Pavement Conformance Workflow

V1.6 December 2021.

Contents

Introduction and background information

The ***'Pavement Conformance Report (Advanced)'*** provides reporting functionality commonly required by civil road authorities. The following workflow shows users how to perform conformance reporting on data typically seen on civil projects.

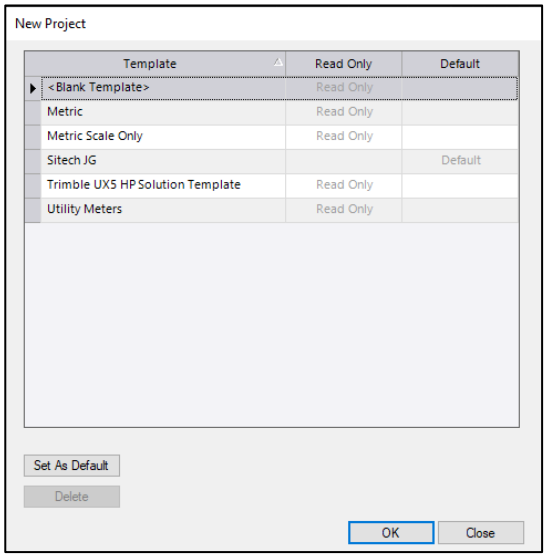
1.Importing Data

Launch a new project

In Trimble Business Center, 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.

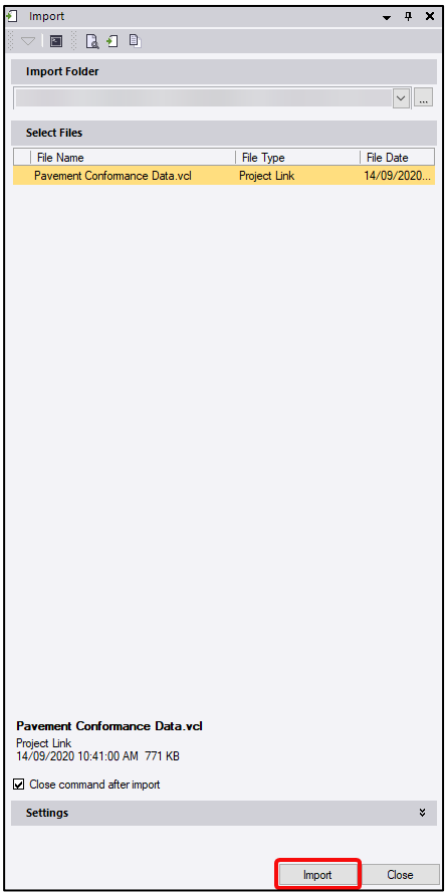


Select *Metric* template or your own default template and click **OK.** The **Plan View** will then display.

Import data

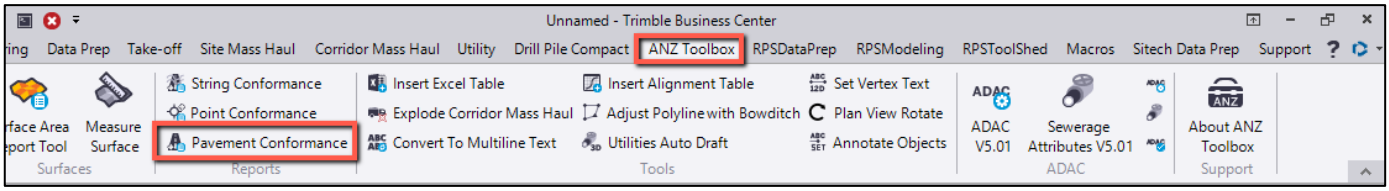
To import data:

1. Start by opening the import window. Navigate to **Home > Data Exchange > Import.**
2. In the import window **click** the ... **icon**. The Import Folder window should display.
3. Navigate to the folder containing the drainage data you wish to import. **Click OK**.
4. In the import window **select** the file containing the data you wish to import. Change the settings if required. **Click Import**.



