COLDNet Pole Design

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COLDNet Pole Design

1.0 Installation

1.1 Installing COLDNet Pole

Figure 1 below shows the COLDNet Pole installation files, double click **Setup.exe** to begin.

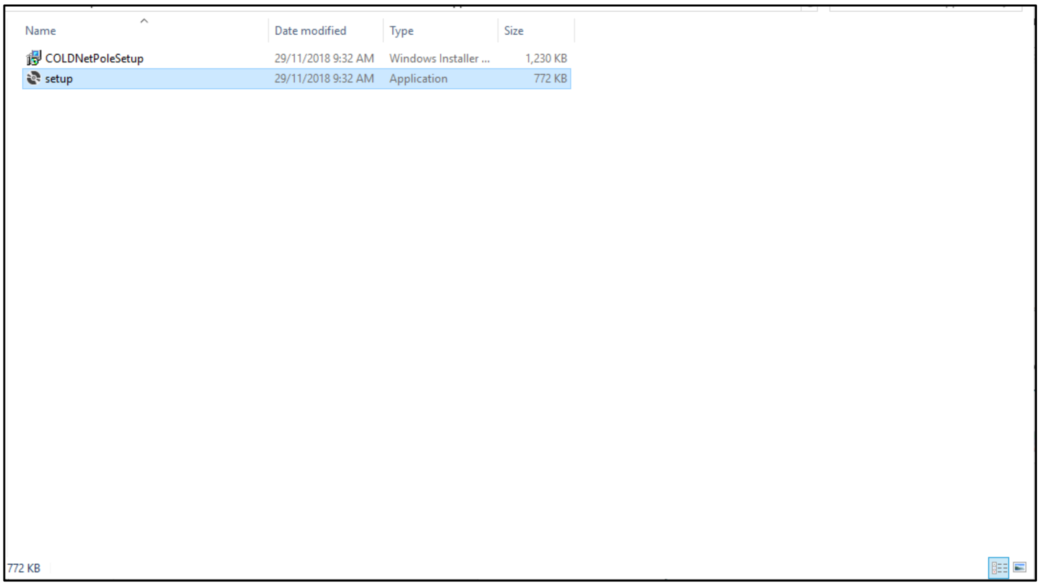


Figure 1: Opening COLDNet Pole from File Explorer

The following screen will then appear as shown in Figure 2 below. Click **Next** to continue.

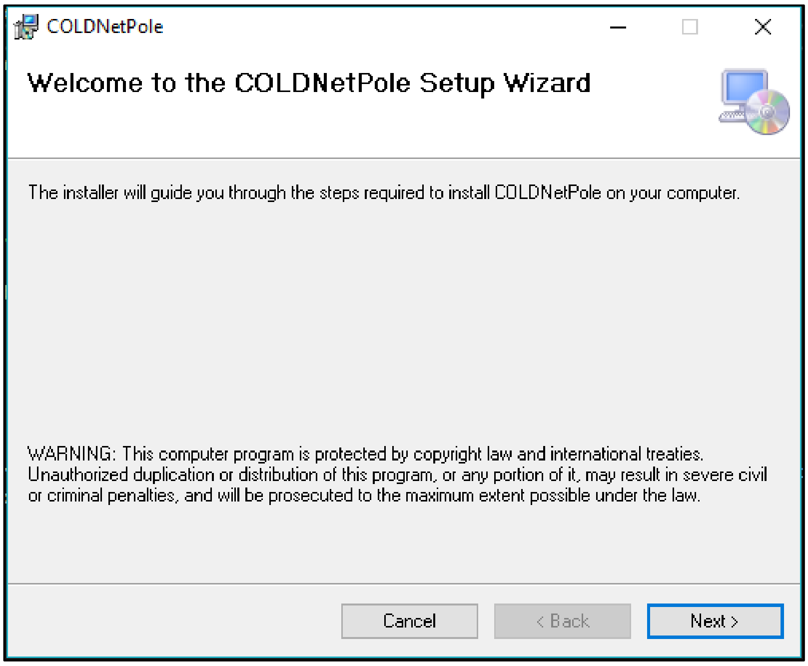


Figure 2: Install Wizard

After clicking **Next,** the following window will appear as shown in Figure 3 below. If you wish to change the location of your install, click the **Browse** button and select the folder you wish to install in. Click **Next** to continue.

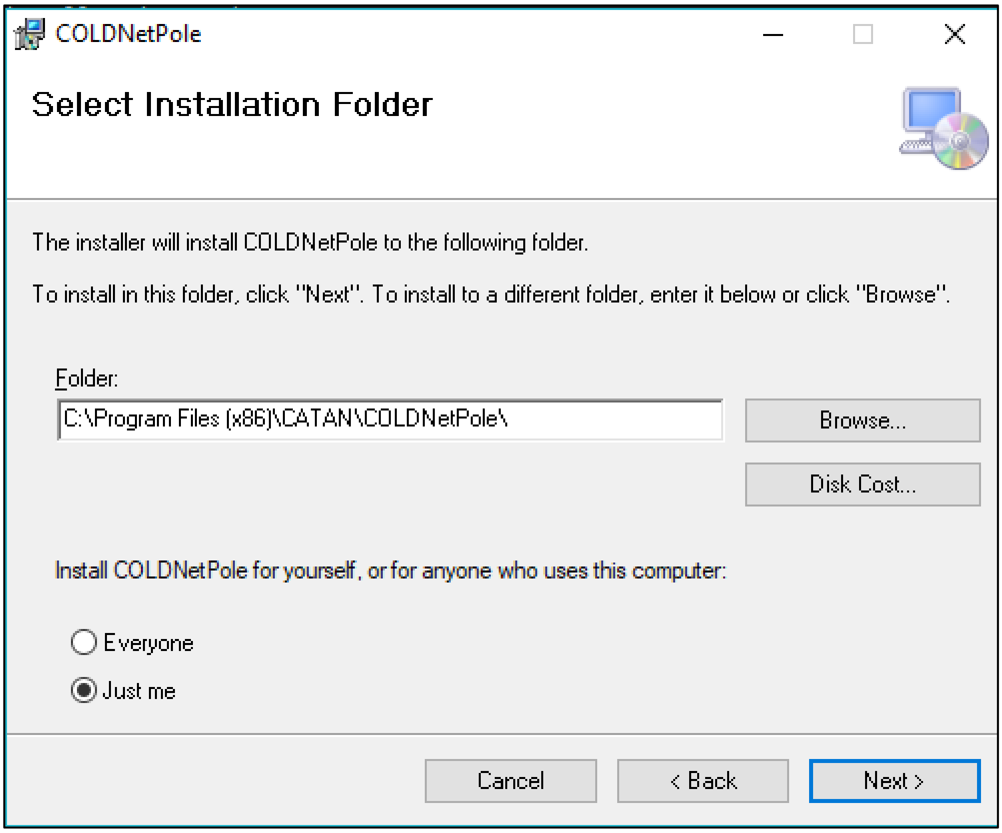


Figure 3: Folder Selection for Installation

The following window will then appear as shown in Figure 4 below, click **Next** to continue.

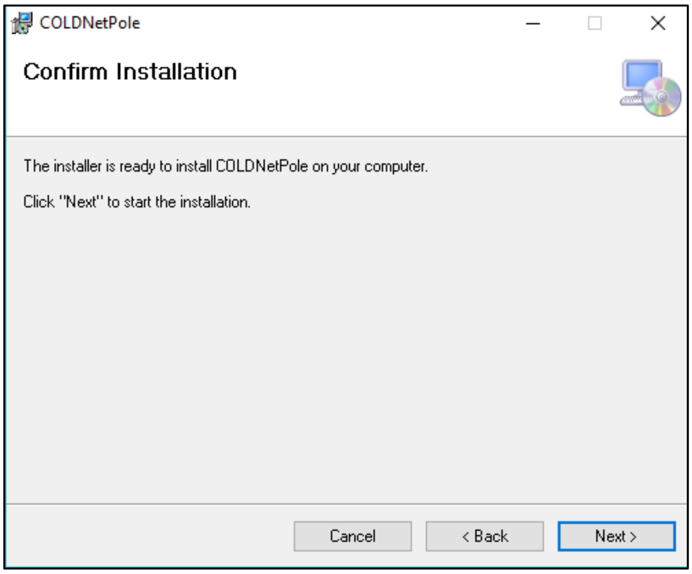


Figure 4: Confirmation Screen

The installation is now complete, click **Close** to finish (Refer Figure 5).

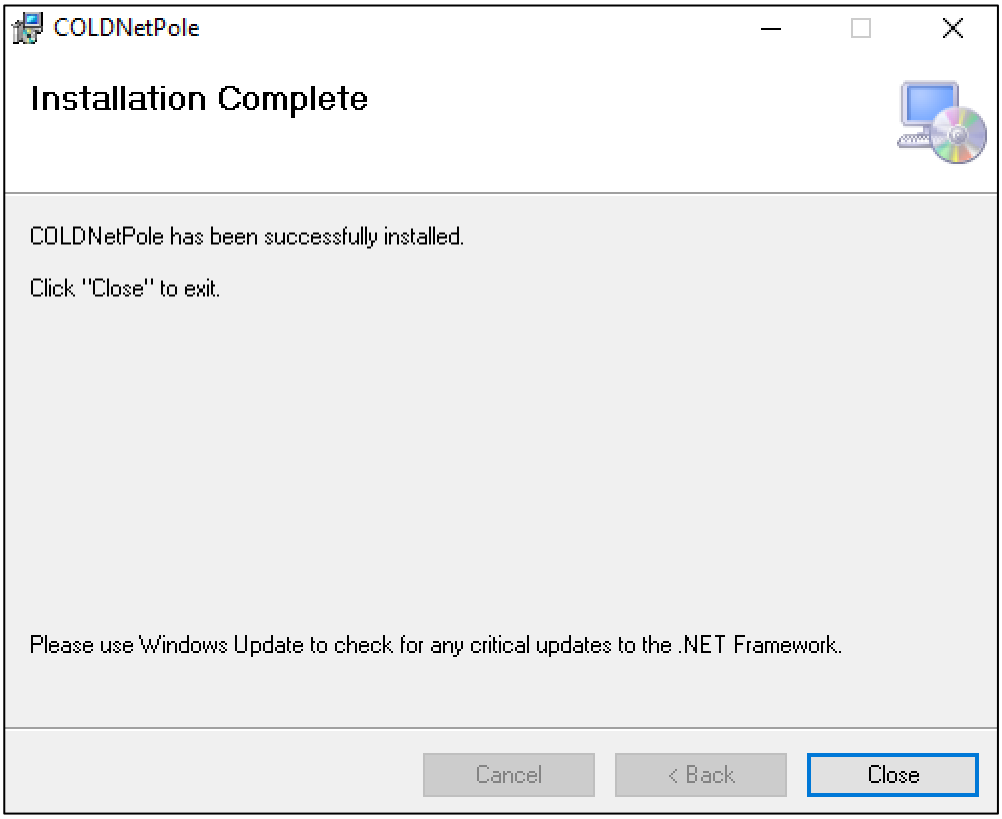


Figure 5: Finish Installation

2.0 Starting COLDNet Pole

2.1 Opening COLDNet Pole

COLDNet Pole can either be opened through the desktop shortcut created from the install or through the Windows Start Menu.

2.2 Opening and Registering COLDNet Pole

Figure 6 below shows the initial window from COLDNet Pole after opening the file.

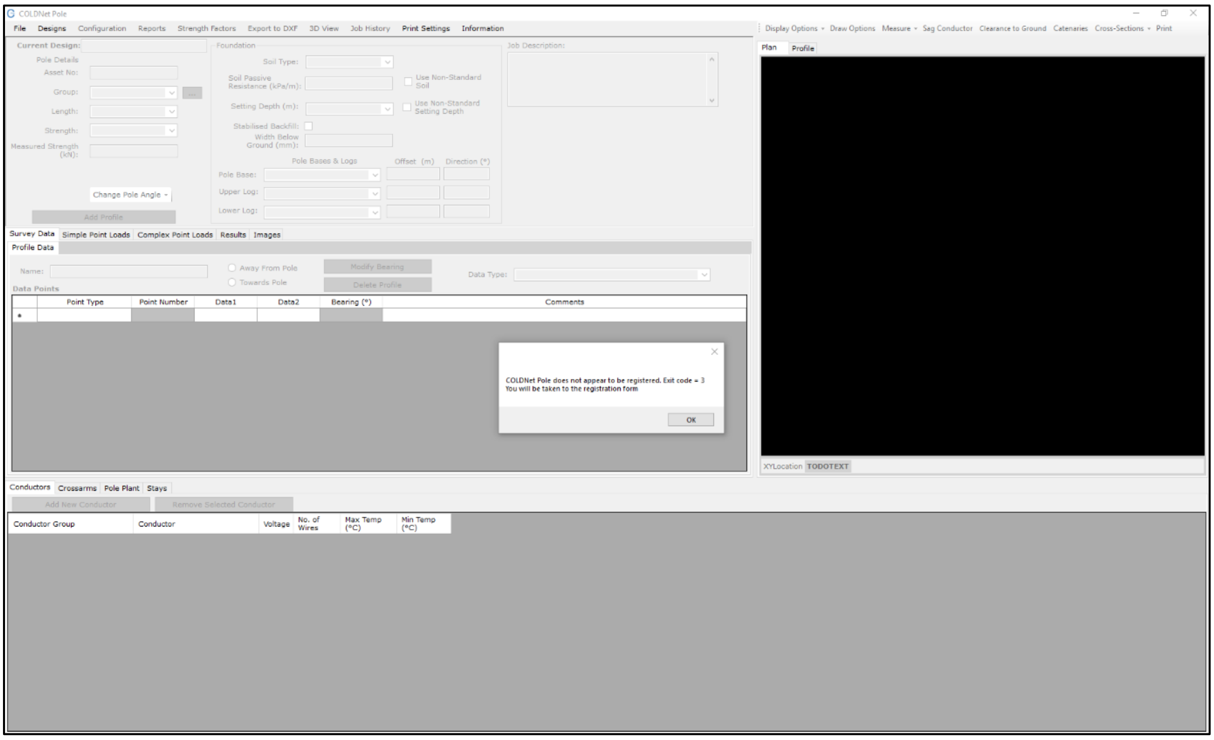


Figure 6: COLDNet Pole Main Screen

For first time registration an 'Exit Code 3' will appear when the program is open. Select **OK**. The following Licencing window will appear, as seen in Figure 7.

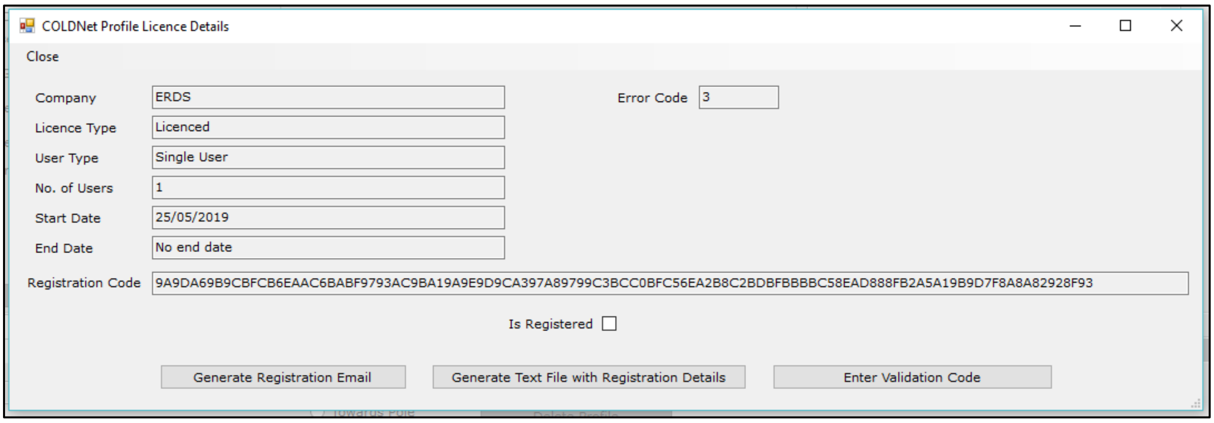


Figure 7: COLDNet Pole Licence Details

If Microsoft Outlook is installed on the computer, select **Generate Registration Email**. A **Name** and **Phone Number** will be required to **Generate Registration Email.** An automatic email will be generated to send to COLDNet Support. Click **Send** and the support team will email you back a registration code. If Microsoft Outlook is not installed on the machine select the **Generate Text File with Registration Details** and follow the previous instructions. This text file will need to be saved and then emailed to support@coldnet.com.au to acquire the registration code.

