TBC ADAC WORKFLOW

V1.1 November 2021.

Contents

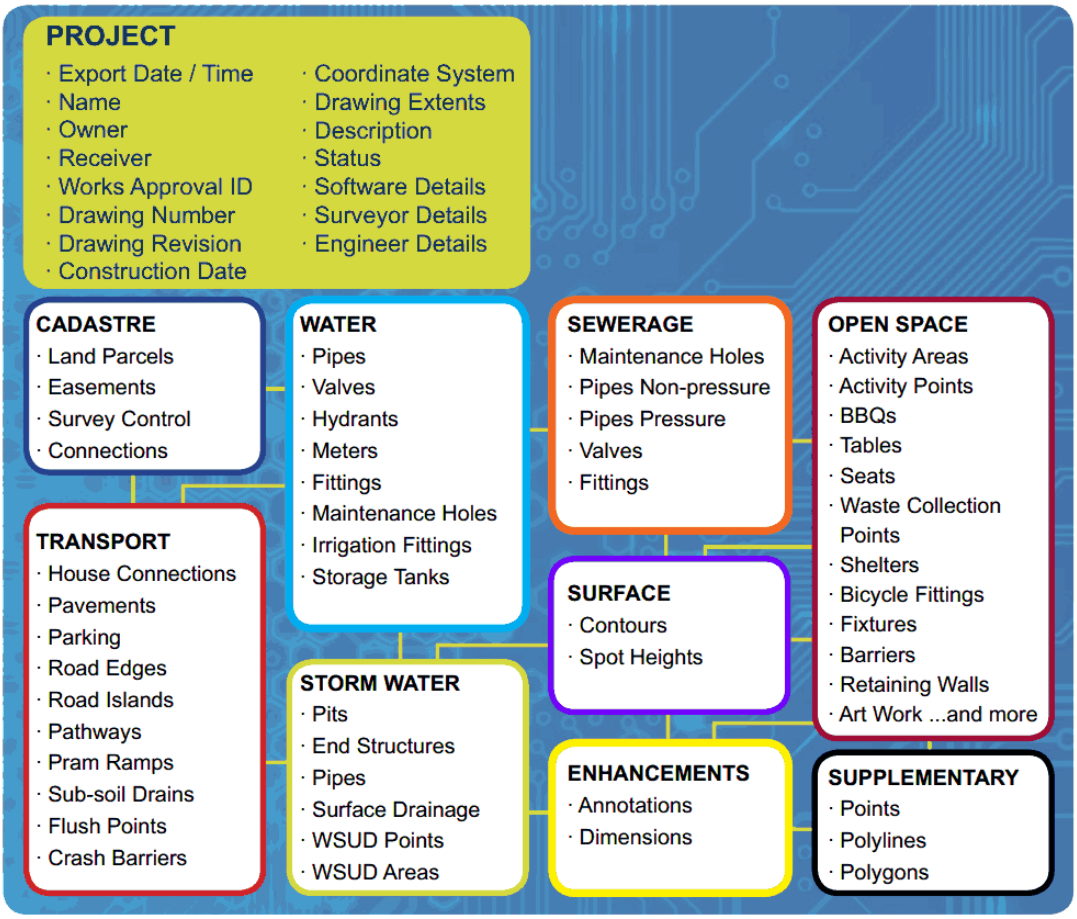
Introduction and background information

This manual has been created to assist utilising Trimble Business Center (TBC) software to create a new ADAC project, import data, process and Export ADAC XML.

This workflow gives the user a general understanding on how to use an FXL, CAD commands and the ADAC setup tool to create, edit and then export an ADAC xml.

Users of this manual are urged to be familiar with the basics of processing feature codes in Trimble Business Center(https://geospatial.trimble.com/trimble-business-center-tutorials), publications and standards of Asset Design and As Constructed (ADAC) data specification and transport format (XML) available from the IPWEA website: https://www.ipweaq.com/faq-s

ADAC is an open source format for the standardisation of asset design and as constructed data. Covering a wide selection of asset categories, consisting of:



1.Setting up a Project in TBC

TBC Template Setup

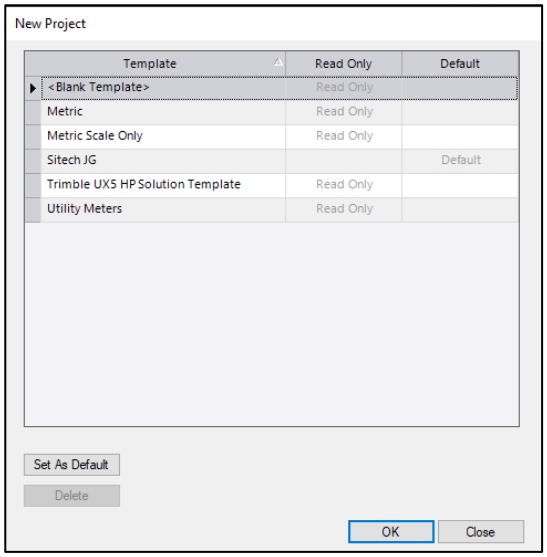
Before importing any data, it is important to get your project template setup.

Launch a new project

In Trimble Business Centre, do either of the following:

1. On the Start Page, click the **New Project** button.
2. In the TBC ribbon, select **File > New**.

The **New Project** window will display.

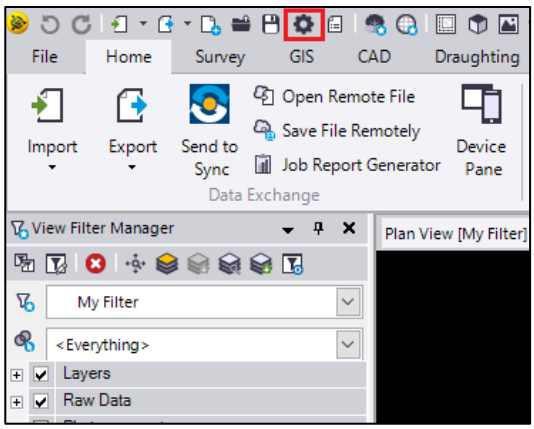


Select *Metric* template and click **OK.**

The **Plan View** will then display.

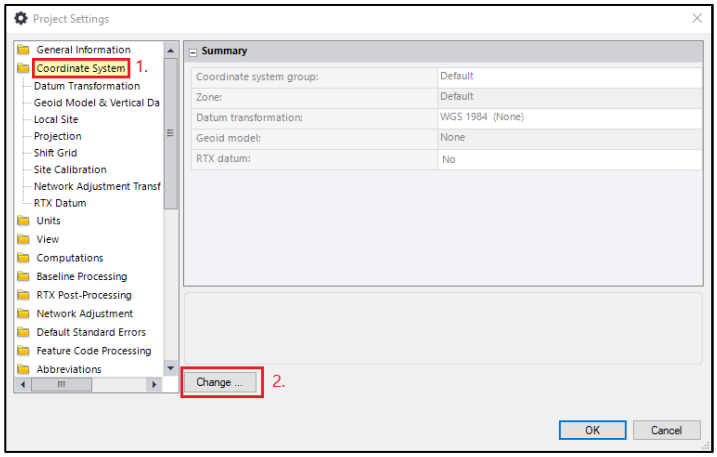
Change the Project Settings

1. In the top left corner of the **Quick Access** toolbar select project settings.

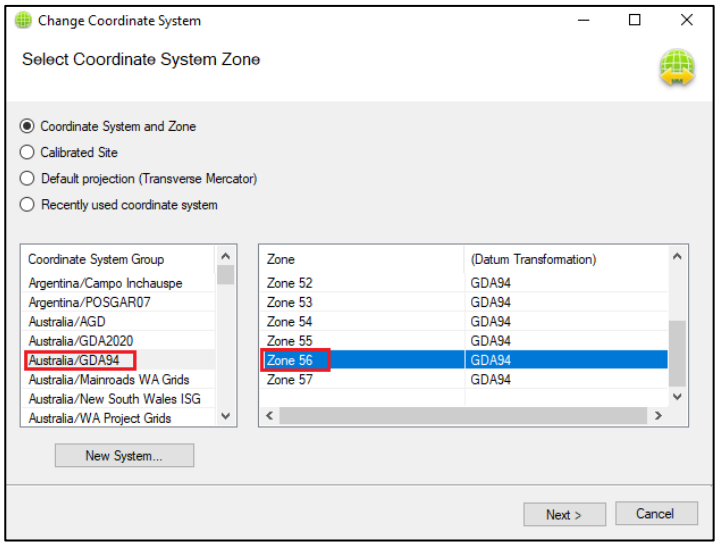


2. Fill out any of the **General Information** if necessary or skip this section.

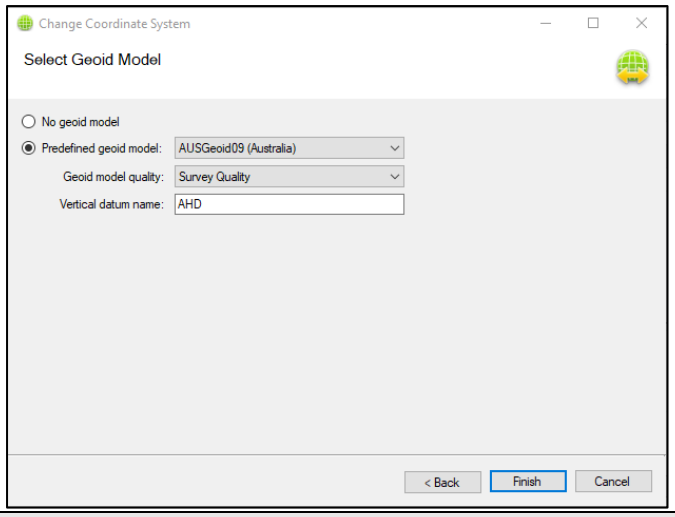
3. Select **Coordinate System** then click **Change.**



4. Select the **specific** coordinate system associated with the job. For this workflow we are using **GDA94 Zone 56.** Click **Next.**



5. Select the **Geoid Model** (AUSGeoid09 for this example), the Geoid quality and the name of the vertical datum (AHD). Then click **Finish.**



Note: You can change more project settings if you wish, but for this workflow, we are mainly concerned with the coordinate system and units.

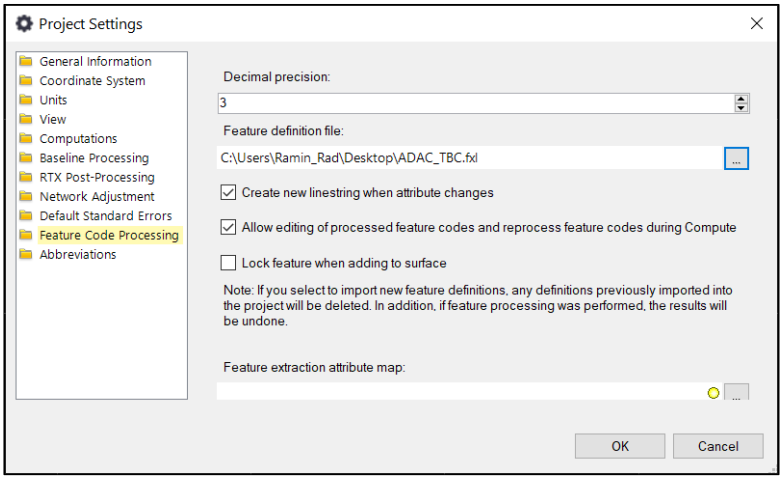
Load the feature definition file (FXL) into TBC

To **load** the FXL into TBC you can do either of the following:

1. In the navigation pane in the **Project Settings** dialog, select **Feature Code Processing**.

   Click the **Browse** button  located to the right of the **Feature definition file** field.

   In the **Open** dialog, browse to where the *ADAC_TBC_V?.fxl is located* and click **Open**.



2. Alternatively, **drag and drop** the FXL into the plan view.

The project is now set up and ready to import in the ADAC data.

Note: The ADAC FXL files can be found C:\Program Files\Sitech Construction Systems and in the ANZToolbox folder for your TBC version.

