

Trimble Business Center

Pavement Conformance Workflow

Contents

Introduction and background information	3
1. Importing Data	3
Launch a new project	3
Import data	4
2. Open the command	4
3. Save and Load Templates	4
4. Reference File Data	5
5. Vertical Settings Tab	5
As-built points	5
Design	5
Measure Perpendicular	5
Design Offset	6
Alignment	6
Chainage Grouping.....	6
Restrict Chainage	6
Tolerances	6
Display Options.....	6
6. XFall Settings Tab	7
Maximum chainage delta	7
Minimum offset delta.....	7
Direction	7
7. Thickness Settings Tab	8
Upper/lower Tolerances	8
Show Non-Conformance Errors	8
8. Edges Settings Tab	9
Left and Right Alignment	9
Left and Right Extent.....	9
Left and Right Tolerance	9
Check vertical on edge points	9
9. Summaries Settings Tab	10
Vertical	10
Thickness.....	10
Edge	10
10. Details Settings Tab	11
11. Formatting Settings Tab	12
12. Visualization Settings Tab	13
Layer prefix	13
Text height.....	13
Text Style	13
Gap.....	13
Clear visualization layers	13
Include data prefix.....	13
Data.....	13
Colours.....	13
13. Create report.....	14
Example report.....	14

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.

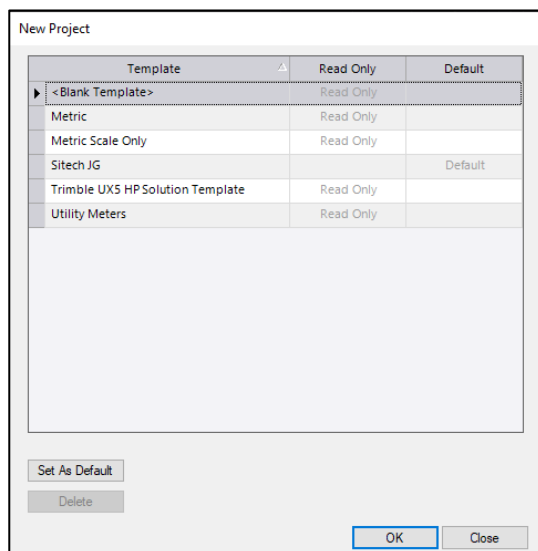
1. Importing Data

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.

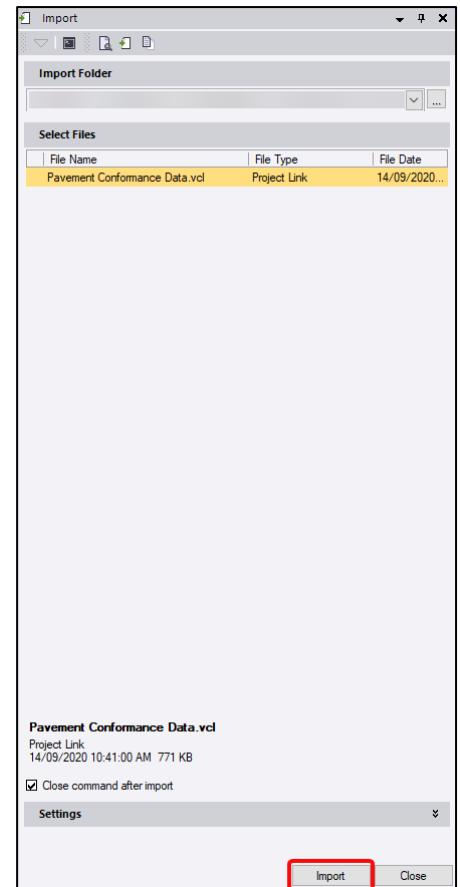


Select *Metric* template or your own default template and click **OK**. The **Plan View** will then display.

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**.