2. Open the command

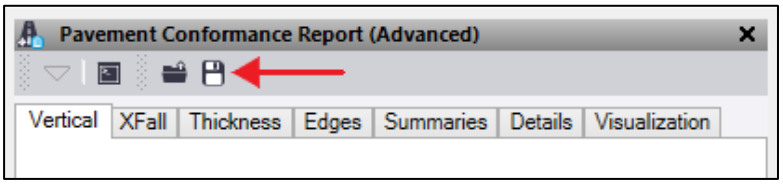
The 'Pavement Conformance Report', is located on the **ANZ toolbox** ribbon tab. Click the  icon to open the command or press F12 and type in the command name.



3. Save and Load Templates

The pavement conformance report tool allows tolerance templates to be saved and loaded into the reporting tool. This means the user can fill out information in each settings tab, then save it as a template for future use. Once you have all relevant data filled in and the report is ready to be created the template can be exported by:

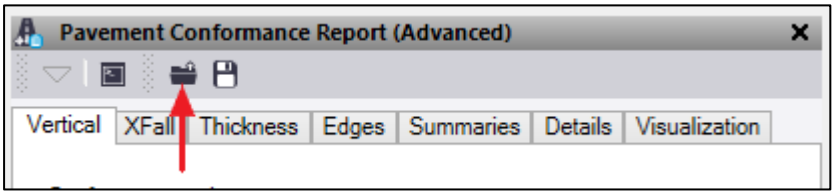
1. Clicking the  icon at the top of the tool bar.



2. Choose the folder you wish to save the template to and click **save**.

To load a saved template:

1. Click the  icon at the top of the tool bar.



2. Navigate to the file containing the template, select the file and click **Open.**

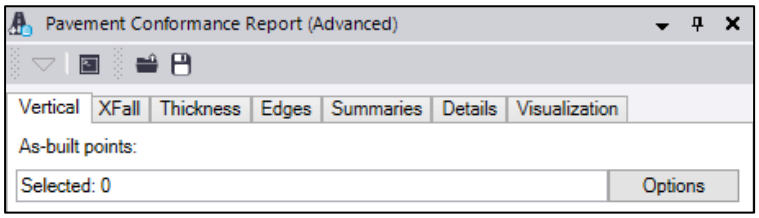
The file should load into the tool and automatically fill the predefined fields in each tab.

4. Vertical Settings Tab

The vertical setting tab provides selection fields for the data being reported as well as options and vertical tolerance settings.

As-built points

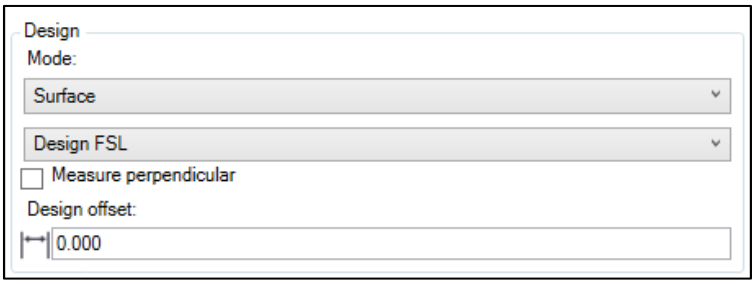
This field requires the selection of points to be reported on. *(The options button provides selection tools to select data more easily from within the project).*



1. **Click** in the **As-built points** field and in the plan view select all points required for conformance.

