

Importing Digital Level Data

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About this tutorial

In this tutorial, you will perform the following workflows:

- "Workflow 1: Import Trimble DiNi level data" - In this workflow, you will import two data files captured with a Trimble DiNi level into a project that already contains GNSS data. During the import, you will use the **Level Editor** to merge level runs, rename points, deselect points, and perform adjustments on the level run.
- "Workflow 2: Import level data using a custom importer" - In this workflow, you will create a custom importer that will allow you to import level data contained in an ASCII data file. Using the **Import Format Editor**, you will create an import definition that matches the record layout of the import file, test the definition, and use it to import the level data into a project.
- "Workflow 3. Import variable row-type level data using a custom importer" - In this workflow, you will use the **Import Format Editor** to copy and modify an existing variable row-type import definition by adding a new row type to import level run IDs along with observation and delta elevation data. A variable row-type import definition allows different types of data records to be included in the same level import file. For example, based on the row-type definition, some rows might be formatted to contain elevation data while other rows are formatted to contain observation data. Each row type is identified by a unique row-type code.

Note: If you need additional help at any time you are using the software, press **F1** to display the online help.

Workflow 1: Import Trimble DiNi level data

In this workflow, you will import two data files captured with a Trimble DiNi level into a project that already contains GNSS data. During the import, you will use the **Level Editor** to merge level runs, rename points, deselect points, and perform adjustments on the level run.

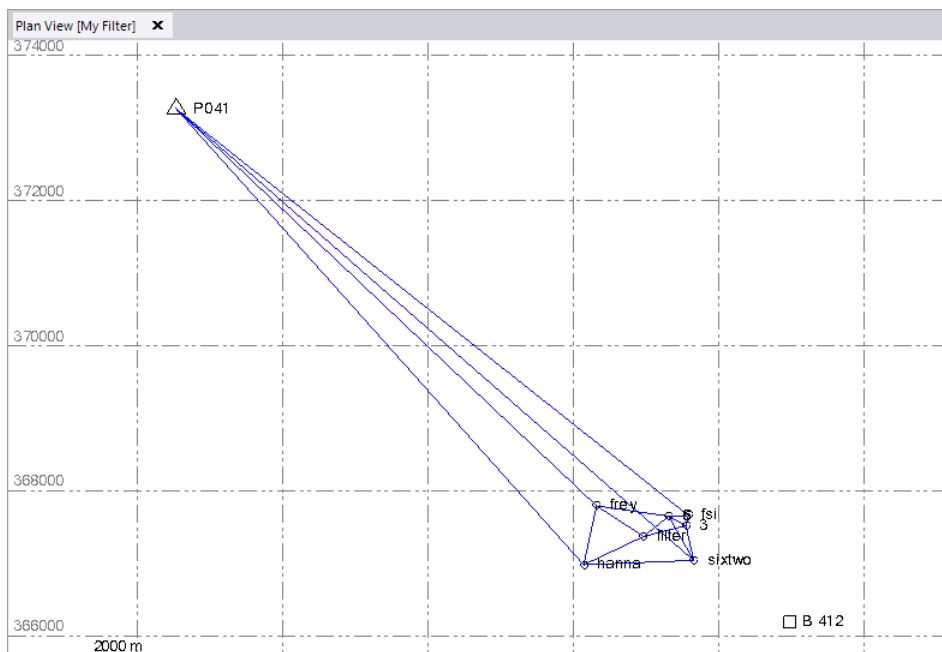
Step 1. Open the project

For this tutorial, you will use the project file *Importing Digital Level Data.vce*. GNSS data has already been imported into the project, and GNSS baselines have been processed.

Note: The downloaded *ImportingDigitalLevelData* folder contains this PDF file, a *Data* folder, and the *Importing Digital Level Data.vce* project file. You will import data from the *Data* folder later in this tutorial.

1. In SO, select **File > Open**.
2. In the **Open File** dialog, browse to `..\ImportingDigitalLevelData\Importing Digital Level Data.vce` and click **Open**.

The project opens in the **Survey Office** window.



The project file is read-only. You can perform the tutorial steps without saving the project file. However, if you are interrupted while performing the tutorial, you can save it with a new name by selecting **File > Save Project As**. Then, you can re-open the project to continue the tutorial at a later time.

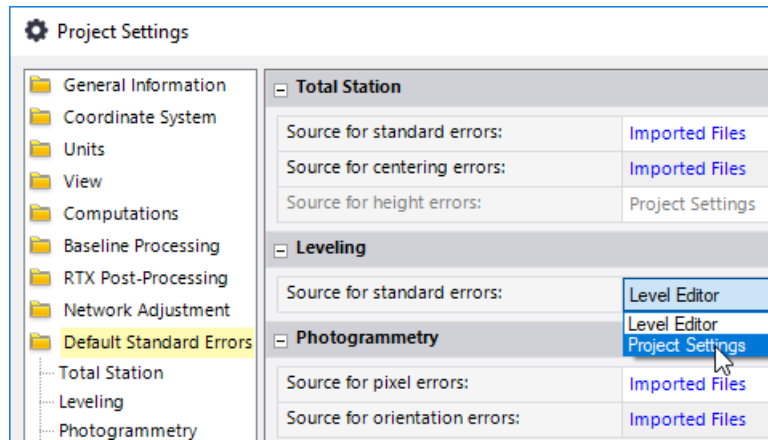
Before you import digital level data into your project, you will select a default standard error to use for the data.

Note: You can change the default standard error for a project at any time. However, to apply the changes, you must open and close the **Level Editor** dialog as described later in this tutorial.

Step 2. Select a default standard error

In this step, you will select to use default standard errors in your project, and verify the default value to be used to calculate the standard error applied to observations in the **Level Editor**.

1. In the **Quick Access Toolbar** (located at the top of the **Survey Office** window), select **Project Settings**.
2. In the navigation (left) pane in the **Project Settings** dialog, select **Default Standard Errors**.
3. In the **Leveling** section, select **Project Settings** in the **Source for standard errors** drop-down list.

