of the drawing in relation to it's true spatial location on the earth's surface.

Typical coordinate systems that will be used will be as follows:

- MGA-52 (Zone 52)
- MGA-53 (Zone 53)
- MGA-54 (Zone 54)

Of these three coordinate systems most ETSA Utilities projects will be conducted within the extents of the MGA-54 (Zone 54) coordinate system.

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By default the MGA-54 coordinate system will be set within the Line Design CAD Drawing template, known as ***LD-Template.Dwt***.

To set another coordinate system, such as the MGA-53 (Zone 53) coordinate system, refer to Section 6 of this training guide ***Drawing Coordinate Systems***.

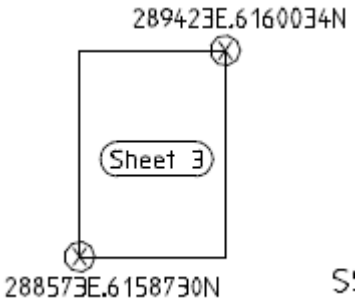
Best Practice	Setting Drawing Coordinate Systems
	Always set the Coordinate system correctly before attaching any source drawings for searching and Data extraction Be sure to do this for any MGA-53 or MGA-52 coordinate system drawings

Exercise: Extract Using Rectangular Geographical Boundary

We will now explore the option of Construct a Geographic boundary, and use this for the selection window.

Firstly we will build a rectangle as a Polyline object, on a designated layer, and then use this rectangular Polyline as the pre-defined boundary window for our extraction process.

In many cases a rectangular geographic boundary is displayed in the lower area of a drawing sheet, similar to the illustration below;



We will now build a ***Project Geo-Boundary*** to define the geographical extents of the project in easting and northing coordinates as shown above.

1. Create a New Drawing based on the LD-Template.dwt file
2. Save the drawing as ***LD-100628702-AW-Rectangle.dwg***
3. Activate the layer for our rectangular Project Geo-Boundary called ***LD-Project-Geo-Boundary*** as shown below:

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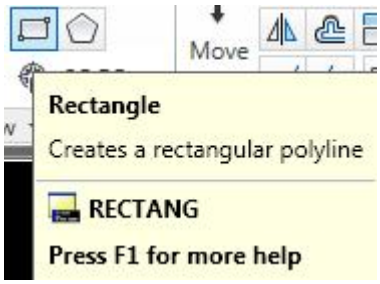
S...	Name	O..	Fre...	Lock	Color	Linetype	Linewei...	Trans...	Plot S...	Pl
	LD-OH-Recloser-Sym				w...	Continu...	0.25 ...	0	Color_7	
	LD-OH-Sectionaliser-Sym				w...	Continu...	0.25 ...	0	Color_7	
	LD-Par-150-LV-UBC-XLPE-P				cy...	Continu...	0.50 ...	0	Color_4	
	LD-Par-150mm-LV-Cable-AB				40	Continu...	0.25 ...	0	Color_...	
	LD-Par-150mm-LV-Cable-E				cy...	Continu...	0.25 ...	0	Color_4	
	LD-Par-150mm-LV-Cable-T...				cy...	Continu...	0.25 ...	0	Color_4	
	LD-Pilot-OH-Main-E				20	Continu...	0.25 ...	0	Color_...	
	LD-Pilot-OH-Main-TBR				20	LD-PILO...	0.25 ...	0	Color_...	
✓	LD-Project-Geo-Boundary				w...	Continu...	Defa...	0	Color_7	
	LD-Sheets				w...	Continu...	Defa...	0	Color_7	
	LD-Symbols				w...	Continu...	Defa...	0	Color_7	
	LD-UG-11kV-Splice-Trouser...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-11kV-Straight-Joint-...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-7.6kV-Straight-Joint...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-Abandoned-Straigh...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-Conduit-Bend-Sym				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-Fibre-Cable-E				154	LD-UG-F...	0.25 ...	0	Color_...	
	LD-UG-Fibre-Cable-P				154	Continu...	0.50 ...	0	Color_...	
	LD-UG-Fibre-Cable-TBAB				154	LD-UG-F...	0.25 ...	0	Color_...	
	LD-UG-LV-Splice-Trouser-J...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-LV-Straight-Joint-Sy...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-Padmount-Transfor...				w...	Continu...	0.25 ...	0	Color_7	
	LD-UG-Pilot-Cable-E				gr...	LD-UG-...	0.25 ...	0	Color_3	
	LD-UG-Pilot-Cable-P				gr...	Continu...	0.50 ...	0	Color_3	
	LD-UG-Pilot-Cable-TBAB				gr...	LD-UG-...	0.25 ...	0	Color_3	
	LD-UG-Switching-Cubicle-...				w...	Continu...	0.25 ...	0	Color_7	
	LD-Viewport-Boundary				ye...	Continu...	Defa...	0	Color_2	
	LOGO-Boundary				0,...	Continu...	0.25 ...	0	Color ...	

4. Draw a rectangular Polyline using the Rectangle command:



5. When prompted for the coordinates of the rectangle, enter the following values:

- For the lower left corner X=288573, Y=6158730 (288573,6158730)
- For the upper right corner X=289423, Y=6160034 (289423,6160034)

Note:

Be careful to use the ***TAB Key*** to change between the X (***easting***) and Y (***northing***) values entered here.

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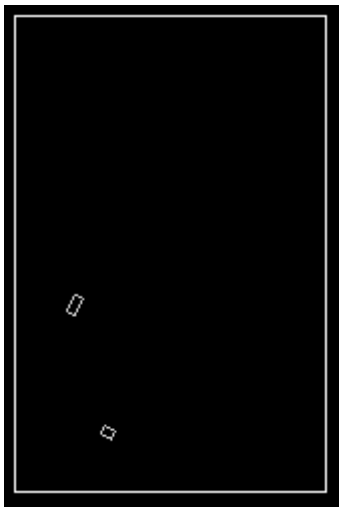
This should build the rectangle appearing similar to the illustration below:



This defines the boundary, which will be used in the next exercise

6. Now save the drawing using File > Save ready for the next exercise

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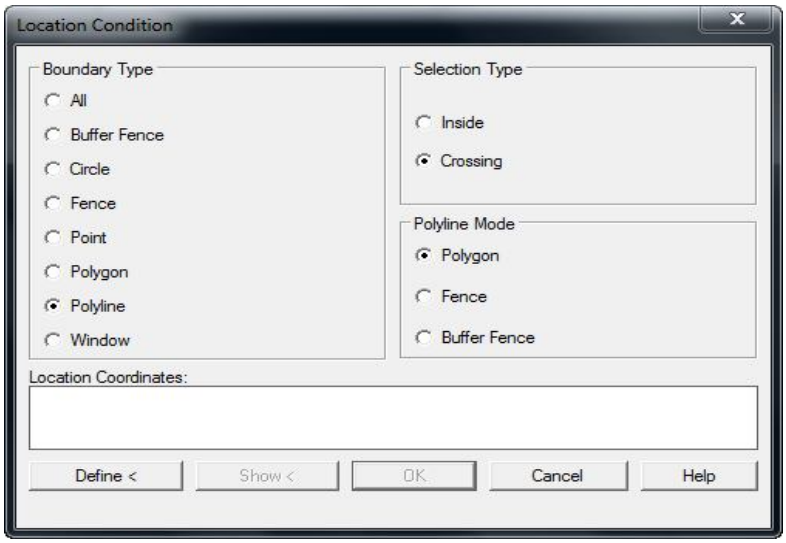
Exercise: Extracting Data using Polyline

We will now perform an extraction of the data using this rectangular Polyline

1. Ensure the drawing from the previous exercise is opened called ***LD-100628702-AW-Rectangle.dwg***
2. Attach the ***LB-Addressed-Property-Elizabeth-MGA54.dwg*** source drawing
3. On the Map Task Pane select ***Data > Query Source Drawing***
4. Clear the current query, and select a new Query using the ***Location*** option:



5. In the ***Location Condition*** window, select the ***Polyline*** option, and leave the other options set as Crossing and Polygon, and then select the ***Define*** function, which will prompt us to select an existing Polyline within the current project drawing.
6. Select rectangle we created previously, and then select the ***Execute Query*** function on the ***Define Query of Attached Drawings*** dialog box, as shown below:

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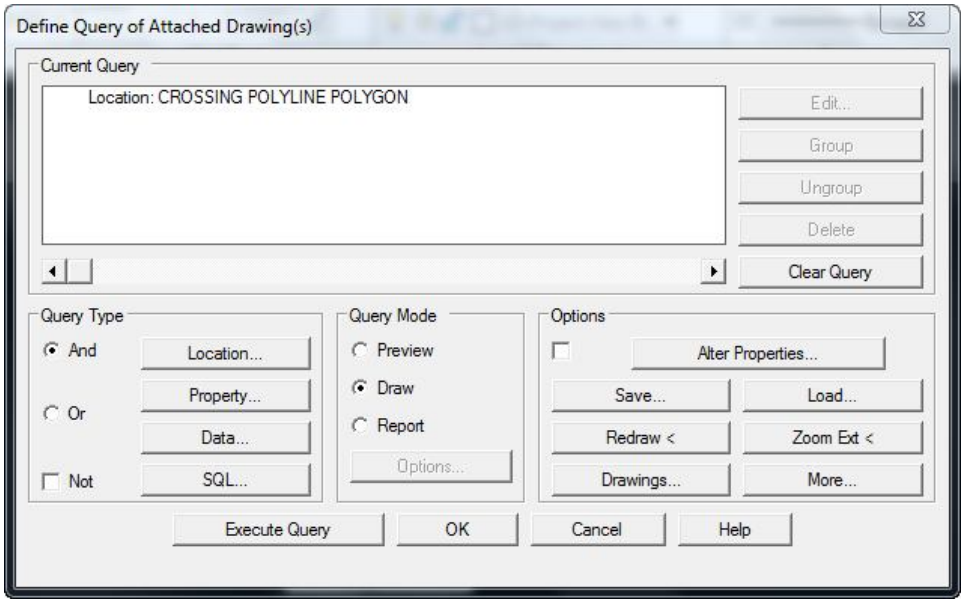

This should result in a data extraction similar to the illustration below:

Note: Suburb boundaries visible of Blakeview and Smithfield, and adjacent Postcode boundaries for 5113, and 5114 are also extracted, as the Polylines representing these "Cross" our Project rectangular Geo-Boundary.

Review the ***Properties*** of the ***Suburb*** and ***Postcode*** boundaries to familiarise yourself with their ***Layers*** and ***Object Properties.***

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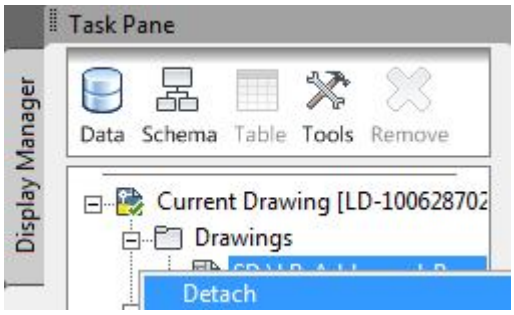
Exercise: *Detaching* the Source Drawing

To complete the process of extracting GIS reference data we would now ***Detach*** the source drawing from our current project drawing.