Once a registration code has been sent from COLDNet Support select **Enter Validation Code** on the licensing form. Simple cut and paste the code provided to you before selecting **OK** and exiting the licensing form (Refer Figure 8).

Figure 8: Entering Registration Code

2.3 Opening a COLDNet Pole File

There are two options for opening a COLDNet Pole file: the first option is to click **File>Open** and select a COLDNet Pole file from the selected folder, and the second option is only available if the user has used COLDNet Pole before, by selecting a file from the recent files list which is located below the **Quit** button in the **File** menu.

2.3 Creating a COLDNet Pole File

The user can also create a new COLDNet Pole file by selecting **File>New.** After selecting this option, the file will require a name to be created and a directory selected for it to be stored. The following screen below will appear as shown in Figure 9. Select **Parameter File Locations>Add Directory** to navigate to the location where the Design Parameters/Libraries have been stored locally on the machine. Once selected **Close** Manage Directories window and double click on the desired parameter file from the list. In this example the Design Parameter file called NZ has been selected.

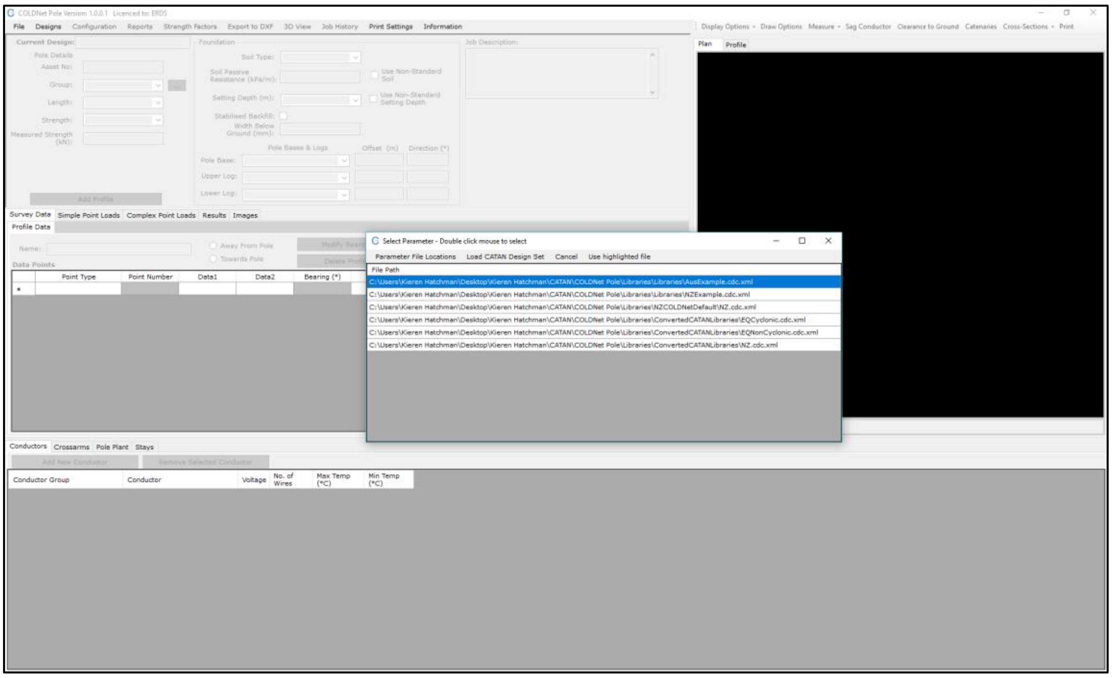


Figure 9: Selecting a Parameter File

3.0 Setting up Libraries

Select **Configuration** from the main COLDNet Pole form from the top tool-bar menu. The following window shown in Figure 10 will appear.

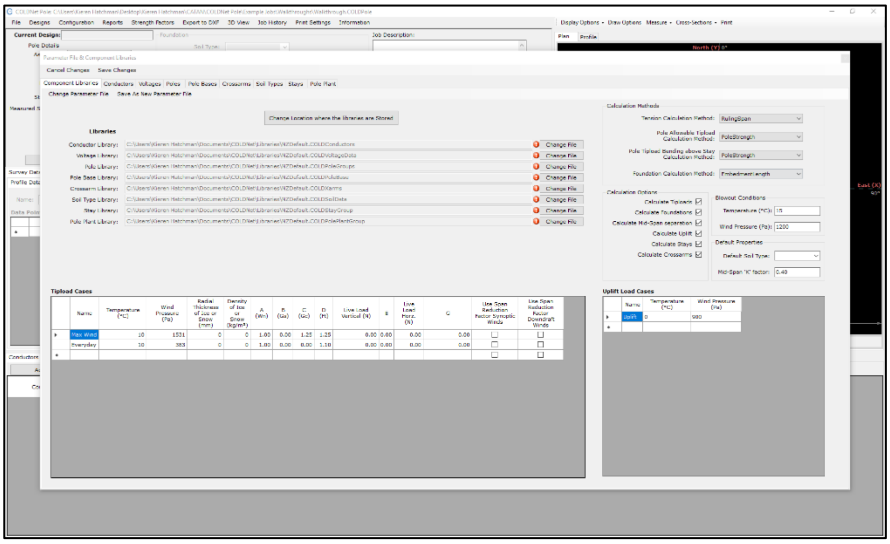


Figure 10: Parameter File & Component Libraries

Before continuing using COLDNet Pole, the Libraries must be set up. To do this, click the **Change File** button next to each library type, locate the library file you wish to use for that data set, and select it. Alternatively, if all the Libraries are stored in the same folder, they can be loaded together using the **Change Location where Libraries are Stored**. This will open a dropdown menu and allow the user to select the folder in which the Libraries are stored. If there is more than one library for each library type, it will load the first library of that type by default. If this is the wrong library then it will be required to be changed manually be selecting **Change File** next the required library and selecting the correct file. The selected data will be able to be viewed in the tabs shown after a file is selected. Once all the libraries have been selected the form should look like Figure 11 below.

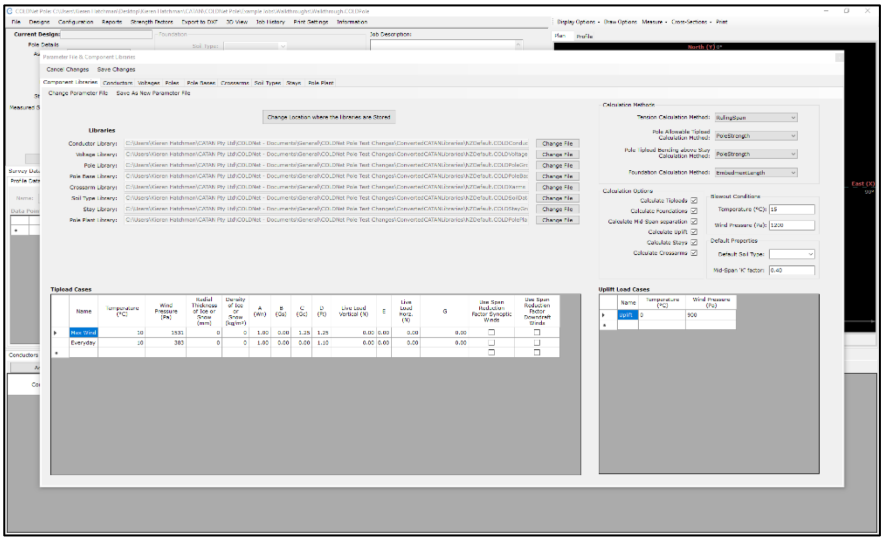


Figure 11: Selected Libraries

3.1 Conductors

To access the Conductor Library select the **Conductors** tab in the Libraries Form. From this tab the user can select a Conductor Group from the dropdown menu and edit any of the conductors populated in the Conductor Table (Refer Figure 12).

Conductor groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close to** commit any changes made.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Conductor Library or **Save As** to create new Conductor Library.

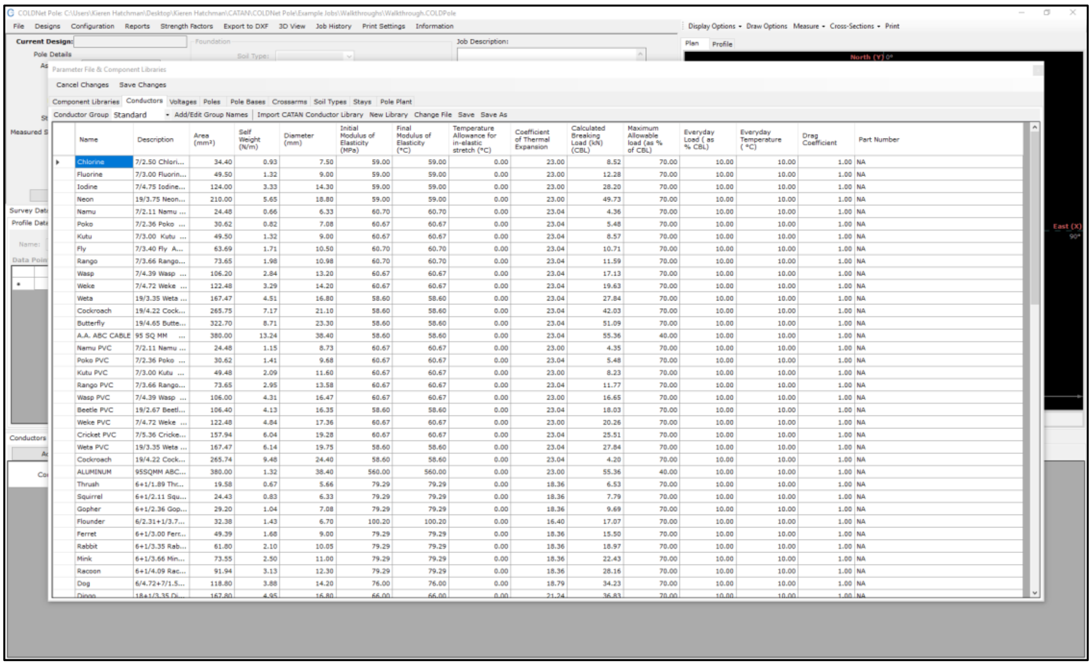


Figure 12: Conductor Library

3.2 Voltages

To access the Voltage Library select the **Voltage** tab in the Libraries Form. From this tab the user can edit any of the voltages populated in the Voltage Table (Refer Figure 13).

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Voltage Library or **Save As** to create a new Voltage Library.

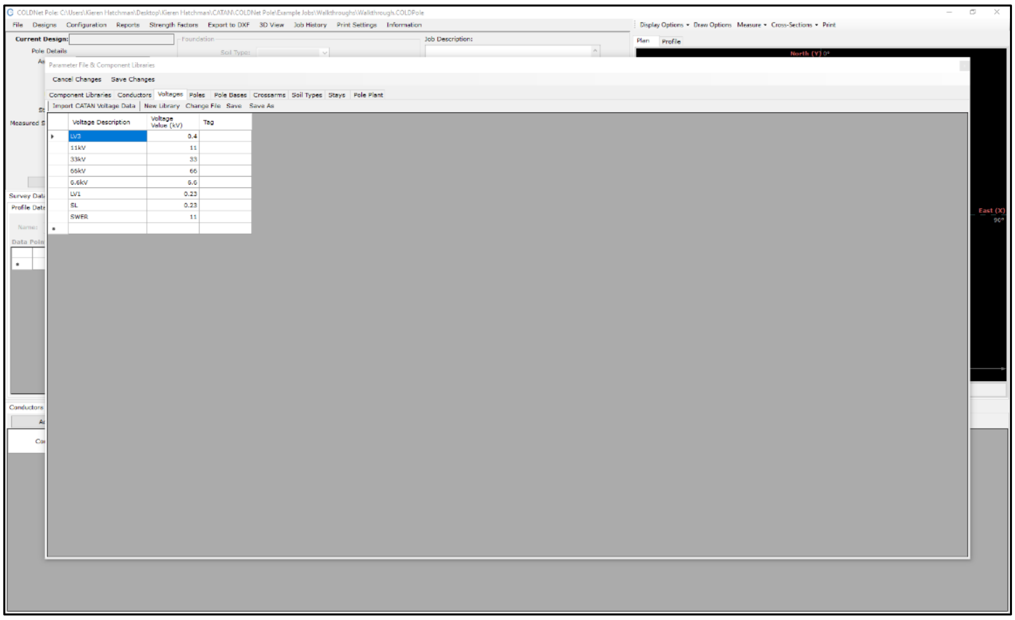


Figure 13: Voltage Library

3.3 Poles

To access the Pole Library select the **Poles** tab in the Libraries Form. From this tab the user can select a Pole Group from the dropdown menu and edit any of the pole details populated in both the Pole Lengths and Pole Strengths Table (Refer Figure 14).

Pole groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close** to commit any changes made.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Pole Library or **Save As** to create a new Pole Library.

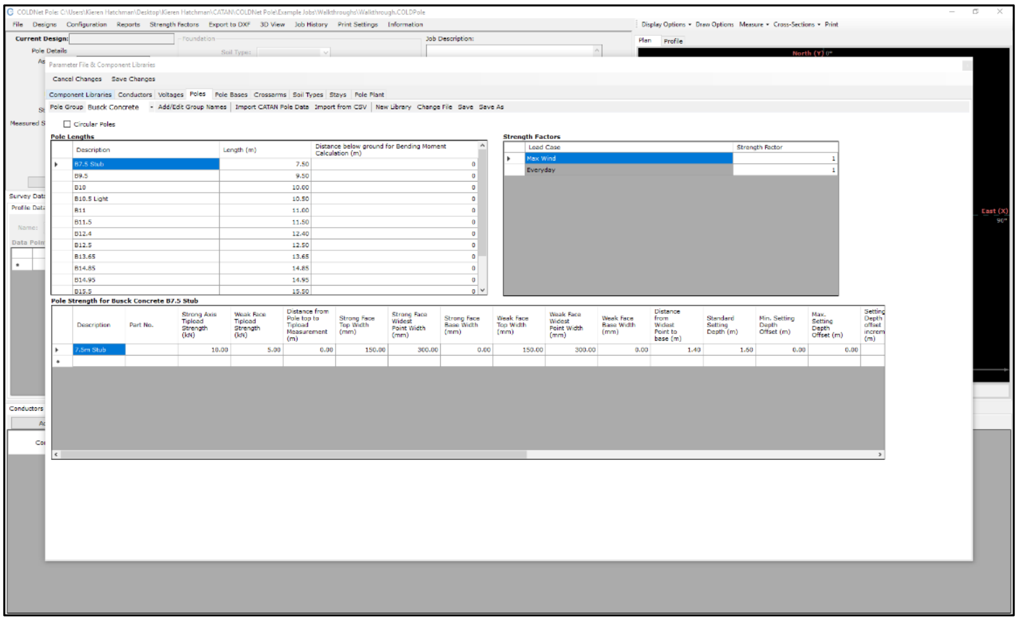


Figure 14: Pole Library

3.4 Pole Bases

To access the Pole Base Library select the **Pole Bases** tab in the Libraries Form. From this tab the user can select a Pole Base Group from the dropdown menu and edit any of the pole bases populated in both the Pole Bases and Pole Logs Table (Refer Figure 15).

Pole Base groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close** to commit any changes made.

The up and down arrow keys located on the right side above the Pole Logs table can be used to transfer pole base data between the two grids.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Pole Base Library or **Save As** to create a new Pole Base Library.