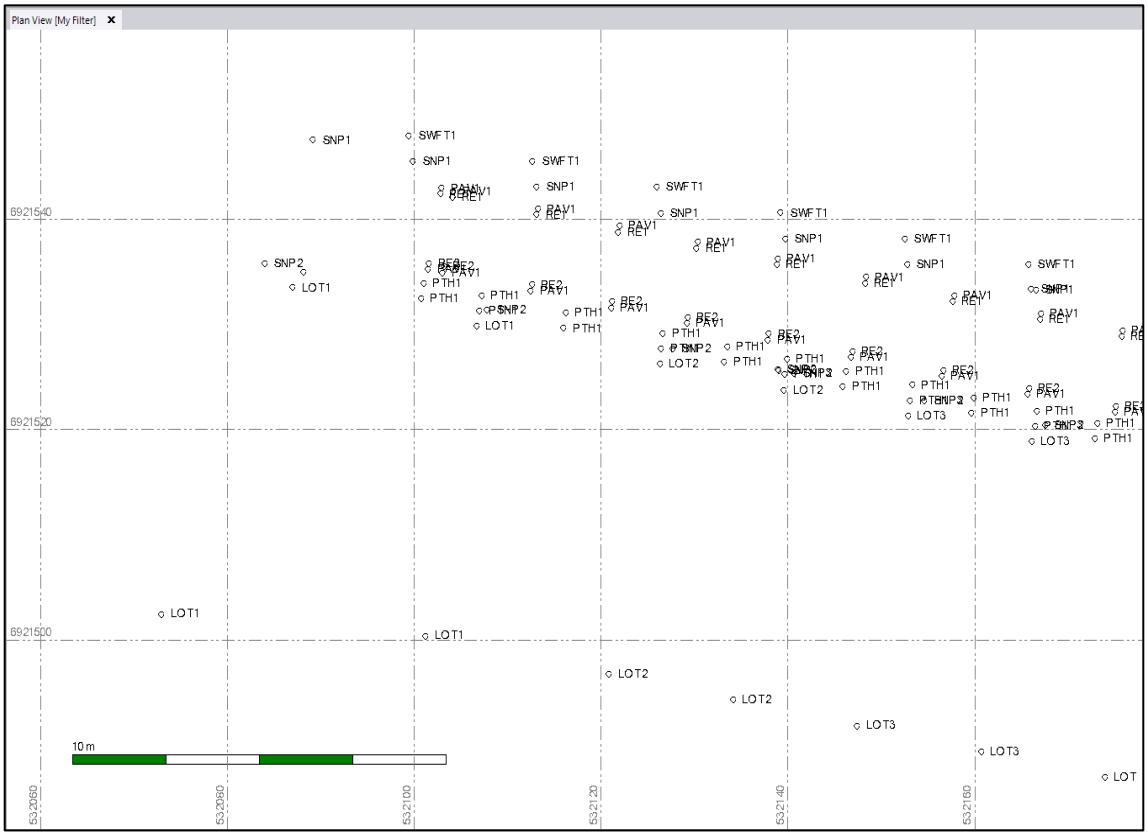
2. Processing the Data

Importing the data

The next step is to **import** in the survey data you wish to use to create the ADAC xml.

1. Navigate to **Home > Data Exchange > Import.**
2. The Import pane will then pop up. Use the ... icon to navigate to the folder that contains the file you want to import. Click **OK**.
3. Select the file you wish to import from the list. Change the settings if required. Then click **Import**.

The image below shows the unprocessed points we have imported and will be using for this workflow.

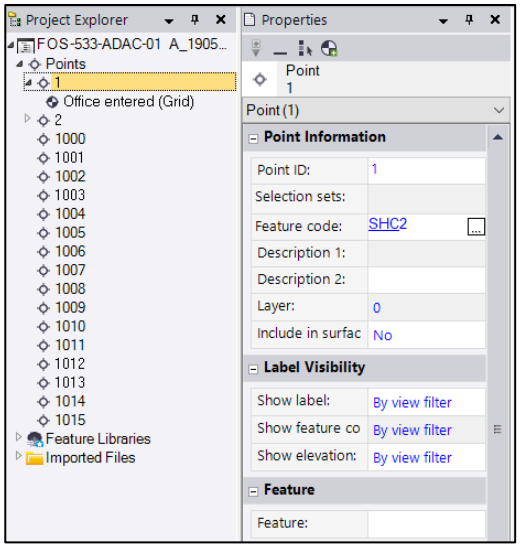


Project Explorer

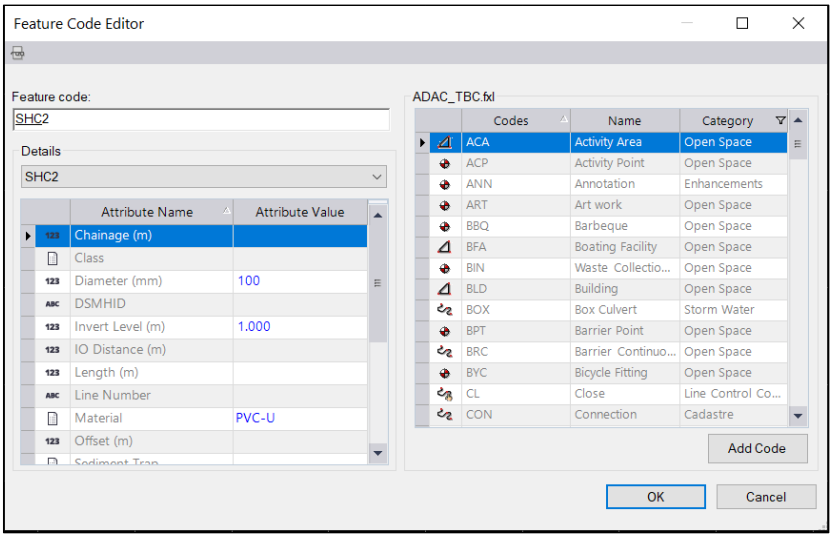
Before you process the feature codes in your project, you can view the codes and their assigned values, and make changes if necessary.

1. In the **TBC** ribbon, select **Home > Data > Project Explorer**. The **Project Explorer** pane should display.
2. In the **Project Explorer** pane, expand the **Points** node. Then double-click the point you wish to view. (Point 1 in this example).

The **Properties** pane displays showing properties for point *1*. The feature code assigned to the point displays in the **Point Information** section.



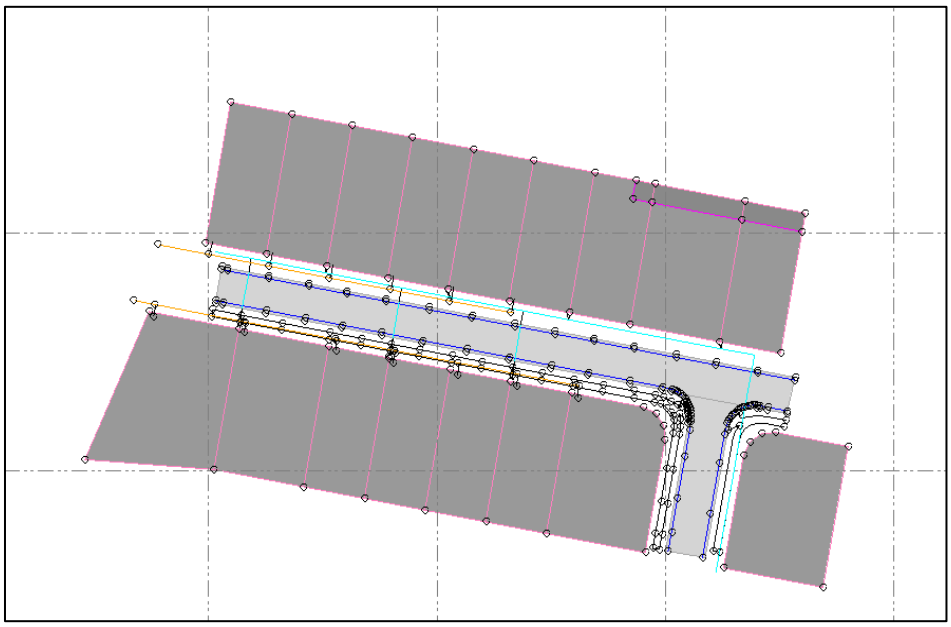
Click the **Browse** button  in the **Feature code** field to view more information about the feature code in the **Feature Code Editor** dialog.

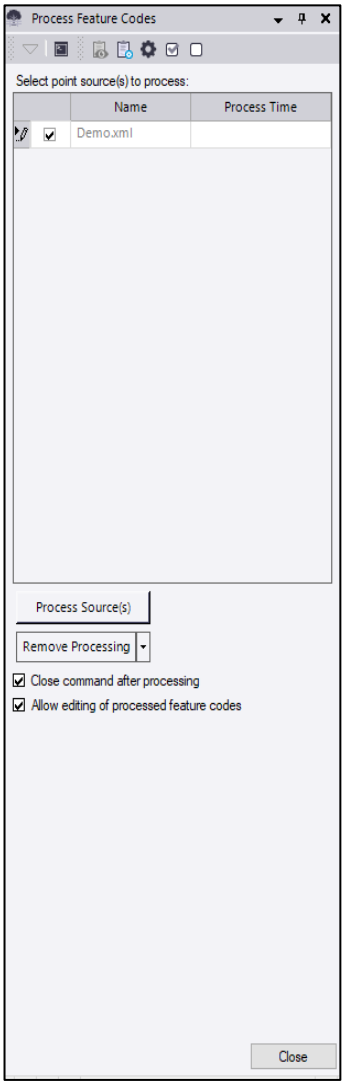


This dialog allows you to remove a feature codes, select a different feature code, add a feature code, and/or change attribute values.

Processing Feature Codes

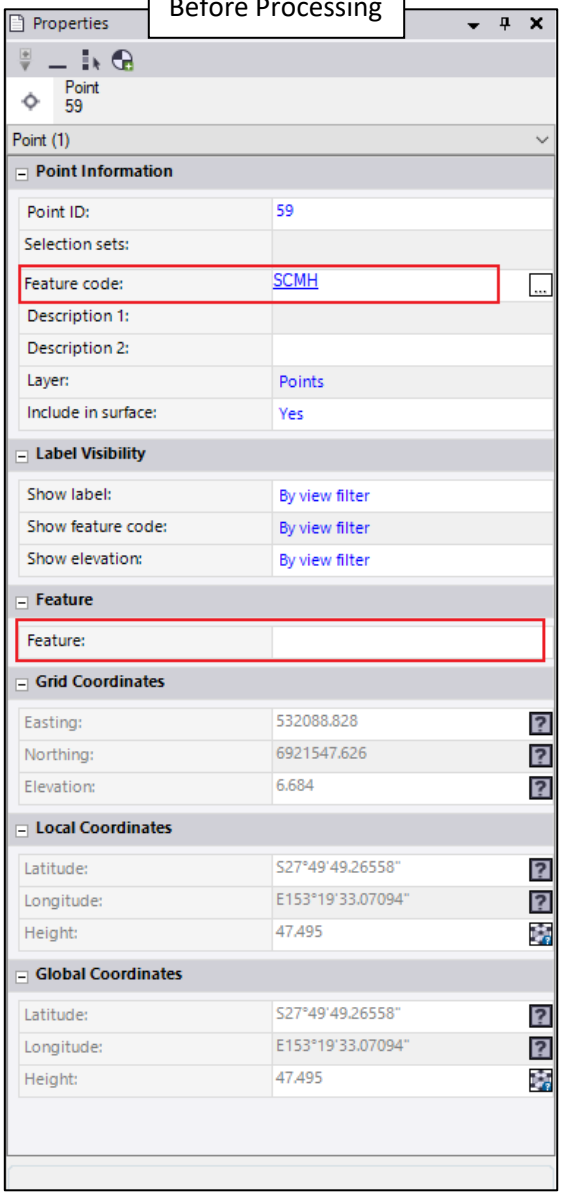
1. The next step is to **process the feature codes**. Navigate to the **GIS > Feature Definition > Process Feature Codes.**
2. Select the **point source** (demo.xml for this example) you want to process for and then click **Process Source(s).** By processing feature codes TBC uses the coding and attribute information to string together points with line codes, colour the linestrings, layer features, give points symbols and process attribute information. The image below shows the points after processing.