The process of ***Detaching*** the source drawing is as follows:

1. Within the Map Task pane, select the source drawing name, right-click and select ***Detach*** as shown below:



Now that the connection between the source drawing, and current project drawing has been removed, we should save the drawing, before proceeding with further project design work.

This completes this exercise.

Object Data Search Fields

A number of pre-defined object data fields are provided with the GIS reference data source drawings for CAD users.

It should be noted that these fields are provided to allow the location of a general geographic area of Cadastral data needed for design work.

This includes some transformer data, and customer NMI data.

We should understand that searching for and locating a transformer and / or NMI is to simply locate Cadastral data adjacent to these asset items, and not to extract or manager data associated with transformer and / or NMI assets.

These fields are provided as ***Object Data*** available within the source drawings, which may be terms "Smart AutoCAD Drawings". They are "Smart AutoCAD Drawings" as they contain Object Data fields associated with each CAD Object.

The following the major fields which are available as Object Data, and therefore searchable:

Field Description	Table Name	Object Data Field Name
• House Number	ACAD_PROPERTY	HOUSE_NUMBER
• Street Name	ACAD_PROPERTY	STREET_NAME
• Suburb Name	ACAD_PROPERTY	SUBURB

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Field Description	Table Name	Object Data Field Name
• Feeder ID	ACAD_TRANSFORMER	FEEDER_ID
• Transformer ID	ACAD_TRANSFORMER	TRANSFORMER_ID
• Customer NMI	ACAD_NMI	NMI
• Plan & Parcel	ACAD_PARCEL	PLAN_NUMBER, PARCEL_NUMBER

Note: A complete listing of all Object Data fields and Data tables is described in Section 15 at the end of this training guide under the title of "GIS Cadastral Data Fields".

Locating Cadastral Data via Transformer and NMI Search

Cadastral Data may need to be located in relation to the location of a Transformer and Customer NMI number.

The method of locating Cadastral data using the location of a Transformer and / or NMI number is different from that used to located addressed properties etc.

The methods discussed here will be only one of a number of methods to use Transformer and NMI data, and can be used in many combinations of options.

The method we will discuss here will be to locate an individual transformer, and then an individual NMI, and then review the addressed property data that exists within the vicinity of both locations.

The process for locating this addressed property Cadastral data would be generally as follows:

- Query and locate the required Transformer
- Query and locate the required NMI
- Zoom both of these onto the screen
- Query and locate Addressed Property data with a window including both of the above locations

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Exercise: Locating Addressed Property Data

Let's perform an exercise related to project 100628702, within the suburb of Blakeview

The objective of this exercise will be to locate the addressed property data and within the vicinity of the following 2 objects:

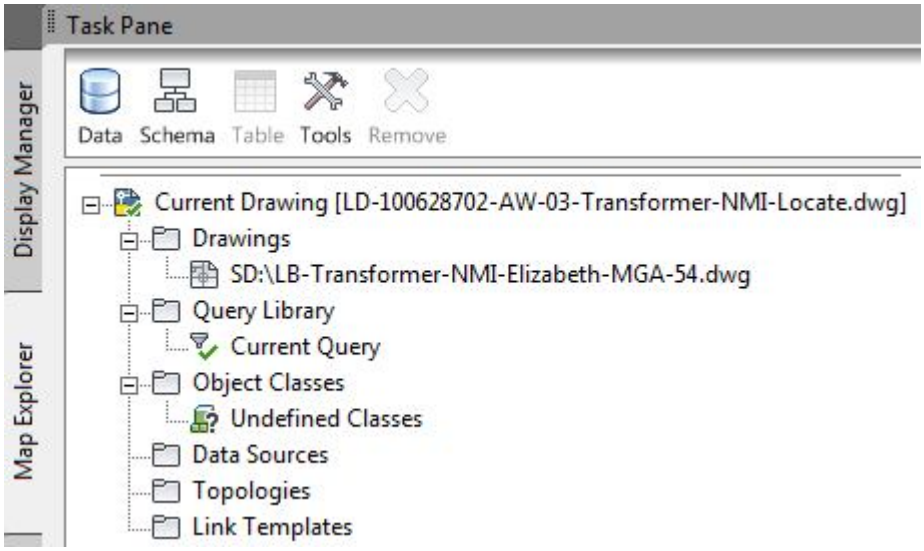
Transformer & NMI Info:

Transformer ID	90
Feeder ID	EL13
NMI #	20017011824

1. Create a new Drawing and save as follows: ***C:\CAD-Vault-LD\100628702\LD-100628702-AW-03-Transformer-NMI-Locate.dwg***

2. Attach the "LB-Transformer-NMI-Elizabeth-MGA-54.dwg" as the source drawing for the Query to be performed within.

At this point the Map Explorer Task Pane should appear similar to the illustration below:



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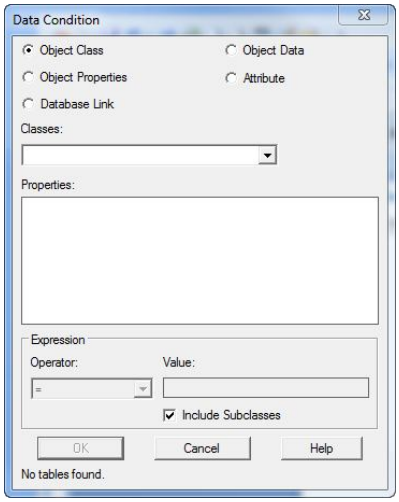
We will now run our ***Query of attached Drawings*** on this Transformer and NMI source drawing.

1. Select ***Data > Query Source Drawing ...*** and then select the ***Data ...*** button.

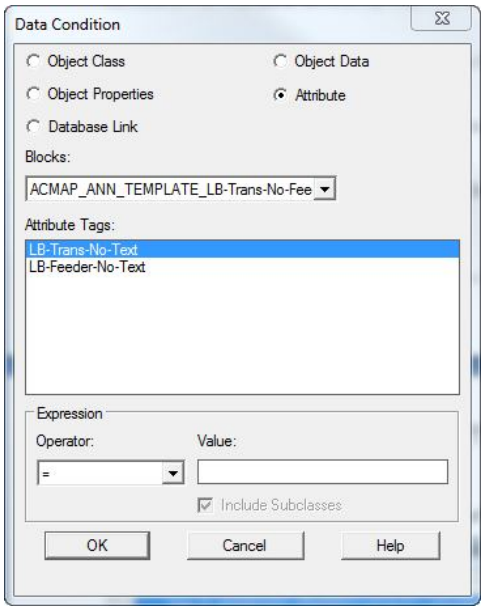
This will activate the Data Condition dialog box, as shown below:



Because both the Transformer and NMI data is actually "Point" data within the source drawing, we will search for this data differently than we did for an addressed property.

2. Select the Attribute option, and then locate the following Block name: ***ACMAP_ANN_TEMPLATE_LB-Trans-No-Feeder-No-Text***

The selection of the Block name within the Data Condition dialog box should appear similar to that shown below:



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3. Select the ***LB-Trans-No-Text*** attribute tag and enter a value of ***90***, and then select ***OK***

4. Select the ***Data ...*** button again, select the ***Attribute*** option, and then locate the same Block name: ***ACMAP_ANN_TEMPLATE_LB-Trans-No-Feeder-No-Text***

5. This time we will select the ***LB-Feeder-No-Text*** attribute tag and enter a value of EL13, and then select OK.

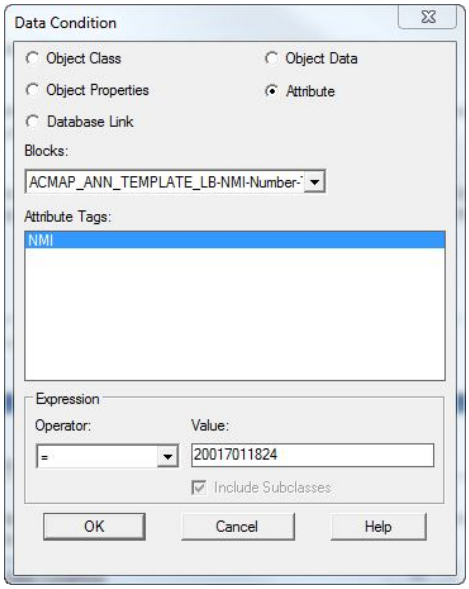
6. We should then select the ***Execute Query*** button, which should locate the above transformer, and display the point and label within our drawing.

Exercise: Locating a Customer NMI

We will now proceed to locate a customer NMI

1. Select ***Data > Query Source Drawing ...*** and then clear the previous query using the ***Clear Query*** button.
2. Now we can go ahead and select the ***Data ...*** button which will activate the ***Data Condition*** dialog box, and we can select the Attribute option, and then locate the following Block name: ***ACMAP_ANN_TEMPLATE_LB-NMI-Number-Text***

The selection of the Block name within the Data Condition dialog box should appear similar to that shown below:



3. Select the ***NMI*** attribute tag, and enter a value of ***20017011824***, and then select ***OK***

4. We should then select the ***Execute Query*** button, which should locate the above customer NMI location, and display the point and label within our drawing.

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The results of the query should indicate that the software has actually located 2 objects as shown in the command line illustrated below:

```
C:\CAD-Source-Drawings\LB-Source-Drawings\Elizabeth\LB-Transformer-NMI-Elizabeth
-MGA-54.dwg ...
Executing data query...done.
Displaying queried objects...
2 object(s) have been queried.

Command:
```

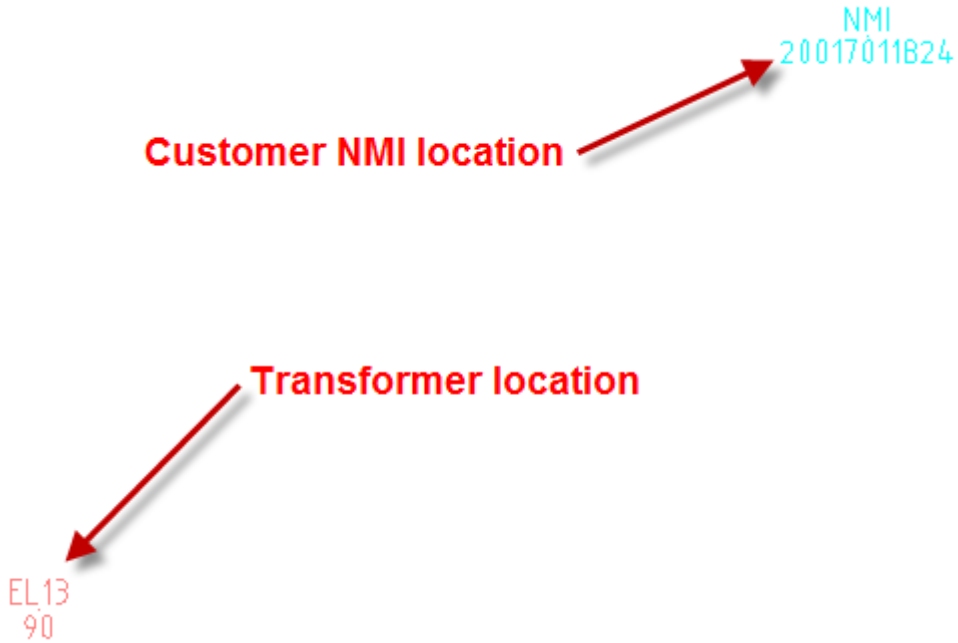
We had two objects located as there is the point, and the label for the point.