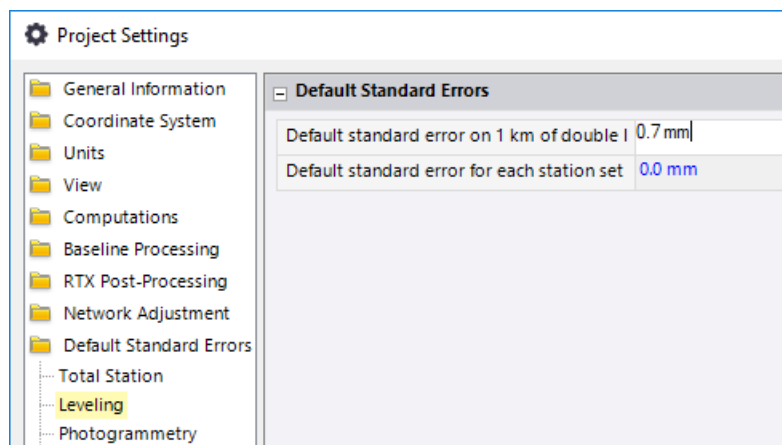


This ensures that the standard error value you specify in **Project Settings** (as described in the next two steps) is used to calculate the standard error applied to observations in the **Level Editor**.

Note: As an alternative, you could select to use a standard error value specified in the data file and displayed in an editable field in the **Level Editor** dialog during import. This would be helpful if, for example, you were importing level data from multiple DiNi instruments with differing accuracies and you wanted to edit the standard error for each during import. But, for this tutorial, you will use the **Project Settings** value.

4. In the navigation pane in the **Project Settings** dialog, select **Default Standard Errors > Leveling**.
5. In the **Default standard error on 1 km of double leveling** field, enter *0.7 mm*.

Ensure that the **Default standard error for each station setup** field contains the value *0.0 mm*. If values are specified in both fields, the standard errors for leveling will use the combination of these two values to calculate the standard errors for the observations.



6. Click **OK**.


You are done changing project settings and are now ready to import digital level data into your project.

Step 3. Import the first digital level data file

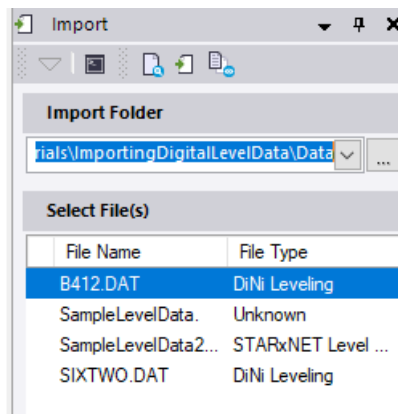
For this tutorial, you will import two digital level data files. For the first data file, which contains multiple level runs, you will merge runs, rename and deselect points, and adjust the runs before importing. For the second data set, which contains a single level run, you will import the data without adjusting it.

1. Select **Home > Data Exchange > Import**.

The **Import** pane opens in the right side of the **Survey Office** window.

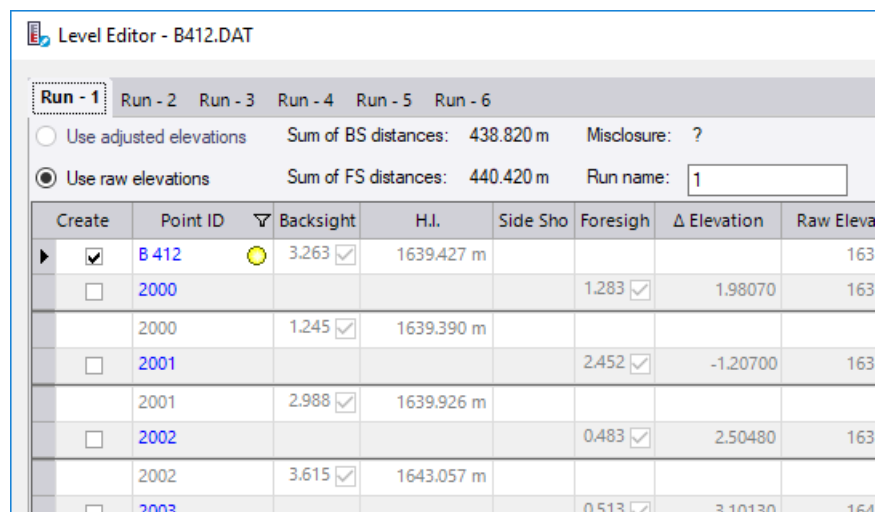
2. In the **Import** pane, click the **Browse** button .
3. In the **Browse For Folder** dialog, browse to `..\ImportingDigitalLevelData\Data` and click **OK**.

The contents of the `ImportingDigitalLevelData` folder displays in the **Select File(s)** list in the **Import** pane.



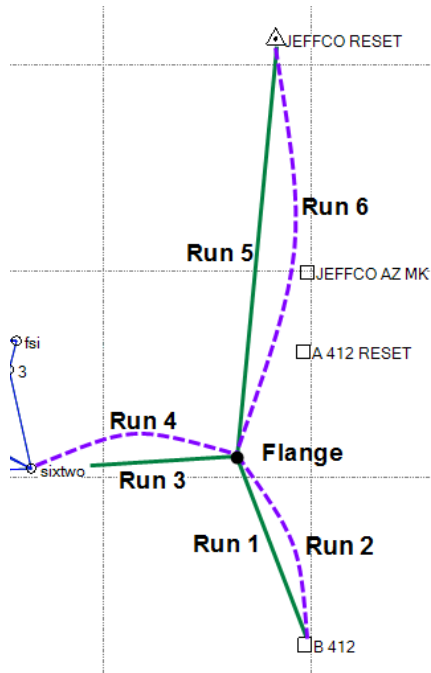
4. In the **Select File(s)** list, select `B412.DAT` and click the **Import** button.

The **Level Editor** dialog displays.



This dialog allows you to review the level data you are importing and make changes as necessary. The sum of the *BS* and *FS* distances are displayed so you can verify observation distance balancing is met.

The imported level data file includes data for six separate level runs that make up three double runs. In the sketch below you can see how the runs are connected.



Your first step is to merge level runs so the **Level Editor** can calculate misclosures.

Step 4. Merge level runs

In the *B412.dat* file, point *B412* is the only point that has a control elevation entered (see the figure below).

For the **Level Editor** to calculate misclosures, a run must begin and end on the same point, or begin and end on two control point elevations. These level runs either begin or end on a benchmark, or they begin or end on unknown points. In all of these cases, no misclosures are calculated for the runs.