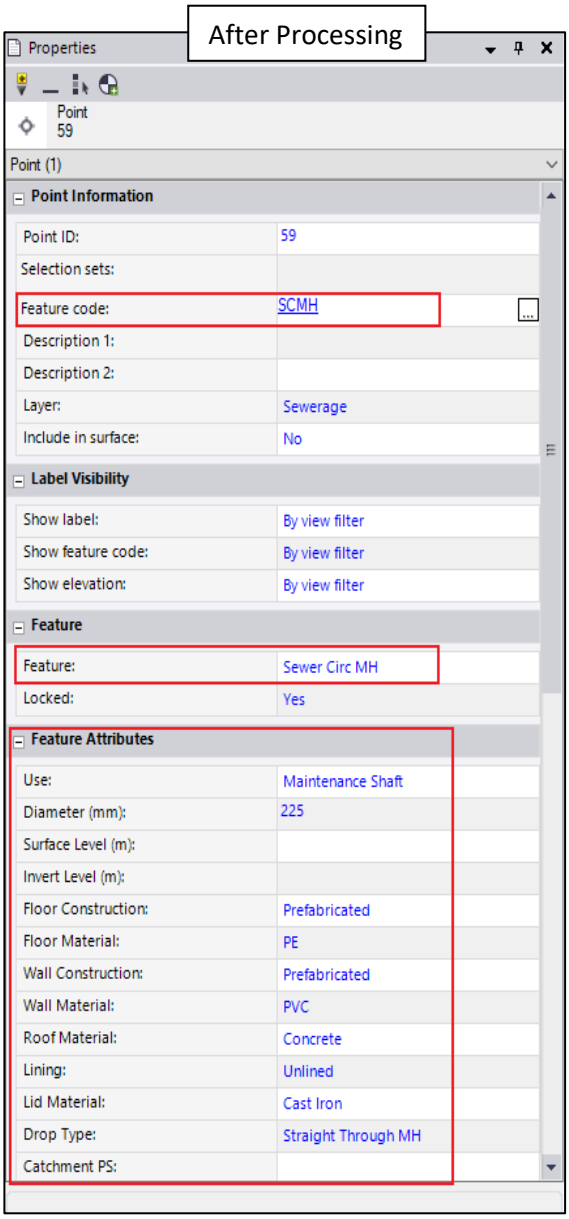


Comparing the properties of point 59 before processing to the properties of point 59 after processing.

Before Processing



After Processing



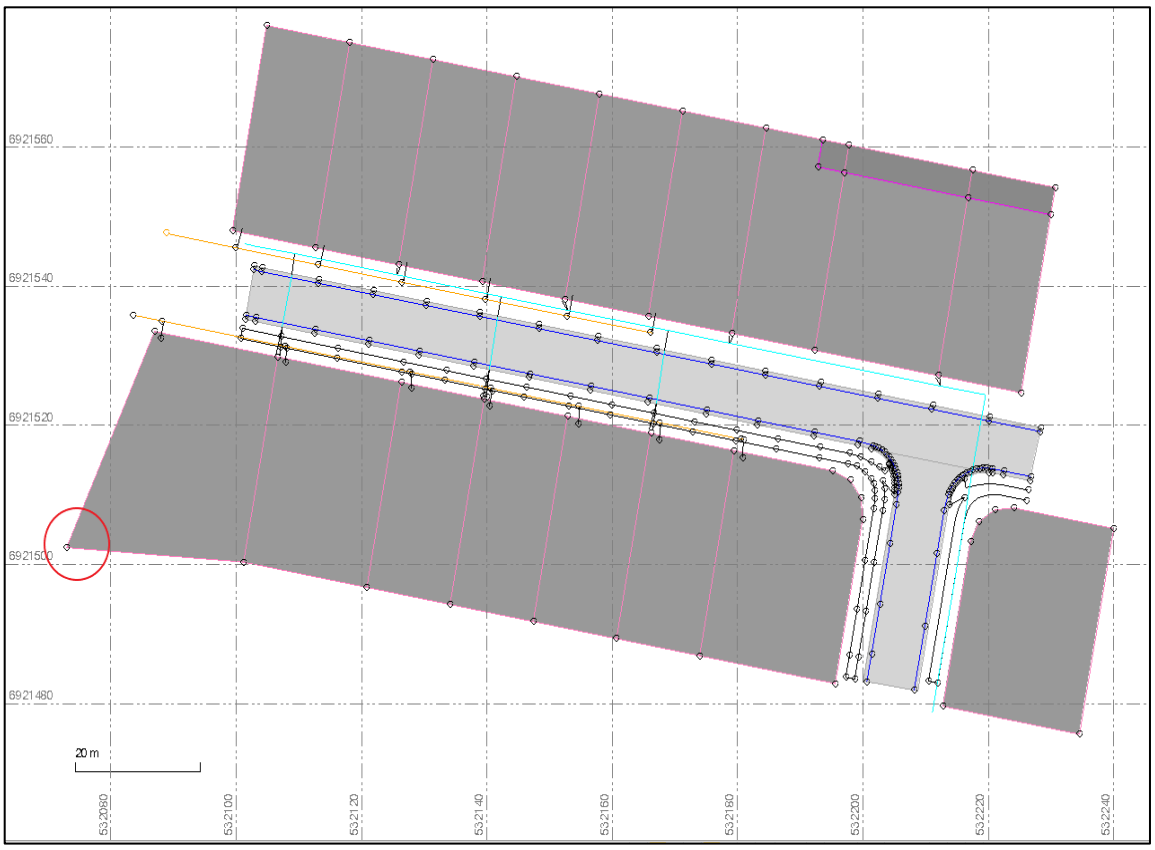
As displayed above. After Processing Feature codes, point 59 now has ADAC standard attributes in the properties tab as well as having a defined feature name and corrected layer.

3.Editing using CAD and other commands

It is rare for there not to be any errors in data after processing. This workflow shows how to use CAD commands and other functions to correct and edit some errors users may come across.

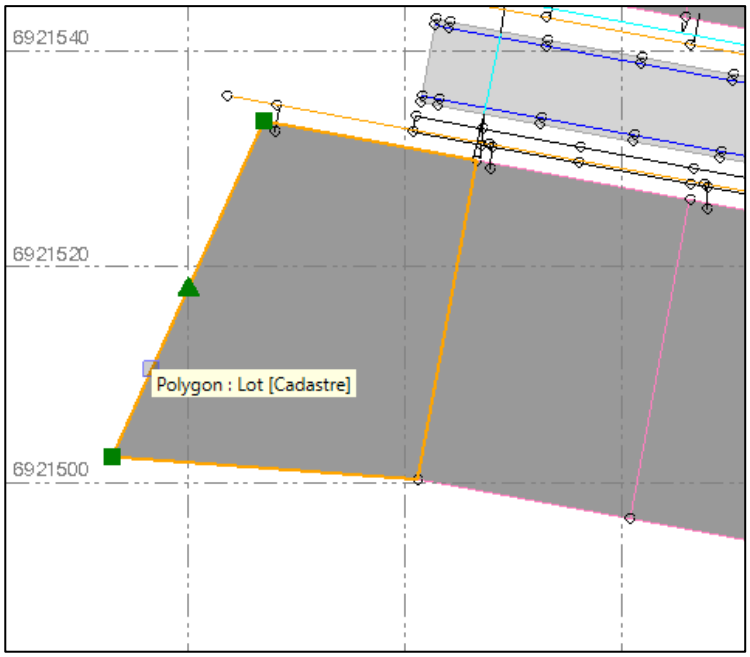
Editing line and polygon geometry

In the example the lot in the far-left corner has an error. The bottom left corner of the lot is meant to be at an angle of 90 degrees. This can be corrected multiple different ways, for this example we will use two different methods one using CAD grips and smart snaps and the other method using the editing tool.



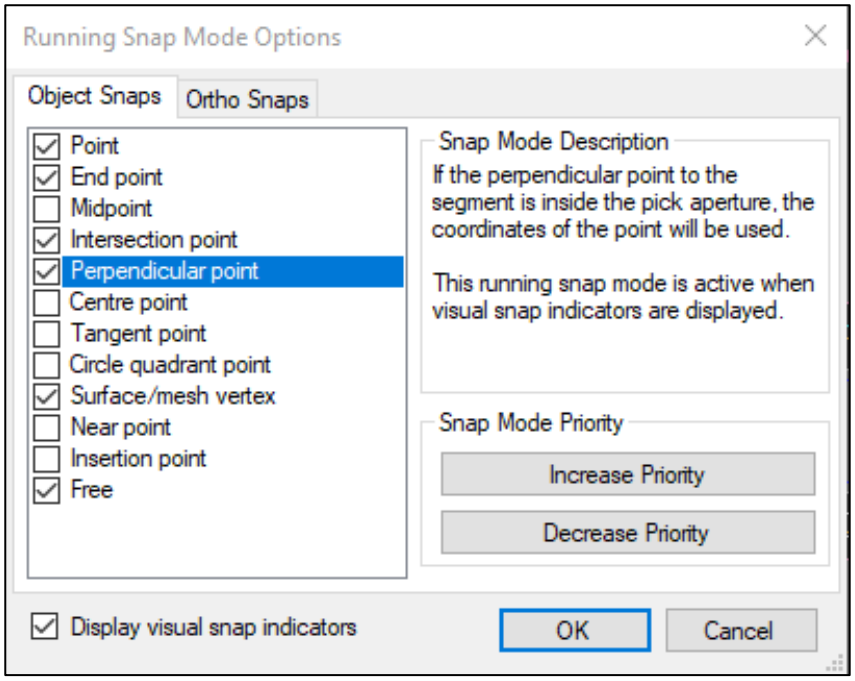
Using CAD Grips and Smart Snaps

1. Start by **clicking** on the lot selecting the polygon.

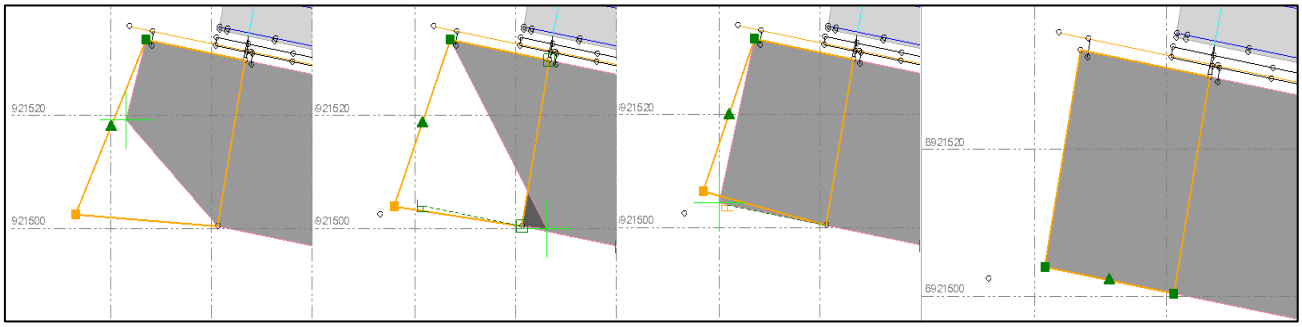


Note: you can right click and select edit to input the coordinate of the bottom left hand corner.

2. In the bottom right corner of the quick access toolbar **click** on Snap to open the **Running Snap Mode Options**. Ensure **Perpendicular Point** is checked and click **OK.** This ensures the bottom left corner will snap to a perpendicular when using the CAD grips.



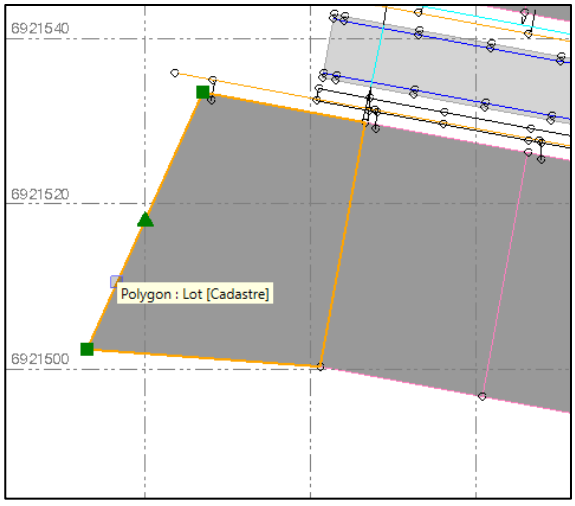
3. Click and hold the **yellow square** in the bottom left corner. You can use the mouse to place the corner anywhere on the plan view. However, we want the point to be **perpendicular** to the other points. While holding, **place** the cursor near the **bottom right corner** of the lot. The perpendicular snap symbol should pop up (Circled below). Once the perpendicular snap symbol pops up, while holding the snap still place the cursor near the perpendicular symbol and release the mouse. The bottom left corner should snap to the perpendicular point.