5. If we perform a ***Zoom Extents*** both the transformer and NMI should display on the drawing, locating the correct coordinate area in MGA-54 of these objects.

6. Having now located these 2 objects, we can ***Detach*** the current source drawing, and attach the addressed property drawing, to obtain adjacent data to these points.

7. Detach the ***LB-Transformer-NMI-Elizabeth-MGA-54.dwg*** and then attach the ***LB-Addressed-Property-Elizabeth-MGA-54.dwg***.

8. ***Zoom*** the drawing so that the transformer and NMI are located similar to the illustration below:



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Road Name Display in AutoCAD

The management of the display of Road Names has always presented a challenge, as Road Names by default will appear adjacent to the centre of a roadway.

If the names are provided as vector geometry, and translate through to the current CAD drawing as text objects, they will invariably be displayed at incorrect angles, and locations.

The design corridor for most line design projects for example is within the road reserve area of Cadastral data, where it would be most common to display road names.

This means that drawing space for Road names, and location of Road names on a drawing can be challenging.

The solution for the display of Road names in the GIS reference data sets, aims to address some of the above issues, and make this workable for the CAD users.

Process for Placing Road Name Labels

The general process for adding Road names to drawings is as follows:

- Add the Road Centreline Geometry to the drawing
- Add Road names with the custom text routine

Exercise: Placing *Road Name* Labels

The objective of this exercise is to run through the above process on a small project drawing, to understand the process and concepts.

1. Firstly ensure AutoCAD is launched, and then open the following drawing:

   C:\CAD-Vault-LD\100628702\LD-100628702-AW-03-Road-Name-Labels.dwg

This will retrieve a drawing with a small amount of Cadastral addressed property data ready for us to apply some basic Road name labels as text objects.

2. When the drawing is opened it should appear similar to the illustration below:

Non-Cadastral Reference Data

There is a need during the design process for access to what we will call reference data other than GIS cadastral data, to complete our design work.

Non-Cadastral Reference Data Types

As CAD users we now have the ability to access and import the following data types into project drawings:

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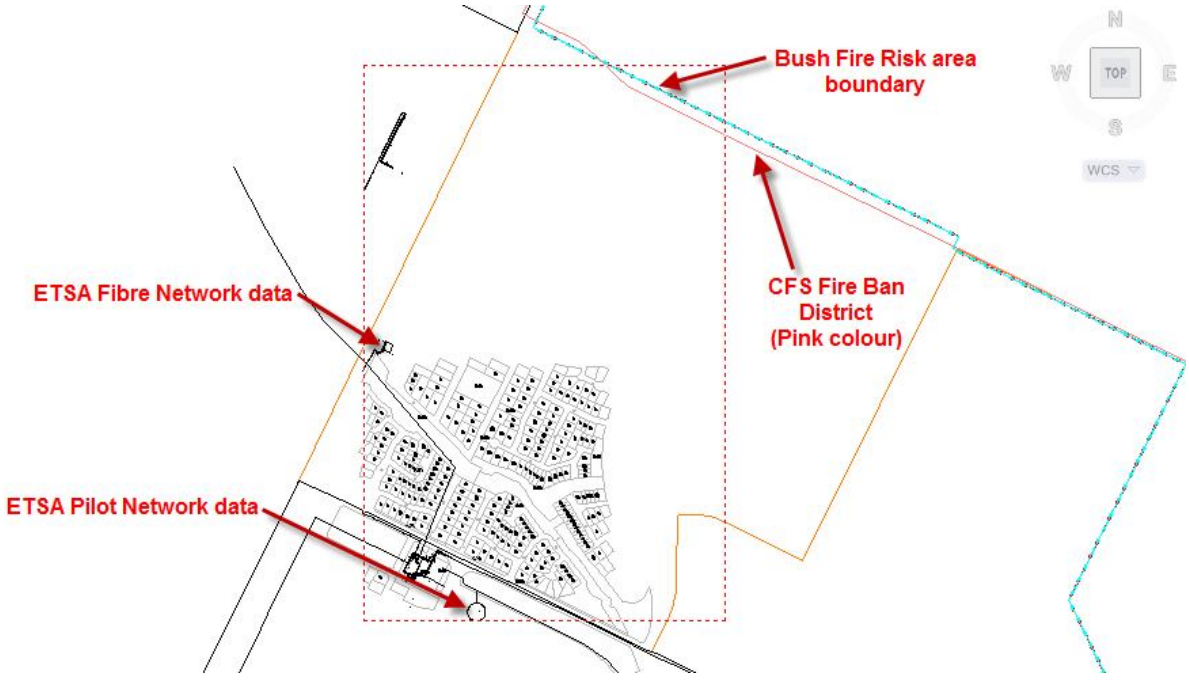
- Bush Fire Risk Areas
- CFS Fire Ban Districts
- Environmental Control Areas
- Phytophthora
- Footrot Areas
- Broomrape Areas
- Needlegrass Areas
- Contaminated Sites
- SA Power Networks Fibre Network
- SA Power Networks Pilot Cable Network
- ENSA Transmission Data
- SEAGas Pipeline Data
- Railway Data
- Water Body Topo Data
- Water Source Feature Topo Data
- Water Course Topo Data
- Water Pipeline Data

This reference data is provided in native CAD format as a series of source drawings to avoid the requirement to trace or estimate where this geometry is located in relation to other Cadastral or project design geometry.

The data can be saved within our project drawing files, and provide additional documentation indicating the available data sources at the time the design project was completed.

Capturing this reference data within the project drawings provides additional project quality assurance and gives the exact location of the reference data as it was at the time the design was completed and documented within the drawing.



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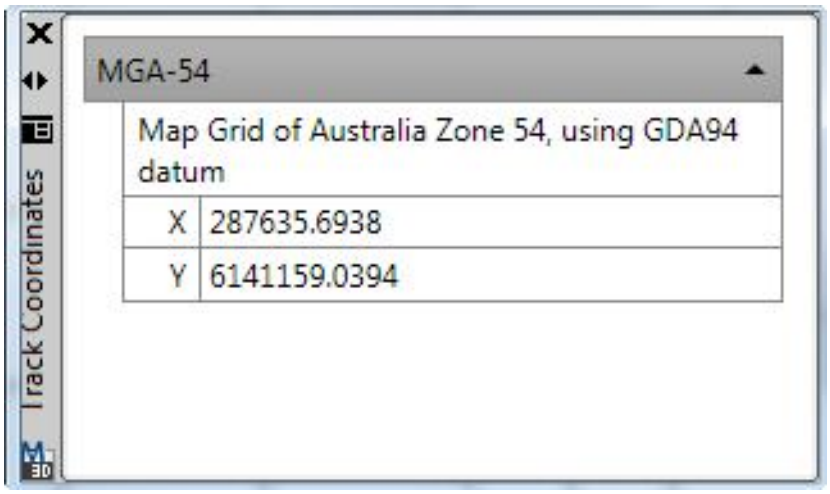
Demonstrate “EXTRIM”

Dynamic Coordinate Display

The requirement for the dynamic display of geographic coordinates so that the location of any object, is provided by a Map Tracking Coordinate display system with the AutoCAD Map software.

When the AutoCAD Map “***maptrackcs***” option is enabled a display similar to that shown below is available to the user:



Additional Coordinate Display Advantages

This coordinate display function also provides some additional advantages as follows:

- This can be used to identify the easting and northing values of the project geographical area
- The display of the easting and northing coordinates can be done in a coordinate system that is different to the coordinate system of the current drawing. For example the current Drawing may have a coordinate system of MGA-54, and the display of coordinates can be set to LL-GDA94
- It is also possible to directly input an easting and northing value into a Drawing using this interface. For example if the CAD user knows the easting and northing coordinate values of existing pole positions, an AutoCAD Block symbol for an existing Stobie Pole can be inserted using these values.

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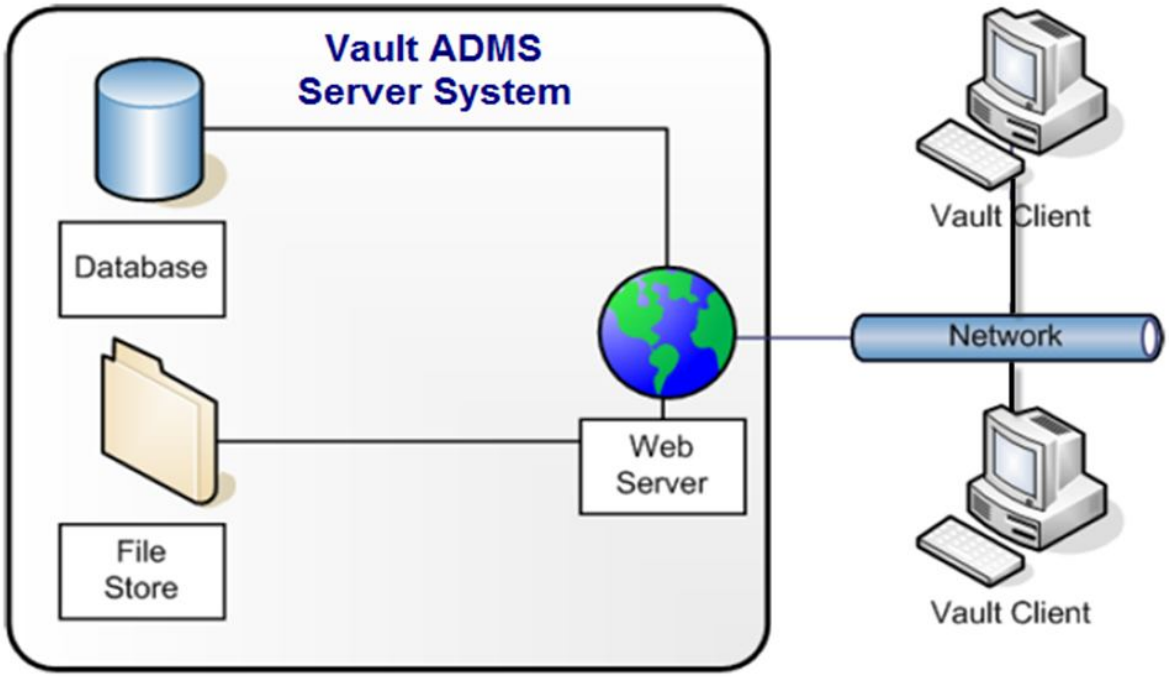
Storing AutoCAD Map 3D Drawings in Autodesk Vault

The Autodesk Vault Drawing repository provides secure database access to Drawing files, which will be stored within the Vault ADMS Server system. The Vault ADMS Server system is based on a Microsoft SQL Server Database system, where each Drawing is indexed within this Database, and references to the actual drawing file are maintained. The Drawing files are stored and encrypted within the ***File Store*** which is unique to the individual Vault Database.