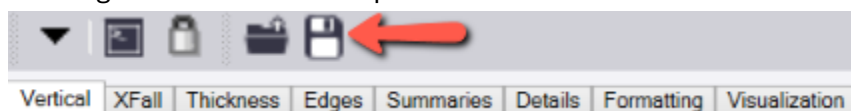
2. Open the command

Navigate to the **Pavement Conformance**  icon on the ribbon 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:

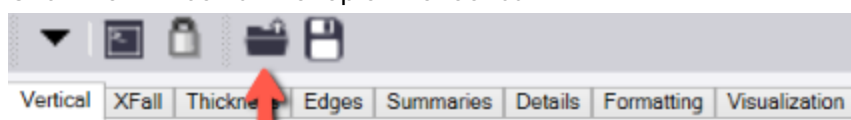
- Clicking the  icon at the top of the tool bar.



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

To load a saved template:

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



- 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. Reference File Data

When using the reports, the following picker is available on some selection boxes. When you see the “Ref...” button it means that you can select a line from a reference file. This allows you to keep the design and as-built files as separate TBC projects, reducing duplication.



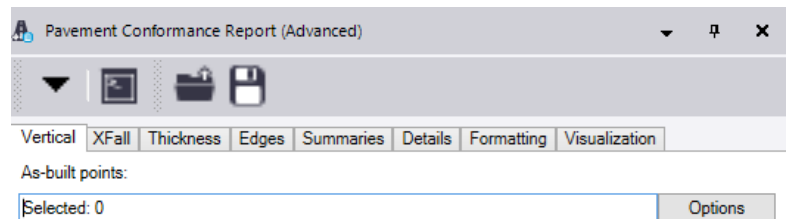
5. Vertical Settings Tab

The vertical 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).*

- **Click** in the **As-built points** field and in the plan view select all points required for conformance. The selection is programmed to only pick points.



Design

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

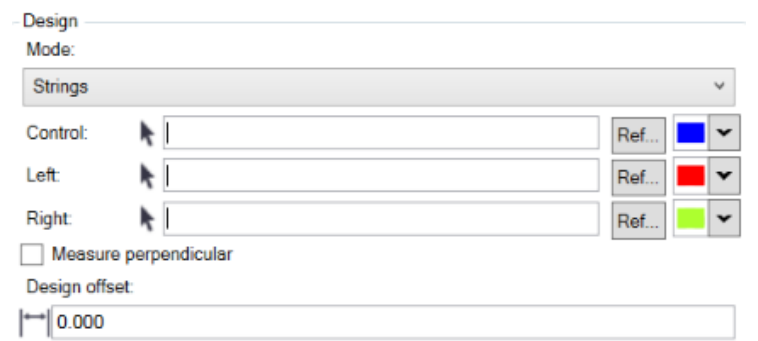
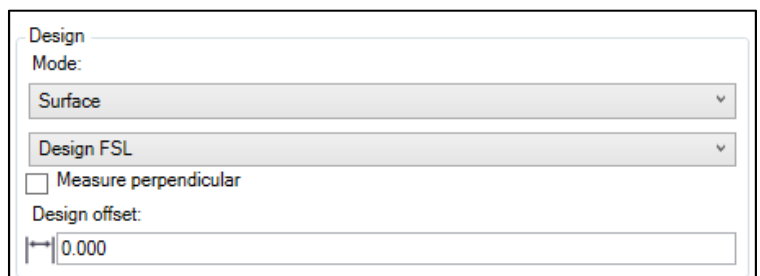
- Select Surface mode and in the dropdown select the design surface.

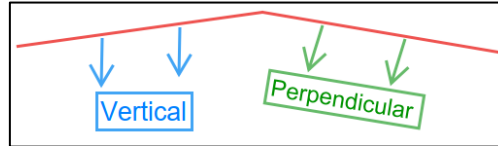
OR

- 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.





- 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.