4. You can choose to move the lot corner point to the new corner of the polygon. However, it is not required as you will not be exporting the point with the ADAC xml.
   To move the point, navigate to **CAD > Edit > Move**.

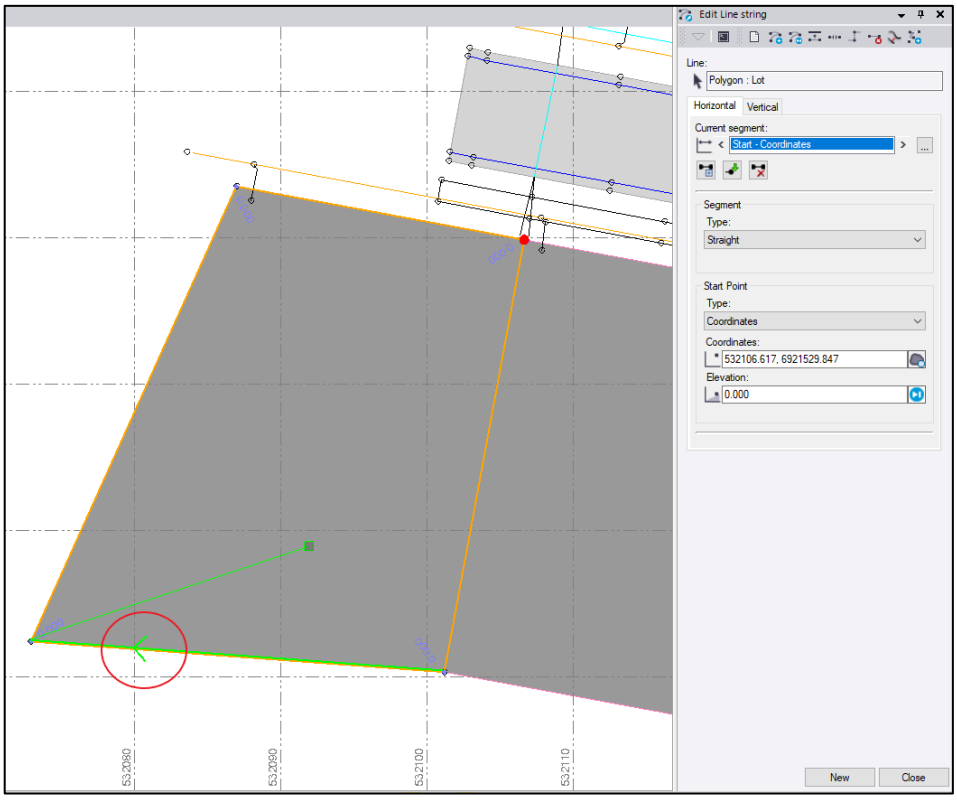
Using the Editing tool

1. Start by **clicking** on the lot selecting the polygon.



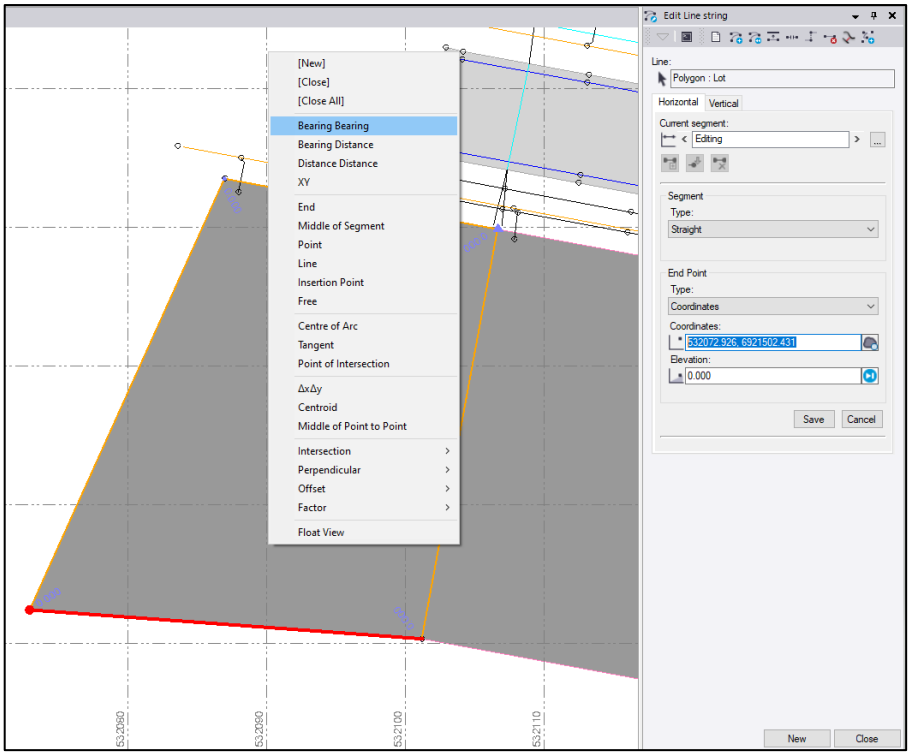
2. **Left click** in the plan view and select **Edit.**
3. In the **Edit Line string** click in the **Current segment box** and ensure it is highlighted.

4. In the **plan view** select the **line string** that has the arrow pointing to the point which you want to edit. Notice the **arrow circled** in red pointing towards the point we are going to edit.

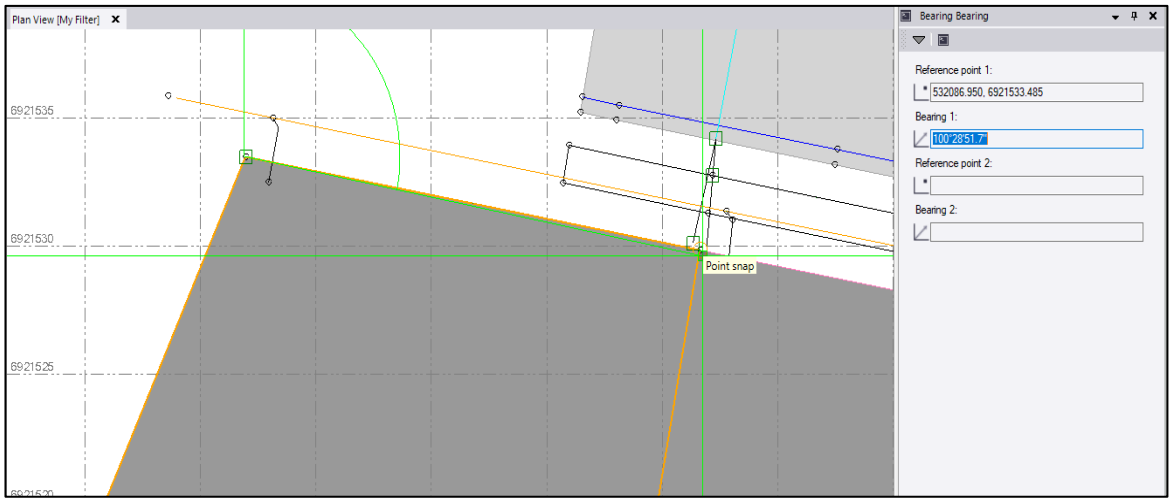


5. Now the line string is selected **highlight** the coordinates box.
6. In the **plan view** right click and select the **Bearing Bearing** command.

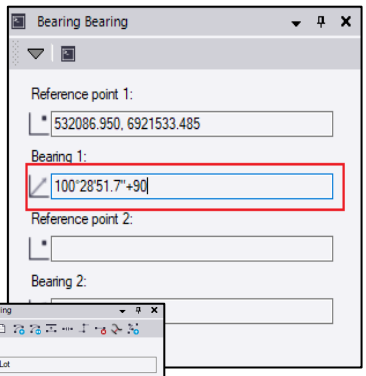
Note: The Bearing Bearing command calculates the coordinates of the intersection point of two bearings.

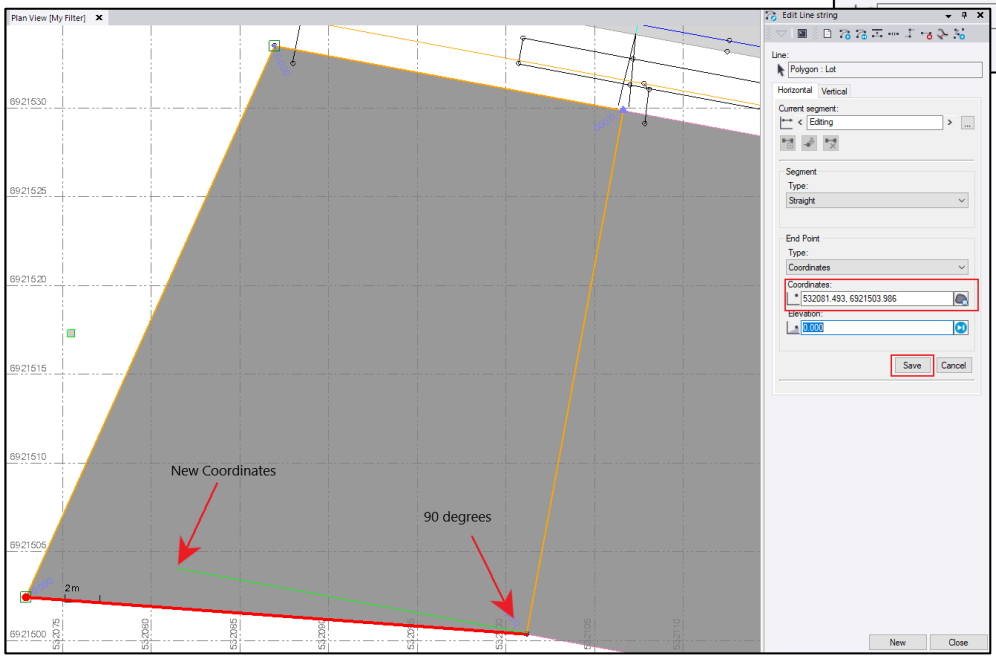


7. Select the **North West corner** as the **reference point 1**. Select the **North East corner** to calculate **bearing 1.** This calculates the bearing from the North West corner to the North East corner to be 100d 28’ 51.7”. See below.



8. Click in the bearing 1 box and after the bearing **type +90** and **press tab**. This **Adds 90 degrees** to the bearing.
9. Select the **South East corner** as **Reference point 2**. Select the **North East corner** to **calculate Bearing 2.** Minus 90 degrees from **Bearing 2**.
10. Click **OK**.



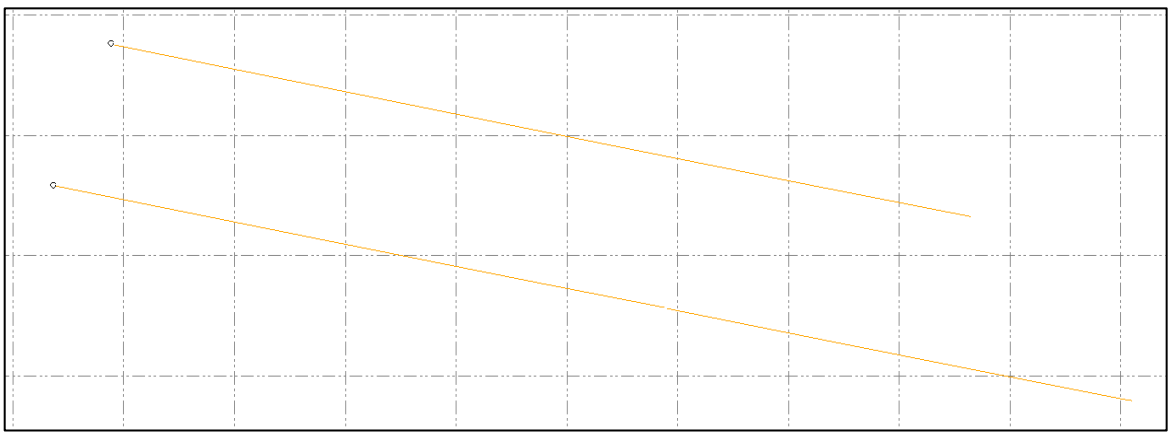


11. The new coordinates have now been calculated. Input an elevation if required then **click save**.

Editing Attribute Data

In post processing TBC allows the user to edit attribute data. Errors in attributes can be adjusted and unknown attributes in the field can be input in the office. An example of how this may be carried out is demonstrated below.