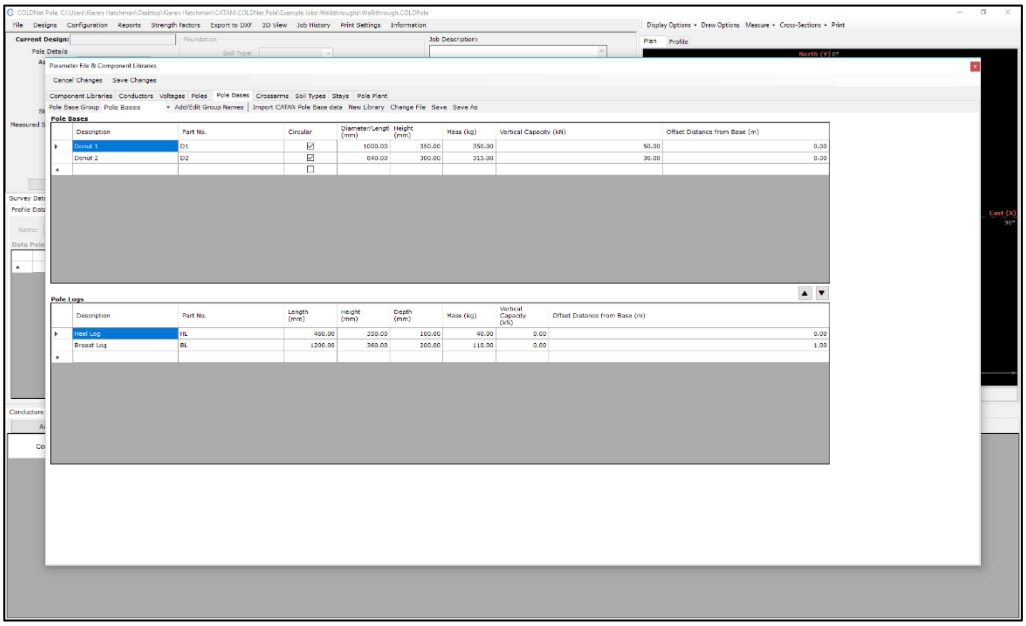


Figure 15: Pole Base Library

3.5 Crossarms

To access the Crossarm Library select the **Crossarm** tab in the Libraries Form. From this tab the user can select a Crossarm Group from the dropdown menu and edit any of the crossarm details populated in both the Crossarm and Crossarm Details Table (Refer Figure 16).

Crossarm groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close** to commit any changes made.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Crossarm Library or **Save As** to create a new Crossarm Library.

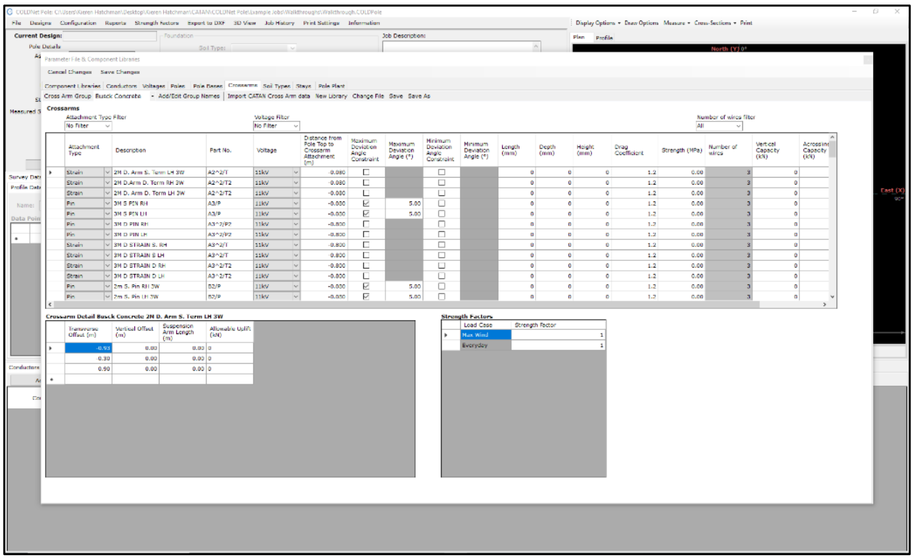


Figure 16: Crossarm Library

3.6 Soil Type

To access the Soil Library select the **Soil Type** tab in the Libraries Form. From this tab the user can edit any of the soil data populated in the Soil Types Table (Refer Figure 17).

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Soil Type Library or **Save As** to create a new Soil Library.

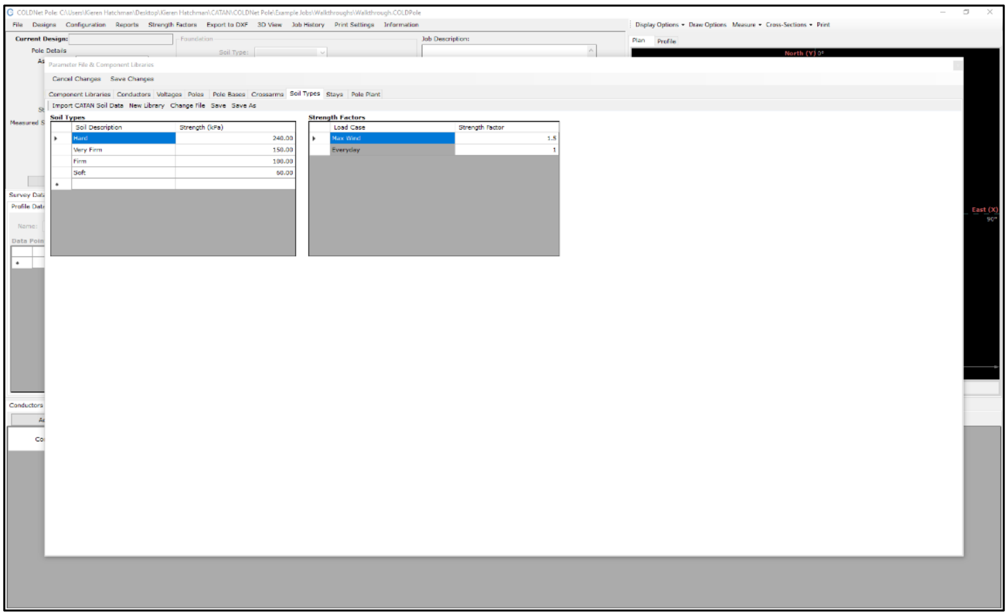


Figure 17: Soil Library

3.7 Stays

To access the Stays Library select the **Stays** tab in the Libraries Form. From this tab the user can select a Stay Group from the dropdown menu and edit any of the stay details populated in the Stay Table (Refer Figure 18).

Stay groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close** to commit any changes made.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Stays Library or **Save As** to create a new Stay Library.

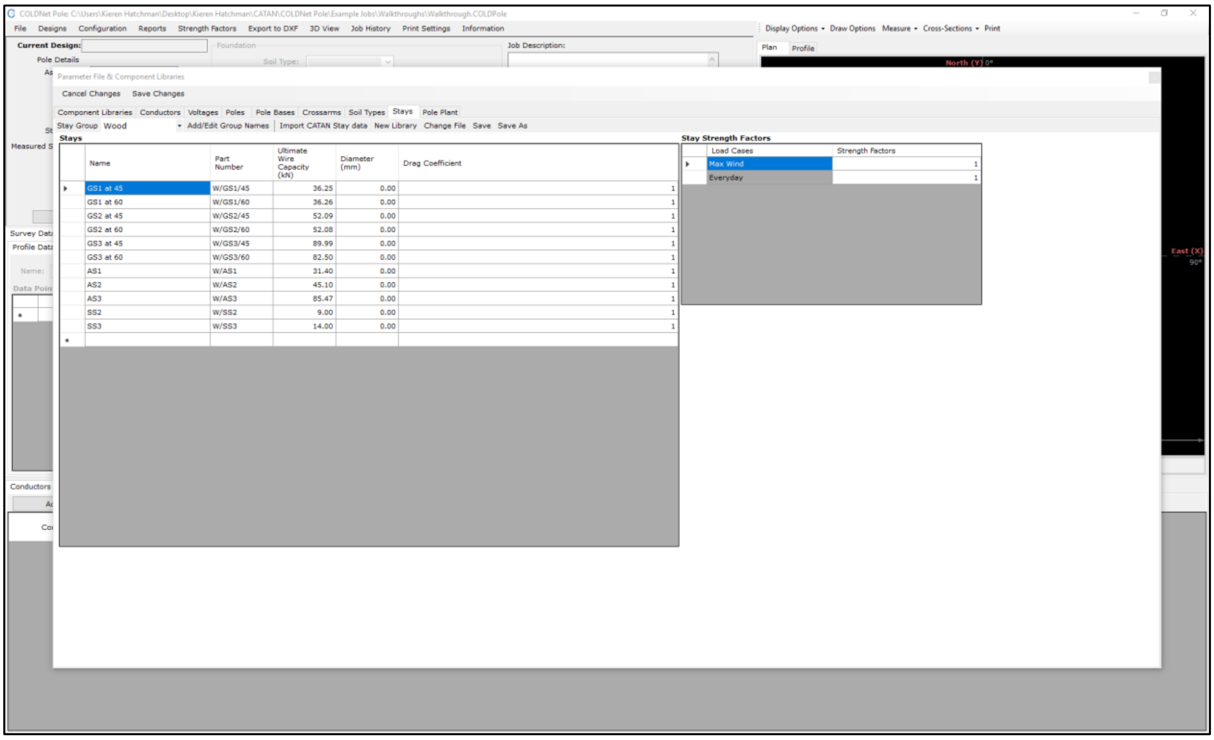


Figure 18: Stay Library

3.8 Pole Plant

To access the Pole Plant Library select the **Pole Plant** tab in the Libraries Form. From this tab the user can select a Pole Plant Group from the dropdown menu and edit any of the pole plant details populated in the Pole Plant Table (Refer Figure 19).

Pole Plant groups can be added and edited by selecting **Add/Edit Group Name**. A new window will open in which groups can be added or edited. Click **Save & Close** to commit any changes made.

Click the **Change File**, before locating and loading the library file to be used for the data set.

Click **Save Changes** to commit any changes made to the Pole Plant Library or **Save As** to create a new Pole Plant Library.

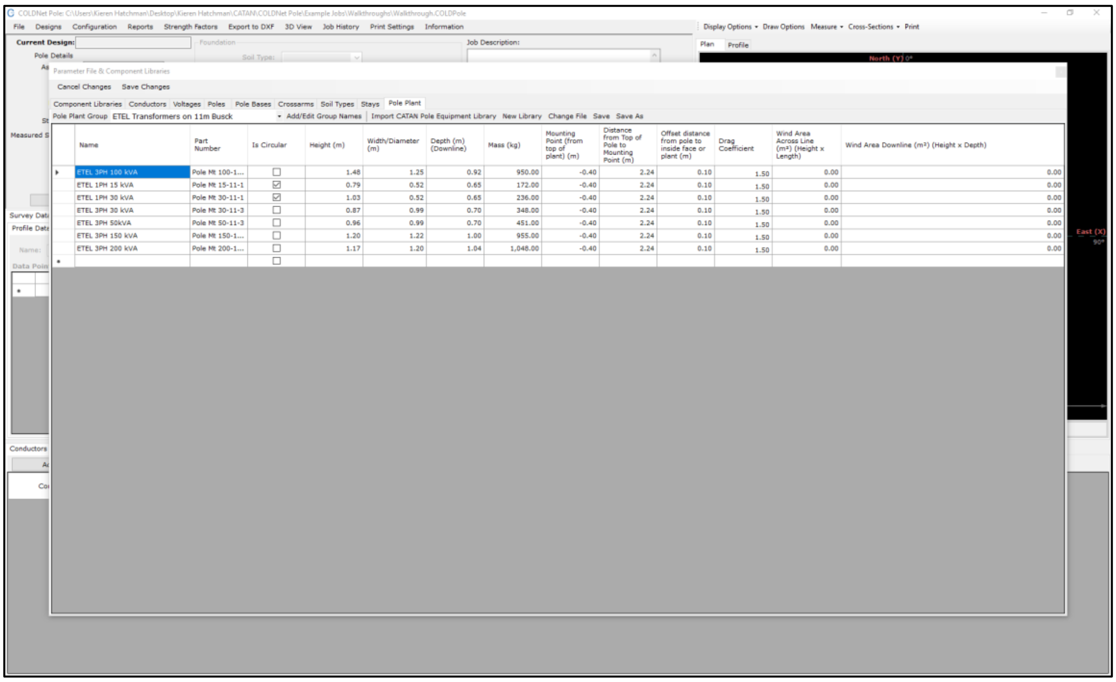


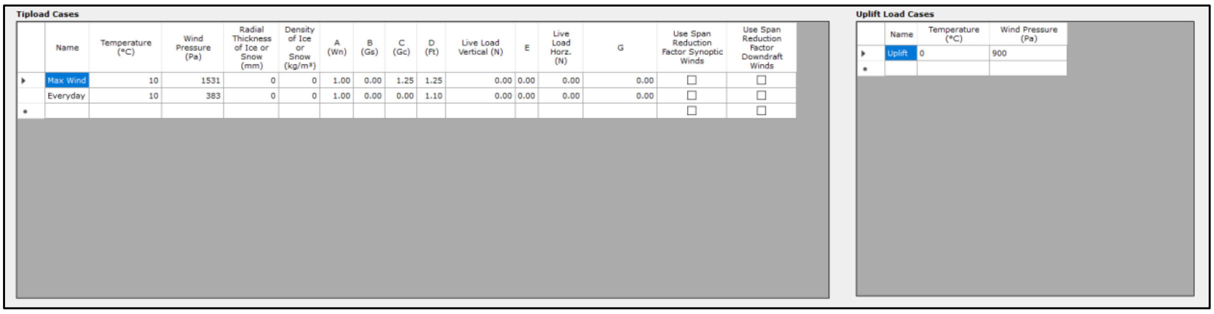
Figure 19: Pole Plant Library

4.0 Parameter File and Design Criteria

The loadcase design criteria established by the user can be created and viewed under **Configuration** on the top tool-bar menu. Once opening the form the user will be able to view and edit the different loadcases located underneath the library section from the **Component Libraries** Tab.

To create a new Parameter File or edit any of the existing Parameter File (by loading one at the start of a new job or loading in an old file), simply double click into the cell and type in the new value. If a new Parameter File has been created it will need to be saved using the **Save File As New Parameter File** button. If editing an existing file click the **Save Changes** button to save the changes made.

An existing Parameter File can also be imported through this form using the **Change File** feature. An example Parameter File that was loaded at the start of a new job can be seen in Figure 20 below.



Tipload Cases

Name	Temperature (°C)	Wind Pressure (Pa)	Radial Thickness of Ice or Snow (mm)	Density of Ice or Snow (kg/m³)	A (Wn)	B (Gs)	C (Gc)	D (Ft)	Live Load Vertical (N)	E	Live Load Horz. (N)	G	Use Span Reduction Factor Synoptic Winds	Use Span Reduction Factor Downdraft Winds
Max Wind	10	1531	0	0	1.00	0.00	1.25	1.25	0.00	0.00	0.00	0.00	☐	☐
Everyday	10	383	0	0	1.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00	☐	☐
													☐	☐

Uplift Load Cases

Name	Temperature (°C)	Wind Pressure (Pa)
Uplift	0	900

Figure 20: Parameter File

5.0 Settings

To view and edit the COLDNet Pole settings, select **Configuration** from the top tool bar menu in the main COLDNet Pole window. The Parameter File & Component Libraries form will then open in a new window (Refer Figure 21). Located on the right-hand side of the form under the **Component Libraries** Tab are the settings (**Calculation Methods, Calculation Options, Blowout Conditions** & **Default Properties)**.

5.1 Calculation Methods

5.1.1 Tension Calculation Method

There are two different methods for calculating the tension of the conductors, which include: Ruling Span & Inclined Ruling Span.

5.1.2 Pole Allowable Tipload Calculation Method

There are two different methods for calculating the allowable pole tipload, which include: Pole Strength & Bending Strength

5.1.3 Pole Tipload Bending Above Stay Calculation Method

There are two different methods for calculating the allowable tipload above stay attachment, which include: Pole Strength & Bending Strength.

5.1.4 Foundation Calculation Method

There are two different methods for calculating the foundations, which include: Modified Broms & Embedment Length.

5.2 Calculation Options

Under **Calculation Options** are a list of options available to the user to be considered in the calculations. All of the calculations are selected by default but can be turned off and on as required by selecting the check box next to each of the options (Refer Figure 21).

5.3 Blowout Conditions

Blowout Conditions for the design can be entered in the fields provided under **Temperature** and **Wind Pressure** (Refer Figure 22).