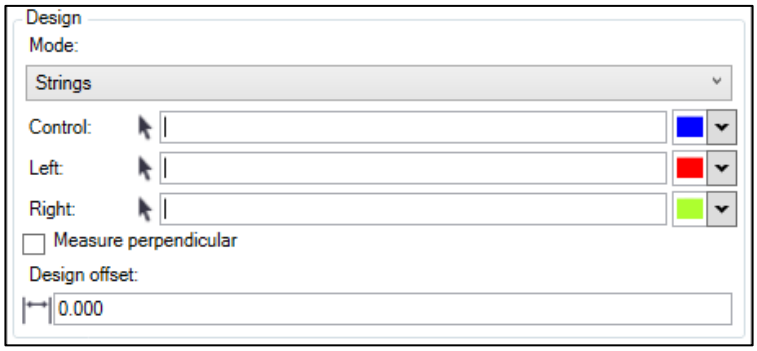
Design

The mode is defined and either a surface or strings can be selected and used to report As-built points against



2.1 Select Surface mode and in the dropdown select the design surface.

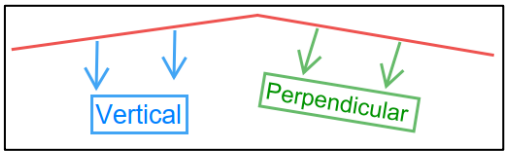
OR



2.2 Select Strings mode and in the plan view select the control, left and right strings.

Measure Perpendicular

The Measure perpendicular tick box changes the computation type from vertical to perpendicular.



3. If required, **click the box** to select the perpendicular measurement type.

Design Offset

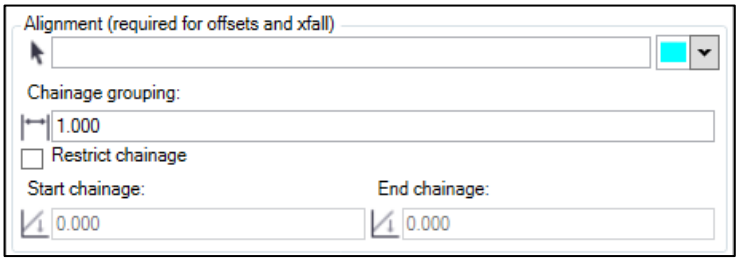
If you are performing conformance to a pavement subsurface layer, a surface offset depth can be applied.

4. If required, click in the **Design offset** field, and enter a surface offset in metre units. This will be applied either vertically or perpendicular depending on the above setting chosen.

Alignment

The report uses an Alignment string to report the conformance points against. *Note: This is required for Xfall or thickness reporting.*

5. **Click** in the **Alignment** field, select in the plan view the relevant alignment string.



Chainage Grouping

Chainage grouping provides options for grouping points in the conformance report. The report will look for points cross-sectionally within this grouping distance.

6. The default setting of 1 metre should suit most cases required, however this value may need modifying depending on survey pickup interval used. click in the **Chainage Grouping** field and enter a value in metre units.

Restrict Chainage

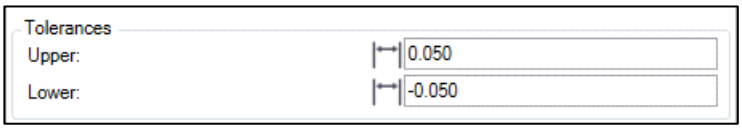
Restrict chainage allows for the report to be limited to between a start and end chainage.

7. Either type in a start and end chainage or select the values in the plan view.

Tolerances

Tolerances are defined as upper and lower values in metre units.

8. **Click** in the **Upper tolerance** field, enter a suitable value. Repeat for **lower tolerance**.



Display Options

The display options are used to toggle on or off columns that will be displayed in the report. Toggle on or off the required display options by clicking the check box

Include point IDs

This includes the point ID of the conformance points and is displayed as the first column.

Include point codes

This includes the feature code of the conformance point as the second column next to the Point ID.