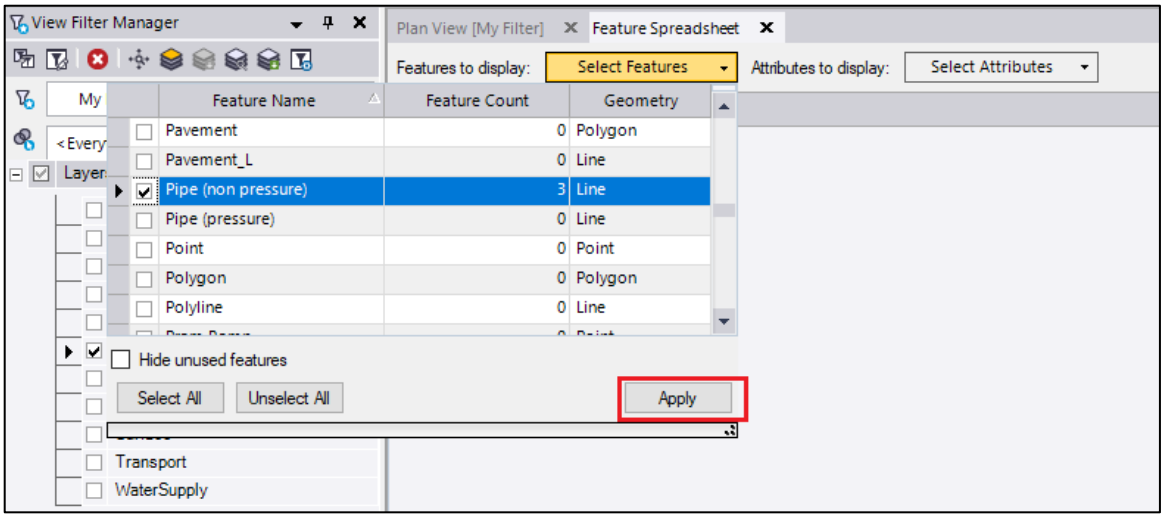
The image below shows two sewer circle manhole points and three pipe (non-pressure) strings. Let us bring up a feature spreadsheet to have a look at the attributes associated with these features.



1. To open a feature spreadsheet, navigate to **GIS > Feature Definition > Process Feature Codes drop down > Feature.** A blank feature spreadsheet should display.

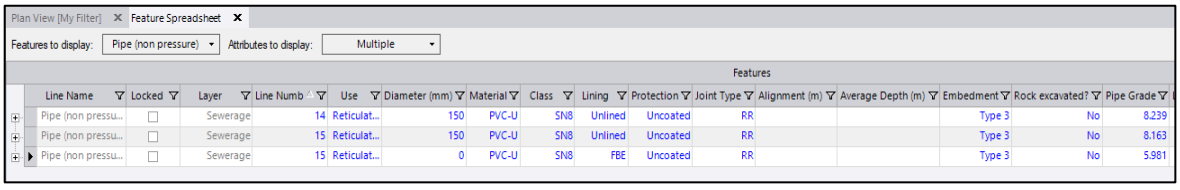
The **Select Feature** drop down shows a list of all the feature names and the number of each specific features in your project. The image below shows the Pipe (non-pressure) with a feature count of three.

2. To display attribute information associated with the pipe tick the **check box** on the left-hand side and then click **Apply**.



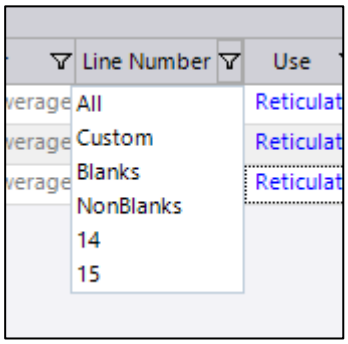
Note: you can check multiple boxes to display attribute information for multiple features at once.

A list with the attribute information should then display.



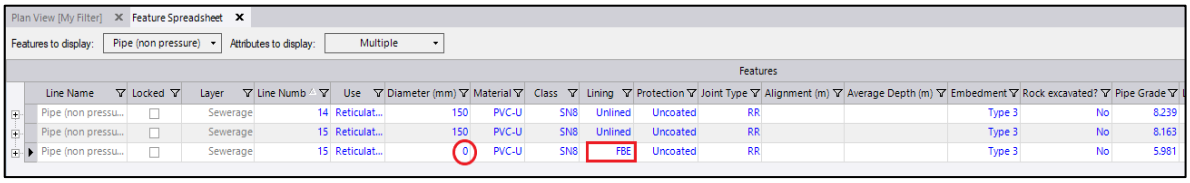
Filters can be used to display features with specific attribute values. By **clicking** the  icon a range of **filter options** are displayed, including:

- **All** – displays all attributes of the selected feature (default).
- **Custom** – allows the creation of custom filters using functions such as equals to, less than, starts with etc.
- **Blanks** – displays all features that have no attribute value for a specific attribute.
- **NonBlanks** - displays all features that have an attribute value for a specific attribute.



Once a satisfactory filter has been selected, attribute editing can begin. For this example, the "all" filter is acceptable.

Looking at the feature spreadsheet of the example above there are some errors that need to be corrected. The diameter and lining of the pipe at the bottom of the list should match the attributes of the pipe above it as they have the same line number but are split into two different strings because a manhole separates them.

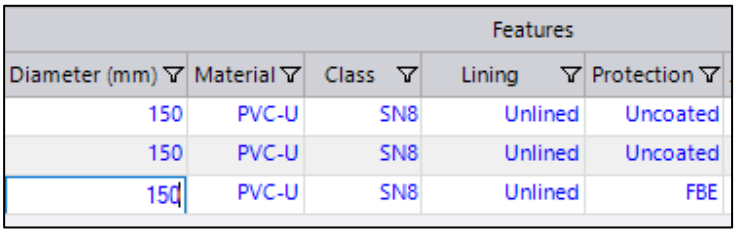


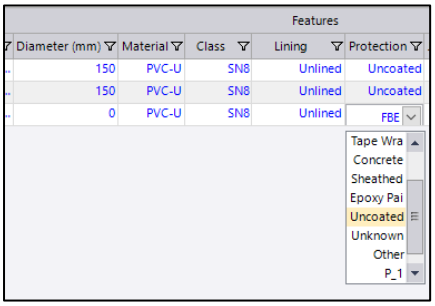
These attributes can be edited **two** different ways.

1. Using the **Feature Spreadsheet**
2. In the **Properties window**

The feature spreadsheet will be used for this example.

Simply, **click** on the attribute value you wish to edit and either choose from the list or input the value using your keyboard and **press enter**.

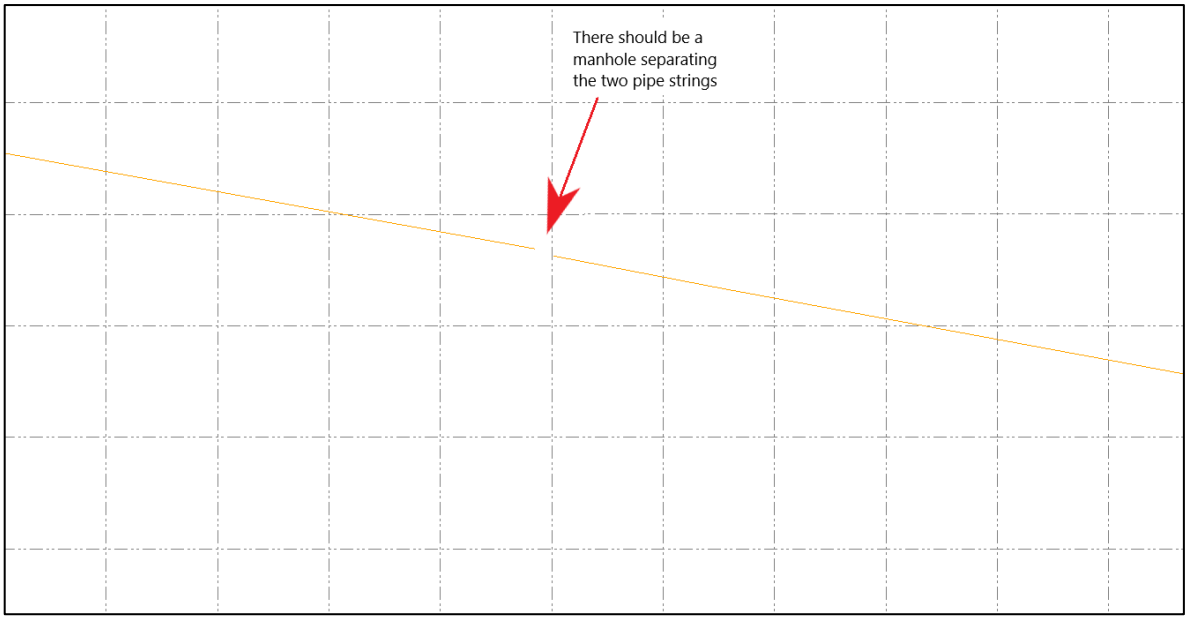


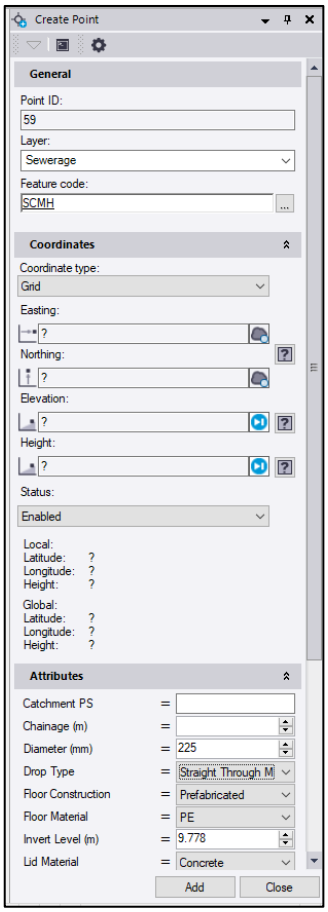


Creating a missing point feature

In the field features can be missed during a pickup survey. TBC allows the user to easily create features manually during post processing. This workflow shows how to create points in TBC.

In the example, there is a manhole missing in between two of the pipe strings as seen below.



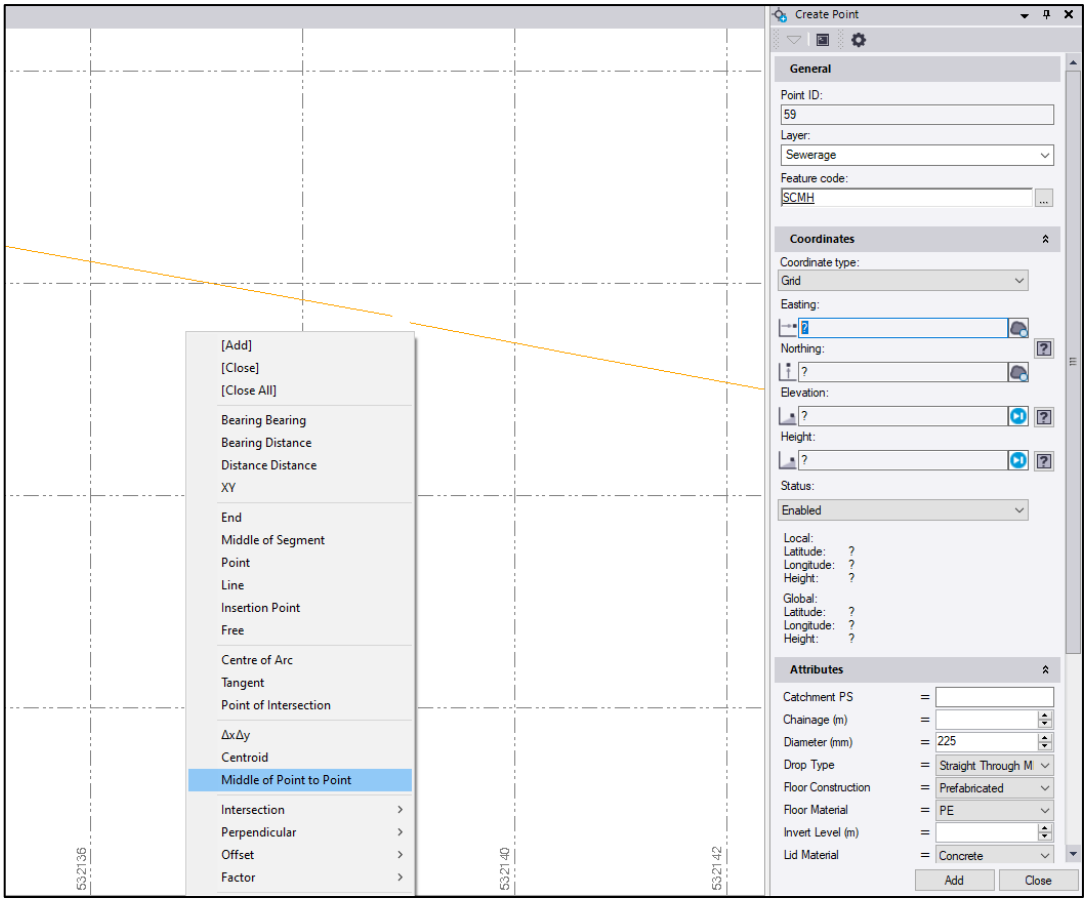


To create a point in between the two pipes.