Level Editor - B412.DAT

Run - 1 | Run - 2 | Run - 3 | Run - 4 | Run - 5 | Run - 6

Use adjusted elevations Sum of BS distances: 438.820 m Misclosure: ? Standard error per km: 0.7 mm

Use raw elevations Sum of FS distances: 440.420 m Run name: 1 Standard error per turn: 0.0 mm

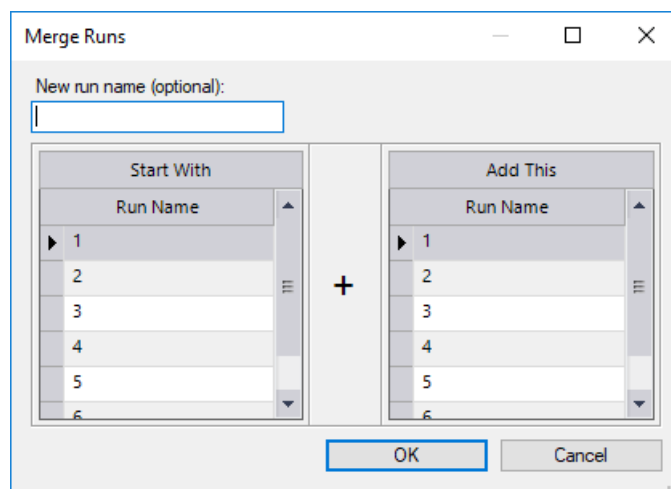
Create	Point ID	Backsight	H.I.	Side Sho	Foresigh	Δ Elevation	Raw Elevation	Misclosure	Adjusted Elevation	Ratio	Elevation
<input checked="" type="checkbox"/>	B 412	3.263 <input checked="" type="checkbox"/>	1639.427 m		1.283 <input checked="" type="checkbox"/>	1.98070	1636.164	0.00000	1636.164		Be
<input type="checkbox"/>	2000						1638.145				Ct
	2000	1.245 <input checked="" type="checkbox"/>	1639.390 m								

Note: It would be acceptable to import level data into the project without merging level runs or without misclosures. All the data would be combined to reflect the survey as it was ran. You could also perform a least-squares adjustment in the **Level Editor** without merging the runs. However, combining level runs provides a good quality check of the data and helps discover errors and blunders.

For this tutorial, you will use the **Level Editor** to merge level runs. Note that for two level runs to be merged, the ending point of the first run must be the first point in the second run.

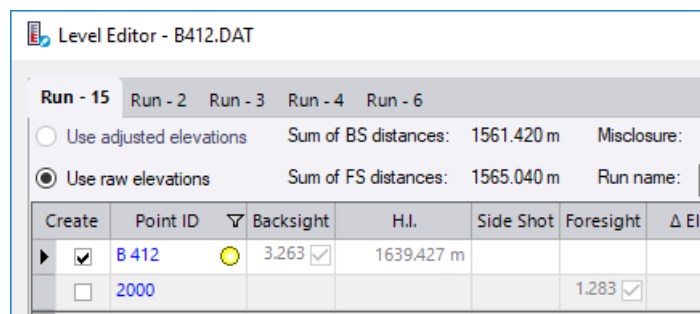
1. In the **Level Editor** dialog, click the **Merge Runs** button located in the lower-right corner of the dialog.

The **Merge Runs** dialog displays.



2. To merge runs, do the following:
 - a. In the **New run name** field, enter 15.
 - b. In the **Start With Run Name** list, select 1, which ends with point *flange*.
 - c. In the **Add This Run Name** list, select 5, which starts with point *flange*.
 - d. Click **OK**.

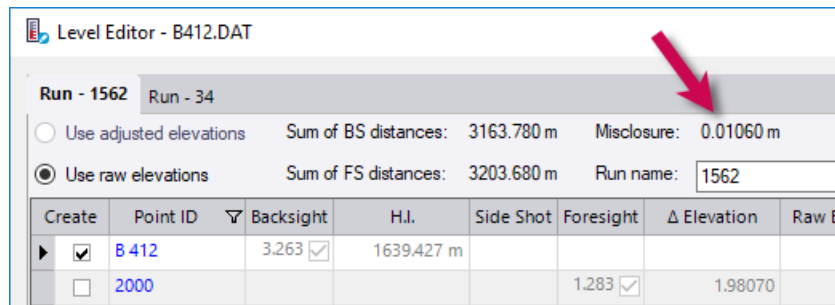
The **Run** tabs in the **Level Editor** dialog show how runs 1 and 5 have been merged into a new run 15.



Note: In the **Level Editor** dialog, you can click the **Reset** button located in the lower-right area of the dialog to undo any changes made to the file during the editing session. However, once you make changes and click **OK**, those changes are saved, including merged runs. If you re-open the **Level Editor** dialog for this file after import, clicking the **Reset** button will not undo the changes made in the previous editing session. If mistakes were made during the previous editing session, you can delete the file from the **Project Explorer > Imported files** area, then re-import the file.

3. Repeat the merge procedure to merge runs as follows:
 - a. Merge runs 6 and 2 into a new run 62.
 - b. Merge runs 15 and 62 into a new run 1562.
 - c. Merge runs 3 and 4 into a new run 34.

A misclosure is displayed for each merged run, allowing you to determine if the runs have met their requirements.



Step 5. Rename and deselect points

In *Run 1562* you can see points with a yellow dot next to the point ID. This indicates that the point is used in other runs within this file.

<input type="checkbox"/>	2005	4.610 <input checked="" type="checkbox"/>	1653.00
<input checked="" type="checkbox"/>	flange		
<input type="checkbox"/>	flange	3.479 <input checked="" type="checkbox"/>	1653.45

The **Level Editor** searches the file to find points that were named automatically by the Trimble DiNi level and the points that were uniquely named by the surveyor. This is why some points are checked to be created in Survey Office and some are not.

Create	Point ID	Backsight	H.I.
<input checked="" type="checkbox"/>	B 412	3.263 <input checked="" type="checkbox"/>	1639.427
<input type="checkbox"/>	2000		
<input type="checkbox"/>	2000	1.245 <input checked="" type="checkbox"/>	1639.390

If one of these DiNi-named points or a point that is similar to the DiNi naming convention is actually meant to be created, you can select the box next to the **Point ID** to create the point in the project.

In this file, some of the point IDs need to be renamed due to the number of characters in the point ID allowed by the DiNi. In these cases, the points need to be renamed to match points already in the project.