Include easting/northing

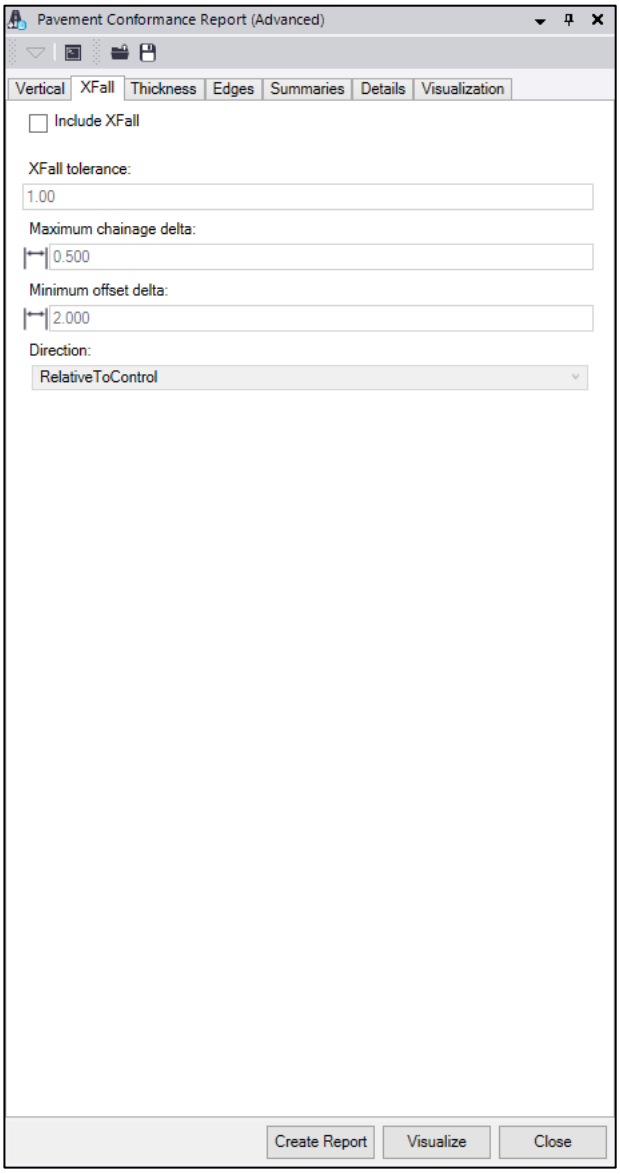
Provides additional columns in conformance report showing the Easting and Northing of the as-built point.

Show non-conformance errors

Provides additional columns in conformance report showing the tolerance and the amount outside of that tolerance.

5. XFall Settings Tab

The XFall tab provides additional crossfall reporting options within the conformance report.



1. **Click** the **Include XFall** box to add crossfall reporting to the conformance report output.
2. **Click** in the **XFall tolerance** field and enter a crossfall tolerance in % grade units.

Maximum chainage delta

This distance is the maximum chainage difference that 2 points can be different by and still report cross fall deltas.

3. **Click** in the **Maximum chainage delta** field and enter a value in metre units.

Minimum offset delta

This is the minimum offset distance between points that are checked for xfall.

4. **Click** in the **Minimum offset delta** field and enter a value in metre units.

Direction

Relative to Control = Normal use for Road reporting. Reported left and right of alignment.

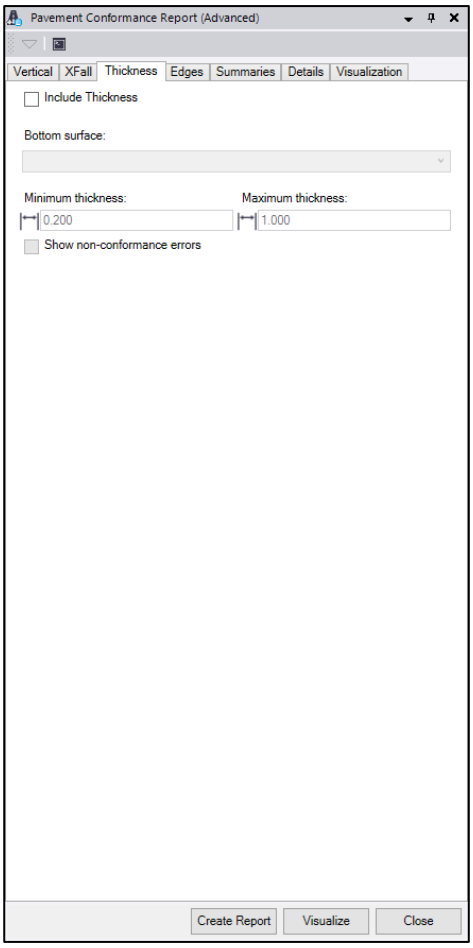
Left to Right = Report all cross falls left to right with chainage

