



String Conformance Workflow

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Introduction and background information

The '**String Conformance Report**' command provides reporting functionality commonly required to produce reports comparing as-built strings against design strings. The function is useful for producing conformance reports associated with items such as kerbs, drains, walls and barriers. The following workflow shows users how to perform conformance reporting using the string conformance report tool.

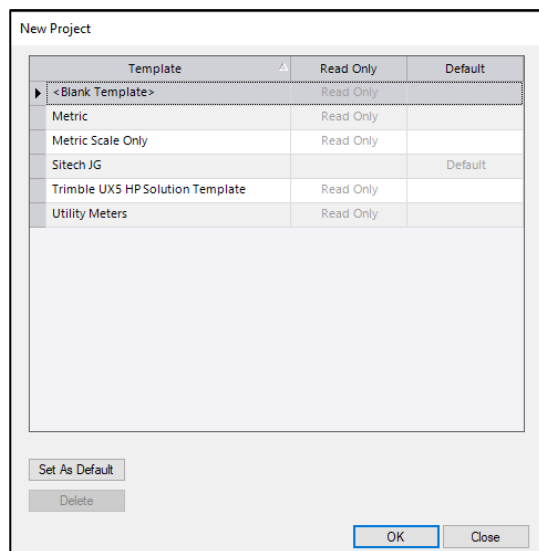
1.Importing Data

1.1 Launch a new project

In Trimble Business Centre, do either of the following:

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


The **New Project** window will display.

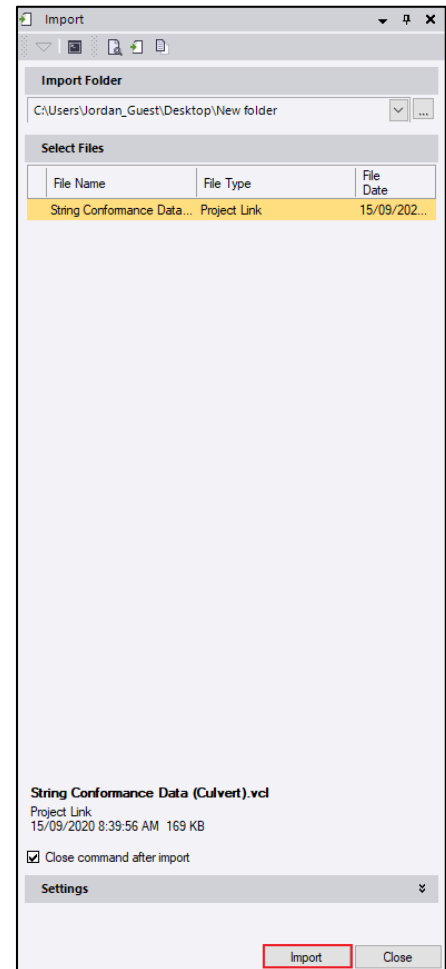


Select *Metric* template or your own default template and click **OK**. The **Plan View** will then display.

1.2 Import data

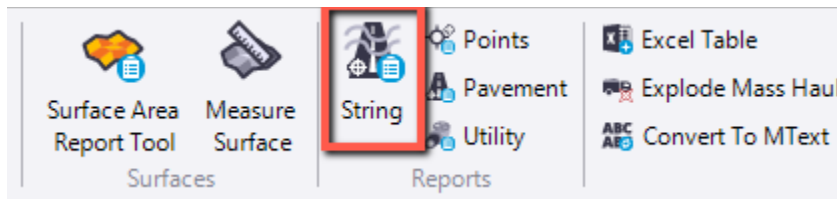
To import data:

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 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. Then **click Import**.



2. Open the command


The 'String Conformance Report' is located on the ANZ toolbox ribbon tab. Navigate to **ANZ Toolbox > Reports > String Conformance Report** or press F12 and type in the command name.

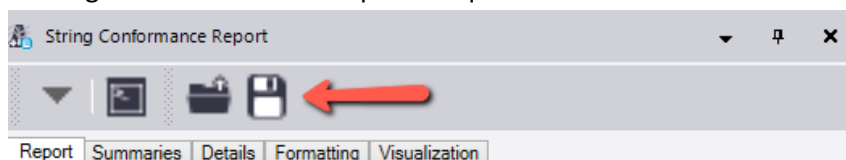


The String Conformance Report window should now display.