The following illustration gives an overview of the Vault systems, showing the Server system on the left, with Client systems in the right:



A Vault Database comprises the following 2 components:

1. A Microsoft SQL Database
2. A File Store folder area unique to that Database

For the ***Line Design Vault Repository*** a separate ***Database*** and ***File Store*** area is provided with encryption of the native Drawing files so that users cannot access them, without the appropriate Client software.

Background Business Drivers for Vault

A requirement was identified to provide a Vault Drawing repository system for the storage and secure access of AutoCAD Drawing files.

The Vault Drawing repository is designed to provide the following general features to the business as a whole:

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Key User Benefits:

- Ensure best CAD performance for Drawing file Opening, editing and Saving
- Version Control and history of Drawing changes
- CAD File relationship management for ease of access by all
- Unique Drawing Filename Enforcement to eliminate file duplication
- Project Folders to assist with file management practices
- Searchable Drawing Title Block Attributes for Fast access to Drawing files
- File Security for ***Work-In-Progress*** Drawing Editing for transparency and collaboration
- Provide a ***Search Tool*** to locate files, for information and editing of drawings
- Replace the "Master Outbox" system for Caddsman

Other Vault Benefits:

- Minimise IT network traffic where possible
- Minimal Network Dependency for best CAD user performance
- Access to the Vault from within AutoCAD
- Automatic Publishing of Drawing Viewable Files for Non-CAD Users (*.Dwf)
- Off-Line Access to Drawing Files for Mobile users off the corporate network
- Effective Control of all AutoCAD Project Drawings via Secure Database Access

Currently Network project officers (NPO), and other CAD design staff who use the Caddsman software utilise various areas of the enterprise ***R:*** drive folders to store data for use in designs projects.

This method is not Best Practice with AutoCAD, and does not keep drawing data files under effective management and control.

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Vault Explorer Toolbar Commands

The following table shows the functions of the Toolbar buttons within the Vault Explorer interface:

Vault Explorer Icon	Function	Description
	New Folder	Creates new folders, and will be used for creating folders for new NPO projects
	Refresh	Updates the display of the status information for Vault files in the main table
	Print direct	Prints the main table grid display
	Print preview	Provides a print preview function of the print direct from the main table above
	Delete	Deletes a drawing file *Note: Must be used with caution, as there is no undo function for this delete command*
	Attachments	This function allows drawing dependencies or attachments to be created and removed
	Add Files	This is the key way of adding non-AutoCAD Drawing files to the Vault Files such as .txt, or .xls, .xlsx, .jpg etc All AutoCAD Drawing files should be added from within AutoCAD itself
	Copy Design	Performs a smart ***Save-As*** function within Vault to save a Drawing and it's attachments to a new name
	Check In	Allows the latest edited version of a file to be updated in the vault database This should only be done within AutoCAD for .dwg files
	Get / Check Out	There is two functions associated with this: 1. Get Latest This is the default setting, and retrieves a ***Read-Only*** version of the file from the Vault database to your local C drive 2. Check Out This reserves and locks the file within the Vault and makes it ***Read-Write*** for the user as well as and retrieving a version of the file from the Vault database to your local C
	Undo Check Out	This function releases the reserve or lock on a file, and makes it available for other users to ***Check Out*** and hence to edit a file

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Vault Explorer Icon	Function	Description
	Find	This function is the Search capability of Vault, which is available as a ***Simple*** or a ***Complex*** search

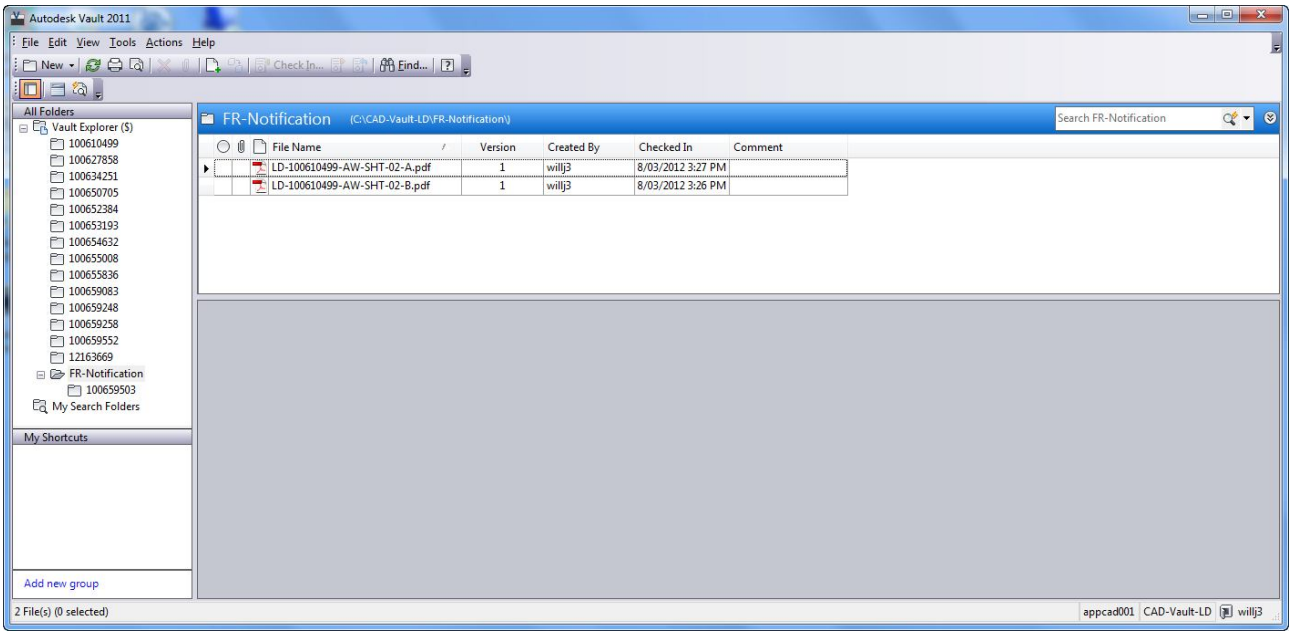
Vault Project Folders for Line Design

To keep projects organised within the Vault database for Line design, folders will be created for the storage of Drawing files and other CAD related files.

The Line Design Vault will provide a top-level folder structure under which all Line Design projects will be filed.

The project folders will be named within Vault according to the SAP NOTI number for the project.

These folders will appear within the Vault repository similar to the illustration below:



Folders can be created by any user but will be visible to all users of the Line Design Vault, across all asset manager areas.

The Vault project folders will have a corresponding local working folder on your local C drive, when files are retrieved from Vault via the ***Get Latest*** or the ***Check Out*** functions.

The ***CAD-Vault-LD*** Database has a fixed top-level folder path for its local Vault Working folder which is: ***C:\CAD-Vault-LD***

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Files within the folder that have been added to the Vault will have their ***status*** synchronised with the Vault Database.

This is the local C drive working area for all editing functions within AutoCAD, and all AutoCAD Drawings must be maintained under effective control within this folder structure.

Exercise: Creating *Project Folders* – Vault Database & Local

In this exercise we create a new project folder, and ensure we see this created on our local C drive, to allow drawing files to be created within that folder.

When creating a new AutoCAD Drawing, it is ***Best Practice*** to create the Drawing initially within the correct folder structure in which it will reside within Vault.

Best Practice	Creating new Drawing Files
	When creating a new AutoCAD Drawing, it is ***Best Practice*** to create the Drawing initially within the correct folder structure in which it will reside within Vault

One way of ensuring this happens is to follow the practice below:

1. Create new Drawing Project Folder in Vault
2. Browse to that folder in the Vault database
3. Right Click on the Folder name and select "Go-to-Working-Folder"
4. Create the new Drawing in AutoCAD
5. Save the Drawing in this new local Working Folder
6. Check In the Drawing to Vault

Let's begin this process:

1) Browse to the top-level "Vault Explorer ($)" folder
2) Right-Click and select ***New Folder***

When naming the folder we will use a combination of an example NOTI number and user name.

3) Call the folder *"100610499-willj3"* but replace the *"willj3"* with your username.

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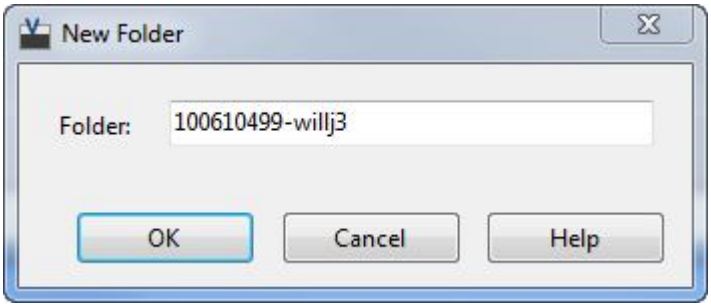
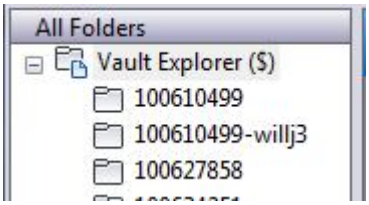


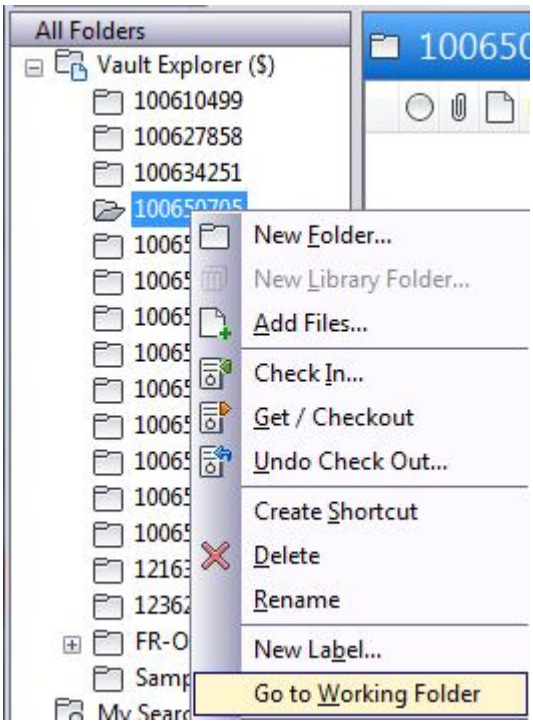
In *the above case the folder should appear within the Vault as shown below:*



The folder has now been created in the database but not locally on the C drive of our PC

To create the folder locally on the C drive of our PC:

1) Select the folder, ***right-click*** and select ***Go to Working Folder*** as shown below:



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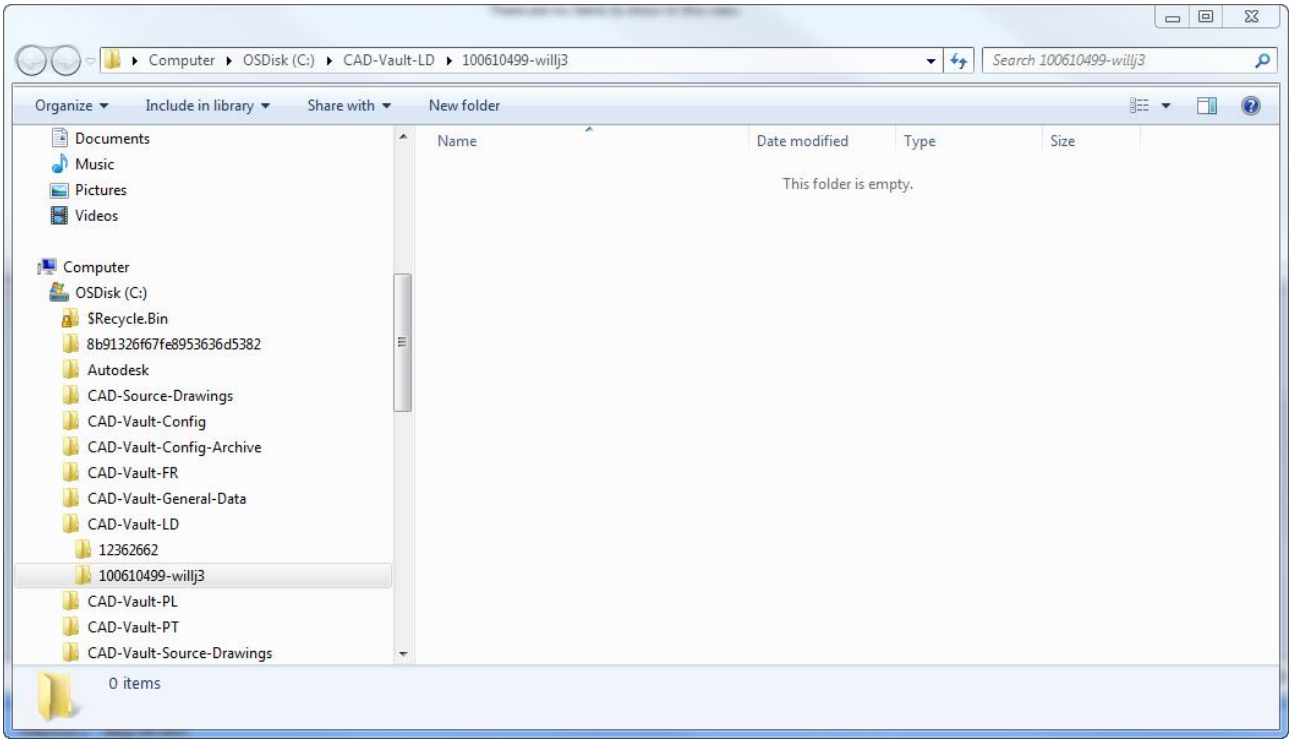
This will open a Windows Explorer window, which on a Windows 7 system will appear similar to the illustration below:



AutoCAD drawing files can now be saved directly into this folder before being added to the Vault with a Check-In process.

Sample Exercise: Creating new *Drawing Files* – Vault Add-In for AutoCAD

In this exercise we will create a new project folder, and ensure we see this created on our local C drive, to allow drawing files to be created within that folder.

We will then create a new AutoCAD Drawing file, save this file into the appropriate folder and Check In this file into the Vault.

Let's begin:

1) Launch AutoCAD with the AutoCAD Map 3D 2011 desktop icon:

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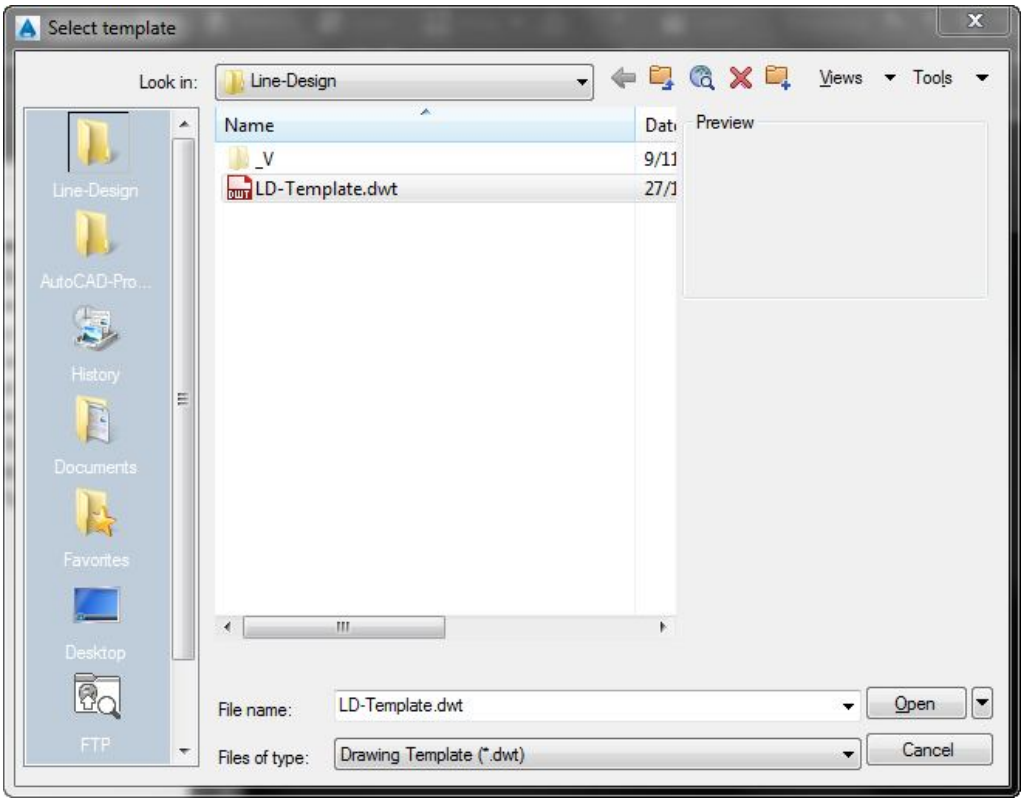
2) Ensure you are working in the Line Design AutoCAD Profile by selecting:

"SAPN Tools > Set Profiles > Line design Profile"

3) Create a new Drawing using the Line Design Template as follows:

a) Select ***File > New >*** select the ***LD-Template.dwt*** file and click ***Open*** in the dialog box, as shown below:



We will now save this Drawing file directly into the project folder we have just created.

1) Select ***File > Save As*** and browse to the "C:\CAD-Vault-LD\100610499-willj3" folder created above.

Note: Your username will be applied to this folder as above.

2) Select the ***File name:*** area of the ***Save Drawing As*** dialog box, and name the Drawing as follows: *LD-100610499-AW-willj3* - replace the *"willj3"* with your own Login name

Note: We are using a username suffix on the drawing files in this exercise to keep the filenames unique within our training Vault system.

In production all Line Design drawing file names will need to comply with the naming convention documented below.

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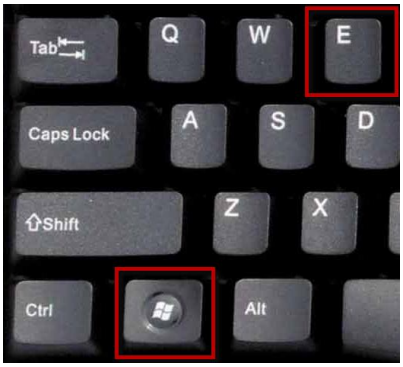
We will now open a local Windows Explorer browser and verify that the file has been created in the correct location.

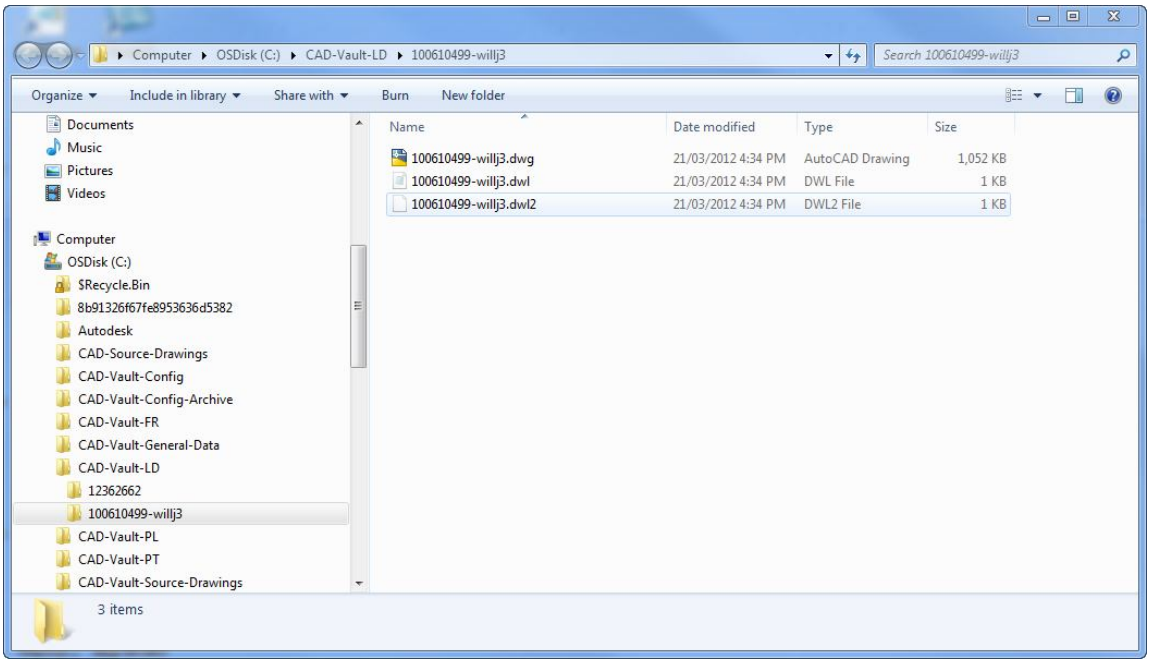
2) Open a local Windows Explorer browser by holding down the "Windows" key on the keyboard and selecting the "E" key as shown in the illustration below:



Note: This combination will always open a local Windows Explorer browser, as opposed to a Web-Desktop explorer window.

3) Browse to the "C:\CAD-Vault-LD\100610499-willj3" folder.

The window should appear similar to that shown below:



We will now Check In the file, so that it's correctly secure in the Vault database through the AutoCAD Vault Add-in.