Right to Left = Report all cross falls right to left with chainage

5. **Choose** the **direction** you want the cross fall to be reported relative to the alignment string.

6. Thickness Settings Tab

The Thickness tab provides additional layer thickness reporting options within the conformance report.



1. **Click** the **Include Thickness** box to add thickness reporting to the conformance report output.
2. **Select** from the **dropdown box** the subsurface to check the thickness conformance against.

Upper/lower Tolerances

Tolerances are defined as minimum and maximum values in metre units.

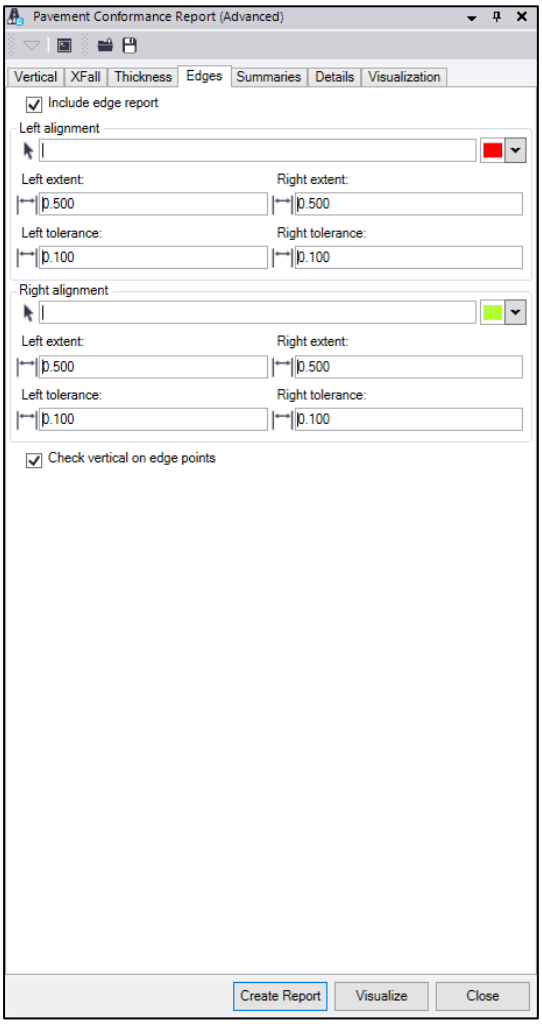
3. **Click** in the **Minimum tolerance** field, enter a suitable value.
4. **Repeat** step 17 for **Maximum tolerance**.

Show Non-Conformance Errors

Provides additional columns in conformance report showing the tolerance and the amount outside of that tolerance.

7. Edges Settings Tab

The Edges tab provides additional edge string reporting options within the conformance report.



1. **Click** the **Include edge report** box to add edge reporting to the conformance report output.

Left and Right Alignment

The left and right alignment are the edge strings used to report the horizontal differences in the conformance report output.

2. **Click** in the **left alignment** field and in the view (plan or 3D) select the relevant edge string. Repeat for **Right alignment** if required.

Left and Right Extent

Extent distances give a range which will be used to search for the points on either side of the alignment string. These numbers are always positive.

3. Type a number in metre units in the **left** and **right extent** boxes.

Left and Right Tolerance

Tolerances to report against are defined as left and right values and are always positive.