1. Select the *Run 1562* tab and change the point IDs for each of the following points by clicking in the **Point ID** field and typing the new name:

- Change *jeffcoaz* to *jeffco az mk* and click on a different row.

Since this point has other observations in this run, a message displays asking whether or not to rename all of the observations. Select **Yes**.

- Change *jeffco r* to *jeffco reset*.

Since this point is observed again only as the backsight for the next setup, no message displays asking whether or not to rename all of the observations.

- Change *A412 res* to *A 412 reset*.

In *Run 34* there are several points selected to be created in the project that do not need to be created. You can de-select them, as explained in the next step.

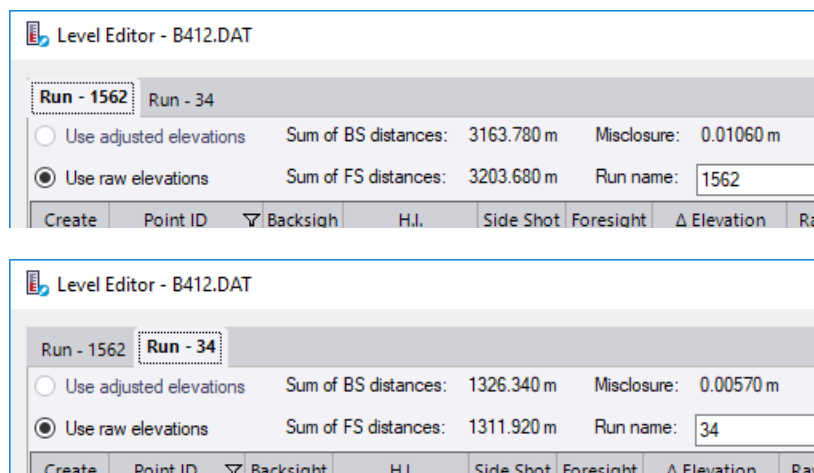
2. Select the *Run 34* tab and uncheck the following check boxes in the **Create** column:

- *HYD1*
- *thing*
- *HYD2*
- *HYD3*

You are now ready to adjust level runs and import the data.

Step 6. Adjust level runs and import the data

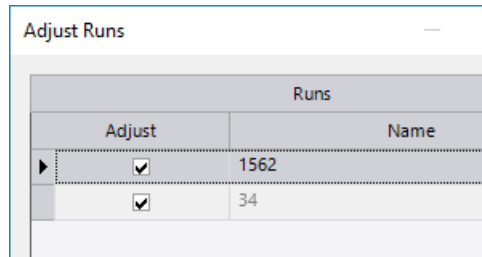
Note that misclosures for *Run 1562* and *Run 34* have been calculated.



You could import this data using the raw elevations, and then use the **Adjust Network** command in **Survey Office** to adjust the errors in the data. But, for this tutorial you will be using the DiNi established points as vertical control points for a network adjustment, so you need to adjust the runs in the **Level Editor**.

1. Click the **Adjust Runs** button located in the lower-right area of the dialog.

The **Adjust Runs** dialog displays. By default, both runs are selected to be adjusted.



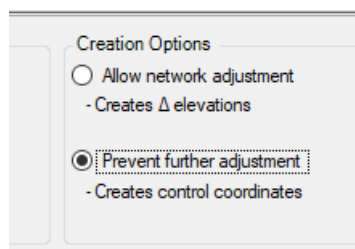
2. Click **OK**.

A least-squares adjustment is performed on the data. The correction and adjusted elevation displays for each point in the **Level Editor** dialog.

Create	Point ID	Backsight	H.I.	Side Shot	Foresight	Δ Elevation	Raw Elevation	Correction	Adjusted Elevation	Elevat
	2016				3.199	-1.60850	1678.365	-0.00912	1678.356	Co
	2016	0.355	1678.720 m							
	2017				3.157	-2.80210	1675.563	-0.00913	1675.554	Co
	2017	0.456	1676.019 m							
<input checked="" type="checkbox"/>	A412 reset				1.132	-0.67610	1674.887	-0.00914	1674.878	Co
<input checked="" type="checkbox"/>	A412 reset	1.047	1675.933 m							
	2018				3.503	-2.45660	1672.430	-0.00915	1672.421	Co
	2018	0.396	1672.826 m							
	2019				3.666	-3.26990	1669.160	-0.00915	1669.151	Co

You can now use these adjusted elevations when you perform a network adjustment to adjust the other data in the project.

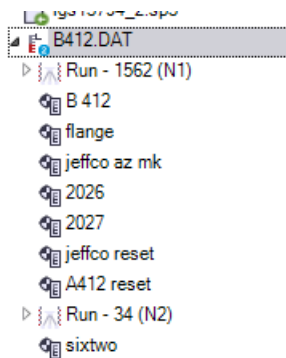
3. In the **Creation Options** box in the lower area of the **Level Editor** dialog, select the **Prevent further adjustment** option.



This will cause each point to be created with a Control quality elevation. Only the Control quality elevation will be imported; the observation will not. For the network adjustment, these points will be in the **Fixed Coordinates** list, eligible to be used as fixed points.

If you had selected the **Allow network adjustment** option, each point would be created with Survey quality and the accumulated delta elevation observations between the points would be created.

4. Click **OK** to import the adjusted level data into your-project.
5. To view the newly imported digital level data in the **Project Explorer**.
 - a. Select **Home > Data > Project Explorer**.
 - b. In the **Project Explorer**, expand the **Imported Files** node.
 - c. Scroll down to *B412.DAT*, right-click the file name, and select **Expand** in the context menu.



You are now ready to import the second digital level data file required for this project.

Step 7. Import the second digital level data file

For this step, you will import a level data file with only one level run. It is a loop starting on point *sixtwo*. The surveyor assumed an elevation of 100.000 when he started the run. Point *sixtwo* was one of the control points established by the *B412.DAT* level data. Because the points in those runs were stored as control points, you can use those elevations to establish elevations in this run. The point must have an elevation with Control quality to be selectable here.

In "Step 3. Import the first digital level data file," you imported data using the **Import** command. For this step, you are going to use a different method for importing data: drag-and-drop.

1. Using your Windows Explorer, browse to `..\ImportingDigitalLevelData\Data`.
2. In the *Data* folder, click and drag the *SIXTWO.DAT* file onto the **Plan View** in the **Survey Office** window.