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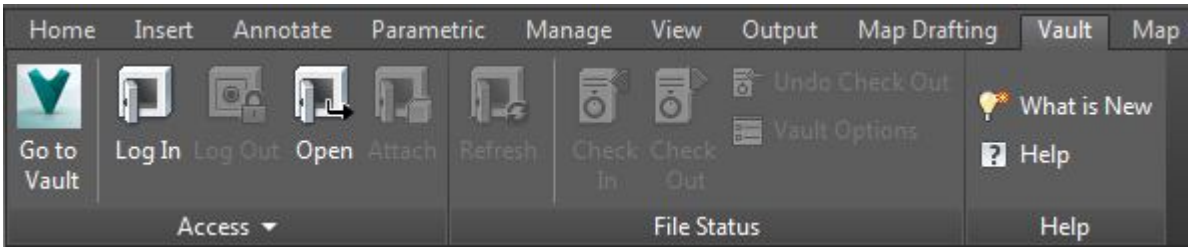
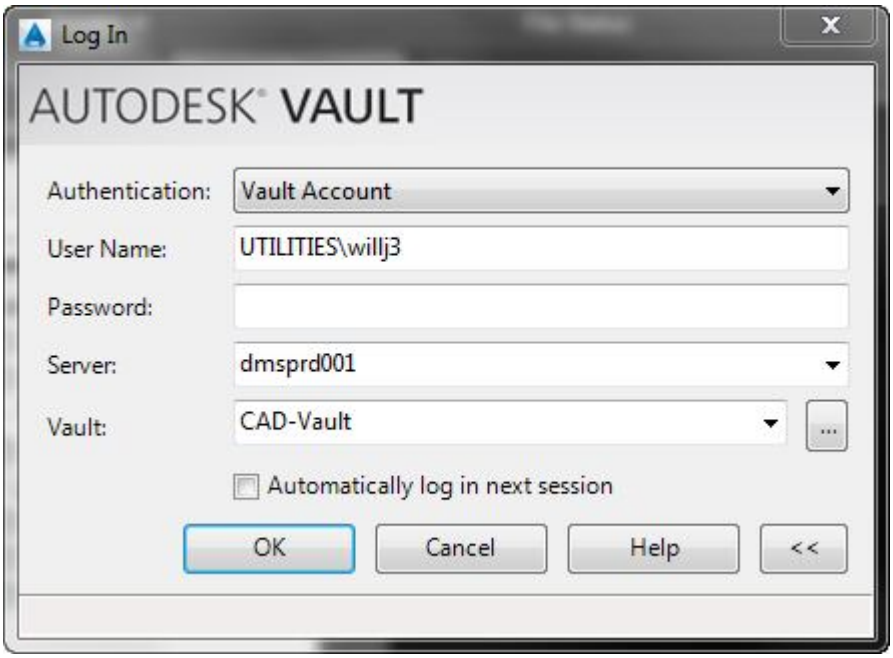
1) Go to the AutoCAD select the “Vault” ribbon, as shown below:



Note: Logging into Vault within AutoCAD is completely separate from the Vault explorer Login.

2) Login to the Vault using the ***Log In*** button on the AutoCAD Vault ribbon as shown below:

The Log In dialog box will appear similar to that shown below:



3) Login with your username and welcome password.

AutoCAD is now connected to and synchronised with the main Vault Database.

*When Login has been successful the **Check In** button on the ribbon will become active.*

4) Select the ***Check In*** button and in the section at the bottom of the ***Check In*** dialog box enter the following comment: “Initial Check In for training”

5) Select ***OK*** and wait a few moments for the Check In process to complete.

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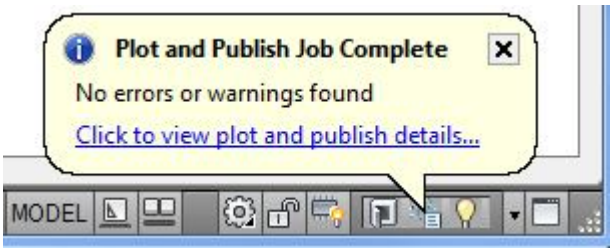
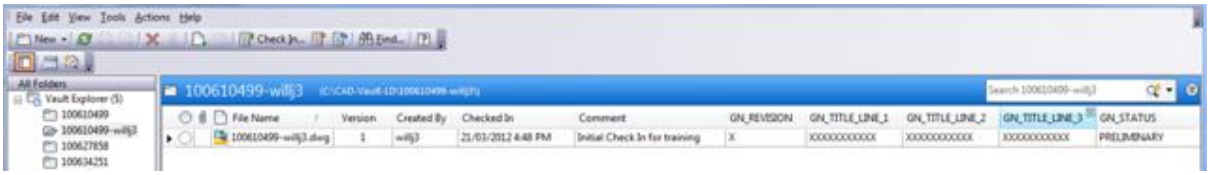
The Check In process should be complete when a message similar to that shown below is displayed:



6) We should now go back to our Vault Explorer window, select the folder we have created, and perform a ***Refresh*** function with the following button:

We should then see our newly created AutoCAD drawing as a .dwg file appear in the correct project folder, similar to the illustration below:



File Naming Conventions – Drawings & Associated Files

With the implementation of a good drawing control system, where we share data easily, comes the need for consistent and common standards in the naming of our files.

This benefits the Customer Solutions group, the Facilities records group, and other support groups who use the files created and stored within the Line Design Vault.

With the new AutoCAD Map drawing system, came the implementation of the Vault Drawing repository for safety security and easy access to our Drawings.

This guide is intended to provide a ready reference for the agreed and approved file naming convention to be used for all Line Design Drawings.

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AutoCAD Drawing Filename Convention

The file naming convention for the AutoCAD Line Design project Drawings will be based on the applicable SAP NOTI number, and also include a Drawing type code.

For example, a typical small project Drawing may be named: ***LD-100652841-AW.Dwg***

The components of the name are:

LD Designates that the drawing is a Line Design drawing and built from the Line Design CAD file template, named "LD-Template.dwt".

100652841 Is the NOTI number from SAP.

AW Is the Drawing type code, which may be ***AW***, ***QS***, ***CS*** or ***DD***

The following Drawing type codes may apply:

- AW – Asset Work
- QS – Quality of Supply
- CS – Customer Supply
- DD – Distribution Defect

Additional Drawing Sheet Information

For minor jobs, generally done by CSOs but not exclusively, only a SAP notification is raised.

For larger jobs a 'Project definition' number is also raised. This is referenced back to the SAP notification and is used to monitor projects including milestones and financial reporting. Project numbers have in the past been CP, NW, EX etc.

As part of the NECF Process we now have a common NC Project (combining CP, EX and URD) which required us to separately identify the different types of projects for reporting.

The list below allows you to choose the project type for inclusion on the drawing sheet.

New 'Project type' descriptors:

- RC – Retail Customer (Customer connect projects)
- RD – Real Estate Development (URD UID)
- EG – Embedded Generation
- AR – Asset Relocation (old EX jobs)
- PLEC – Powerline Environment Committee
- Q of S – Quality of Supply
- TC – Telecommunications
- NW - Network Upgrade Projects
- NBN – NBN Projects

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So for the majority of NPO type projects, the drawing sheet will include a Project number, NC-000000; a Project type, RC; and a Notification type, CS. This will allow us to search for drawings within the Vault, based on project number, type and notification type.

Drawing File Names - Single Sheet Drawings

The standard file naming format for single sheet drawings will be as follows:

LD-1006####-CS.dwg

By not adding a '-01' on single sheets, viewers can quickly identify if multiple sheets are involved.

Note:

We do not add a revision number to the drawing name, as this is captured and searchable as a separate field in the Vault Database.

Drawing File Names - Multiple Sheet Drawings

For multiple sheet drawings, the following file naming conventions will be used:

Standard CSO, NSO or NPO drawings

For multiple sheet drawings that will be:

- Only worked on by one person at a time;
- and all sheets will be revised in unison
-

All sheets will be contained within a single drawing file using multiple layout tabs.

The standard file naming format for these drawings will be as follows:

LD-1006####-CS.dwg

Strategic Project or major project drawings

For multiple sheet drawings that may be:

- Worked on by multiple people at any one time;
- or sheets may be revised individually
- Each sheet will be contained within a single drawing file with a single layout tab.

The standard file naming format for these drawings will be as follows:

LD-1006####-CS-01.dwg

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LD-1006####-CS-02.dwg

LD-1006####-CS-03.dwg

The above arrangements will provide the simplest file naming convention, while allowing for the future implementation of Vault Professional revision tracking and approval functions.

Note:

- *Where multiple AutoCAD Drawing files exist for larger projects they will all be stored within the same folder, named according to the applicable NOTI number.*
- *Files can be Renamed within the Vault Drawing repository to allow for some project flexibility*
- *This rename function is however an "Editor Level 2" function*

TIF & PDF File Naming Convention

The file naming convention for TIF and PDF files created from AutoCAD Drawings and added to the Vault, will be based on the drawing name, with the addition of a revision letter at the end of the file name.

Single sheet example:

LD-1006####-CS-A.tif or

LD-1006####-CS-A.pdf

Multiple sheet example:

LD-1006####-CS-01-A.tif or

LD-1006####-CS-01-A.pdf

Site Photograph Image File Naming Convention

The file naming convention for site photographs, maps etc that are added to AutoCAD Drawings from within the Vault, will be based on the drawing name, with the last two numbers being a simple numerical list of image files used for this project, for example:

First photo image used:

LD-1006####-01.jpg

Second photo image used:

LD-1006####-02.jpg etc

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Excel Spreadsheet File Naming Convention

The file naming convention for Excel Spreadsheets that are used in AutoCAD Drawings from within the Vault, will be based on the drawing name, with the last two numbers being a simple numerical list of files used for this project, for example:

Pole schedule example:

LD-1006####-PS-01.xlsx

Stringing chart example:

LD-1006####-SC-01.xlsx

Bore Log example:

LD-1006####-BL-01.xlsx

Drawing Filename Prefixes – Other SA Power Networks Groups

There will be a number of different SA Power Networks groups using AutoCAD based software, and creating drawings from different AutoCAD template files.

The following groups will be using the following drawing filename prefixes:

Drawing Filename Prefix	SA Power Networks - CAD Group
LD-	Line Design Group – AutoCAD Map "LD-Template.dwt"
GN-	General Drafting – Common to all - AutoCAD Map "GN-Template.dwt"
FR-	Facilities Records Group - AutoCAD Map "FR-Template.dwt"
PL-	Public Lighting Group - AutoCAD Map "PL-Template.dwt"
SV-	Survey Group - AutoCAD Civil3D "SV-Template.dwt"

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Unique Filenames in Vault

All files within the Vault database for Line Design will have unique names.

This means that once a file has been added to the Vault, no other file may be added of the same name.

For example:

If “LD-100652841-AW.Dwg” is already in the Vault, no other file named “LD-100652841-AW.Dwg” can be added to any other folder of the Vault.

However “LD-100652841-AW.TIF” or “LD-100652841-AW.PDF” could be added to the Vault, as they do have a different file extension to the .Dwg file.

The Vault will have a unique filename enforcement policy, to enforce the above, so that there is only 1 master file of each name, and the latest file location is clearly know to all.

Working with Vault and AutoCAD

The information in this section is focussed on work done directly within the AutoCAD software, and how this interacts with the Vault database.