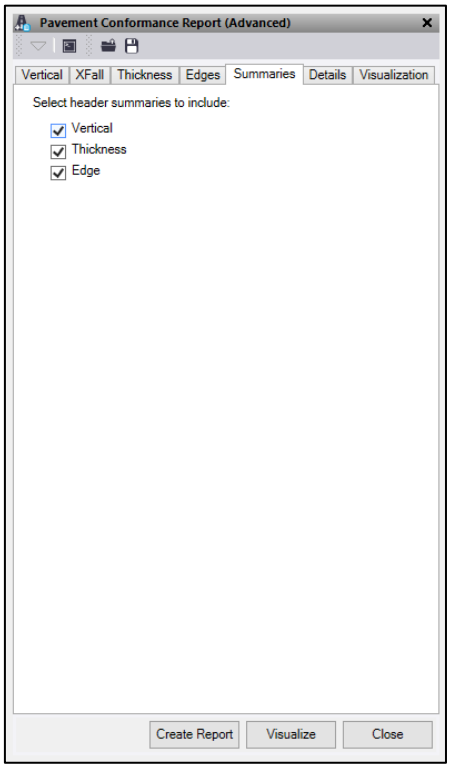
4. Type a number in metre units in the **left** and **right tolerance** boxes.

Check vertical on edge points

If this is checked then points that are reported horizontally will also be used for vertical checks. If not, then they will only be used horizontally.

8. Summaries Settings Tab

The Summaries tab provides additional reporting options and header summaries within the conformance report.



Vertical

Include information and summary on the vertical statistics of the nodes reported.

Vertical Summary		
Points Tested:	69	
Within Tolerance:	69	100.0%
Too High:	0	0.0%
Too Low:	0	0.0%
Average Conformance:	0.001	
Standard Deviation:	0.006	
Max Conformance:	0.011	
Min Conformance:	-0.012	

Thickness

Include information and summary on the thickness statistics of the nodes reported.

Thickness Summary		
Points Tested:	69	
Within Tolerance:	67	97.1%
Too Thick:	1	1.4%
Too Thin:	1	1.4%
Average Conformance:	0.351	
Standard Deviation:	0.006	

Edge

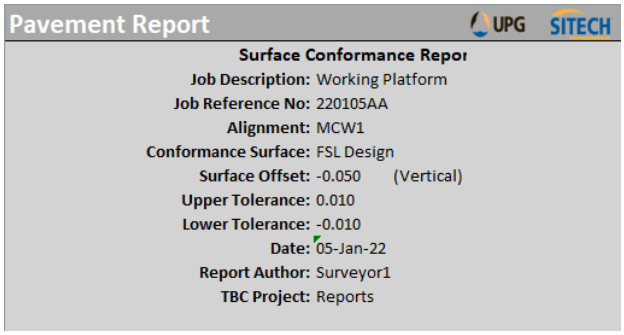
Include information and summary on the Horizontal statistics of the nodes reported.

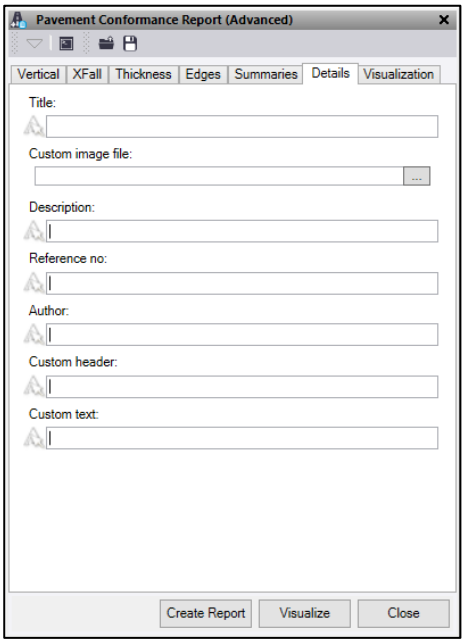
Horizontal Summary		
Points Tested:	28	
Within Tolerance:	23	82.1%
Too Wide:	0	0.0%
Too Narrow:	5	17.9%
Average Left:	-0.020	
Average Right:	-0.021	
(-ve values are on center line side)		

9. Details Settings Tab

The details settings tab provides fields to add report information. Information such as the report title, description, reference number (job number) and surveyor name are all defined by the user in this tab. There is also a custom header and custom text area for the user to define their own.