The **Level Editor** dialog displays.

Level Editor - SIXTWO.DAT

Run - 1

Use adjusted elevations Sum of BS distances: 2002.590 m Misclosure: 0.00550 m Sta

Use raw elevations Sum of FS distances: 2026.910 m Run name: 1 Sta

Create	Point ID	Backsight	H.I.	Side Shot	Foresight	Δ Elevation	Raw Elevation
<input checked="" type="checkbox"/>	sixtwo	2.979 <input checked="" type="checkbox"/>	102.979 m				100.000
<input type="checkbox"/>	2000				1.034 <input type="checkbox"/>	2.01730	102.017
	2000				0.962 <input checked="" type="checkbox"/>	2.01730	
	2000	2.868 <input checked="" type="checkbox"/>	104.885 m				
<input type="checkbox"/>	2001				0.424 <input checked="" type="checkbox"/>	2.44330	104.461

- In the **Elevation Type** field for point *sixtwo*, select **Coordinate** in the drop-down list and then click on a different row.

Adjusted Elevatio	Elevation Typ	Distance	C
100.000	Benchmar	37.570	tb
	Benchmark	31.640	#
	Computed	38.790	1
	Coordinate	49.000	1

The **Level Editor** reads the elevation of point *sixtwo* from the project and enters it in the **Adjusted Elevation** field.

Adjusted Elevatio	Elevation Typ	Distance	C
1655.340	Coordinate	37.570	tb
	Computed	31.640	#
		38.790	1
		49.000	1

This loop runs through several points in your project: *sixtwo*, *hanna*, and *filter*. However, there are several other points in the run that do not need to be created.

- In the **Create** column, uncheck all check boxes except for *sixtwo*, *hanna*, and *filter*.

The quickest way to do this is to right-click the **Create** header column and select **Exclude All**. Then select the check boxes for *sixtwo*, *hanna*, and *filter*.

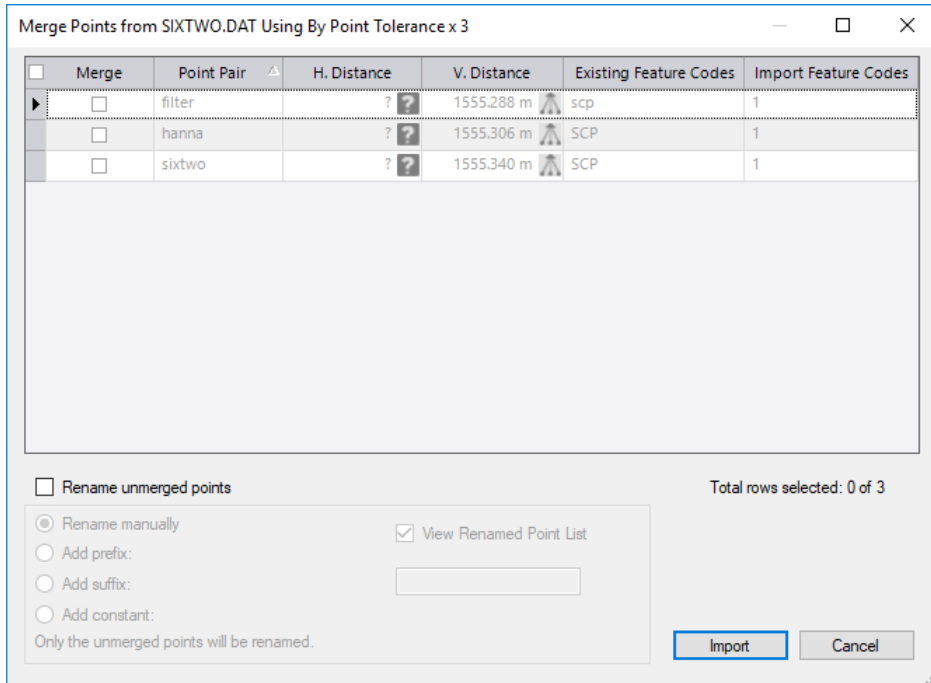
Since this is a loop level run, the **Level Editor** has calculated a misclosure of *0.00550m*.

Misclosure: 0.00550 m
Run name: 1

You could adjust this run to correct for this error as you did with the *B412.DAT* file. But instead, you will import the data without an adjustment. The data will be adjusted later as part of a network adjustment.

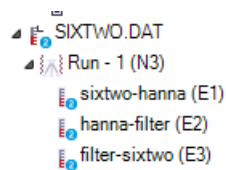
- Click **OK** to import the second data file into your project.

Because *filter*, *hanna*, and *sixtwo* represent duplicate points in the project (points with the same names were imported in the first import), the **Merge Points** dialog displays allowing you to select whether to merge the duplicate points or, optionally, rename them on import.



- In the **Merge Points** dialog, ensure the check box is checked for each of the points. Then, click **Import**.

The newly imported digital level data displays in the **Project Explorer**.



You are done importing digital level data into your project.

- Select **File > Close**.

The **Save Changes** dialog displays. If you saved the project to a new location or with a new name, you can click **Yes**. Otherwise, click **No**.

This completes the first tutorial workflow.

Workflow 2: Import level data using a custom importer

In this workflow, you will create a custom importer that will allow you to import level data contained in an ASCII data file. Using the **Import Format Editor**, you will create an import definition that matches the record layout of the import file, test the definition, and use it to import the level data into a project.

Step 1. Open a new project

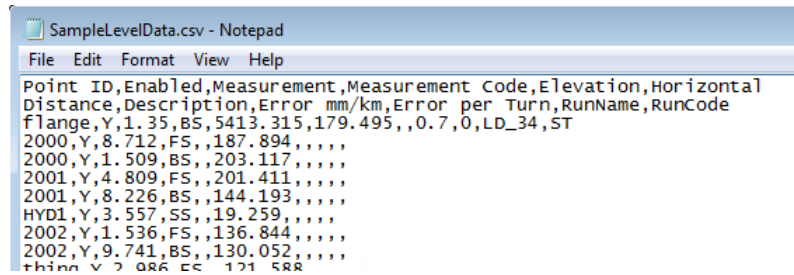
To simplify this workflow, you will import the level data into a new project without regard for additional survey data.

In the **Quick Access Toolbar** (located at the top of the **Survey Office** window), select **New Default Project**.