5.4 Default Properties

Default Properties for the **Soil Type** and **Mid-Span 'K' Factor** that will be used in the relevant calculations can be entered in the fields provided (Refer Figure 21).

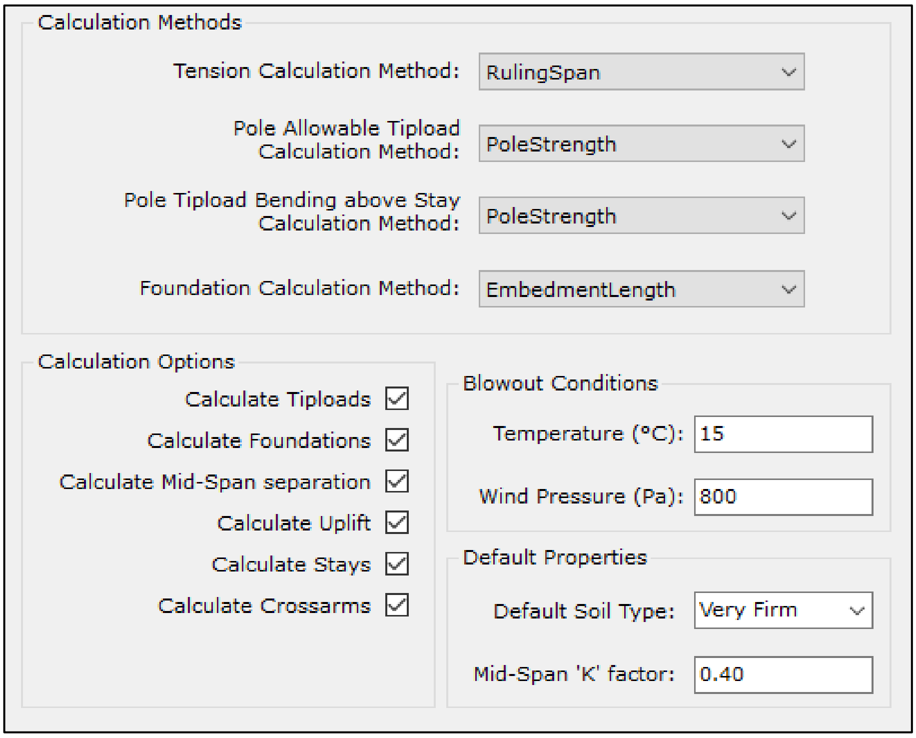


Figure 21: COLDNet Pole Settings

6.0 Pole Design

After the Libraries and Parameter Files have been set up, the user can begin assigning the **Pole Details** in the required fields (Refer Figure 22). Any new design changes or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

6.1 General Design Information

The **General Information** required for the single pole analysis can be selected from the dropdown menus available or entered where provided (Refer Figure 22).

6.1.1 Selecting Pole

The **Pole Group** must first be selected from the dropdown menu provided. The options in the dropdown are populated from the user Pole Library.

A **Pole Length** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the pole lengths that are available for the **Pole Group** that was previously selected. This data is also generated from the Pole Library.

Once a **Pole Length** has been selected, the **Pole Strength** will then need to be to be allocated from the dropdown provided. The options in the dropdown are populated from the pole strengths that are available for the **Pole Length** that was previously selected. Once again, this data will be generated from the Pole Library.

If a **Measure Strength** is available and required to use for the design it can be entered in the field provided. These values will be used as the allowable tipload strength of the pole if entered.

An **Asset No.** can also be entered into the field provided if required.

6.1.2 Pole Angle

The pole angle is only visual and edited if the pole structure is rectangular. Circular poles will not have the angle displayed or editable.

To change the pole angle, either enter in the specific value in **Pole Angle** textbox provided or by selecting one of the default options available under **Change Pole Angle**. The **Change Pole Angle** dropdown options will only become available once a profile has been entered. Any changes made to the pole angle can be visually seen in the main plan view. Note that the pole angle is displayed and entered in decimal degrees.

6.1.3 Foundations

The **Soil Type** can then be selected from the dropdown menu. The options in the dropdown are populated from the user Soil Library.

From the **Soil Type** selected, the **Soil** Strength value is populated for the Soil Library. If the user wishes to change this value, they can do so by selecting **Non-Standard Soil Strength** and entering the desired value in the textbox provided.

From the pole selected, the standard setting depth is populated for the pole (which is generated from the Pole Library). If the user wishes to change this value, they can do so by selecting **Non-Standard Setting Depth** and entering the desired value in metres in the textbox provided.

If applicable a **Stabilised Backfill** is available for both circular and rectangular poles. To add stabilised backfill, select **Stabilised Backfill** and enter in the desired **Width below Ground** in millimetres. If the **Stabilised Backfill** is checked the **Width below Ground** will be automatically populated with the widest base width of the pole selected. The diameter of the stabilised backfill that is entered must be equal too, or greater than this value.

7.1.3.1Pole Bases

Pole bases can be added or removed to any rectangular pole. There are three different types of pole bases: donuts, upper logs and lower logs that are generated from the Pole Base Library. Bases can be removed by selecting 'None' from any of the dropdown menus and all changes can be visible in both the elevation and plan views.

A donut can be added to a pole by selecting an available one from the first dropdown menu. The **Offset Distance** of a donut will automatically be defaulted to 0m and can only be changed so that the donut sits underneath the pole (i.e. the offset distance can only be 0m or the '-' the depth of the donut). The **Orientation** cannot be edited for donuts.

An upper log can be added in conjunction with either a lower log or donut, or by itself if required. Simply select the desired **Upper Log** from the dropdown menu. This will automatically populate the **Offset Distance** as a vertical distance from the ground line to the bottom of the pole, specified for the log in the Pole Base Library. This value can be changed if required, however the offset distance must be positive and no greater than the setting depth of the pole. The upper log must be placed on a face of the pole and will automatically be placed on the inside face of the pole. The **Orientation** can also be changed manually in the space provided.

A lower log can be added in conjunction only with an upper log, or by itself if required. Simply select the desired **Lower Log** from the dropdown menu. This will automatically populate the **Offset Distance** as a vertical distance from the bottom of the pole to the ground line, specified for the log in the Pole Base Library. This value can be changed if required, however the offset distance must be positive and no greater than the setting depth of the pole or the upper log offset if current. The lower log must be placed on a face of the pole and will automatically be placed on the outer face of the pole. The **Orientation** can also be changed manually in the space provided.

6.1.4 Job Description

A **Job Description** can be entered into the field provided if desired by the user.

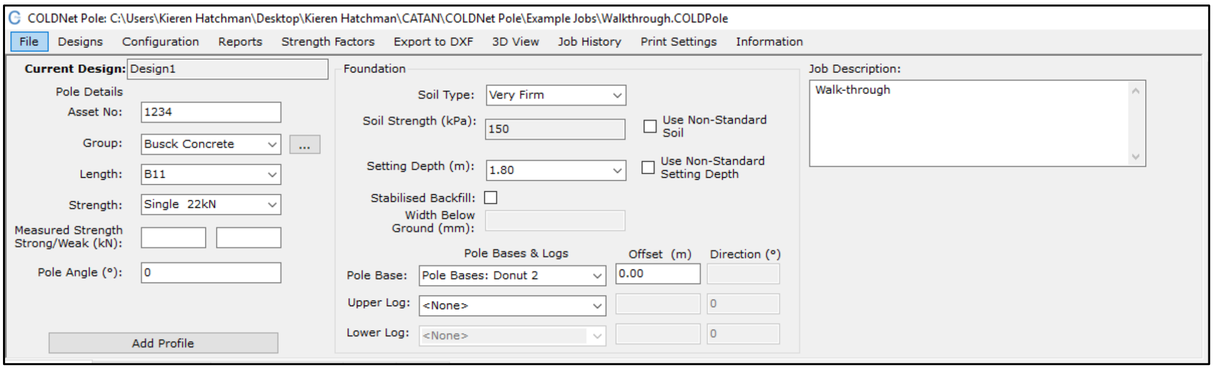


Figure 22: COLDNet Pole Design Information

7.0 Survey Data

After the Pole and Foundation details have been set up, the user can begin by entering in the required field data in the **Survey Data** tab underneath the pole information on the main form (Refer Figure 23). Any new data or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

7.1 Creating and Editing a Profile

Before the user can enter in the field data, they must first add a **New Profile**. A profile can be entered by typing in the required direction in the field provided, followed by OK or selecting the Enter key. The bearing of the new profile must be between 0 – 360 degrees. Once a bearing has been added, the data field grid will become available.

The tabs that are displayed under **Survey Data** displays the current bearing that is being worked on. To change bearings, select from the tabs across the top of the **Data Points** table.

To modify an existing bearing select **Modify Bearing** and enter in the desired change.

To remove a bearing from the job completely, select **Delete Bearing**.

By default, the Bearing **Name** will be empty, however this can be changed by entering in a new description in the **Name** field provided.

Before entering the field data the user should first specify the **Date Type** that was used during the survey. The two options available are: **Relative Horizontal Distance & Height** & **Absolute Distance and Elevation**. The user should then specify which orientation the data was collected in and therefore be recorded in. The two options available are: **Away from Pole** and **Towards Pole**. **Away from Pole** specifies that the data was collected from the pole of interest (origin) to an outer direction. **Towards Pole** specifies that the data was collect from an outer reference in an inward direction towards to pole of analysis. By default **Away Pole** using **Relative Horizontal Distance & Height** are selected. If the survey data has been entered wrong at any stage it can be corrected by selected the correct option for both of these fields.

7.2 Entering Field Data

The way in which the data is required to be entered into the data grid is specific to the **Data Type** that was selected when creating the job. All data is to be entered on a per bearing basis (i.e. a new profile will need to be created every time a data enter falls off the centreline from the previous entry). As outlined, there are two **Data Type** options available to choose from including: **Relative Horizontal Distance & Height, Absolute Distance & Elevation**. The example shown will be entered using **Relative Horizontal Distance & Height**.

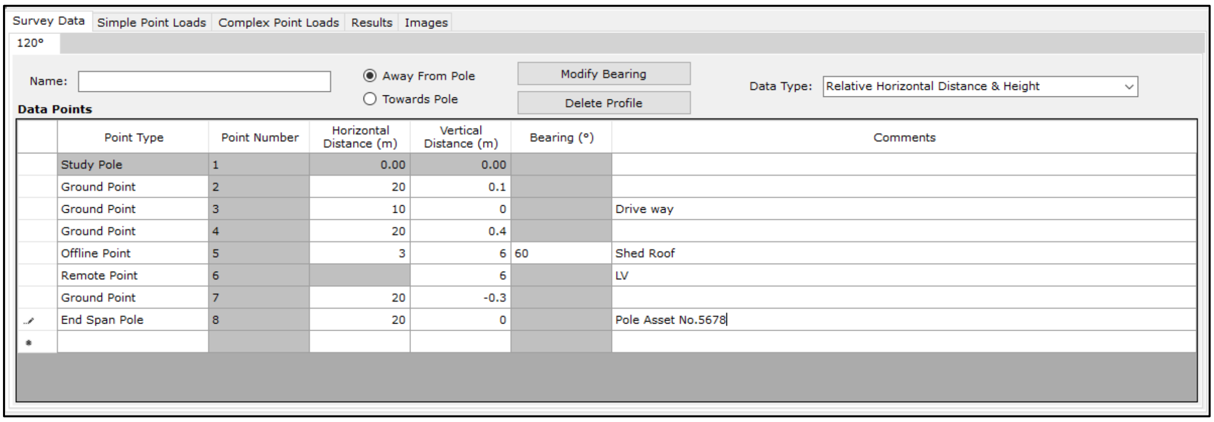
7.2.1 Relative Horizontal Distance & Height

For this data entry type, the user will enter the **Horizontal Distance** and **Vertical Distance** (in metres) for each data point. This is the change in horizontal and vertical distance between the current data point and the previous point. The user will then need to specify what **Point Type** is applicable from the dropdown provided. **Comments** can be added if required. A profile will only be created if an **"End Span Pole"** has been added for the current Working Bearing (maximum of one End Span

Pole per bearing) (Example shown in Figures 23 & 24). The data points entered will be visually represented in the main plane view screen.

7.2.2 Absolute Distance & Elevation

For this data entry type, the user will enter the **Absolute Distance** and **Elevation** for each data point. This is the absolute distance and elevation from the pole (or first data point if data was collected towards the pole) to the current data point. The user will then need to specify what **Point Type** is applicable from the dropdown provided. **Comments** can be added if required. A profile will only be created if an "**End Span Pole"** has been added for the current Working Bearing (maximum of one End Span Pole per bearing). The data points entered will be visually represented in the main plan view screen.



Survey Data | Simple Point Loads | Complex Point Loads | Results | Images

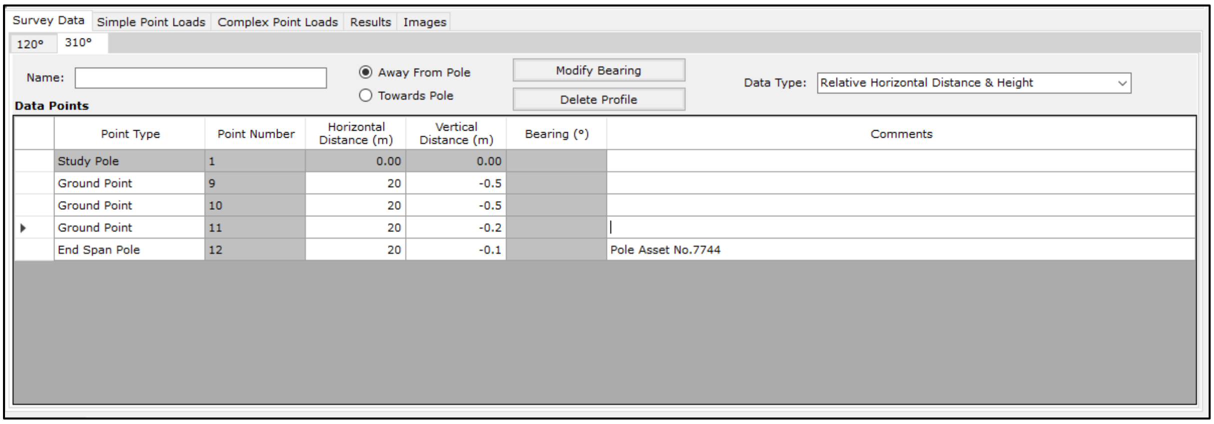
120°

Name: ◉ Away From Pole ○ Towards Pole | Modify Bearing | Delete Profile | Data Type: Relative Horizontal Distance & Height

Data Points

Point Type	Point Number	Horizontal Distance (m)	Vertical Distance (m)	Bearing (°)	Comments
Study Pole	1	0.00	0.00		
Ground Point	2	20	0.1		
Ground Point	3	10	0		Drive way
Ground Point	4	20	0.4		
Offline Point	5	3	6	60	Shed Roof
Remote Point	6		6		LV
Ground Point	7	20	-0.3		
End Span Pole	8	20	0		Pole Asset No.5678

Figure 23: COLDNet Pole Data Input – Relative Horizontal Distance & Height



Survey Data | Simple Point Loads | Complex Point Loads | Results | Images

120° | 310°

Name: ◉ Away From Pole ○ Towards Pole | Modify Bearing | Delete Profile | Data Type: Relative Horizontal Distance & Height

Data Points

Point Type	Point Number	Horizontal Distance (m)	Vertical Distance (m)	Bearing (°)	Comments
Study Pole	1	0.00	0.00		
Ground Point	9	20	-0.5		
Ground Point	10	20	-0.5		
Ground Point	11	20	-0.2		
End Span Pole	12	20	-0.1		Pole Asset No.7744

Figure 24: COLDNet Pole Data Input - Profile 2

8.0 Point Loads

Point Loads can be added at any stage of the design process once the Pole Design Information has been established. The user can add any additional point loads that are required for the design through the **Simple Point Loads** and **Complex Point Loads** tabs respectively (located next to the Survey Data Tab). The loadcase factors are applied to all point load calculations. Any new design changes or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

8.1 Simple Point Loads

To add a new simple point load to the design click **Add New Point Load**, a new row in the simple loads grid will appear.