3. Save and Load Templates


The string 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:

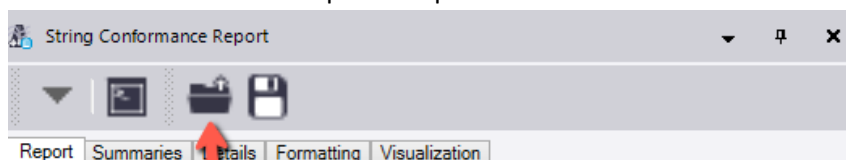
- Clicking the  icon in the top of the quick access tool bar.



- Navigate to the folder you wish to save the template in, give the file a name then click **Save**.

To import a saved template into the string conformance report tool do the following:

- Click the  icon at the top of the quick access toolbar.



- Navigate to the folder containing the saved template you wish to load, select the file then click **Open**.

The file should have loaded into the string conformance report window, filling in the information defined in the saved template.

4. Using the String Conformance Report tool

The tabs allow the user to customise the settings that determine how the report will be created. These tabs and settings will be explored in the following workflow and how they can be used when creating a conformance report.

4.1 Report Tab

The report tab is where the majority of the settings are located.

As-Built

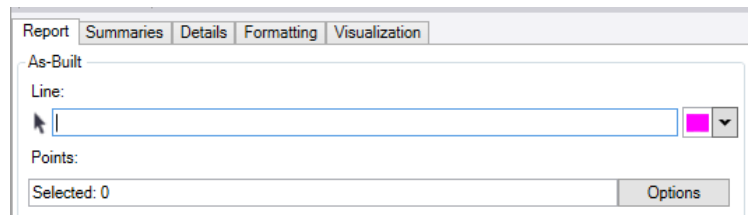
The as-built features can be picked up as either strings, pipe strings or points.

Note: the options button provides more tools to select points.

- Start by clicking in the **As-built** box. Select the associated as-built string in the plan view.
- **As-built points** can also be used at the same time or on their own.

Note: the highlight colour of linestrings can be changed using the drop down.

- Selected **pipe strings** will activate the **pipe level** drop down box, where the measured elevation of the pipe can be chosen.



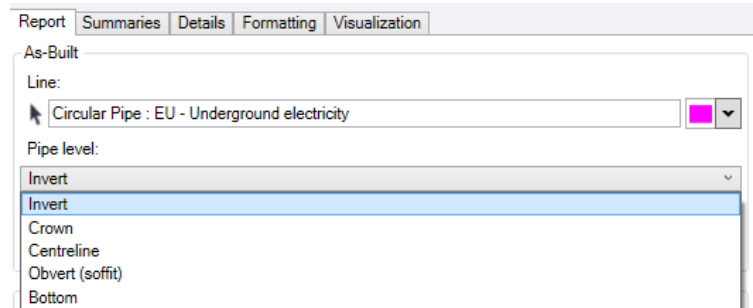
Report | Summaries | Details | Formatting | Visualization

As-Built

Line: [] []

Points:

Selected: 0 [Options]



Report | Summaries | Details | Formatting | Visualization

As-Built

Line: [Circular Pipe : EU - Underground electricity] []

Pipe level:

Invert

Crown

Centreline

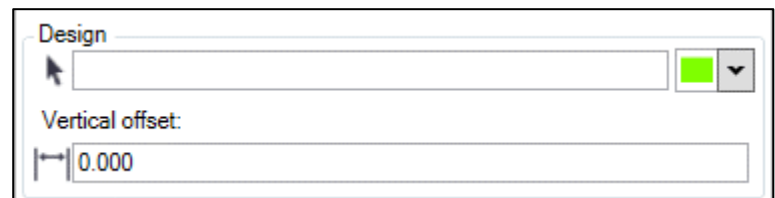
Obvert (soffit)

Bottom

Design

The **Design** string is what the as-built points or line is reported against. The horizontal and vertical differences between the design and as-built features are calculated and displayed in the report. A vertical offset can be used to apply an adjustment to the design string.