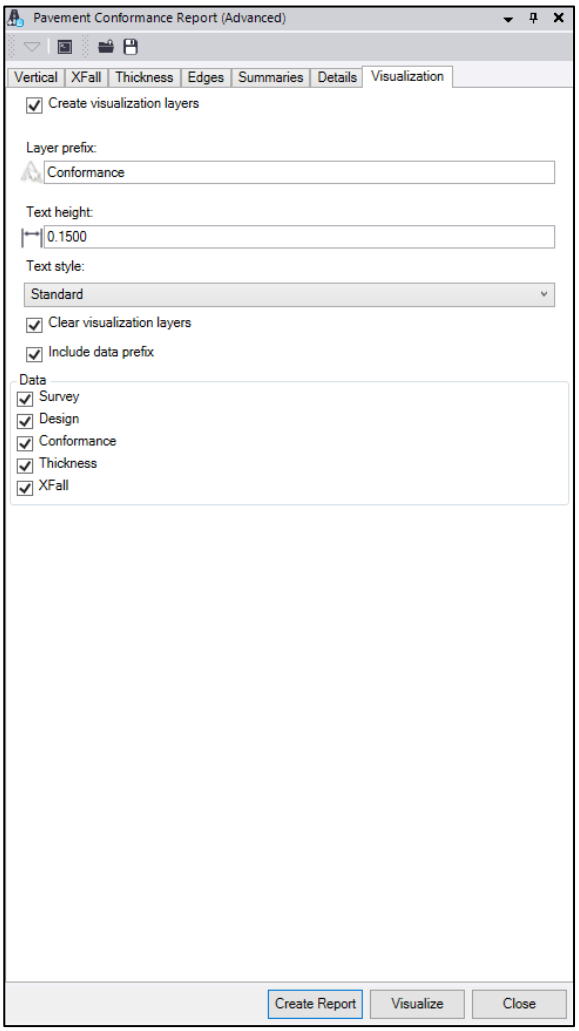
Select a “png” or “bmp” image file to be added as a custom image file to the top right corner of the report. E.g., company Logo or project image. This only appears if you have a ***Title*** filled out.





10. Visualization Settings Tab

The visualization tab provides options to create CAD text data displaying information about the conformance point and tolerances.



5. **Click** the **Create visualization layers** box to enable the creation of CAD text detailing the conformance point.

Layer prefix

The layer prefix field sets a text prefix to the layers created to store the visualization text data. The default prefix is 'Conformance'.

6. If the default value is not suitable, **replace** the text in the Layer prefix field.

Text height

The text height field is used to set the size of the CAD text created.

7. **Input** the desired **text height**.

Text Style

The text style drop down is used to choose an existing or create a new text style for the conformance text.

8. **Select** an **existing text style** or create a **new text style**.

Clear visualization layers

Clears all visualization point object layers each time the Visualize button is clicked. By default, this box is ticked.

Include data prefix

The include data prefix allows the data prefix such as conformance, design, As-built etc. to be toggled on or off. By default, this box is ticked.

Data

This allows the user to toggle on or off the text associated with the point including:

Survey – displays the As-built point level
Design – displays the design level of the point
Conformance – displays the conformance result
Thickness – displays the thickness result
XFall – displays the Xfall conformance result

9. **Click** the **Visualize** button to create customised text in the model view (plan and 3D) on specific layers. View the results.

9. Create report

Review tabs as required to verify all options are set as required.

10. **Click** the **Create Report** button to generate Excel report.

11. Example report

Below is an example report.