First, an optional **Description** can be entered into the first cell in the grid, followed by the **Bearing** for the simple load which will need to be entered in the field provided in decimal degrees.

Next, the **POA** (Point of Attachment) will need to be entered manually as a height above the ground in metres, in the field provided.

The **Horizontal Load** that is required for the point load can be entered in kilo-Newtons in the field provided. This is the horizontal load per wire, not the overall load from the point load.

Finally, the **No. of Wires** will need to be entered in the space provided. The number of wires will get multiplied with the horizontal load to obtain the total load from the point load. Refer Figure 25 for an example

If a simple point load is no longer required for the design it can be removed by selecting **Remove Selected Point Load**. The simple load will be removed from the simple loads grid.

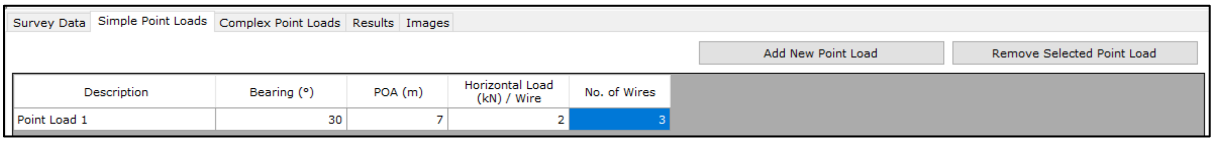


Figure 25: COLDNet Simple Point Load Information for the Design

8.2 Complex Point Loads

To add a new complex point load to the design click **Add New Point Load**, a new row in the complex loads grid will appear.

First, an optional **Description** can be entered into the firs cell in the grid, followed by the **Bearing** for the complex load which will need to be entered in the field provided in decimal degrees.

Next, the **POA** (Point of Attachment) and **POA End** will need to be entered manually as a height above the ground in metres, in the fields provided.

The **Conductor Group** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the user Conductor Library.

A **Conductor** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the conductors that are available for the **Conductor Group** that was previously selected. This data is also generated from the Conductor Library.

The **Everyday Load** needs to be entered as a percentage of the conductor breaking load in the field provided.

The **No. of Wires** will need to be entered in the space provided. The number of wires will get multiplied by the calculated tension load to obtain the total load from the point load.

Either the **Span Length** or the **Ruling Span** must finally be entered in the fields provided. If there is no **Ruling Span** provided the **Span Length** value will be used in the complex load calculation. However, if a **Ruling Span** has been provided this will be used regardless of whether a **Span Length** has been entered or not.

If a complex point load is no longer required for the design it can be removed by selecting **Remove Selected Point Load**. The complex load will be removed from the complex loads grid.

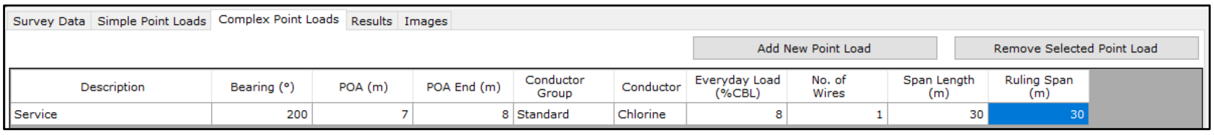


Figure 26: COLDNet Complex Point Load Information for the Design

7.0 Design Information

After the Survey Data has been entered and the Profiles have been created, the user can begin assigning the **Design Information** in the required tabs. Any new design changes or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

7.1 Conductors

After the Profiles have been generated, the user can create a list of conductors that are required for the design in the **Conductor** tab at the bottom of the main screen (Refer Figure 27). Any new design changes or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

To add a new conductor to the design click **Add New Conductor**, a new row in the conductor grid will appear.

The **Conductor Group** must first be selected from the dropdown menu provided. The options in the dropdown are populated from the user Conductor Library.

A **Conductor** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the conductors that are available for the **Conductor Group** that was previously selected. This data is also generated from the Conductor Library.

Next, the **Voltage** must be selected from the dropdown menu provided. The options in the dropdown are populated from the user Voltage Library.

The **No. of Wires**, **Max Temp** and **Min Temp** need to be entered in the fields provided. If the voltage and number of wires selected for a conductor doesn't match any of the entries in the Crossarm Library a message box will appear.

If a conductor is no longer required for the design it can be removed by selecting **Remove Selected Conductor**.

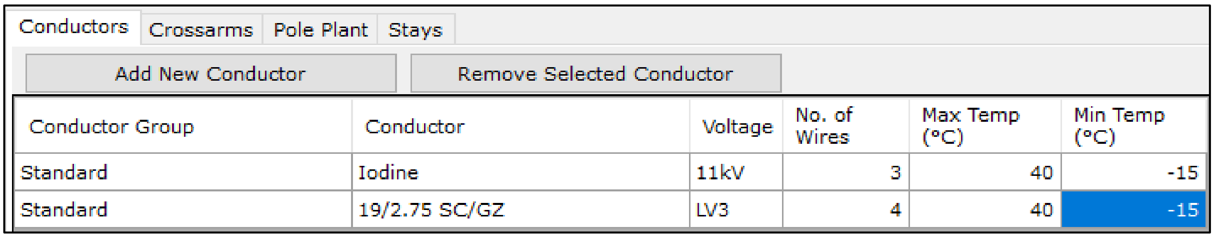


Figure 27: COLDNet Conductor Information for the Design

7.2 Crossarms

After the Conductors have been added to the design, the user can begin to create the profiles and add circuits to the design. To add the crossarms and circuits to the design, select the **Crossarm** tab at the bottom of the main screen and select the bearing tab that is required to be designed (Refer Figure 28). Any new design changes or edits to existing data will need to be saved (**File>Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

To add a new circuit to the design click **Add New Circuit**, a new row in the pole crossarm grid and end crossarm grid will appear. First enter in all the required information in the pole crossarm grid before moving onto the end crossarm grid.

It must first be determined if the circuit is connected to a different circuit on another bearing. Connected circuit simply means that the two circuits share the same crossarm at the attachment. Only one crossarm will be present at that attachment and will share the same parameters between the two circuits. If the circuit is not connected there will be a crossarm present at the attachment of each circuit. To connect a circuit, select **Connected Circuit** from the dropdown menu and choose which circuit to connect too. In order to connect a circuit there first bust be at least one complete circuit on two or more profiles. Circuits can only be joined if all the required information has been entered.

Next, select the **Attachment Type** for the crossarm from the dropdown provided. Either a **Pin** or **Strain** crossarm must be selected.

A **Conductor** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the list of conductors that have been added to the design in the Conductors Tab.

The **Everyday Load** needs to be entered as a percentage of the conductor breaking load in the field provided.

The **Crossarm Group** must first be selected from the dropdown menu provided. The options in the dropdown are populated from the user Crossarm Library.

A **Crosssarm** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the crossarms available for the **Crossarm Group** that was previously selected. Only crossarms that match the **Conductor** parameters will be listed in the dropdown menu (i.e. crossarms that match the attachment type, number of wires and voltage in the Crossarm Library).

The **POA** (Point of Attachment) will automatically be generated from the Crossarm Library for the top circuit based on the **Crossarm** selected. If the circuit is not the top circuit it will need to be entered in manually as a height above the ground in metres, in the field provided. Select the **Locked POA** function to fix this this height above ground.

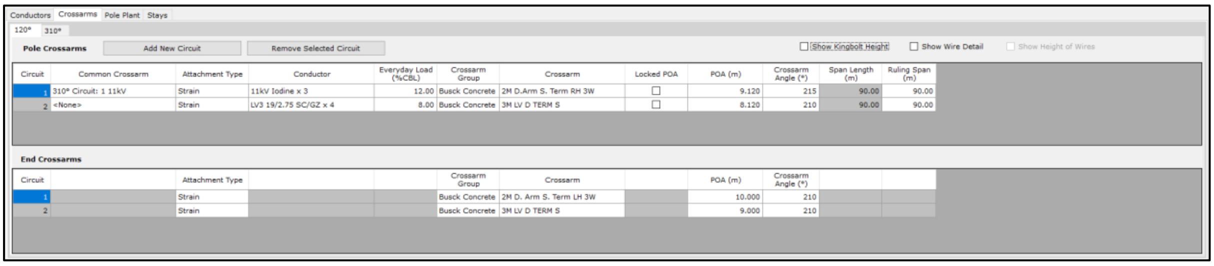
The **Crossarm Angle** will automatically be populated so that it is positioned on the closest face across the line of the circuit. If required this value can be changed by entering into the field provided in decimal degrees.

The **Span Length** will be automatically populated as the distance between the two poles. This value cannot be edited. **Ruling Span** will also be automatically calculated and populated in the field provided. This value can be changed if required.

If a circuit is no longer required for the design it can be removed by selecting **Remove Selected Circuit**. The circuit will be removed from both the pole crossarm grid and the end crossarm grid.

There is an option available to **Show Kingbolt Height** instead of the **POA**. To do this simply select the option from the top right-hand corner of the **Crossarms Tab**.

There is also options available to **Show Wire Detail** and **Show Height of Wires** above ground. To show any of these two options select them from the top right-hand corner of the **Crossarm Tab**.



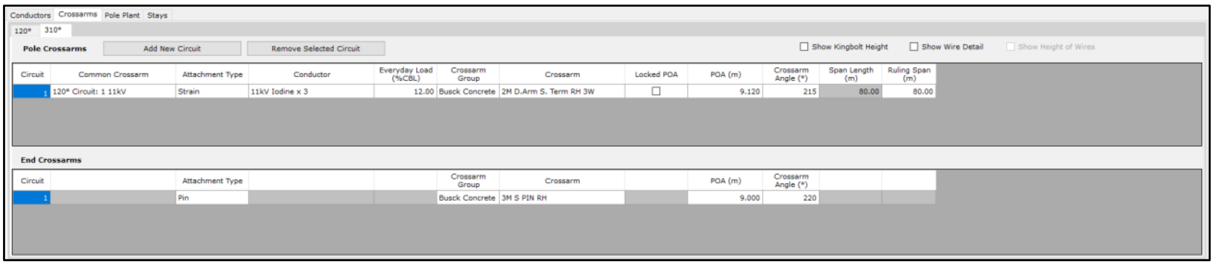


Figure 28: COLDNet Crossarm Information for the Design

7.4 Pole Plant

After the Circuits and Crossarms have been added to the design, the user can add Pole Plant equipment if required. To add the equipment to the design, select the **Pole Plant** tab at the bottom left-hand corner of the main screen (Refer Figure 29). Any new design changes or edits to existing will need to be saved (**File> Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

To add a new pole plant to the design click **Add New Pole Plant**, a new row in the pole plant grid will appear.

The **Pole Plant Group** must first be selected from the dropdown menu provided. The options in the dropdown are populated from the user Pole Plant Library.

A **Pole Plant** must then be selected from the dropdown menu provided. The options in the dropdown are populated from the pole plants that are available for the **Pole Plant Group** that was previously selected. This data is also generated from the Pole Plant Library.

The **Distance from Pole Top (m)** and **Offset Distance from Pole** will be automatically generated after the **Pole Plant** has been selected based on the information in the user Pole Plant Library. This information can also be changed manually in the fields provided if required.

The **Direction** will automatically be populated so that the plant is placed across the line and behind the line for terminations. This value can be changed by entering it into the field provided in decimal degrees.

Pole plant **Comments** can be added in the field provided if required.

If a pole plant is no longer required for the design it can be removed by selecting **Remove Selected Pole Plant**.

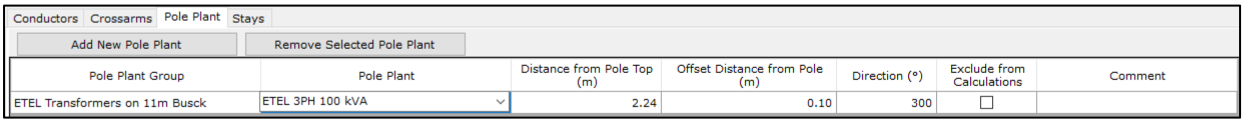


Figure 29: COLDNet Pole Plant Information for the Design

7.5 Stays

Details of the stays can be viewed in the **Stays** tab at the bottom left-hand corner of the main screen (Refer Figure 30). Any new design changes or edits to existing will need to be saved (**File> Save**) to commit changes. Quit (**File>Quit**) can be used to remove any changes made during the editing session on the job.

7.5.1 Creating Stays

To add a new stay to a pole select **Add New Stay**. This will add a new entry into the Stay Table and populate a stay onto the selected pole. The **Stay Orientation**, and other details can then be entered.

Once all the required stay information has been added, select **Check Stays** to run the calculations for the pole configuration. The new results will be displayed in the results grid under the **Results** tab.

If a stay is required to be deleted, select **Remove Selected Stay**. This will remove the selected stay in the table and will automatically rerun the calculations for the new stay configuration.

7.5.2 Stay Orientation

There are three options available to the user to default the stay angle for new or existing stays including: **Resultant Angle of Maximum Load**, **Bisect Angle** & **Inline Stays**. These options can be selected from the left-hand menu bottoms and will automatically change the **Direction** in the results grid and update the Elevation and Plan View drawings accordingly. The **Stay Results Grid** will be updated automatically upon selection.

Resultant Angle of Maximum Load can only be used for a single or multiple stays. It will place all the stays that have been added to the stay grid in the direction opposing the angle of maximum load on the pole.

Bisect Angle can only be used when one or more stays are present and will place all the stays that have been added to the stay grid on the bisect angle. To calculate the bisect angle, there must be two or less spans on the pole.

Inline Stays can be used with a single or multiple stays up to the number of spans. The stays will automatically be placed in-line and behind each of the spans. **Offset Inline Stays** can be used when two inline stays have been placed on the job. To use this, select the check box and enter the **Distance to Offset** value required in the text box provided followed by the Enter key. This will automatically update the two **Directions** of the inline stays with the correct offset.

7.5.3 Stay Details

Specific details regarding the stays can be found in the **Stay Table** provided.

As well as the default stay orientation options, the user can also change the direction of the stay manually in the Stay Table, under **Direction**. The angle must be between

0-360 degrees. Any changes made will be displayed visually in the Elevation and Plan Views. Select **Check Stays** to view the new results.

The **Locked Data Column** is available to fix a specific stay configuration. Any changes made to the stay details won't affect the results in the selected locked column field. The user can select from: Stay Spread, Height on Pole and Angle with Ground. By default, **Stay Spread** will be locked and will be unable to be edited until a new locked column is selected. The locked data columns will be shaded grey for clarification.

Distance from Top of Pole is the vertical distance from the top of the pole to the point of attachment of the stay and is measured in metres. The **Distance from Top of Pole** can be changed if this data column is not locked. Following any changes made the remaining stay fields will be updated automatically accordingly.

Height at Pole is the vertical distance from the ground level to the point of attachment of the stay and is measured in metres. The **Height at Pole** can be changed if this data column is not locked. Following any changes made the remaining stay fields will be updated automatically accordingly.

Angle with Ground is the elevation angle from the ground line to the point of attachment of the stay and is measured in degrees. The **Angle with Ground** can be changed if this data column is not locked. Following any changes made the remaining stay fields will be updated automatically accordingly.

Stay Spread is the horizontal distance from the base of the stay to the point of attachment the stay makes with the ground and is measured in metres. The **Stay Spread** can be changed if this data column is not locked. Following any changes made the remaining stay fields will be updated automatically accordingly.

The stay can be changed by selecting a **Stay Group** and **Stay** from the provided dropdown menus. The options in the dropdown are populated from the user Stay Library.

Part Number can also be changed via the text box provided.

Stay Comments are comments can be added or removed as required by the user via the text box provided.

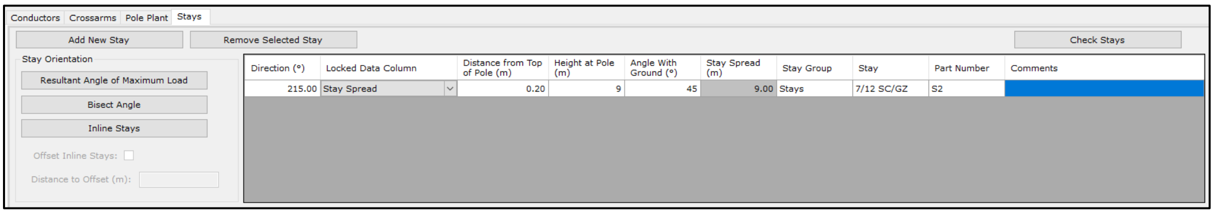


Figure 30: COLDNet Stay Information for the Design

8.0 Results

At any stage during the design process a list of results and defects is available to the user through the **Results** tab in the middle of the main screen. Underneath this tab is a table of results that are current to the design (Refer Figure 31). If any defects are present the pole on the main plan view screen will be highlighted red. The list is automatically updated after any changes are made to the design.