- 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

Use an optional Alignment string to report the conformance points against. *Note: This is mandatory for Xfall or thickness reporting.*

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

Chainage Grouping

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

- 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 you to limit the start and end chainage.

- 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.

- **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 conformance point.

Show non-conformance errors

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

6. XFall Settings Tab

The XFall tab allows for crossfall reporting within the conformance report.

- **Click** the **Include XFall** box to add crossfall reporting to the conformance report output.
- **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.

- **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.

- **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

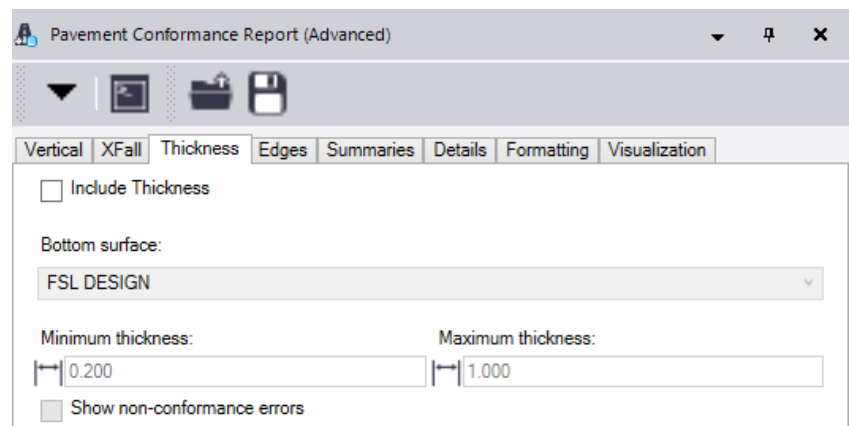
- **Choose** the **direction** you want the cross fall to be reported relative to the alignment string.

The screenshot shows the 'Pavement Conformance Report (Advanced)' window with the 'XFall' tab selected. The 'Include XFall' checkbox is unchecked. The 'XFall tolerance' field is set to 1.00. The 'Maximum chainage delta' field is set to 0.500. The 'Minimum offset delta' field is set to 2.000. The 'Direction' dropdown menu is set to 'RelativeToControl'.

7. Thickness Settings Tab

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

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



The screenshot shows the 'Pavement Conformance Report (Advanced)' window. The 'Thickness' tab is selected, and the following settings are visible:

- Include Thickness
- Bottom surface: FSL DESIGN (dropdown menu)
- Minimum thickness: 0.200 (input field)
- Maximum thickness: 1.000 (input field)
- Show non-conformance errors

Upper/lower Tolerances

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

- **Click** in the **Minimum tolerance** field, enter a suitable value.
- Repeat for **Maximum tolerance**.

Show Non-Conformance Errors

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

8. Edges Settings Tab

The Edges tab allows for edge string reporting options within the conformance report.

- 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.

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

The screenshot shows the 'Edges' tab in a software interface. It features a toolbar at the top with icons for navigation and a tabbed menu. The 'Edges' tab is selected, showing a 'Left alignment' section with a dropdown menu, a 'Ref...' button, and a red color selection button. Below this are input fields for 'Left extent' (0.500), 'Right extent' (0.500), 'Left tolerance' (0.100), and 'Right tolerance' (0.100). A similar section is visible for 'Right alignment' with a green color selection button. At the bottom, there is a checked checkbox for 'Check vertical on edge points'.

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.

- 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.

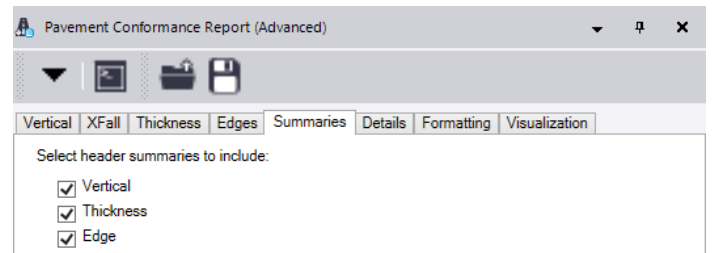
- Type a number in metre units in the **left** and **right tolerance** boxes.