Pavement Project

Surface Conformance Report

Job Description:	QA WP	
Job Reference No:	Job	
Alignment:	MCW1	
Conformance Surface:	FSL Design	
Surface Offset:	-0.050	(Vertical)
Upper Tolerance:	0.010	
Lower Tolerance:	-0.010	
Bottom Surface:	SG Test 2	
Max Thickness Tol:	0.360	
Min Thickness Tol:	0.345	
XFall Tolerance:	0.5%	
XFall Direction:	RelativeToControl	
Date:	07-Apr-21	
Report Author:	Surveyor	
Project	TBC Pavements	

Vertical Summary

Points Tested:	68	
Within Tolerance:	64	94.1%
Too High:	1	1.5%
Too Low:	3	4.4%
Average Conformance:	0.001	
Standard Deviation:	0.006	
Max Conformance:	0.011	
Min Conformance:	-0.012	

Horizontal Summary

Points Tested:	28	
Within Tolerance:	28	100.0%
Too Wide:	0	0.0%
Too Narrow:	0	0.0%
Average Left:	-0.020	
Average Right:	-0.021	

(-ve values are on center line side)

Thickness Summary

Points Tested:	68	
Within Tolerance:	58	85.3%
Too Thick:	1	1.5%
Too Thin:	9	13.2%
Average Conformance:	0.351	
Standard Deviation:	0.006	
Max Conformance:	0.361	
Min Conformance:	0.338	

		Alignment		Levels			Pavement	Horizontal		XFall		
Point ID	Code	Chainage	Offset	As-Built	Design	Delta	Thickness	Side	Delta	As-Built	Design	Delta
-50FSL	BUI	344.835	-3.472	64.176	64.187	-0.011	0.340	Left	-0.028			
-50FSL	BUI	344.962	-2.034	64.210	64.222	-0.012	0.338			-2.35%	-2.48%	0.13%
-50FSL	BUI	345.067	0.008	64.287	64.278	0.009	0.359			-3.74%	-2.70%	-1.05%
-50FSL	BUI	345.177	1.967	64.341	64.330	0.011	0.361			2.78%	2.67%	0.11%
-50FSL	BUI	345.187	3.466	64.364	64.374	-0.010	0.340	Right	-0.034	1.56%	2.97%	-1.41%
-50FSL	BUI	353.053	-3.454	63.716	63.722	-0.006	0.345	Left	-0.046			
-50FSL	BUI	353.004	-1.988	63.774	63.769	0.005	0.356			-3.93%	-3.18%	-0.74%
-50FSL	BUI	352.947	-0.003	63.836	63.832	0.004	0.355			-3.12%	-3.16%	0.04%
-50FSL	BUI	352.996	2.202	63.899	63.895	0.004	0.355			2.86%	2.87%	-0.01%
-50FSL	BUI	353.014	3.461	63.940	63.932	0.008	0.359	Right	-0.039	3.24%	2.92%	0.32%
-50FSL	BUI	363.079	-3.488	63.184	63.184	-0.001	0.350	Left	-0.012			
-50FSL	BUI	363.001	-1.996	63.241	63.233	0.008	0.358			-3.84%	-3.26%	-0.57%
-50FSL	BUI	363.059	-0.033		63.289							
-50FSL	BUI	363.048	2.033	63.359	63.351	0.008	0.358					
-50FSL	BUI	362.941	3.484	63.394	63.400	-0.006	0.344	Right	-0.016	2.41%	3.37%	-0.96%
-50FSL	BUI	373.033	-3.486	62.685	62.684	0.001	0.351	Left	-0.014			
-50FSL	BUI	373.009	-2.020	62.732	62.729	0.002	0.353			-3.18%	-3.08%	-0.10%
-50FSL	BUI	373.018	0.001	62.794	62.790	0.004	0.355			-3.08%	-2.98%	-0.11%
-50FSL	BUI	373.030	2.000	62.852	62.849	0.003	0.354			2.91%	2.97%	-0.06%
-50FSL	BUI	373.042	3.479		62.893			Right	-0.021			