Drawing Check Out and Editing Functions

We will now review the editing functions that are performed within AutoCAD and the process of Checking Out the Drawing we have just created so further editing can be performed on the Drawing.

During the edits we will remove a number of Sheets (Layouts) from this Drawing, and use only an A3 landscape Sheet.

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Exercise: Drawing Check Out and Editing

In this exercise we will access the newly Vaulted drawing from within the Vault ribbon interface in AutoCAD, to see the interaction between AutoCAD and Vault.

IMPORTANT NOTE:

Before commencing the exercise below, please ensure the drawing previously used has been closed without saving, checking out etc.

1) Activate the AutoCAD window, and select the Vault ribbon.

2) Confirm that you are Logged into Vault.

*If you are not Logged into Vault the **Login In** button will appear available, as shown below:*

During Login a confirmation message will appear within the AutoCAD command prompt area, similar to that shown below:

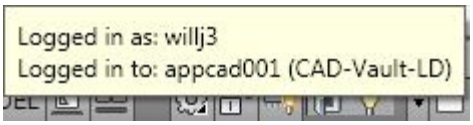
```
User 'willj3' has successfully logged into the Vault
Command:

Command:
```

We can confirm the connection status of AutoCAD to the Vault database by Checking the small Vault Icon in the Drawing Status bar at the bottom right corner of the AutoCAD window.

The Vault status Icon appears similar to  *button.*

3) Hover over the button with your cursor, you should see your connection status similar to that shown below:



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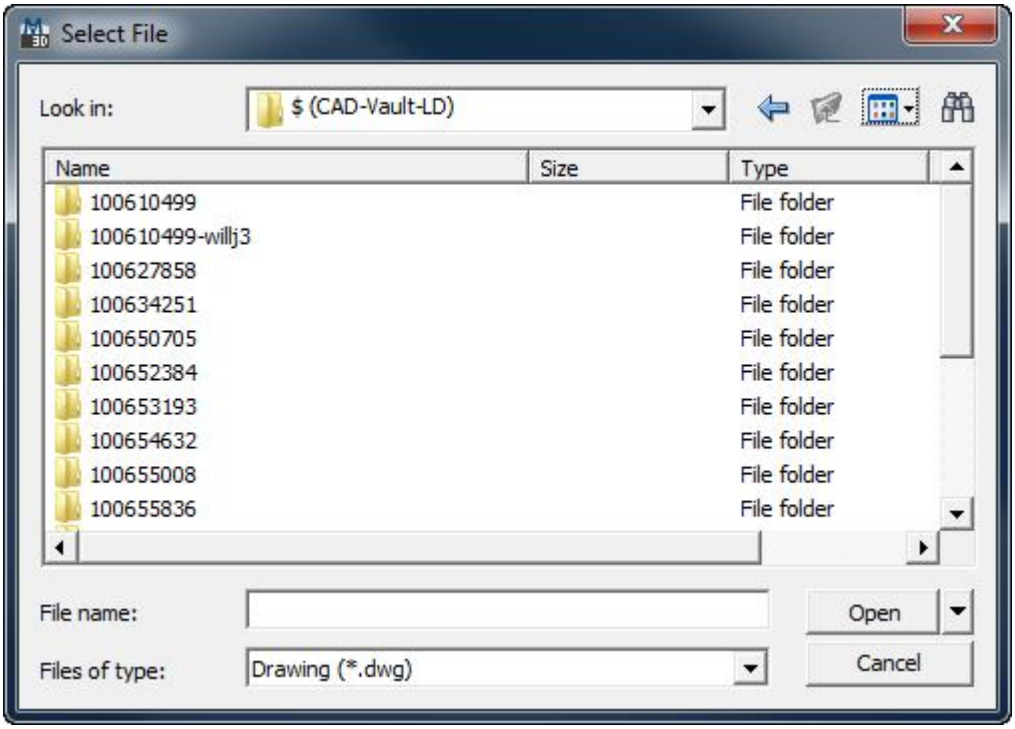
*If you are Logged into Vault the **Login Out** button will appear available, as shown below:*

4) Within the AutoCAD Vault ribbon, select the ***Open*** button as shown below:

This will force AutoCAD to browse the Vault database for Drawing files, rather than your local Windows drive.

5) Navigate the folders to your project folder, in a similar manner to the illustration below:



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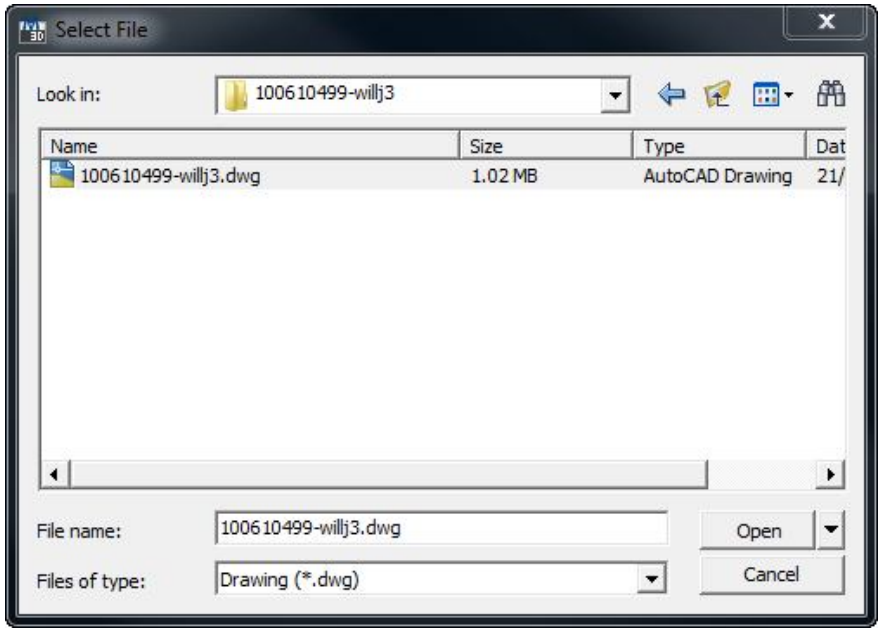
6) Select the Drawing file, and select ***Open*** on the dialog box as shown below:



*A prompt should now appear indicating that the Drawing is not currently **Checked Out** to you as a Vault user, and do you want to **Check it Out** now?*

7) Select ***Yes*** on the dialog box above, to make the drawing file ***Read/Write*** on our local PC so we are able to edit.

*In performing the **Check Out** function on this Drawing we have reserved it for editing only by ourselves, and locked this file in the central Vault database.*

8) Open your Vault Explorer window and select the ***Refresh*** button to see the new ***Checked Out*** status of the file.

The Status of the Drawing should now change, showing a ✔ mark as the drawing status icon.

This should appear similar to the illustration below:

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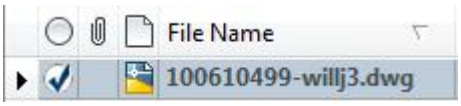


We will track the status changes as we proceed with our editing session in AutoCAD.

We will now edit this drawing to remove the unwanted drawing sheets, leaving only the A3 sheet.

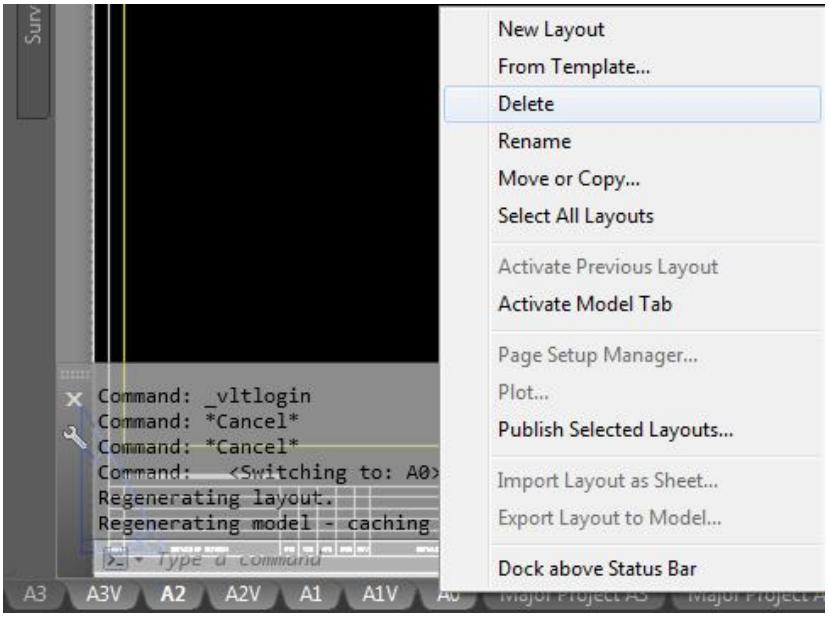
1) Go to the Layout Tabs at the bottom of the AutoCAD drawing area which show the ***Model*** and all other Sheet Layouts:

2) To remove unwanted sheets firstly activate the "A0" sheet as shown 

and then holding the ***CTRL*** key down, select the other sheets, not needed 

being cautious not to select the A3 sheet we wish to keep.

3) When the Layout sheets are selected, ***right-click*** over one of the Layout Tabs and select ***Delete*** from the menu, in the similar manner to the illustration below:



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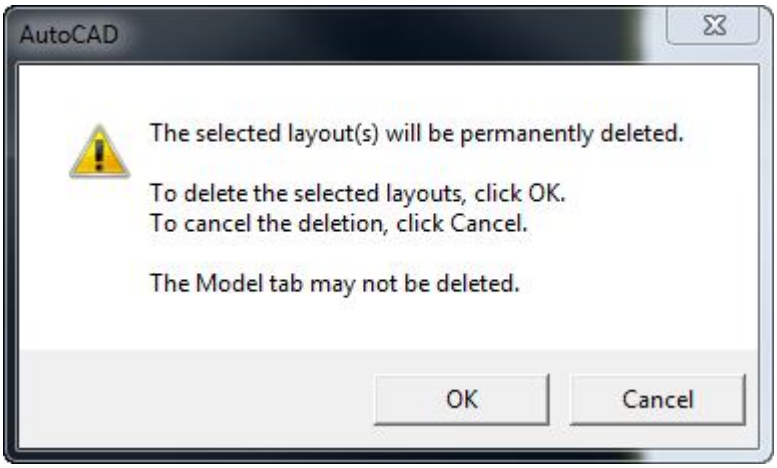
A warning window will appear as shown below:



4) Simply select ***OK*** to proceed.

The final display of the Model and Layout tabs should appear as shown below:

Best Practice	**Remove Un-Used Drawing Sheets from Paper Space**
	It is Best Practice to remove any un-used drawing sheets from the Drawing Paper Space area for the following reasons: • Drawing file size will be more compact if un-used sheets are removed • This reduces the ***Previews*** generated for each sheet on ***Check-In*** • Drawing Title Block attribute mapping is controlled correctly

Exercise: Checking In

We will now ***Check In*** the drawing, to see if changes have occurred within Vault.