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 for horizontal reporting.

9. 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 points 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 points 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

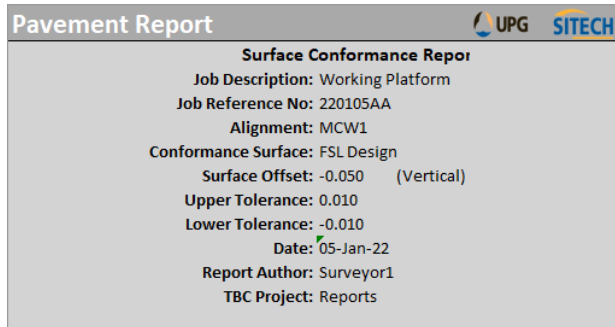
Include information and summary on the Horizontal statistics of the points reported.

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)	

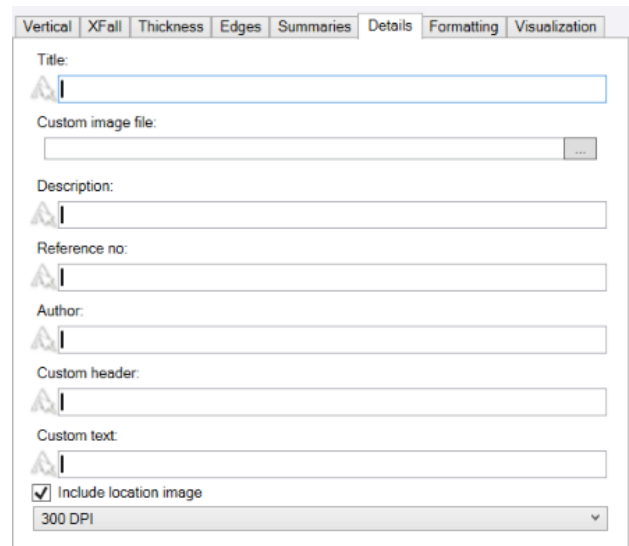
10. Details Settings Tab

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.



Check the **Include location image** box to add a snapshot of your current view to the report. The image clarity can be controlled by the DPI dropdown.



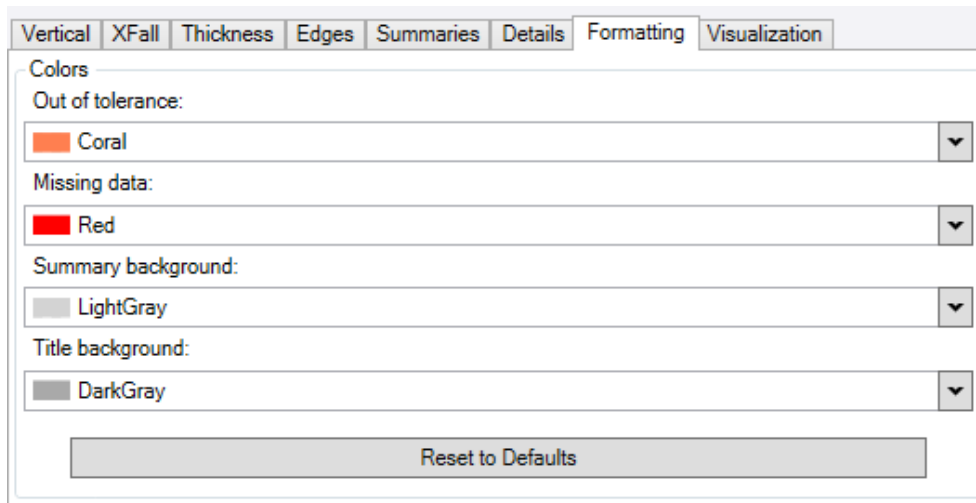
The screenshot shows the 'Details' tab in the software interface, which includes the following fields and options:

- Vertical | XFall | Thickness | Edges | Summaries | **Details** | Formatting | Visualization
- Title: [Text input field]
- Custom image file: [File selection button]
- Description: [Text input field]
- Reference no: [Text input field]
- Author: [Text input field]
- Custom header: [Text input field]
- Custom text: [Text input field]
- Include location image
- 300 DPI [Dropdown menu]

11. Formatting Settings Tab

The formatting tab is used to adjust the colour variations to the generated report.