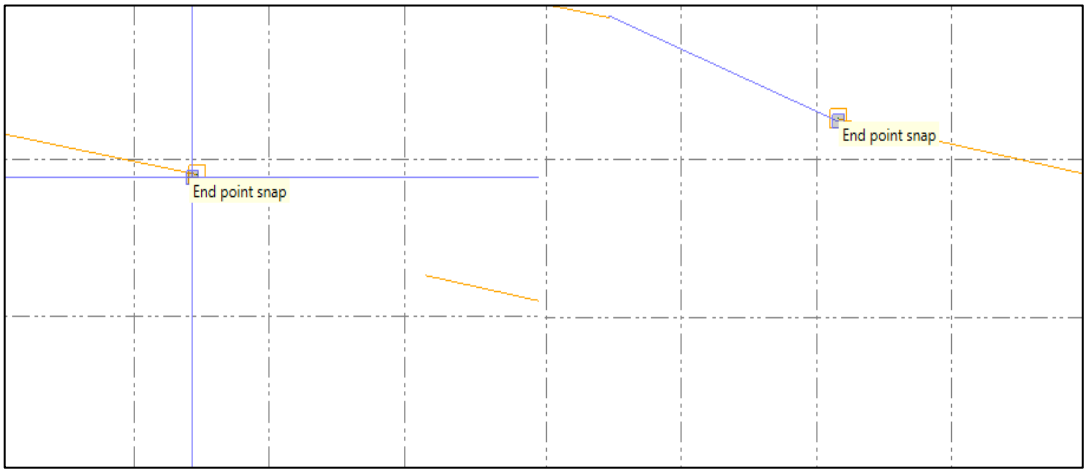
1. Start by navigating to **CAD > Points > Create Point.**
2. The create point menu should then display. **Fill in** the data fields i.e. Point ID, Layer, Feature Code and attributes. For this example, the feature code of SCMH (Sewer Circ Manhole) is used.

Note: If you are creating strings in TBC make sure you give the code a string number for example giving string points a code of SNP1 all the points with this code will be strung together when processing feature codes.

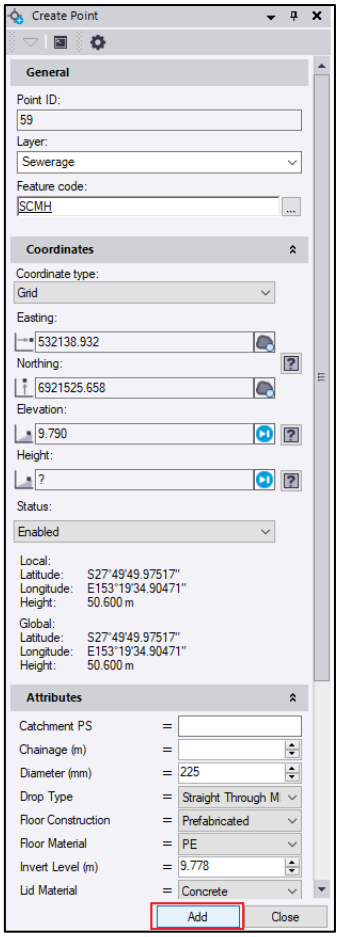
3. The next step is to give the point some coordinates. **Click** in the **Easting box**.
4. With the cursor in the plan view **Right Click.** In the drop-down list **select Middle of Point to Point**.



5. **Select the end points of both strings** (which end point you select first does not matter).



Note: By using the middle of the point to point function the manhole point is placed at the invert level between the two pipes. See the image to the right, by using the Middle of Point to Point function the Easting, Northing and Elevation were calculated.



6. Once the point has the correct coordinates and attribute data, click **Add**.

The point that was just created should appear in the plan view.

Note: if the point did not appear in the plan view ensure the correct layer is turned on.

7. The final step is to process the feature codes again (described in detail on **p.g. 9**). Ensure the **Keyed in Block** check box is ticked before processing the codes.

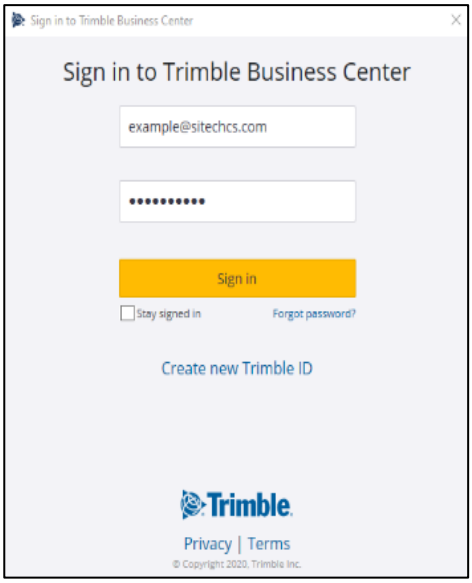
Note: Every time a new point is created in TBC and that point is required to be exported in the ADAC XML, ensure the Keyed in block feature codes are processed. This guarantees points are strung together correctly, the feature data is correctly displayed in the software and the data associated with that point will be correctly exported in the ADAC XML.

Using the TBC background map

TBC allows users to toggle on and off a background map within the plan view (as seen below). The background map is a good tool to use to check if the project is in the right general location. To use the background map feature, TBC requires the user to log in with their Trimble ID.

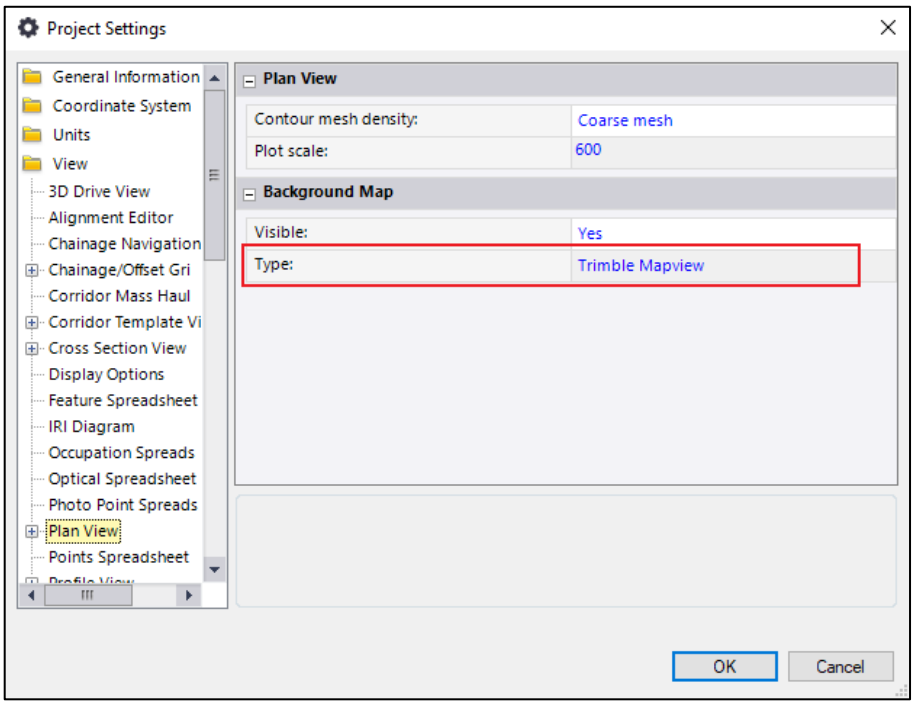
The following workflow will show users how to log into TBC with their Trimble ID and access the background map.

1. Access the **Start Page**. Navigate to **Support > Start-Up > Start Page.**
2. In the **Start Page** click **Log In** located in the top right corner.
3. Fill in your credentials if you have a Trimble ID **or** create a new Trimble ID for free in the same window. **Click Sign In**.
4. In the Plan View toggle, the background map by clicking the  **button** on the bottom **quick access toolbar**.



You can change the background map from a street view to satellite image. To do so navigate to the project settings.

1. Click  **button** in the quick access toolbar. The **Project Settings** will then display.
2. Navigate to **View > Plan View.** Under the background map tab, you can **change the type** from Trimble Map view to Digital Globe Imagery.



Digital Globe Imagery

Trimble Map View

4.ANZ Toolbox customization and additional commands

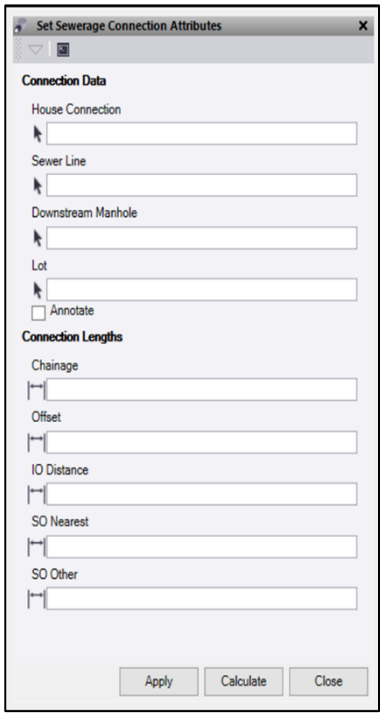
ANZ Toolbox has been created by our SITECH team and features commands that are required to setup an ADAC project and assist with ADAC data preparation.

The following workflows display how some of the tools in the ANZ Toolbox can be used to create ADAC files and require the ANZ Toolbox Module.