1) If you select the ***Vault ribbon*** within AutoCAD, you should now see the ***Check In*** button available to use, as shown below:

2) Select the ***Check In*** button to secure the drawing changes into the Vault database.

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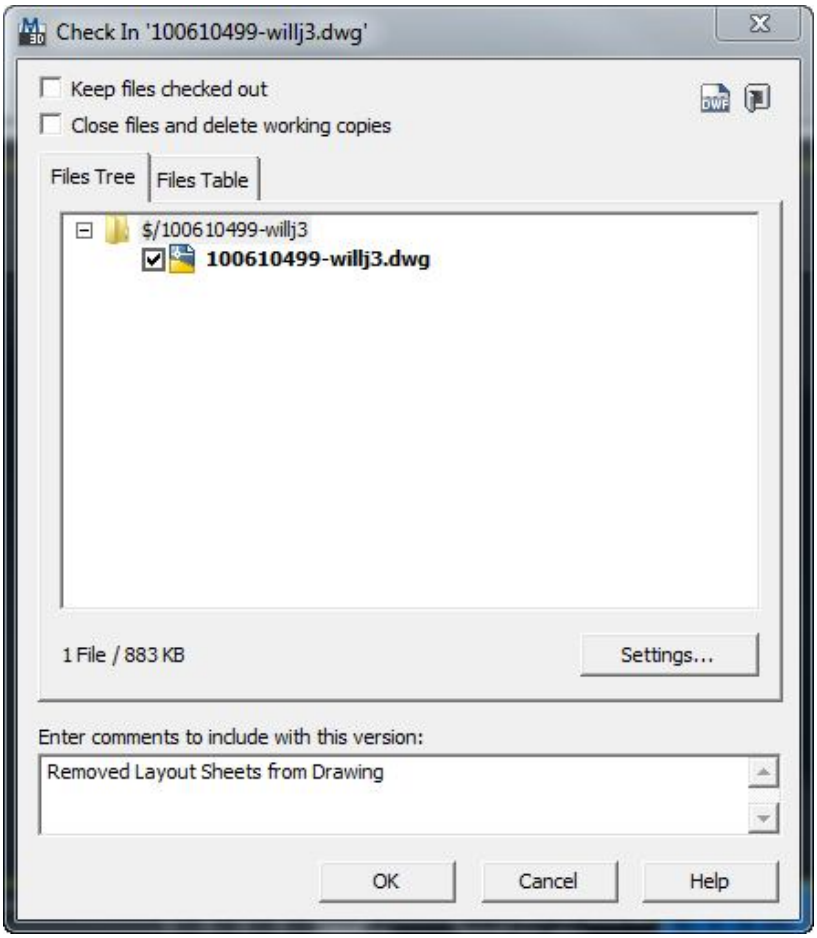
*The **Check In** dialog box should now appear similar to the illustration below:*



3) Enter the comment as above ***Removed Layout Sheets from Drawing***

As we have not yet actually saved the drawing file since our edits, AutoCAD will prompt us to save it to our local drive before continuing with the Check In process.

4) Select ***Yes*** in the dialog box above:

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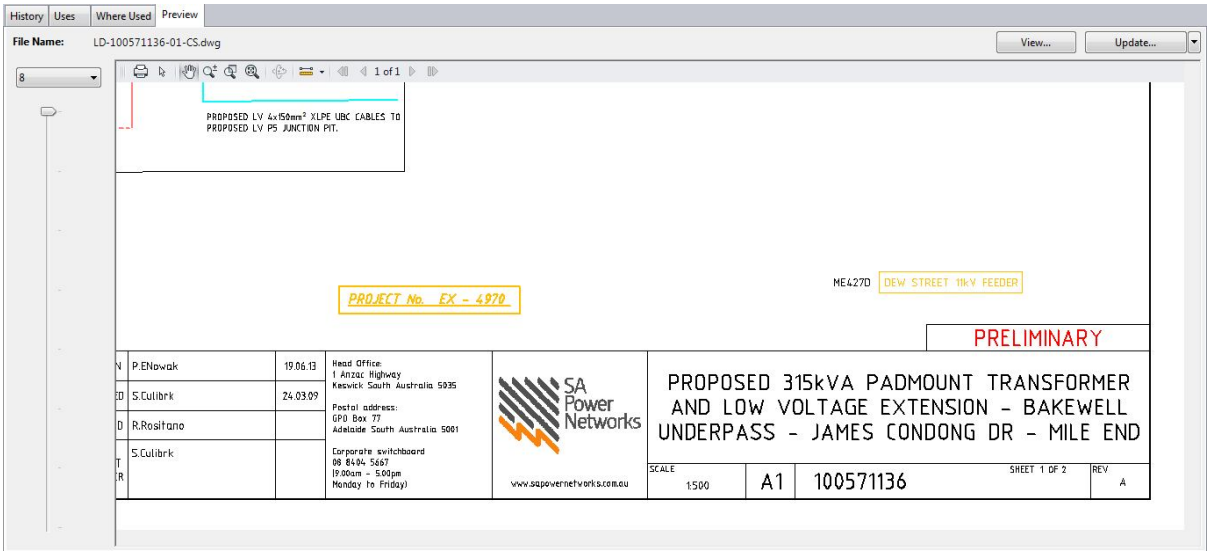
Best Practice	Exercise Caution with “Check In Comments”
	It is ***Best Practice*** to enter comments in the ***Check In*** dialog box, which are meaningful to the current status of the drawing development. For example if Land Base data has just been imported, you may wish to record a comment / remark saying “Land Base data imported” or “Reference Data for Bush Fire Risk area added”. Check In remarks are visible and searchable within the Vault database, and cannot be edited.

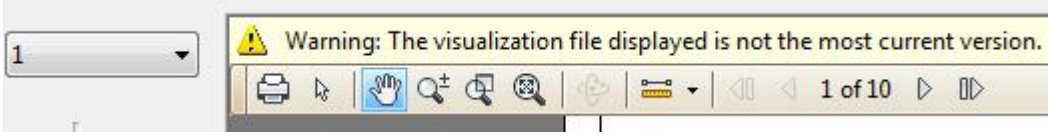
5) Within the Vault Explorer window, select the Drawing file, and note that we have a new ***Version*** of the drawing file, with the comment of ***Removed Layout Sheets from Drawing.***

6) If we view the ***Preview Tab***, we will now see that we only have ***1 of 1*** sheets, which simplifies the display.

The Preview Tab within Vault Explorer should appear similar to the illustration below:



*We should also note that previous visualisation files are displayed in the **Preview Tab**, by selecting an earlier **Version** number from the **Pull Down** list on the left of the preview window:*



In the case of our Drawing, Version 1 shows 10 sheets.

Note the warning associated with this visualisation file:

“Warning: This visualisation file displayed is not the most current version”

This is simply because we now have a later version of the file, which is why when we select ***Latest*** version, the message is not displayed.

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Appendix:

Sample Data Sets

The sample data sets used in the training exercises previously are available for download from the file named “”CAD-Source-Drawings.zip”. This file is 138Mb in size.

following table contains a list of terms, acronyms and their definitions used in this document:

Definitions, Acronyms and Abbreviations

The following table contains a list of terms, acronyms and their definitions used in this document:

Term	Definition
AutoCAD	A CAD (Computer Aided Design/Drafting) software application for 2D and 3D design and drafting, developed and sold by Autodesk, Inc.
CAD	Computer Aided Drafting
Conversion	The “on demand” process to convert drawings from CADDSMAN to AutoCAD on an as needs basis.
SAPN	SA Power Networks
GIS	Geographic Information system
Migration	The process to migrate, in bulk, CADDSMAN drawings to the AutoCAD format
NMT	Network Management Team
NPO	Network Project Officer
PLS CADD	Power Line Systems – Computer Aided Design and Drafting. Software for the structural and geometrical design of overhead power lines
Schema File	A file which defines the interface between two systems (.xml)
Switching Diagram	CAD based drawing indicating High Voltage Distribution Network for operational purposes
TOPAS	Powerline design software integrated into and dependant on CADDSMAN to operate
AutoCAD .Dwg file	This is the standard native format of AutoCAD Drawing files, which has become a global CAD 2D Industry standard
Smart AutoCAD .Dwg file	This is an enhanced AutoCAD Drawing format file which includes additional Object Data applicable to the Mapping / Civil Engineering and Surveying fields

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Object Data	Object Data is CAD based metadata about a CAD object. It is attached to the CAD Object in a non-geometric format. For example a Road may appear as Line geometry, but the name of a Road is attached to it as Object Data
Shape File	This is an ESRI Geospatial Data exchange format which can be read by and written to by the AutoCAD Map software. Shape file data is usually provided as a set of data files
SDF File	This is an Autodesk format of Geospatial file capturing both Geometry and Object data in one compact file format
ECW File	This is an "Enhanced Compression Wavelet" graphical image format optimized for aerial and satellite imagery, and proposed for use as Topographical map files for reference data
Reference Data	This is data used to assist CAD designers in locating other objects and geometry that relate to the current design. This may be a "Bush Fire Risk Area" or "Environmental Control Area" or existing SA Power Networks Fibre Network location
Georeferencing	The ability to define the location of assets "Poles" or "Transformers" etc in physical space. To correctly Georeference an object's location is to establish its location in terms of a map projection or coordinate systems
CAD Layer	This is a feature of a CAD System to place CAD Geometry such as Lines of Text on a Layer, and have the visibility of all Objects on this Layer On or Off by changing the state of the Layer to On or Off
Map Layer	This is a feature of the AutoCAD Map software to reference non-CAD Geometry such as an ESRI Shape file, SDF file, or ECW file into a Map Drawing and have the ability to change the visibility of all Objects on this Layer On or Off by changing the state of the Layer to On or Off
Data Translation	This is the process of converting the format of a data file from one format to another, to import or export data from the CAD system. For example ERSI Shape file data may be converted or translated into AutoCAD .Dwg file data and vice-versa. This practice should be kept to a minimum for productivity and data consistency reasons
TOPO Data	This is an acronym for Topographic Data which is essentially a detailed and accurate graphic map representing cultural and natural features on the ground. Topo data will be provided to AutoCAD users in ECW format

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Map Sheets	A tiled grid of map sheet references corresponding to the geographic polygon shapes of map numbers and sheet references at scales of 1:100,000 and 1:250,000. These are defined and maintained by Geoscience Australia, who describe this data set as follows: "These are separate GIS data of map numbers and map names appearing on NATMAP 1:100 000 and 1:250 000 scale topographic maps and GEODATA TOPO 250K Series 2 data tiles. The datasets contain map numbers, map names and the geographic extent of each map and data tile in the index of map sheets"
Oracle Spatial INTFIN Database	A master of GIS Land Base Data sourced from the DENH Land Services Group is contained within the Oracle Spatial "INTFIN" Database. This also contains data which has been processed by the SA Power Networks GIS group, to cleanse geometry issues, and enrich the metadata for downstream business applications within SA Power Networks
Customer NMI	A customer NMI is a National Meter Identifier. This is a unique number used nationally by electricity suppliers to identify the electricity meter at customer properties. This is included as a location identifier for searching and finding a geographical location

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