For each of the calculation results listed in the table there will be a calculation type which outlines the type of calculation present, the **Loadcase** for which this occurs and the description of the **Component** that is being calculated. Each result populates the calculated value, as well as the allowable value and utilisation if applicable.

The desired results can be turned off and on by selecting and un-selecting each of the calculation types list above the results table. There is also an option available to **Show All** and **Hide All** if required.

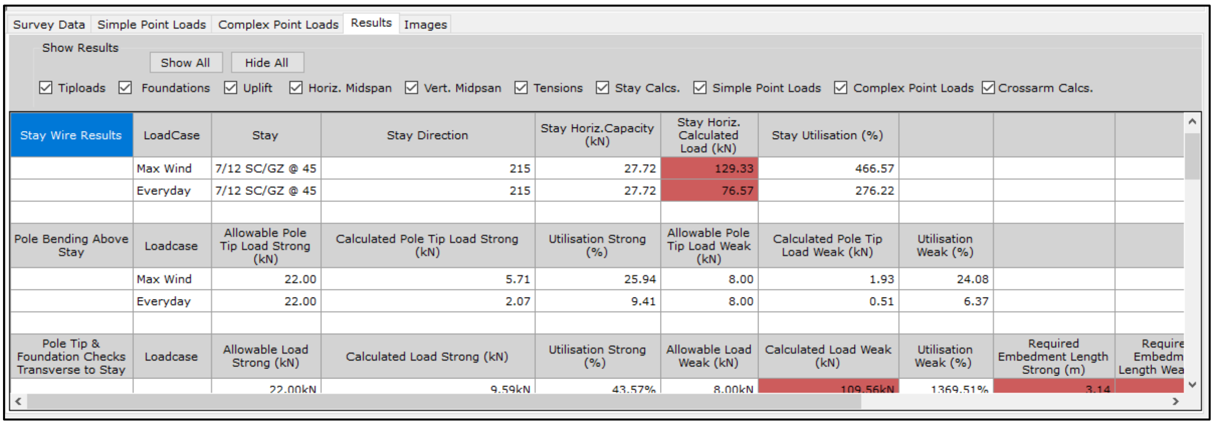


Figure 31: COLDNet Pole Results Grid

9.0 Profiles

After the data and design information has been entered, profiles will be created radially around the pole of interest in the design. The elevation views of each of these profiles can be viewed by selecting them from the **Profile** tabs generated at the top of the main screen next to the **Plan View** tab. A **Profile** tab will be generated for every bearing that consists of a Study Pole and an End Span Pole. From the **Profile** tab the user has the ability to sag the conductors through conductor points that have been entered for that particular bearing of interest. From these screens Ground Clearances and Conductor Curves can also be added.

9.1 Stringing Conductor through Remote Points

If Remote Points have been entered in the data input table for the selected profile, they will appear in the Conductor Everyday Stringing grid which can be accessed by navigating to the Profile of interest and selecting **Sag Conductor**. The **Chainage** and **Height** columns are read only and are calculated from the Data Input grid. **Point Comments** can be added from the grid which will be reflected back into the **Comments** field in the Data Input grid.

To begin the conductor stringing, the user must first select which circuit requires stringing by selecting it from the dropdown menu provided under **Select Circuit**. The number of circuits in the dropdown list will be equal to those that have been added when filling out the crossarm grids under the **Crossarms** tab.

Next, select the Remote Points from the table that will be used to sag the conductor. To do this, simply select the check box in the end column called **Sag Point** for the points required.

Once all the **Remote Points** have been selected, a **Conductor Temperature** is required to be entered. This is the temperature of the conductor at the time the conductor data points were taken. The temperature needs to be entered in degrees Celsius.

Select **Calculate Stringing** to see the new **Everyday Load** and **Everyday Tension** (Refer Figure 32). Click **Update Stringing** to commit the changes to the design. This will update the elevation view as well as the **Everyday Load** value for the circuit in the **Crossarm** tab.

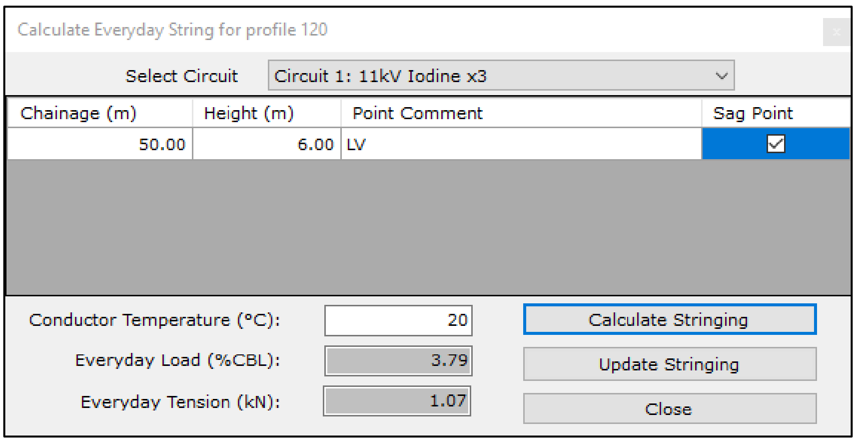


Figure 32: Stringing Conductor through Remote Points

9.2 Clearance to Ground

A ground clearance line (as an offset from the groundline) can also be added by selecting **Clearance to Ground**. Select **Add Clearance** and enter in the desired clearances (Refer Figure 33). Select **Remove Clearance** to remove. Select **Save** to commit changes. This will now be displayed on the Profile Drawing.

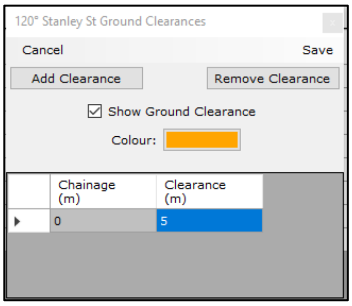


Figure 33: Adding a Ground Clearance Line to a Profile

9.3 Catenary Curves

Catenary Curves can be edited and added by selecting **Catenaries** from the tool strip menu for each of the profiles. Upon selection a new window will open and by default, have a Maximum Temperature and a Minimum Temperature curve displayed for each of the circuits on the profile (Refer Figure 34).

These curves are generated from the Maximum and Minimum Operating temperatures that were selected for that conductor. These values along with the **Radial Thickness** and **Density Ice / Snow** can be edited by entering in the desired values into the grid. There are check boxes available to **Show Minimum Clearance in Span**, **Show Curve** and **Show Clearance Curve**. When **Show Minimum Clearance in Span** is turned on a red arrow will also appear at the location of lowest clearance in the profile. The value for the lowest clearance and the position in which it occurs along the span can be seen in the Profile Drawing. If a **Clearance Curve** is selected, a **Clearance** value will need to be entered into the adjacent column. The colours that are displayed in the Profile Drawings for these curves can be changed under the **Colour** and **Clearance Colour** column in the grid. Additional curves for each circuit can be added and removed by selecting **Add Curve** and **Remove Curve** respectively. To change circuits select from the list of tabs that have been automatically generated.

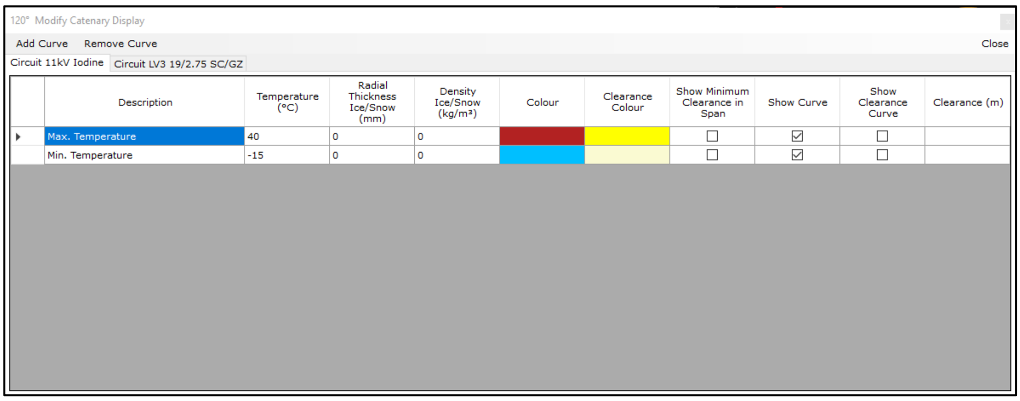


Figure 34: Adding and Modifying Clearance Curves

10.0 Reports

There are four predefined reports available to the client to assist with analysing the conditioning of the pole and its assets. These three reports include: **Pole Information & Loads**, **Calculation Results, Terrain Data** & **Sag/Tension Report**. They are standard summary reports that show the basic information and calculation results for the pole of interest. To access any of these reports simply select the report tab of interest under **Reports** in the top tool bar menu of the main form. Once selected the report form will open in a new window. From there the client can view the reports as well as export them to a CSV or Microsoft Excel format if required.

To export any of the reports select either **Export to CSV** or **Export to Excel** from the top tool bar menu and select **Export Current**. After selecting either of these options a new window will appear with the exported data. Create a name for the file and save after complete. Use **Export All** to export all of the report to a single document and repeat the previous process.

The reports can be printed in a similar manner by selecting **Print** from the top tool bar. Once again, select **Print Current** to print the current report tab or **Print All** to combine the reports into one document. **Print Settings** are also available if required from the top menu bar.

Click **Close** to exit the form and return to the main screen.

10.1 Pole Information & Loads Report

The component information available in the **Pole Information** report include: Poles, soil type, conductors, crossarms, pole plants and stays. Any simple or complex point loads on the design will also be displayed in the table. This report gives the user a detailed understanding of the critical information and components used in the design (Refer Figure 35).

10.2 Calculation Report

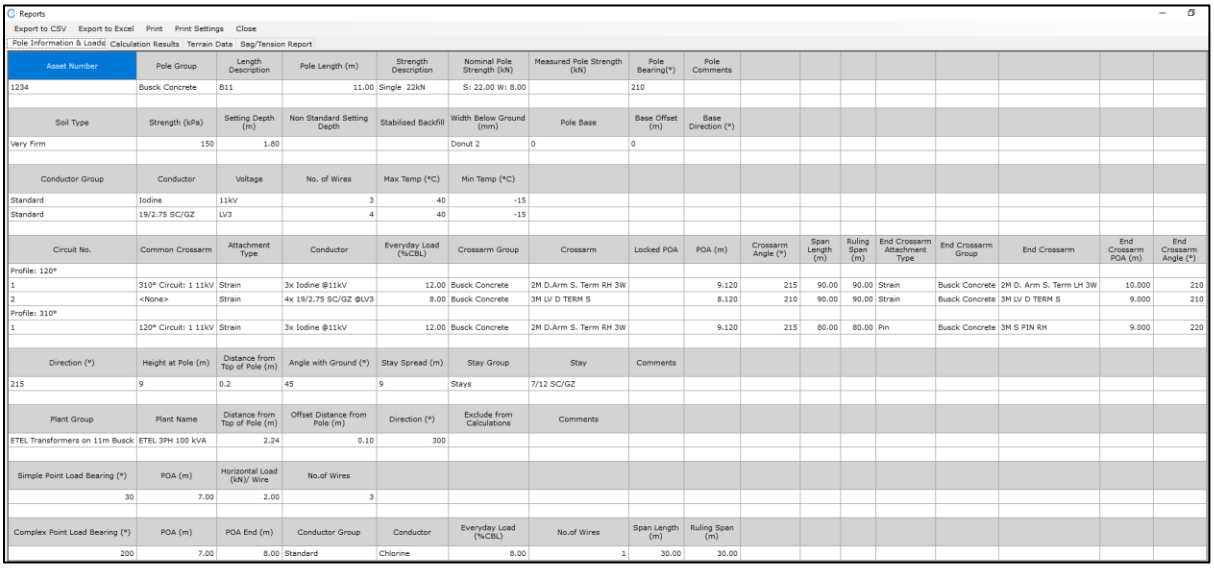
The standard calculations in the **Calculation Report** provided include: Tiploads, Foundations, Horizontal Mid-Span Separation, Vertical Mid-Span Separation, Uplift, Conductor Tensions, Crossarm Loads, Stay Tensions, Stay Bending Loads, Stay Transverse Loads & Stay Foundations. Each calculation will show the calculated result, allowable result and utilisation (if applicable) for each loadcase (Refer Figure 36). The desired results can be turned off and on by selecting and un-selecting each of the calculation types list above the results table. There is also an option available to **Show All** and **Hide All** if required.

10.3 Terrain Data Report

The **Terrain Data** report has information regarding all the data points entered in the design (Refer Figure 37). The report shows a list of bearings and the survey data contained within each of them (Refer Figure 37).

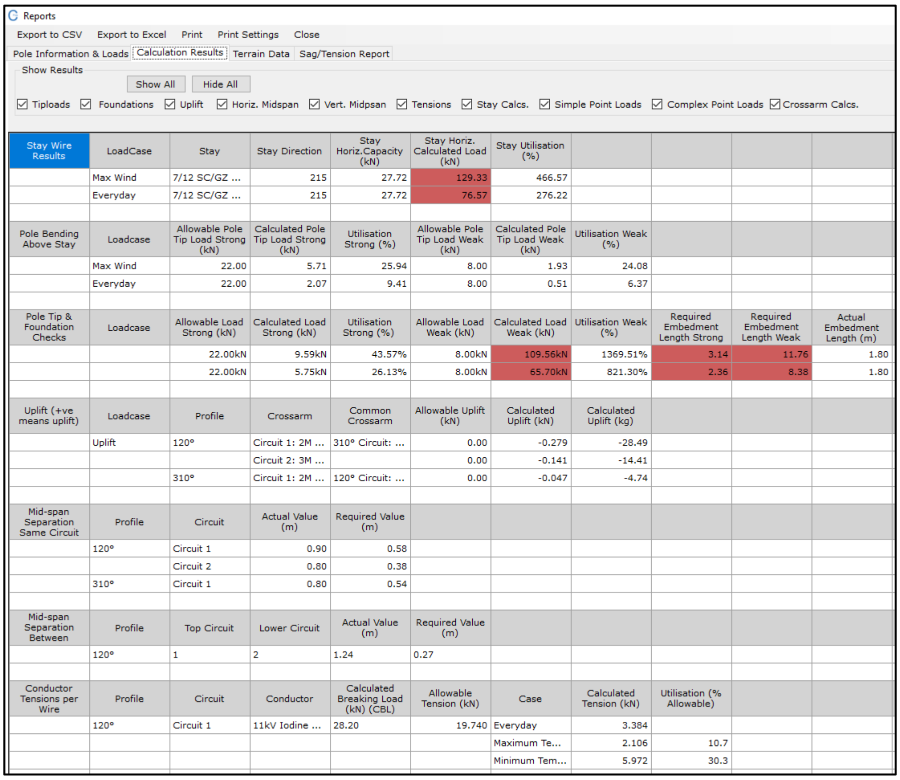
10.4 Sag/Tension Report

A **Sag/Tension** Report can be generated for each of the circuits oh the job. First the user must select whether to use Initial or final modulus of elasticity for each conductor. This can be done be selecting the checkbox under the column **Use Initial Modulus of Elasticity**. If the final modulus of Elasticity is used instead, an option is available to enter a **Temperature Allowance for Inelastic Stretch**. This can be entered in the column provided or a default value of 0°C will be used. An **Exclude from Report** option is available for each circuit. The **Initial Modulus of Elasticity** and **Final Modulus of Elasticity** will be automatically generated from the conductor properties that have been entered in the Conductor Library. The report will calculated four different results including: **Sag**, **Horizontal Tension**, **Axial Tension** and **Time for 3 Return Waves**. Each of these options can be turned off and on by selecting the checkboxes provided under **Report Options**. A **Start Temperature** & **End Temperature** need to be entered into the fields provided following be a **Temperature Increment**. A calculation will be done for each temperature between the start value and end value increasing by the temperature increment. Select **Generate Report** to populate (Refer Figure 38).