Use **Reset to Defaults** to revert to the default colours, shown below.

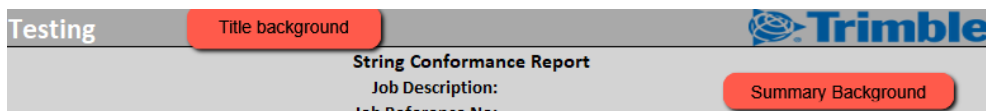


The screenshot shows a software interface with several tabs: Vertical, XFall, Thickness, Edges, Summaries, Details, Formatting, and Visualization. The 'Formatting' tab is selected. Under the 'Colors' section, there are four dropdown menus:

- Out of tolerance: Coral
- Missing data: Red
- Summary background: LightGray
- Title background: DarkGray

At the bottom of the settings panel is a button labeled 'Reset to Defaults'.

Note: Title background is only active when there is Title used in the details tab, shown in #9.



12. Visualization Settings Tab

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

- **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'. If the default value is is not suitable, **replace** the text as required.

Text height

The text height field is used to set the size of the CAD text created. **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. **Select** an **existing text style** or create a **new text style**.

Gap

The Gap setting is the distance in metres that the insertion point of the text will be right of the node it is created for.

Clear visualization layers

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

Include data prefix

The include data prefix allows the data prefix text 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 conformance text associated with the report. The prefixes can be adjusted by the user.

- 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

Colours

Adjust the colours used in the plan view for the text.

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

The screenshot shows the 'Visualization' settings tab with the following details:

- Text**
 - Create visualization layers
 - Layer prefix: Conformance
 - Text height: 0.150
 - Text style: Standard
- Gap**: 0.000
- Rotation**: 90°00'00"
- Draw leader line with gap
- Clear visualization layers
- Include data prefix

Data and prefixes

<input checked="" type="checkbox"/> Survey	As-Built
<input checked="" type="checkbox"/> Design	Design
<input checked="" type="checkbox"/> Conformance	Conformance
<input checked="" type="checkbox"/> Thickness	Thickness
<input checked="" type="checkbox"/> XFall	XFall

Colours

InTolerance	MediumGreen
AboveTolerance	Red
BelowTolerance	Cyan
Edge	Magenta
NotTested	LightGrey

Buttons: Create Report, Visualize, Close

13. Create report

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

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

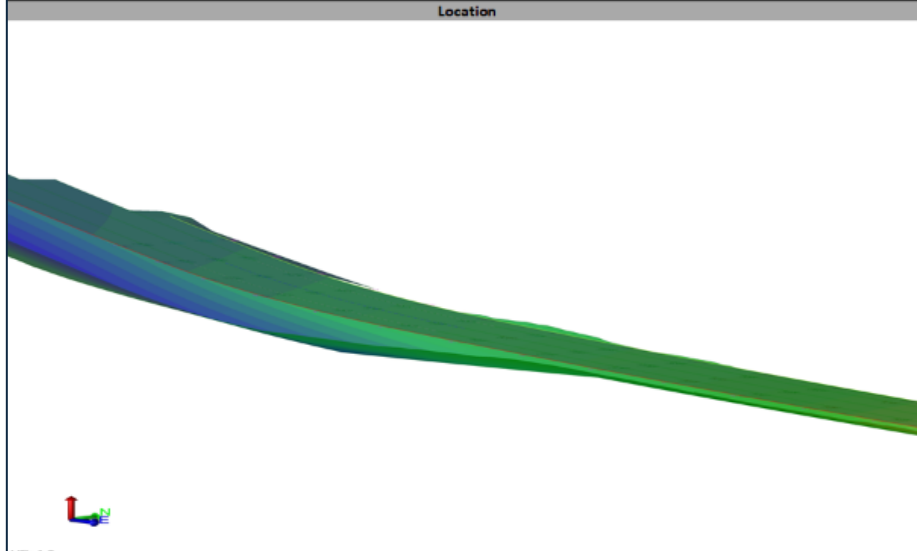
Note: As the report is generated the conformance results are added to each point as 12d attributes.