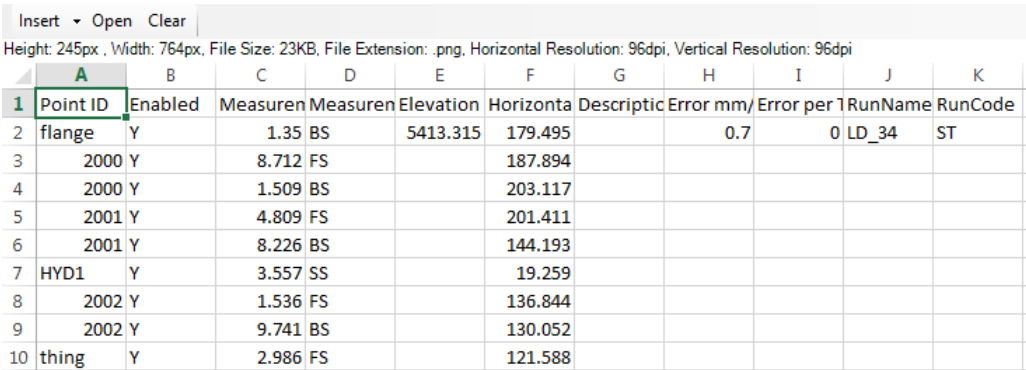
Step 2. Review the level data file

Before you create a custom importer to import the ASCII level data, you must review the level data file to determine the layout of the records (rows) contained in it. Then you can create an import definition that matches the record layout in the file.

Using **Windows Explorer**, navigate to `..\ImportingDigitalLevelData\Data` and open `SampleLevelData.csv` in a text editor or spreadsheet.



```
SampleLevelData.csv - Notepad
File Edit Format View Help
Point ID,Enabled,Measurement,Measurement Code,Elevation,Horizontal
Distance,Description,Error mm/km,Error per Turn,RunName,RunCode
flange,Y,1.35,BS,5413.315,179.495,,0.7,0,LD_34,ST
2000,Y,8.712,FS,,187.894,,,,,
2000,Y,1.509,BS,,203.117,,,,,
2001,Y,4.809,FS,,201.411,,,,,
2001,Y,8.226,BS,,144.193,,,,,
HYD1,Y,3.557,SS,,19.259,,,,,
2002,Y,1.536,FS,,136.844,,,,,
2002,Y,9.741,BS,,130.052,,,,,
thing,Y,2.986,FS,,121.588,,,,,
```



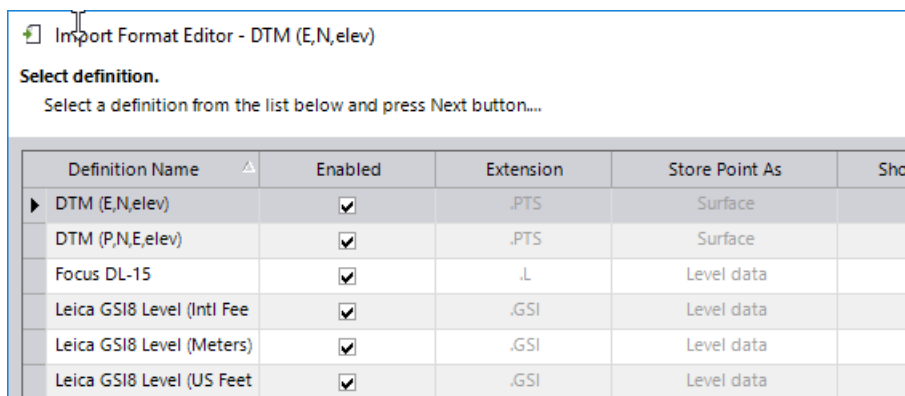
	A	B	C	D	E	F	G	H	I	J	K
1	Point ID	Enabled	Measuren	Measuren	Elevation	Horizontal	Descriptio	Error mm/	Error per T	RunName	RunCode
2	flange	Y	1.35	BS	5413.315	179.495		0.7	0	LD_34	ST
3	2000	Y	8.712	FS		187.894					
4	2000	Y	1.509	BS		203.117					
5	2001	Y	4.809	FS		201.411					
6	2001	Y	8.226	BS		144.193					
7	HYD1	Y	3.557	SS		19.259					
8	2002	Y	1.536	FS		136.844					
9	2002	Y	9.741	BS		130.052					
10	thing	Y	2.986	FS		121.588					

Note that the file includes a header row that specifies the name of the each field contained in the data records that follow it in the file.

Using the **Import Format Editor**, you will create a custom import definition that replicates the record layout in the data file so that the data in each field maps to a corresponding field in SO on import.

Step 3. Create a custom importer for the level data

1. Select **Home > Data Exchange > Import > Import Format Editor**.

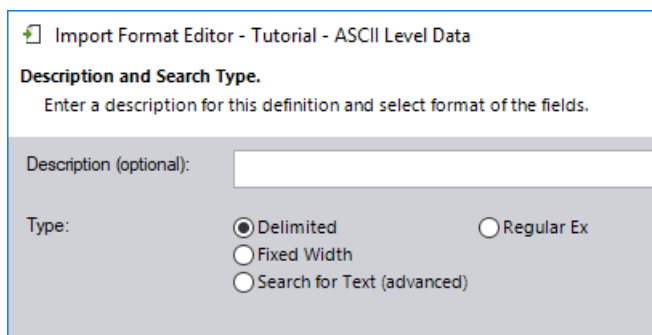


The **Import Format Editor** includes all of the import definitions defined for your project, including predefined definitions and any definitions you have created.

2. In the **Import Format Editor**, click the **New** button and enter a name for the new definition: *Tutorial - ASCII Level Data*. Then click **Next**.

Optionally, you could select an existing definition and modify it for the ASCII file you want to import.

3. On the **Description and Search Type** screen, ensure **Delimited** is selected as the row format type, which matches the comma-delimited record format type in the import file. Then click **Next**.



4. On the **Select General Properties** screen, do the following:
 - a. In the **Delimiter** drop-down list, select *comma* to specify that fields in each record are separated by commas.
 - b. In the **Store data as** drop-down list, select *Level data*.

This ensures that only level data-type fields are available to add to the definition.

c. In the **Default file extension** field, enter `.csv`, which matches the file extension of the import file.

d. Ensure that the **Show editor on import** check box is checked.