Asset Number	Pole Group	Length Description	Pole Length (m)	Strength Description	Nominal Pole Strength (kN)	Measured Pole Strength (kN)	Pole Bearing(°)	Pole Comments								
1234	Busck Concrete	B11	11.00	Single 22kN	S: 22.00 W: 8.00		210									
Soil Type	Strength (kPa)	Setting Depth (m)	Non Standard Setting Depth	Stabilised Backfill	Width Below Ground (mm)	Pole Base	Base Offset (m)	Base Direction (°)								
Very Firm	150	1.80			Donut 2	0	0									
Conductor Group	Conductor	Voltage	No. of Wires	Max Temp (°C)	Min Temp (°C)											
Standard	Iodine	11kV	3	40	-15											
Standard	19/2.75 SC/GZ	LV3	4	40	-15											
Circuit No.	Common Crossarm	Attachment Type	Conductor	Everyday Load (%CBL)	Crossarm Group	Crossarm	Locked POA	POA (m)	Crossarm Angle (°)	Span Length (m)	Ruling Span (m)	End Crossarm Attachment Type	End Crossarm Group	End Crossarm	End Crossarm POA (m)	End Crossarm Angle (°)
Profile: 120°																
1	310° Circuit: 1 11kV	Strain	3x Iodine @11kV	12.00	Busck Concrete	2M D.Arm S. Term RH 3W		9.120	215	90.00	90.00	Strain	Busck Concrete	2M D. Arm S. Term LH 3W	10.000	210
2	<None>	Strain	4x 19/2.75 SC/GZ @LV3	8.00	Busck Concrete	3M LV D TERM S		8.120	210	90.00	90.00	Strain	Busck Concrete	3M LV D TERM S	9.000	210
Profile: 310°																
1	120° Circuit: 1 11kV	Strain	3x Iodine @11kV	12.00	Busck Concrete	2M D.Arm S. Term RH 3W		9.120	215	80.00	80.00	Pin	Busck Concrete	3M S PIN RH	9.000	220
Direction (°)	Height at Pole (m)	Distance from Top of Pole (m)	Angle with Ground (°)	Stay Spread (m)	Stay Group	Stay	Comments									
215	9	0.2	45	9	Stays	7/12 SC/GZ										
Plant Group	Plant Name	Distance from Top of Pole (m)	Offset Distance from Pole (m)	Direction (°)	Exclude from Calculations	Comments										
ETEL Transformers on 11m Busck	ETEL 3PH 100 kVA	2.24	0.10	300												
Simple Point Load Bearing (°)	POA (m)	Horizontal Load (kN)/ Wire	No.of Wires													
30	7.00	2.00	3													
Complex Point Load Bearing (°)	POA (m)	POA End (m)	Conductor Group	Conductor	Everyday Load (%CBL)	No.of Wires	Span Length (m)	Ruling Span (m)								
200	7.00	8.00	Standard	Chlorine	8.00	1	30.00	30.00								

Figure 35: Pole Information & Loads Report



Reports

Export to CSV | Export to Excel | Print | Print Settings | Close

Pole Information & Loads | Calculation Results | Terrain Data | Sag/Tension Report

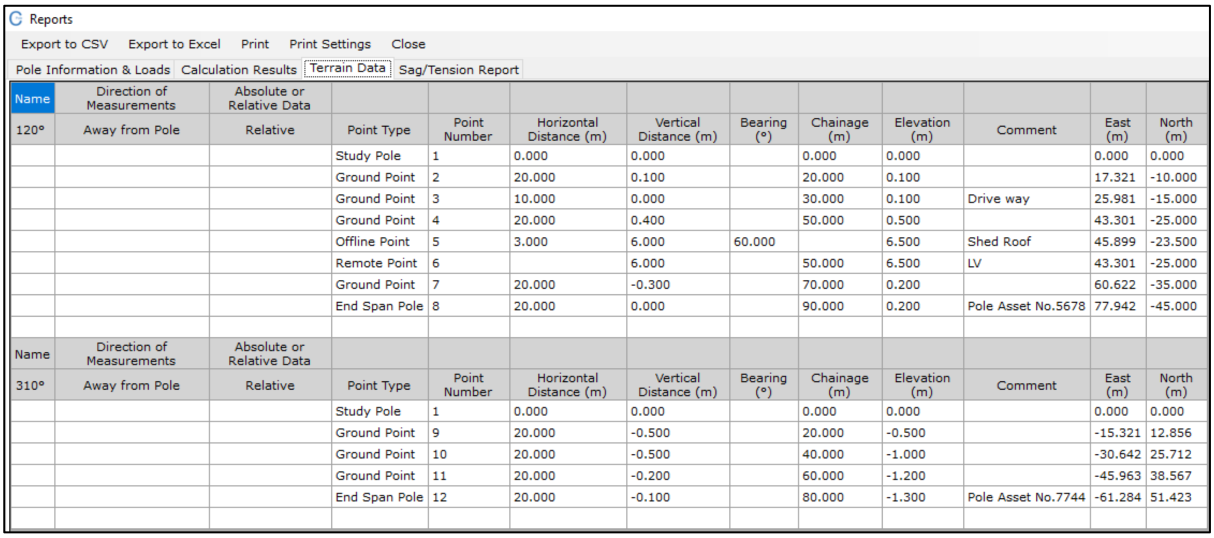
Show Results

Show All | Hide All

☑ Tiploads ☑ Foundations ☑ Uplift ☑ Horiz. Midpsan ☑ Vert. Midpsan ☑ Tensions ☑ Stay Calcs. ☑ Simple Point Loads ☑ Complex Point Loads ☑ Crossarm Calcs.

Stay Wire Results	LoadCase	Stay	Stay Direction	Stay Horiz.Capacity (kN)	Stay Horiz. Calculated Load (kN)	Stay Utilisation (%)				
	Max Wind	7/12 SC/GZ ...	215	27.72	129.33	466.57				
	Everyday	7/12 SC/GZ ...	215	27.72	76.57	276.22				
Pole Bending Above Stay	Loadcase	Allowable Pole Tip Load Strong (kN)	Calculated Pole Tip Load Strong (kN)	Utilisation Strong (%)	Allowable Pole Tip Load Weak (kN)	Calculated Pole Tip Load Weak (kN)	Utilisation Weak (%)			
	Max Wind	22.00	5.71	25.94	8.00	1.93	24.08			
	Everyday	22.00	2.07	9.41	8.00	0.51	6.37			
Pole Tip & Foundation Checks	Loadcase	Allowable Load Strong (kN)	Calculated Load Strong (kN)	Utilisation Strong (%)	Allowable Load Weak (kN)	Calculated Load Weak (kN)	Utilisation Weak (%)	Required Embedment Length Strong	Required Embedment Length Weak	Actual Embedment Length (m)
		22.00kN	9.59kN	43.57%	8.00kN	109.56kN	1369.51%	3.14	11.76	1.80
		22.00kN	5.75kN	26.13%	8.00kN	65.70kN	821.30%	2.36	8.38	1.80
Uplift (+ve means uplift)	Loadcase	Profile	Crossarm	Common Crossarm	Allowable Uplift (kN)	Calculated Uplift (kN)	Calculated Uplift (kg)			
	Uplift	120°	Circuit 1: 2M ...	310° Circuit: ...	0.00	-0.279	-28.49			
			Circuit 2: 3M ...		0.00	-0.141	-14.41			
		310°	Circuit 1: 2M ...	120° Circuit: ...	0.00	-0.047	-4.74			
Mid-span Separation Same Circuit	Profile	Circuit	Actual Value (m)	Required Value (m)						
	120°	Circuit 1	0.90	0.58						
		Circuit 2	0.80	0.38						
	310°	Circuit 1	0.80	0.54						
Mid-span Separation Between	Profile	Top Circuit	Lower Circuit	Actual Value (m)	Required Value (m)					
	120°	1	2	1.24	0.27					
Conductor Tensions per Wire	Profile	Circuit	Conductor	Calculated Breaking Load (kN) (CBL)	Allowable Tension (kN)	Case	Calculated Tension (kN)	Utilisation (% Allowable)		
	120°	Circuit 1	11kV Iodine ...	28.20	19.740	Everyday	3.384			
						Maximum Te...	2.106	10.7		
						Minimum Tem...	5.972	30.3		

Figure 36: Calculation Results Report



Reports

Export to CSV | Export to Excel | Print | Print Settings | Close

Pole Information & Loads | Calculation Results | Terrain Data | Sag/Tension Report

Name	Direction of Measurements	Absolute or Relative Data										
120°	Away from Pole	Relative	Point Type	Point Number	Horizontal Distance (m)	Vertical Distance (m)	Bearing (°)	Chainage (m)	Elevation (m)	Comment	East (m)	North (m)
			Study Pole	1	0.000	0.000		0.000	0.000		0.000	0.000
			Ground Point	2	20.000	0.100		20.000	0.100		17.321	-10.000
			Ground Point	3	10.000	0.000		30.000	0.100	Drive way	25.981	-15.000
			Ground Point	4	20.000	0.400		50.000	0.500		43.301	-25.000
			Offline Point	5	3.000	6.000	60.000		6.500	Shed Roof	45.899	-23.500
			Remote Point	6		6.000		50.000	6.500	LV	43.301	-25.000
			Ground Point	7	20.000	-0.300		70.000	0.200		60.622	-35.000
			End Span Pole	8	20.000	0.000		90.000	0.200	Pole Asset No.5678	77.942	-45.000
Name	Direction of Measurements	Absolute or Relative Data										
310°	Away from Pole	Relative	Point Type	Point Number	Horizontal Distance (m)	Vertical Distance (m)	Bearing (°)	Chainage (m)	Elevation (m)	Comment	East (m)	North (m)
			Study Pole	1	0.000	0.000		0.000	0.000		0.000	0.000
			Ground Point	9	20.000	-0.500		20.000	-0.500		-15.321	12.856
			Ground Point	10	20.000	-0.500		40.000	-1.000		-30.642	25.712
			Ground Point	11	20.000	-0.200		60.000	-1.200		-45.963	38.567
			End Span Pole	12	20.000	-0.100		80.000	-1.300	Pole Asset No.7744	-61.284	51.423

Figure 37: Terrain Data Report

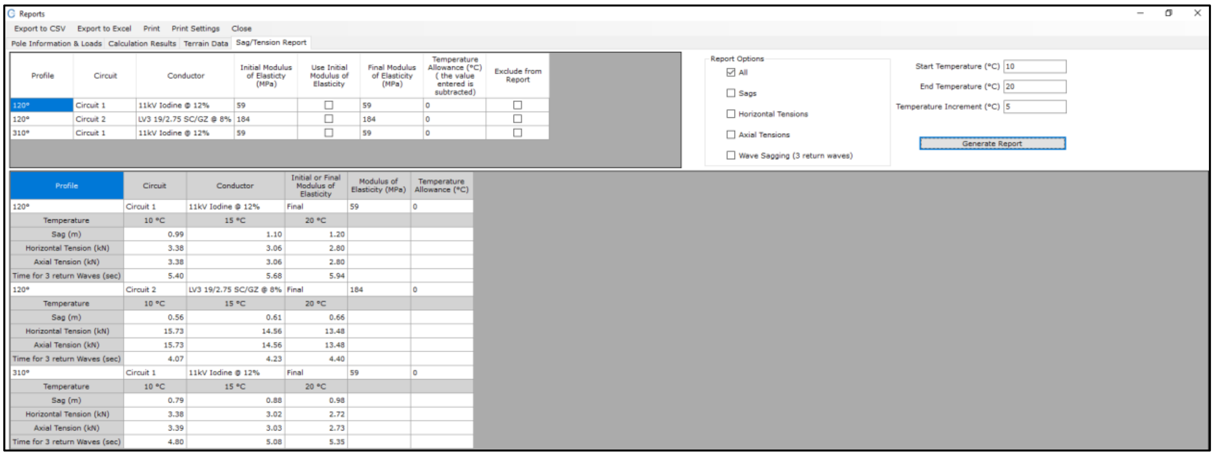


Figure 38: Sag/Tension Report

11.0 Strength Factors

The strength factors for both the Pole and Soil can be modified by selecting **Strength Factors** from the top tool strip menu on the main screen (Refer Figure 39). The strength factors can be modified for each of the loadcases that are present in the Parameter File. To change the values simply enter in the desired factor in the field provided followed by the **Save** button. Upon exiting the form, the calculations will automatically be reprocessed to replicate these strength factor altercations.

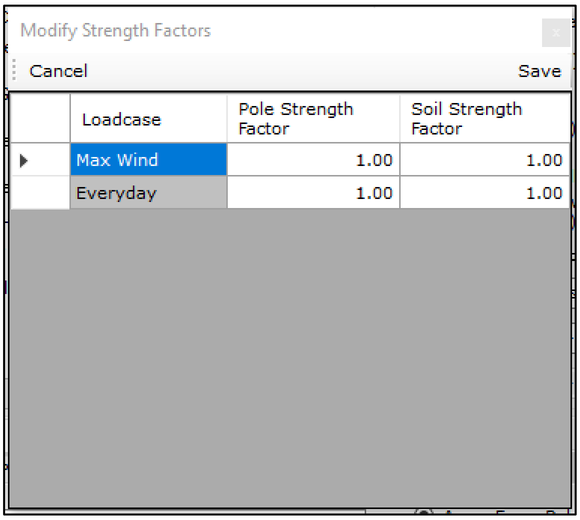


Figure 39: Modifying Strength Factors

12.0 Export to DXF

The design can be exported to a DXF format by selecting **Export to DXF** and selecting from one of the three options: **Plan View**, **Profile Views** & **Export All**. The DXF files will automatically be generated with a default name and saved into the same location that the COLDNet Pole job file had been elected to save to. Upon selection an option will appear to open the folder in which the location has been saved to. To open the DXF file simple double click on the created file (Refer Figure 40). A DXF viewer will need to be installed on the user's computer to be able to view the file.

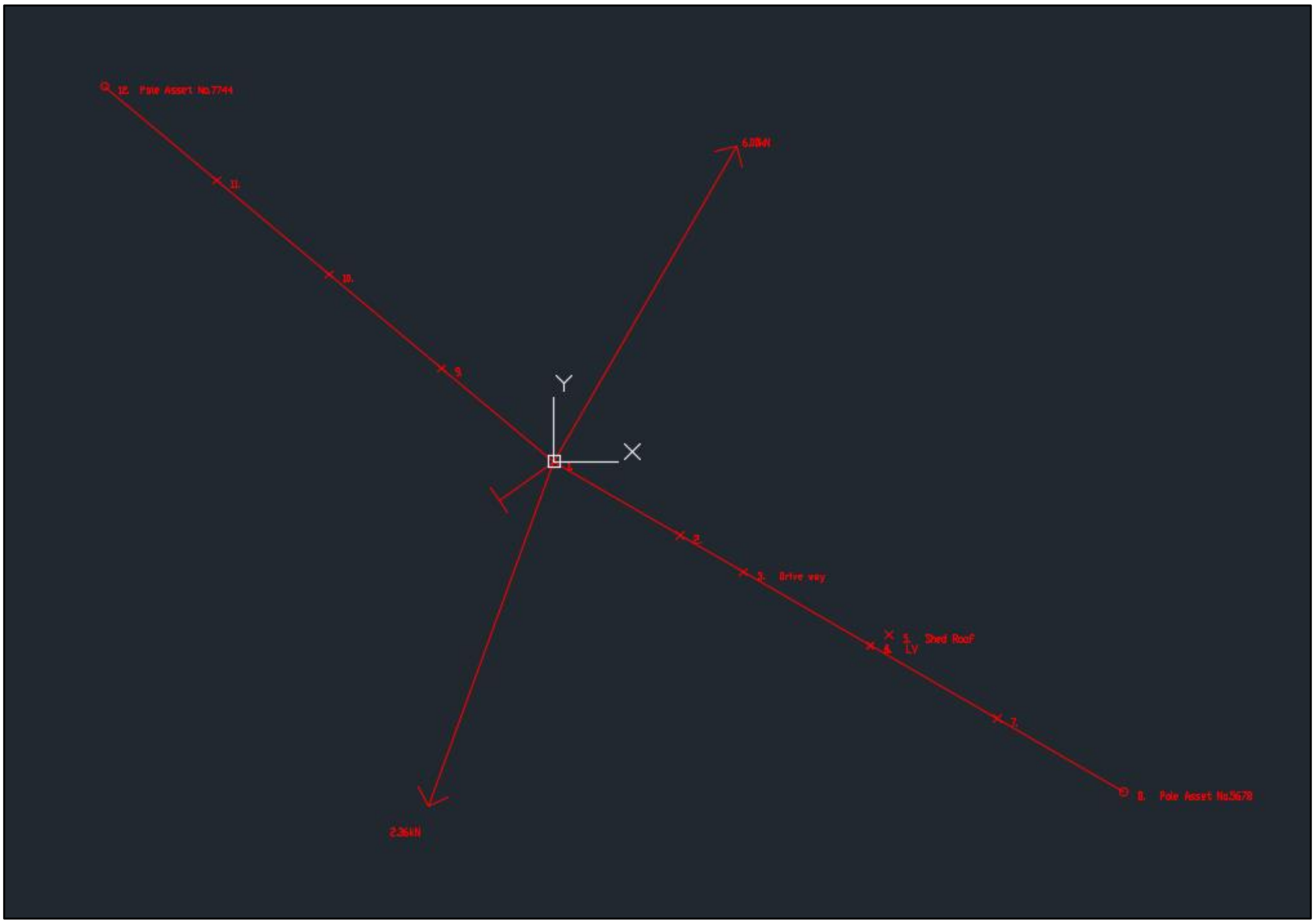


Figure 40: Exported DXF File Example

13.0 3D View

To view the design in 3D select the **3D View Option** from the top tool strip menu. A new window will open where the 3D model can be viewed. To toggle the view hold and move down the left-mouse key. To orbit the model hold down and move the right mouse key. Use the mouse scroll wheel to zoom into the cursor location. To rest the drawing back to the original view select **Redraw**.