Example report

Below is an example report.

Surface Conformance Report	Vertical Summary
Job Description: QA CMB Job Reference No: 230220AA Alignment: M/CW1 Conformance Surface: FSL Design Design Offset: -0.050 (Vertical) Upper Tolerance: 0.007 Lower Tolerance: -0.007 Bottom Surface: SG Test 2 Max Thickness: 0.360 Min Thickness: 0.350 XFall Tolerance: 0.5% XFall Direction: RelativeToControl Date: 16-Apr-26 Report Author: Surveyor TBC Project: Pavements	Points Tested: 62 Within Tolerance: 50 80.6% Too High: 9 14.5% Too Low: 3 4.8% Average Conformance: 0.001 Standard Deviation: 0.005 Max Conformance: 0.009 Min Conformance: -0.010

Horizontal Summary	Thickness Summary
Points Tested: 25 Within Tolerance: 25 100.0% Too Wide: 0 0.0% Too Narrow: 0 0.0% Average Left: -0.019 Average Right: -0.018 (-ve values are on centre line side)	Points Tested: 62 Within Tolerance: 41 66.1% Too Thick: 0 0.0% Too Thin: 21 33.9% Average Conformance: 0.351 Standard Deviation: 0.005 Max Conformance: 0.359 Min Conformance: 0.340



VE: 1.0

Point ID	Code	Alignment		Levels			Pavement Thickness	Horizontal		XFall		
		Chainage	Offset	As-Built	Design	Delta		Side	Delta	As-Built	Design	Delta
-50FSL	-50FSL	353.053	-3.454	63.716	63.722	-0.005	0.345	Left	-0.046			
-50FSL	-50FSL	353.004	-1.988	63.774	63.768	0.006	0.356			-3.93%	-3.18%	-0.75%
-50FSL	-50FSL	352.947	-0.003	63.836	63.831	0.005	0.355			-3.12%	-3.16%	0.04%
-50FSL	-50FSL	363.079	-3.488	63.184	63.184	0.000	0.350	Left	-0.012			
-50FSL	-50FSL	363.001	-1.996	63.241	63.232	0.008	0.358			-3.84%	-3.27%	-0.57%
-50FSL	-50FSL	363.059	-0.033	63.288	63.288							
-50FSL	-50FSL	363.048	2.033	63.359	63.351	0.008	0.358					
-50FSL	-50FSL	362.941	3.484	63.394	63.400	-0.006	0.344	Right	-0.016	2.41%	3.37%	-0.96%
-50FSL	-50FSL	373.033	-3.486	62.685	62.684	0.001	0.351	Left	-0.014			
-50FSL	-50FSL	373.009	-2.020	62.732	62.729	0.003	0.353			-3.18%	-3.08%	-0.10%
-50FSL	-50FSL	373.018	0.001	62.794	62.789	0.005	0.355			-3.08%	-2.98%	-0.11%
-50FSL	-50FSL	373.030	2.000	62.852	62.848	0.004	0.354			2.91%	2.97%	-0.06%
-50FSL	-50FSL	373.042	3.479	62.889	62.892	-0.003	0.347	Right	-0.021	2.51%	2.96%	-0.45%