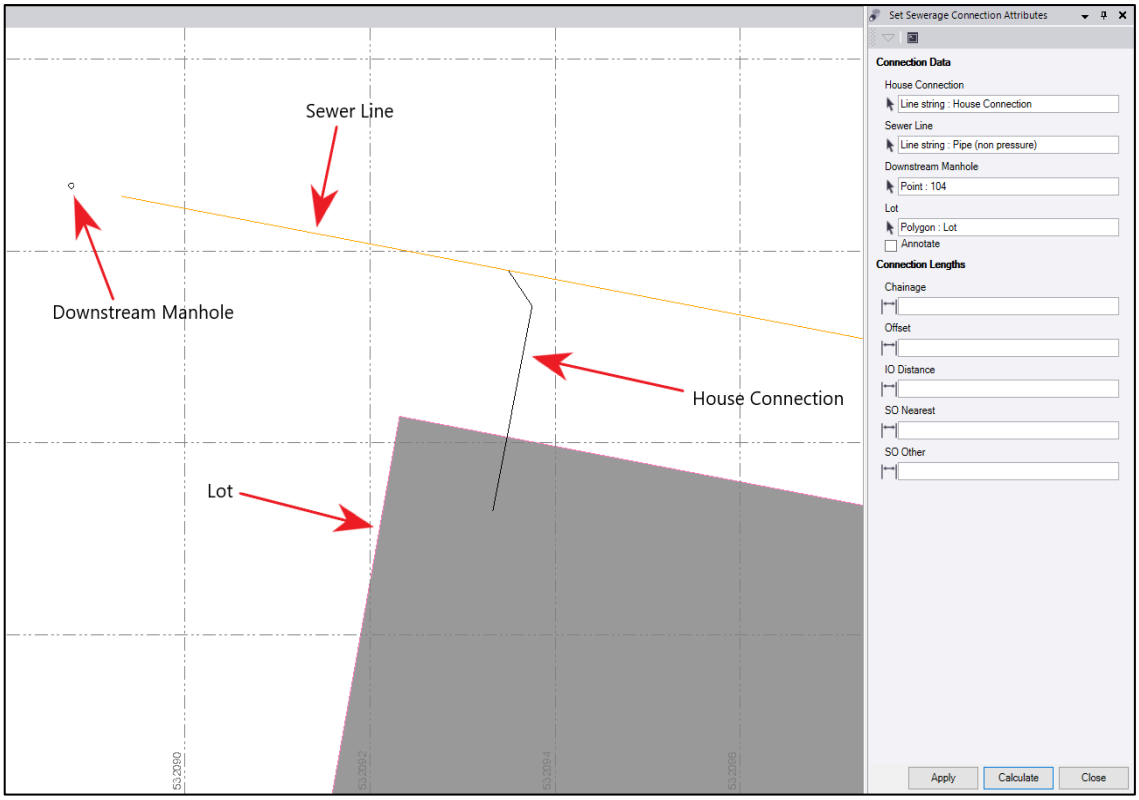
Set Sewerage Connection Attribute Command

The Set Sewerage Connection Attributes command automatically calculates distances required to be measured between a house connection, sewerage pipes and the cadastral boundaries. Choose either V4.2 or V5.01 version depending on your required data output.

1. To use the command, navigate to **ANZ Toolbox > ADAC > Set Sewerage Connection Attributes.** The Set Sewerage Connection window should then display.
2. **Select** the **House Connection** geometry representing the property sewerage connection in Plan view or 3d view.
3. **Select** the **Sewer line** the house connection runs into.
4. **Select** the **Down Stream Manhole** along the sewer line from the house connection.
5. **Select** the **Lot/Cadastral Boundary**.



An example is shown on the next page.



6. **Check** the annotate box to display line strings with the associated connection lengths in plan view.
7. **Click Calculate.** The results of the connection lengths will then display. The values of the connection lengths include:

Results:

Chainage - Distance from the point of connection of the sewer line along the direction of the sewer pipe to the downstream manhole.

Offset - Perpendicular distance from the property connection to the sewer pipe.

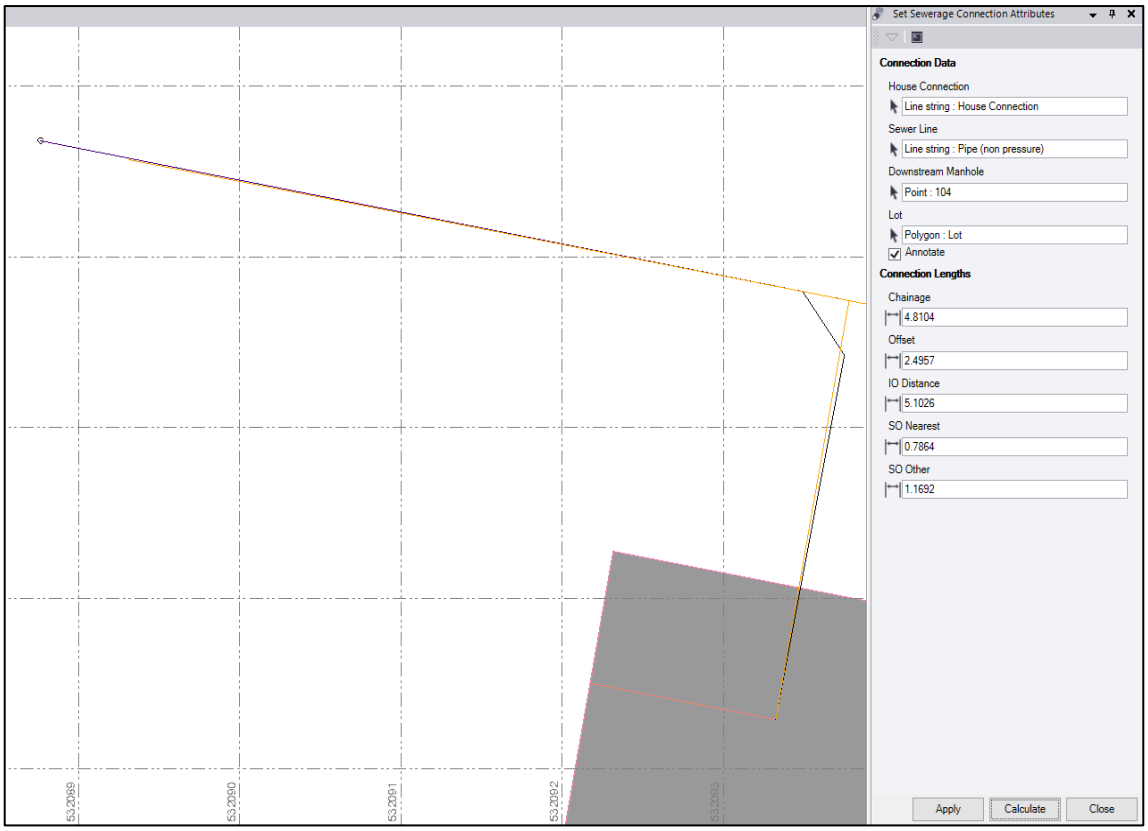
IO-Distance – Distance from the property connection along the direction of the sewer pipe to the downstream manhole.

SO Nearest - House Connection perpendicular distance to the nearest cadastral boundary.

SO Other - House Connection perpendicular distance to the next nearest cadastral boundary.

Note: You can right-click on any measurement node and change the displayed measurement value or remeasure in Plan View or 3D View.

The results of the calculations are shown below.

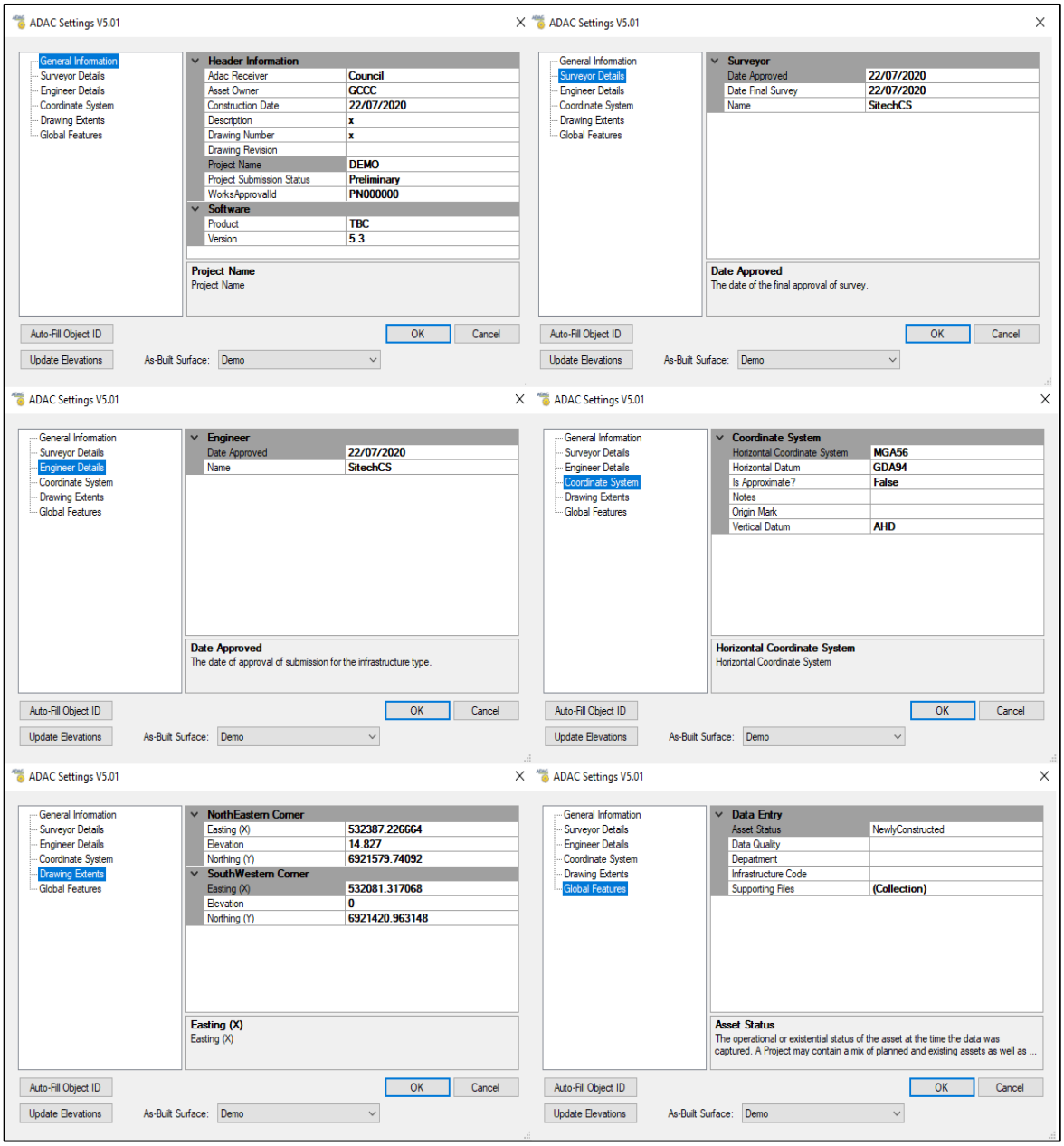


8. If satisfied with the results, **click Apply** to save the displayed house connection to the lines attributes.
9. Then, **click Close** to finish.

ADAC Settings V5.01 or V4.2

Use the ADAC Settings panel to enter appropriate header attributes for your project. The ADAC Settings panel is brought up with any header data already entered for the current project. The ADAC settings information is only entered once for a project. This requires only a small amount of information, consisting of ADAC project name, the asset owner and construction date, the coordinate system used and other optional attributes such as the surveyor and the engineer name.

1. To open the ADAC Settings navigate to **ANZ Toolbox > ADAC > ADAC Settings V5.01** or **V4.2.** The command window will display.
2. Fill in the information that is required to be included in the ADAC XML. An example of setting information is shown below.



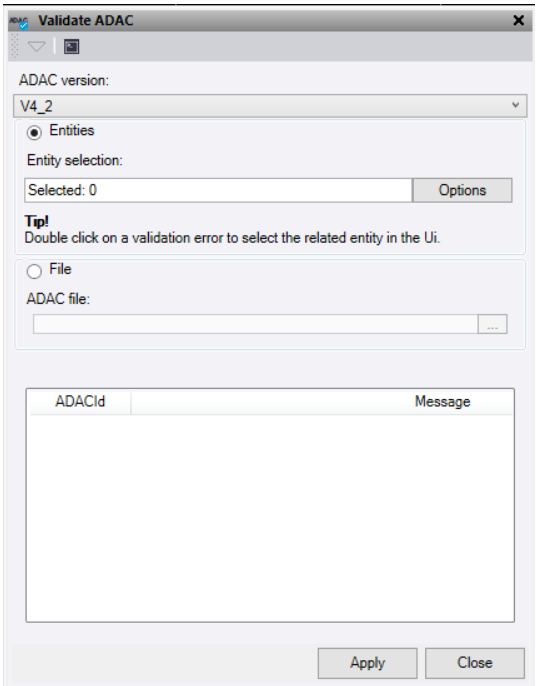
3. **Click** the **Auto-Fill ObjectID** to automatically give all the attributes a unique ID value.

Note: Every asset in ADAC has a unique identifier.

4. Next if required, choose an **As-Built Surface** if there is one loaded into your project. Then **click Update Elevations.** Update Elevations automatically populates values for surface elevation and average depth where applicable.
5. Once satisfied with the information **click OK**. The settings will then save and be exported with the ADAC XML.