There is a check box available **Show Terrain** which can be turned off and on to allow the user to view any pole bases that are positioned below ground level.

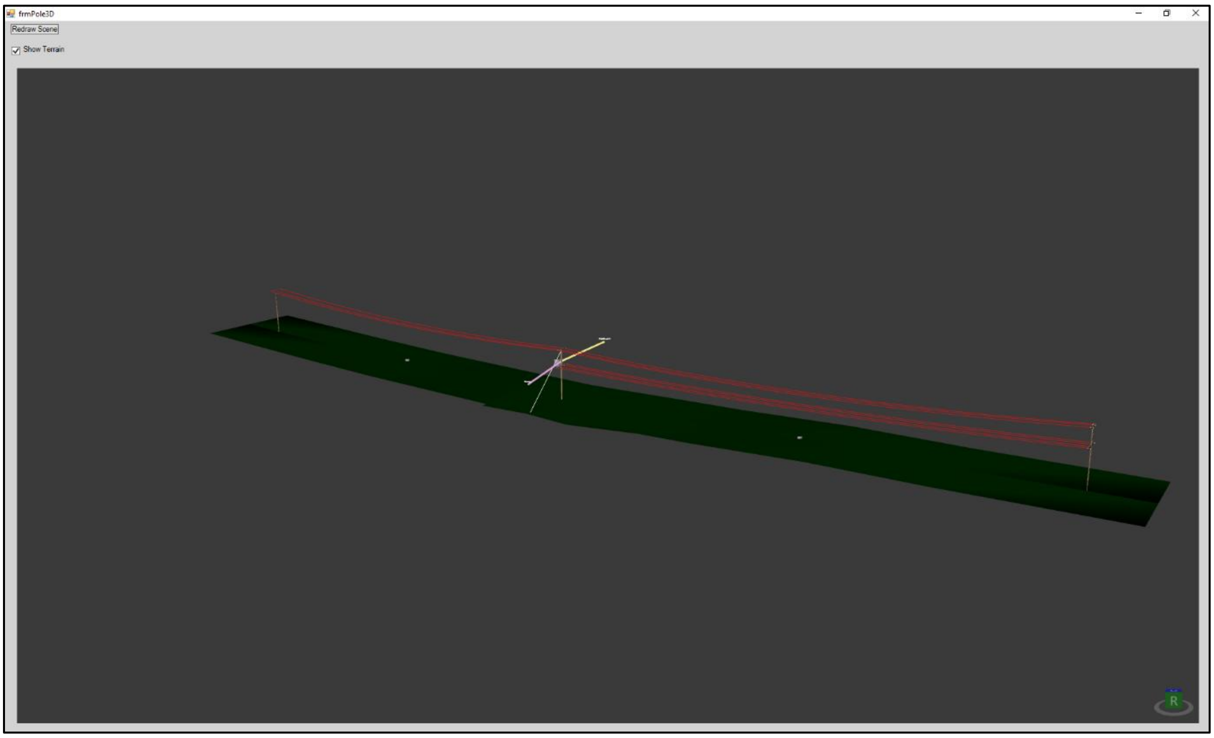


Figure 41: 3D View of Design

14.0 Display Options

There are several different methods that the user can view and highlight their data which can be accessed from the main window screen of COLDNet Pole.

11.1 Display Options

Display Options are available for the user to turn off and on, to create a customised view for the user. The display options selected by the user will be saved, and appear whenever they start the program. Individual or multiple display options can be selected at a given time.

11.1.1 Remote Points

The remote points can be displayed in the main plan view and profile screens via **Display Options>Remote Points.** By default, the remote points will be displayed by a blue cross. This can be changed through the **Draw Options** panel.

11.1.2 Ground Points

The ground points can be displayed in the main plan view and profile screens via **Display Options>Ground Points**. By default, the ground points will be displayed by a white cross. This can be changed through the **Draw Options** panel.

11.1.3 Offline Points

The offline points can be displayed in the main plan view and profile screens via **Display Options>Offline Points**. By default, the offline points will be displayed by a white circle. This can be changed through the **Draw Options** panel.

11.1.4 Point Coordinates

The point coordinates (X, Y, Z) can be displayed in the main plan view and profile screens via **Display Options>Point Coordinates**. The point coordinates will be displayed in text next to the point.

11.1.5 Point Numbers

The point numbers can be displayed in the main plan view and profile screens via **Point Numbers>Point Coordinates**. The point numbers will be displayed in text next to the point.

11.1.6 Comments

Data points that have user comments can be highlighted via **Display Options>Comments**. The comment will be displayed in text next to the point.

11.1.7 Span Length

For bearings that contain a profile (i.e. a pole point is in the data set) the span length is available via **Display Options> Span Length**. The span length will be displayed as a dimension in metres above or below the profile.

11.1.8 Show Blowout

For bearings that contain a profile (i.e. a pole point is in the data set) the blowout curve is available via **Display Option> Show Blowout**. The blowout curve will be generated based on the blowout conditions that have been entered for the design. If no blowout conditions have been entered you will be taken to the settings form where these can be entered. The blowout curve is drawn based on the location of the blowout from the outer most wires and is shown via a violet line in the plan view drawing.

11.1.9 Show Wires

For bearings that contain a profile (i.e. a pole point is in the data set) the wire configuration can be seen in the plan view screen via **Display Option> Show Wires**.

11.1.10 Full View

To reset the plan view drawing back to fit-to-page select full view via **Display Options>Full View** or alternatively using **Ctrl + F**.

11.2 Draw Options

Each of the **Display Options** outlined in section 11.1 above can be customised for the user comfort. Under the **Draw Options** menu (on the top tool strip menu) each highlighting options have three settings: Colour, Width and Shape. These three options can be edited by the user (Refer Figure 42).

Colours can be changed by selecting **...** button, located next to **Draw Colour**.

The width of the highlight can be changed via **Draw Width** by selecting the up and down arrow keys.

The shape of the highlight can be changed by selecting the desired shape from the list under **Draw Shape**.

Reset reverts any changes made back to their original state, or **Reset All** to revert all display options changes back to their original state. Changes can be applied via **Apply Changes**.

The background colour of the plan view can also be changed from the Draw options form by selecting **...** button next to the **Background Colour** setting.

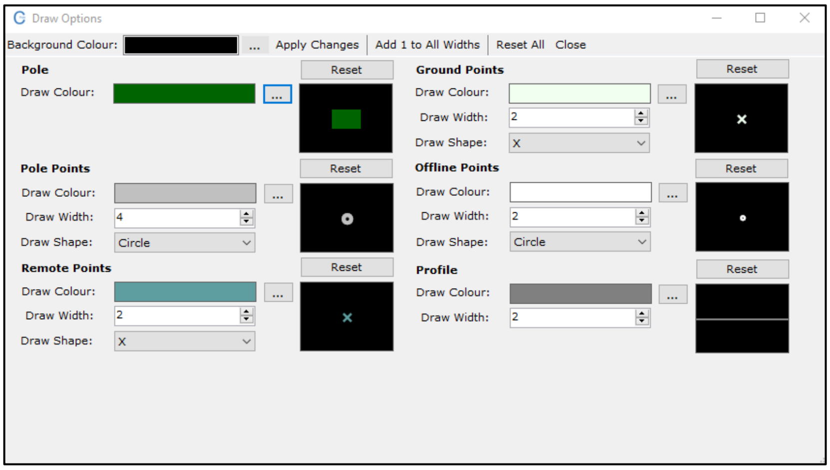


Figure 42: Draw Options

11.3 Measure Distance and Bearing

The user can measure the distance and bearing between two points by selecting **Measure>Between Two Points** from the top tool strip menu on the main plan view screen. After selecting the option, a small form will appear at the top right-hand corner of the screen. From there, select the two points of interest by clicking on them individually from the plan view screen. The bearing will be calculated from the first point of selection to the second point of selection (Refer Figure 43). Use the **Reset** function to repeat the process for another two points. Once finish select **Close** to continue with the design. There is also a similar tool available for measuring the distance and bearing between two mouse clicks by selecting **Measure>Between Mouse Click Points** and repeating the process above.

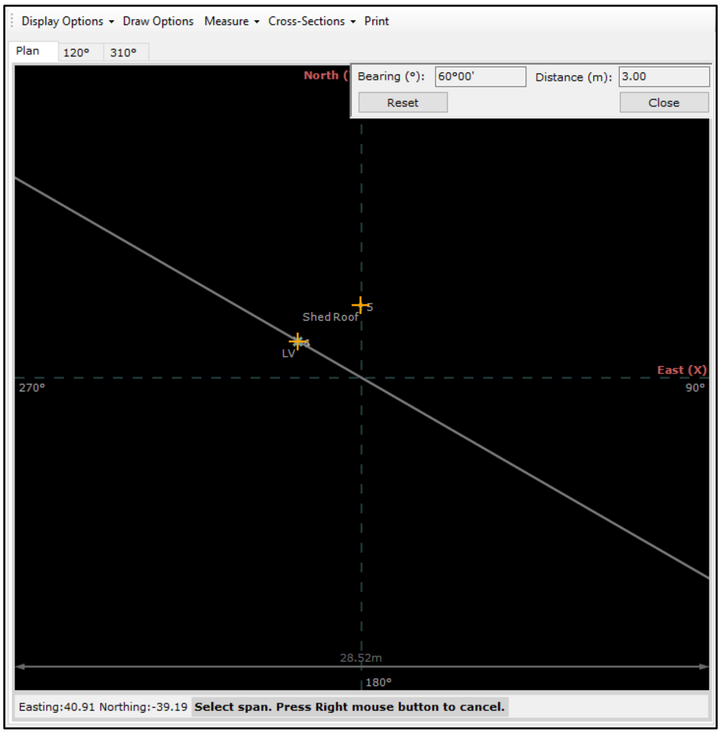


Figure 43: Measuring Distance and Bearing between Two Points

11.4 Cross-Sections

A cross-sectional view of the line can be created by selecting **Cross-Sections>Create Cross-Section**. The cross-sectional view can be used to measure horizontal and vertical clearances to the conductor. A blowout curve will also be displayed to show the geometry of the conductor swing under blowout conditions. The user will first be required to select the Offline Point to incorporate into the cross-section. The Offline Point will usually be in reference to a building or object that has been captured during the survey to verify it meets the required clearance values. After selecting the offline point, a span will need to be selected. Once selected, a new window will automatically be generated with the cross-sectional view (Refer Figure 44). More than one cross-sectional view can be created. They can be viewed under **Cross-Sections>View Cross-Sections** and deleted via **Cross-Sections>Delete Cross-Sections**.

Once the form is open, the **Temperature** and **Wind Pressure** can be changed and **Recalculated** to produce a new cross-sectional view.

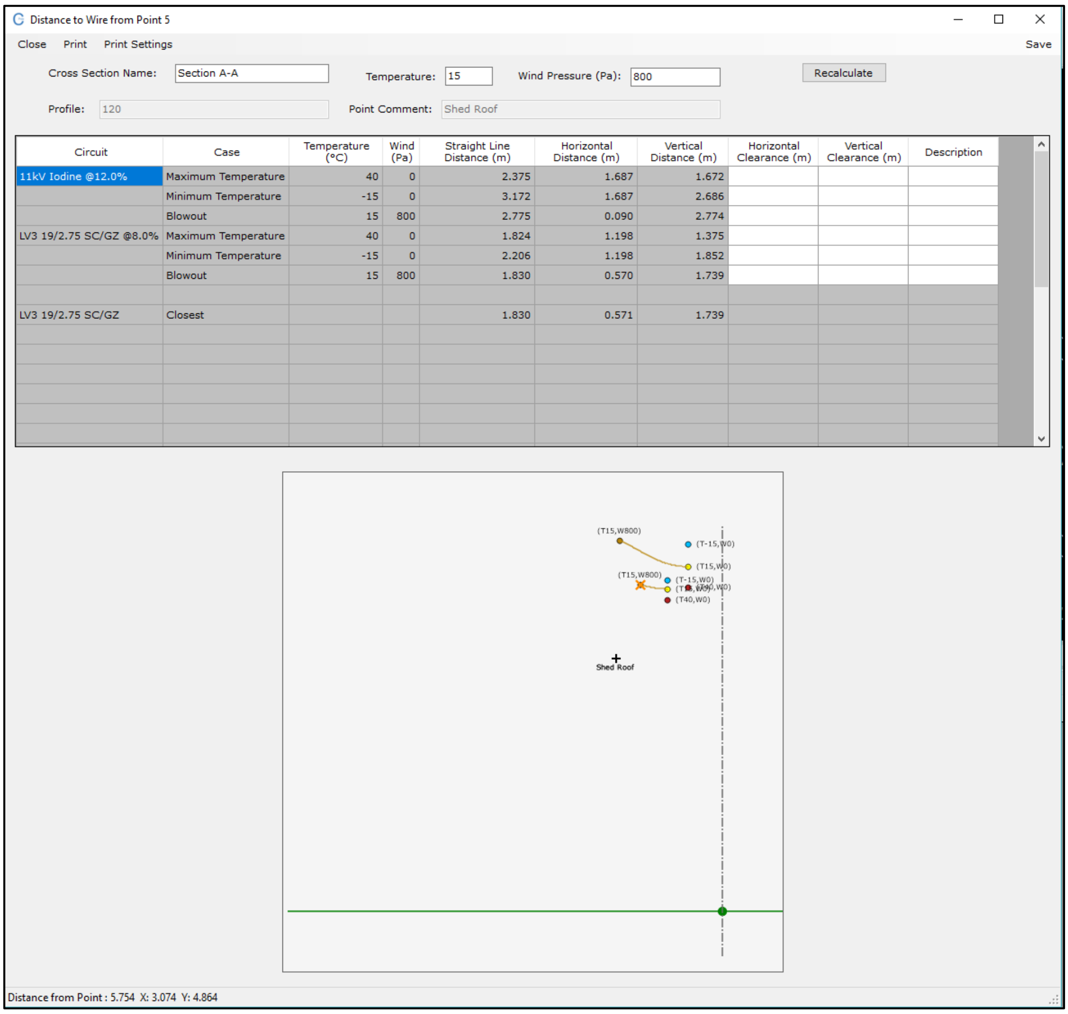


Figure 44: Cross-Sectional Views