- Select the design box, select the design string in plan view. Enter required **Vertical offset** or leave it set to 0 if there is no offset.
- Selecting a pipe string will trigger the **pipe level** drop down box to confirm elevation level is either; *invert, crown, centreline, obvert or bottom*.



Design

[] []

Vertical offset:

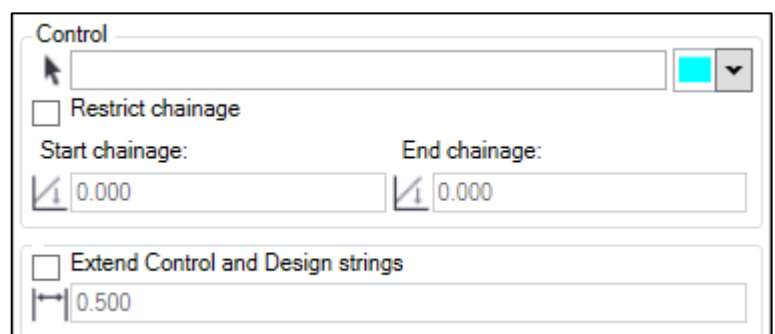
[0.000]

Control

The control alignment string is used as a reference in which chainage and offset of the as-built vertices are calculated from.

Note: Design and control strings can be the same.

- Select the **Control** box, and in the plan view select the alignment string required.
- If required, tick the **restrict chainage** box and enter a start and end chainage to the length of line calculated.
- Tick the **Extend Control and Design strings** function to extend the control and design strings on grade by the specified distance allowing As-Built points just beyond the design string to be reported.



Control

[] []

Restrict chainage

Start chainage: [0.000] End chainage: [0.000]

Extend Control and Design strings

[0.500]

Tolerances

Upper and lower tolerances refer to the vertical tolerance, left and right tolerances refer to the horizontal. These tolerances set the parameters for the vertices, if an as-built node is beyond the set tolerance from the design it is flagged in the report.

- Set the vertical and horizontal tolerances.

Note: Horizontal Tolerances are always set as a positive number.

Tolerances

Upper: Lower:

Left: Right:

Reporting intervals

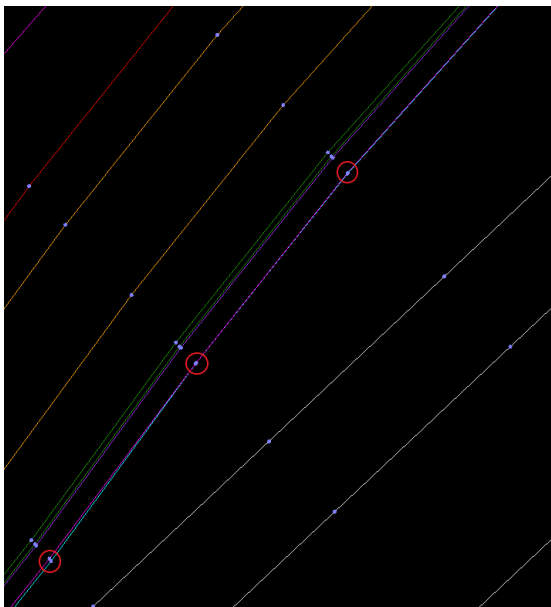
- Check the **Report at As-Built nodes** to perform calculations at the as-built nodes.
- **Report at regular Control interval** is used for QA types like walls that may not need to be reported at just the pickup locations.


Reporting intervals

Report at As-Built nodes

Report at regular Control interval

Control interval:



Note: The **Report at As-Built nodes** takes the points along the string that were picked up in the field and creates the conformance report referencing these nodes. To view the nodes of the line marking in the plan view like the image to the left, click the  (toggle line marking) button on the bottom quick access toolbar.

As-built length

Check the **Measure as-built length** to report as-built length offsets. Use the start and end offsets to adjust the design length location reported against.

Note: This length is measured along the “control” alignment

As-built length

Measure as-built length

Start offset: End offset:

Display Options

- Check the **include points ID** box if you wish to include the associated point ID's in the report (only works if as-build points are used).
- Check the **Include codes** box if you wish to include the feature code of the points in the report (only works if as-build points are used).
- The **Include easting/northing delta** option can be used for reporting deltas (differences) in Easting and Northings

Display options

As-Built point IDs As-Built point codes Easting/northing delta

4.2 Summaries Tab

The summaries tab allows users to select the header summary fields that you wish to include in the report.