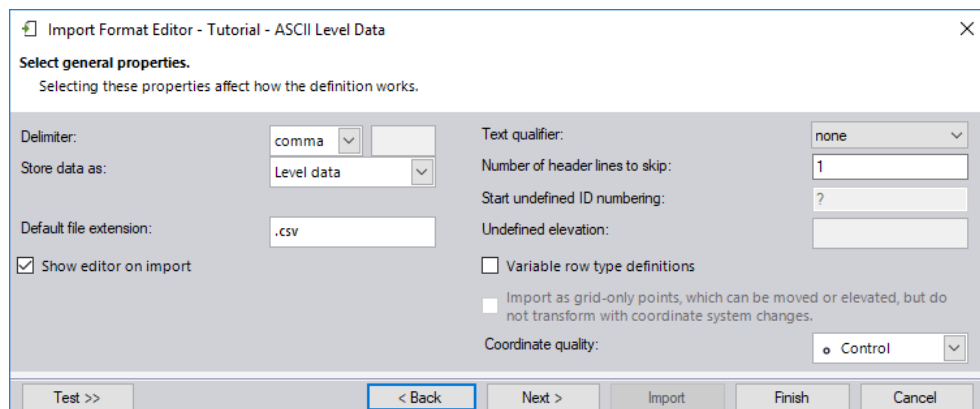
This specifies that the **Import Format Editor** displays when it is used to import this type of data file, allowing you to verify the importer properties and test it with your import file before performing the import.

e. In the **Number of header lines to skip** field, enter `1` to ensure that SO does not attempt to import the field labels in the first row into the project.

Do not check the **Variable row type definitions** check box since the data file does not include variable record types. You will use that option in the next workflow: "Workflow 3. Import variable row-type level data using a custom importer." The other fields and check box are not applicable and are, therefore, disabled. For more information about these other fields, see the SO online Help.


f. In the **Coordinate quality** drop-down list, select *Control*.

This specifies the coordinate quality for imported points that assign a benchmark elevation.

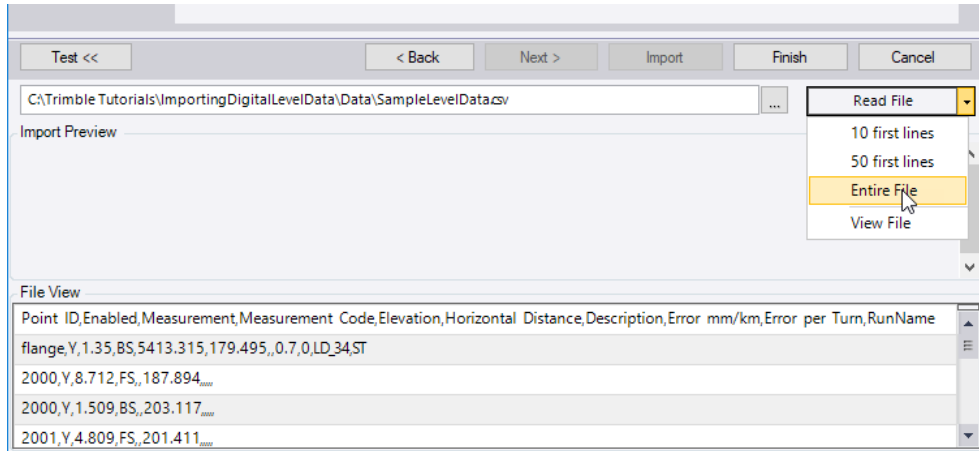


g. Click **Next**.

5. On the **Fields** screen, do the following:

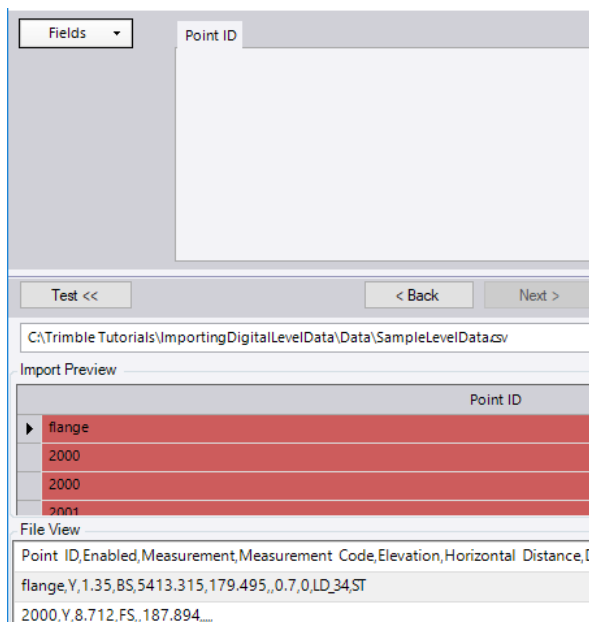
a. Click the **Test** button to display the two view panes: **Import Preview** and **File View**. Then click the **Browse** button  located to the immediate right of the `<Enter file name>` field and browse to `..\ImportingDigitalLevelData\Data\SampleLevelData.csv` and click **Open**.

The contents of the *SampleLevelData.csv* file are displayed in the **File View** pane. Since you have not yet added any fields to the definition, nothing is displayed in the **Import Preview** pane. Note that you can click the drop-down arrow button located next to the **Read File** button to specify how many import records to display in the **Import Preview** and **File View**.

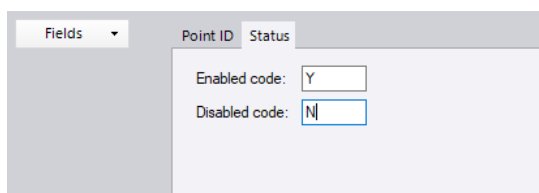


- b. In the **Fields** drop-down list, select the first field type you want to add to the row definition: *Point ID*.

This matches the first field type in the import record. Note that the **Import Preview** pane displays the **Point ID** field containing the data to be imported from the file.



- c. In the **Fields** drop-down list, select the second field type you want to add to the definition: *Status*. (This field corresponds to the *Enabled* field in the import record.) Then, on the **Status** tab, enter *Y* for the **Enabled code** and *N* for the **Disabled code**. (These values correspond to the values that can be contained in this field in the import file.)