6.Exporting an ADAC XML from TBC

After the project has been edited, the settings created, and the user is satisfied with the standard of the data the next step is to Validate the data against the Schema using the **Validate ADAC** command. **ANZ Toolbox > ADAC > Validate ADAC**



Choose the version being used for this data set and select all the data on screen to be checked. Any errors that need attention will be shown in the message box and can then be resolved individually.

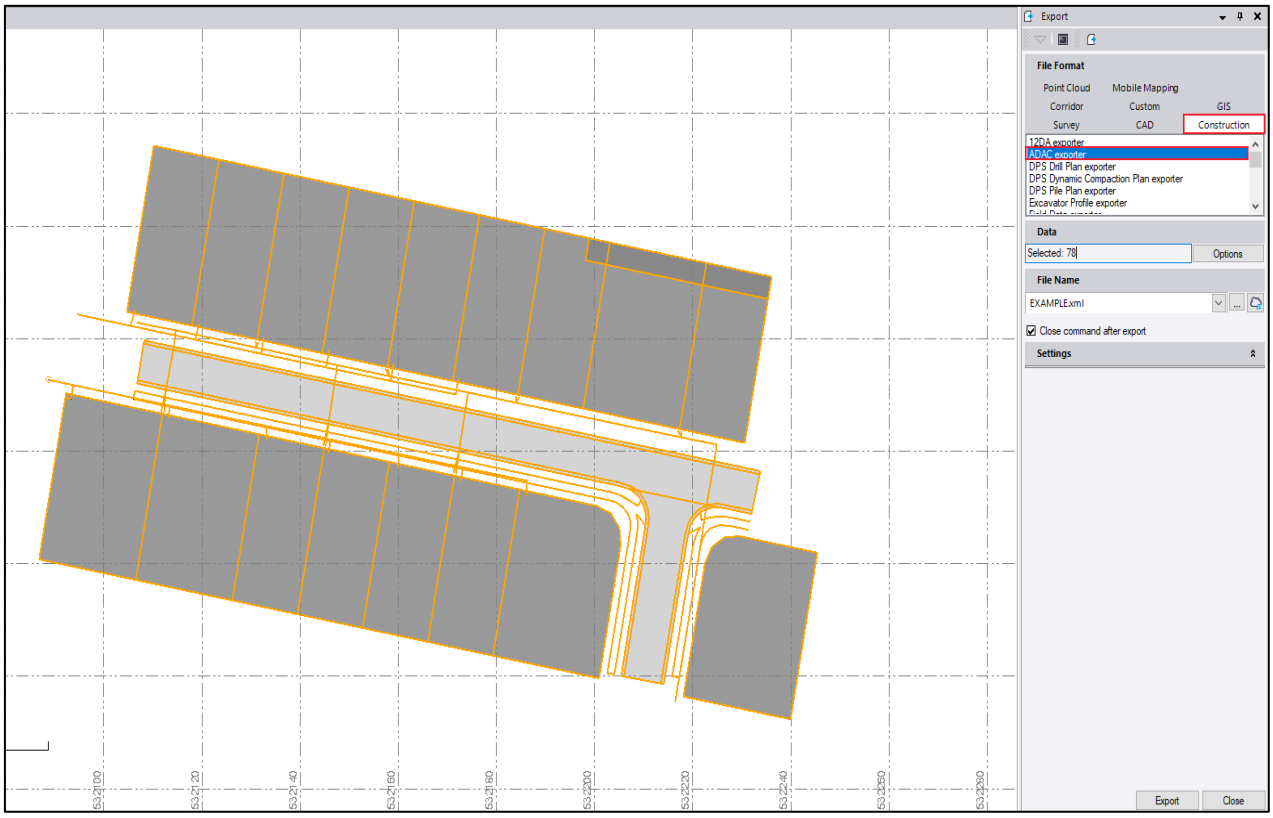
Note: There may be some data that has had attribute fields left empty on purpose such as pavement layers and these will get flagged. If they are correct, and are allowed to be set to nil in the schema you are able to highlight the lines and right click to display *"set parent to nil"* and this will set them correctly so they are no longer considered to be an error.

Once the data has validated, export the data as an ADAC XML format which is compatible with GIS software and other packages.

To export data:

1. Start by **selecting the points, lines and polygons** to be included in the XML. Select the features in the plan view, project explorer or 3D view. Everything selected will be highlighted.
2. Then navigate to **Home > Data Exchange > Export** or **click** the  **icon** in the quick access toolbar. Opening the export window.

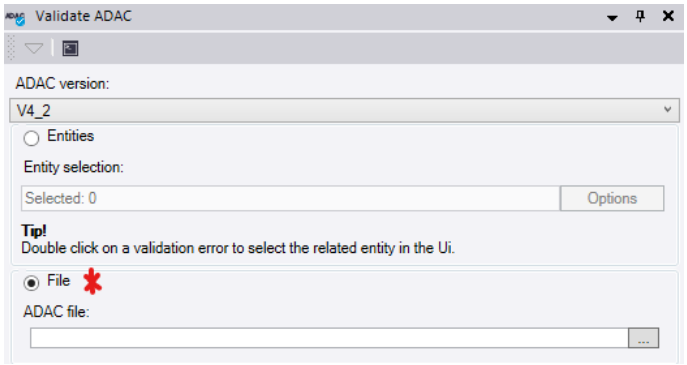
3. In the export window click the **Construction Tab** then select either **ADAC exporter (v4.2)** or **ADCA exporter (v5.01)** from the list.



Note: The selected box displays the number of objects to be exported.

4. Next, **click** the  **icon**. Choose a file location to save the exported xml and give it a name.
5. Then **click Export.**

An exported file can be checked via the **Validate ADAC** command without needing to import it into TBC.

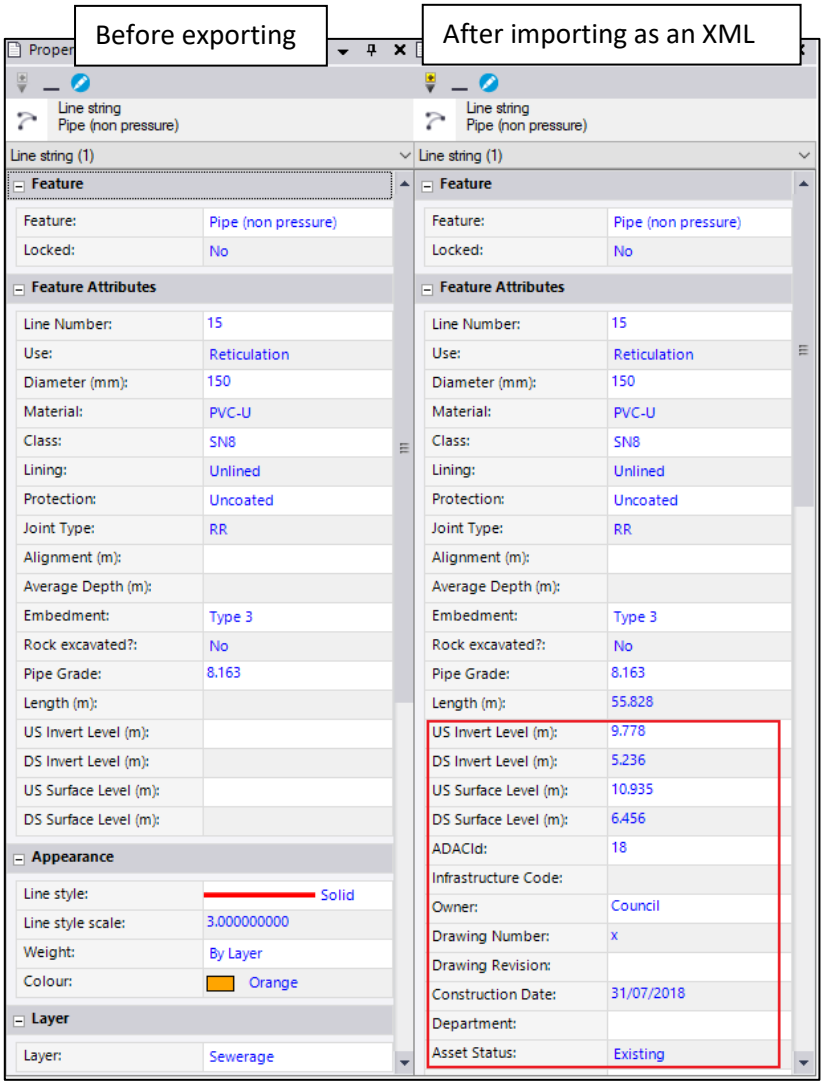


7.Importing ADAC XML into TBC

TBC also allows the user to import ADAC XML files. This allows the user update XML files that have errors or bring in external data.

1. First step to importing an XML file is to **import the associated FXL, see page 6**.
2. Once the FXL file has been imported into TBC the next step is to **import the XML file**. Follow the **same steps** used to import the FXL to import the XML.

Looking at an example, a comparison of the properties of a sewer pipe (non-pressure) can be made before the pipe was exported out of TBC as an xml and after the pipe has been imported as an xml.

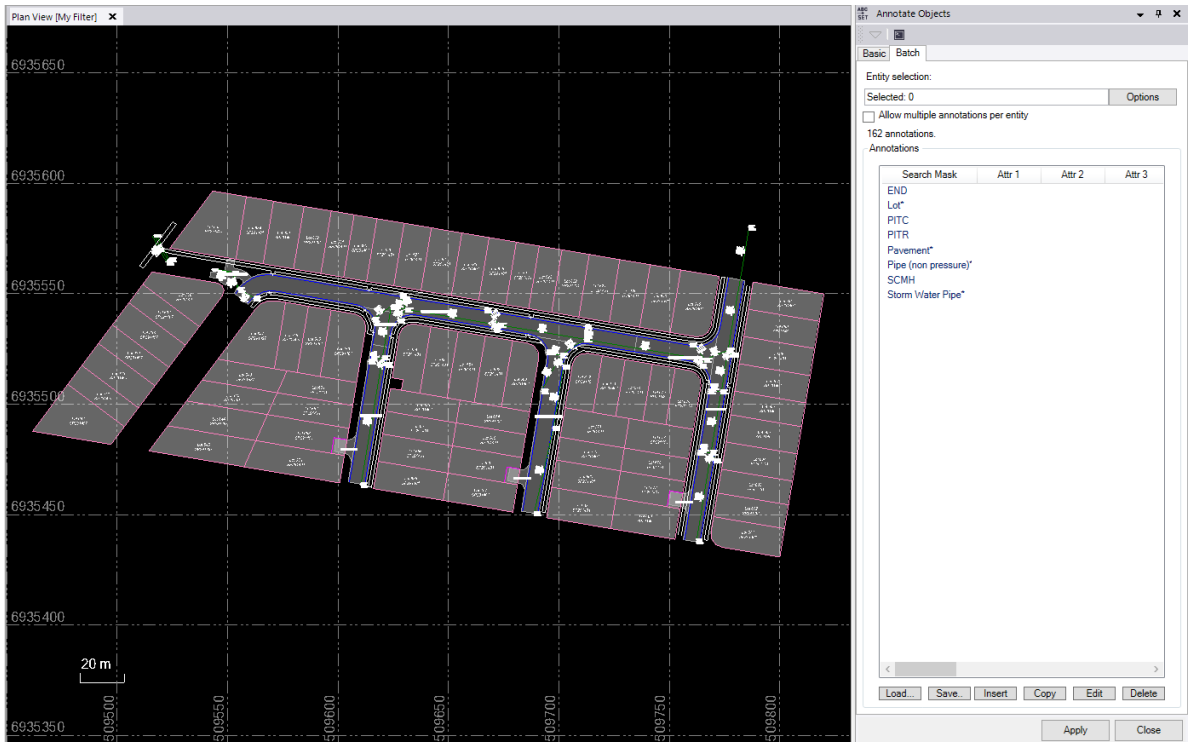


Comparing the two there is a noticeable difference in the attributes. Notice the ADAC Settings have been imported with the XML and are referenced in the attributes of the imported pipe data. Also notice the lot has been assigned a unique ADACId.

8.Annotating drawings with Attribute values

It is possible to annotate your drawing with the required attribute values from your data using the "Annotate Objects" command in the ANZ Toolbox ribbon. (Example file available from anztoolbox@sitechcs.com)

By creating a rule set you can quickly apply these to your whole data set and then go and manually edit the placement of text to suit your drawing layout.



Once the text has been moved around to suit it is ready to plot.