Detail

Include information about the report such as Job Description and Job reference number.

Example of detail header in a report.

String Conformance Report	
Job Description: QA Kerb Lip	
Job Reference No: 200915AA1	
Control String: MCX1	
Design String: KLL	
Vertical Offset: 0.000	
Upper Tolerance: 0.010	
Lower Tolerance: -0.010	
Left Tolerance: 0.020	
Right Tolerance: 0.020	
As-Built String: KL	
Date: 14-Oct-20	
Report Author: Surveyor	

Vertical

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

Example of a vertical summary header in a report.

Vertical Summary		
Points Tested: 59		
Within Tolerance: 46		78.0%
Too High: 9		15.3%
Too Low: 4		6.8%
Average Conformance: 0.001		
Standard Deviation: 0.011		
Max Conformance: 0.037		
Min Conformance: -0.015		
Vertical deltas are As-Built minus Design (+ve if above design, -ve if below)		

Horizontal

Include information and summary on the horizontal tolerances and statistics of the nodes.

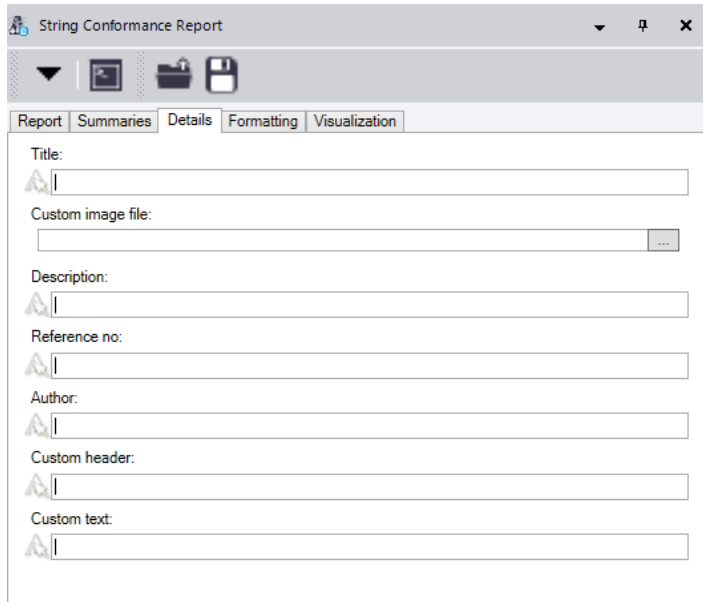
Example of a horizontal summary header in a report.

Horizontal Summary		
Points Tested: 59		
Within Tolerance: 36		61.0%
Too Left: 21		35.6%
Too Right: 2		3.4%
Average Left: -0.023		
Average Right: 0.011		
Horizontal deltas are -ve when left of design, +ve when right		

4.3 Details Tab

The details tab is used to create the detail header discussed above. Information such as the report title, description, reference number (job number) and surveyor name are all defined by the user in this tab. The image below shows an example of information that can be input in the details tab.

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.



String Conformance Report

Report | Summaries | Details | Formatting | Visualization

Title:
[Image icon] [Text input field]

Custom image file:
[Text input field] [Browse button]

Description:
[Image icon] [Text input field]

Reference no:
[Image icon] [Text input field]

Author:
[Image icon] [Text input field]

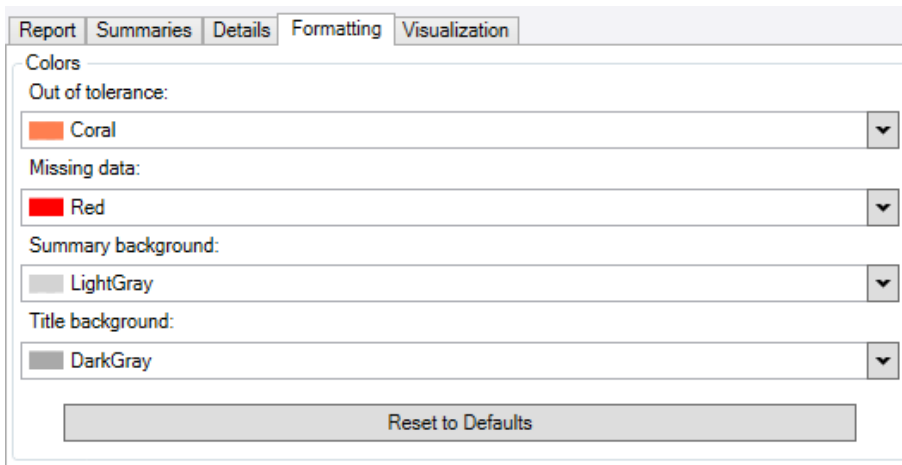
Custom header:
[Image icon] [Text input field]

Custom text:
[Image icon] [Text input field]

4.4 Formatting Tab

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

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



Report | Summaries | Details | **Formatting** | Visualization

Colors

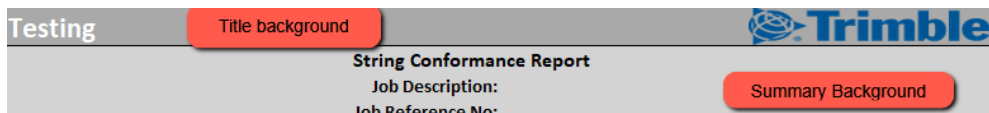
Out of tolerance:

Missing data:

Summary background:

Title background:

Note: Title background is active when there is a Title in the details tab, shown in 4.3.



4.5 Visualization Tab

The visualisation tab is used to set the parameters for the visualisation tool. Notice down the bottom of the String Conformance report window there is a visualise button. By setting the parameters in the visualize tab and then clicking the visualize button, text with information detailing the string conformance is created.

Create Visualisation Layers

This creates new layers in TBC with the visualisation points as part of those layers. Ensure the create visualisation layers tab is **checked** if you want the text to be created when you click create report.

Layer Prefix

This is user defined, it gives the created visualisation layers a unique prefix so they can be easily identifiable in the layer manager or view filter. Set the **layer prefix name** to your own name or leave default "StringConformance".

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 Visualisation Layers

This is used if the visualisation tool is used consecutively. By checking this box, whenever the visualize tool button is pressed the previous points are deleted from that layer and new points are added. Ensure the Clear Visualisation Layers box is **checked** unless you want to keep the previous data.

Include data prefix

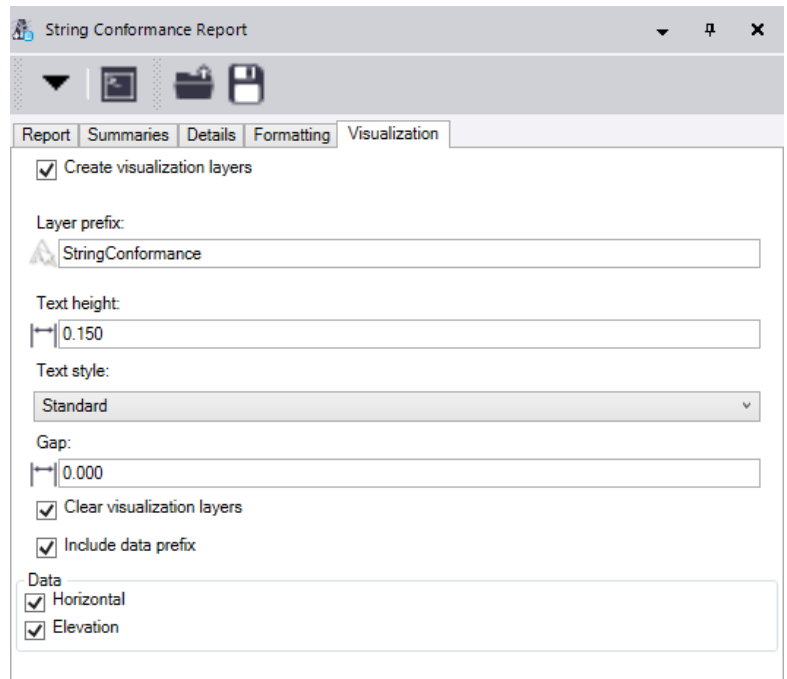
The include data prefix allows the data prefix such as conformance, design, As-built etc. to be toggled on or off. By default, this box is ticked.

Data

Check the boxes for the data you need to see on screen.

- **Horizontal** – Delta offset.
- **Elevation** – Delta Elevation.

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



4.5 Create Report

The final step in the workflow is to create the report, if you are satisfied with the defined settings click the **create report button**.

An excel spreadsheet will then open with all the report information.

Note: the bigger the project and more points the longer it will take to load the report.

Below is a sample created from the String Conformance Report. The header summaries are the same as those outlined in 4.2 and have been cropped out from the image.

As-Built String Vertices									
Relative to Control		As-Built Coordinates							
Chainage	Offset	Point ID	Easting	Northing	As-Built Level	Design Level	Horizontal Delta	Vertical Delta	
0.323	10.084		506470.835	6940871.169	33.364	33.374	-0.023	-0.010	
4.938	9.801		506474.444	6940874.060	33.247	33.209	-0.014	0.037	
10.052	9.476		506478.450	6940877.254	33.068	33.035	0.008	0.032	
14.892	9.187		506482.230	6940880.291	32.915	32.881	0.010	0.034	
20.285	8.949		506486.371	6940883.730	32.776	32.763	-0.050	0.013	
25.063	8.936		506489.894	6940886.926	32.664	32.644	0.038	0.020	
30.019	8.974		506493.506	6940890.287	32.523	32.519	0.027	0.004	
35.029	8.996		506497.159	6940893.683	32.406	32.400	0.004	0.006	
39.922	8.994		506500.735	6940896.991	32.322	32.321	0.006	0.001	
44.730	8.983		506504.247	6940900.243	32.252	32.243	0.017	0.009	

Note: the orange highlighted cells represent the nodes that are out of the set tolerance.

Below is an example of a report with the include **eastings/northing delta box checked**.

As-Built String Vertices											
Relative to Control		As-Built Coordinates									
Chainage	Offset	Point ID	Easting	Northing	E Delta	N Delta	As-Built Level	Design Level	Horizontal Delta	Vertical Delta	
0.323	10.084		506470.835	6940871.169	0.014	-0.018	33.364	33.374	-0.023	-0.010	
4.938	9.801		506474.444	6940874.060	0.009	-0.011	33.247	33.209	-0.014	0.037	
10.052	9.476		506478.450	6940877.254	-0.005	0.006	33.068	33.035	0.008	0.032	
14.892	9.187		506482.230	6940880.291	-0.007	0.008	32.915	32.881	0.010	0.034	
20.285	8.949		506486.371	6940883.730	0.034	-0.036	32.776	32.763	-0.050	0.013	
25.063	8.936		506489.894	6940886.926	-0.026	0.028	32.664	32.644	0.038	0.020	
30.019	8.974		506493.506	6940890.287	-0.018	0.020	32.523	32.519	0.027	0.004	
35.029	8.996		506497.159	6940893.683	-0.003	0.003	32.406	32.400	0.004	0.006	
39.922	8.994		506500.735	6940896.991	-0.004	0.005	32.322	32.321	0.006	0.001	
44.730	8.983		506504.247	6940900.243	-0.012	0.013	32.252	32.243	0.017	0.009	

Below is an example of a report created with the **regular control interval set to 10m**.

At Intervals										
Relative to Control		As-Built Coordinates								
Chainage	Offset	Point ID	Easting	Northing	As-Built Level	Design Level	Horizontal Delta	Vertical Delta		
10.000	9.479		506478.410	6940877.222	33.069	33.037	0.008	0.032		
20.000	8.962		506486.153	6940883.548	32.784	32.769	-0.067	0.014		
30.000	8.973		506493.492	6940890.274	32.523	32.519	0.027	0.004		
40.000	8.994		506500.792	6940897.043	32.320	32.320	0.006	0.001		
50.000	9.002		506508.065	6940903.840	32.163	32.164	-0.002	-0.001		
60.000	8.993		506515.352	6940910.673	32.017	32.016	0.007	0.001		
70.000	9.004		506522.632	6940917.529	31.870	31.874	-0.004	-0.004		
80.000	9.009		506529.915	6940924.381	31.727	31.737	-0.009	-0.010		