- d. Repeat this procedure to add the following fields to the row definition in the order shown:
- *Measurement* - Keep the default unit selection: *Meter*. Keep **Apply to all** checked.
 - *Measurement Type* - This field corresponds to the *Measurement Code* field in the import record. For the **Backsight observation code**, enter *BS*. For the **Foresight observation code**, enter *FS*. For the **Intermittent measurement code**, enter *SS* (side shot). These codes correspond to the codes that can be contained in this field in the import record.

The screenshot shows a configuration pane with a 'Fields' dropdown menu. The selected field is 'Measurement Type'. Below the header, there are three input fields: 'Backsight observation code' containing 'BS', 'Foresight observation code' containing 'FS', and 'Sideshot observation code' containing 'SS'.

- *Benchmark Elevation* - This field corresponds to the *Elevation* field in the import record. Keep the default unit selection: *Meter*. Keep **Apply to all** checked.
- *Horizontal distance* - Keep the default unit selection: *Meter*. Keep **Apply to all** checked.
- *Description* - No properties.
- *Error per km* - This field corresponds to the *Error mm/km* field in the import record. Keep the default unit selection: *Millimeter*.
- *Error per Turn* - Keep the default unit selection: *Millimeter*.
- *Run ID* - This field corresponds to the *RunName* field in the import record.
- *Run Start/End* - This field corresponds to the *RunCode* field in the import record. For the **Start run code**, enter *ST*. For the **End run code**, enter *END*. These codes correspond to the codes that can be contained in this field in the import record.

The screenshot shows a configuration pane with a 'Fields' dropdown menu. The selected field is 'Run Start/End'. Below the header, there are two input fields: 'Start run code' containing 'ST' and 'End run code' containing 'END'.

By viewing the **Import Preview** pane, you can see that you have successfully mapped all of the fields in the import record to the row layout in the import definition.

Point ID	Status	Measureme	Measureme	Benchmark EI	Horizontal Di	Description	Error per k	Error per T	Run ID	Run Start/E
flange	Y	1.35	BS	5413.315	179.495		0.7	0	LD_34	ST
2000	Y	8.712	FS		187.894					
2000	Y	1.509	BS		203.117					
2001	Y	4.809	FS		201.411					
2001	Y	8.226	BS		144.193					
HYD1	Y	3.557	SS		19.259					
2002	Y	1.536	FS		136.844					
2002	Y	9.741	BS		130.052					
thing	Y	2.986	FS		121.588					
thing	Y	7.79	BS		187.172					

Point ID	Enabled	Measurement	Measurement Code	Elevation	Horizontal Distance	Description	Error mm/km	Error per Turn	RunName
flange	Y	1.35	BS	5413.315	179.495		0.7	0	LD_34
2000	Y	8.712	FS		187.894				

Note the following when working with the **Fields** screen:

- When you add a field to the row, other fields may no longer be available for selection because they are mutually exclusive.
- To move a field in the row (to match the import record), click and drag the tab to a new location.
- If you want SO to ignore (not import) data contained in a specific field in the import record (for example, there is no corresponding data stored in SO), insert the **Skip** field at that location in the row.
- If you select **Fixed Width** as the row format type (step 3), you must also specify the width for each field in the row.
- If you select **Search for Text** as the row format type (step 3), you must also specify the start and end text for each field in the row.
- If you select **Regular Expression** as the row format type (step 3), after you add the necessary fields to the record, select **Next** and enter the regular expression to use. For additional instructions, see "Regular Expressions" in the SO online Help.

6. Click **Finish**.

The **Import Format Editor** dialog closes and the new custom importer is ready for use.

Step 4. Import the level data file

In this step, you will import data contained in the *SampleLevelData.csv* data file using the new custom exporter you created. However, the procedure for importing a different type of ASCII data file (for example, a Spectra Precision DL-15 level data file) using a different custom importer (for example, the predefined Focus DL-15 importer) is basically the same as described here.

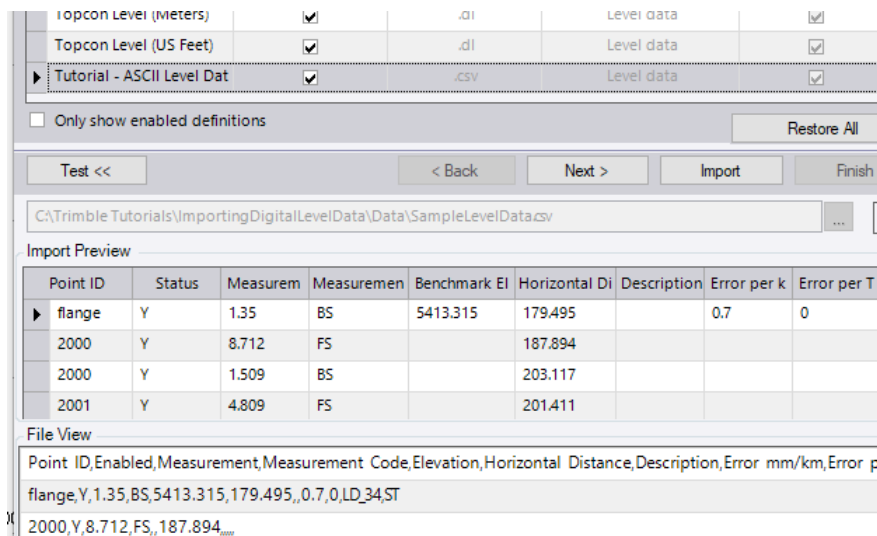
1. Import `..\ImportingDigitalLevelData\Data\SampleLevelData.csv`.

The **Import Format Editor** dialog displays.

When you select to import a non-standard ASCII data file, SO uses certain validation criteria (for example, the import file extension, the number of record fields, field types, and so on) to determine the best custom importer to use for the import. If there is more than one import definition that matches the selected file (that is, at least 50% of the records in the file can be imported into the project using the definition), SO may not select the specific definition you want to use. In this case, you simply need to select the correct definition in the **Import Format Editor** dialog.

2. If it is not already selected, select *Tutorial - ASCII Level Data* in the **Definition Name** list.

You can view the **Import Preview** and **File View** panes to verify that the selected definition matches the import file.



3. Click **Import**.

The **Level Editor** dialog displays, allowing you to make changes to the import as described earlier in this tutorial. Since there is no other survey data in the project, you can click **Cancel** to close the **Level Editor** and cancel the import.

This completes the second tutorial workflow. If you intend to continue with the third workflow in this tutorial, do not close the **Survey Office** window.

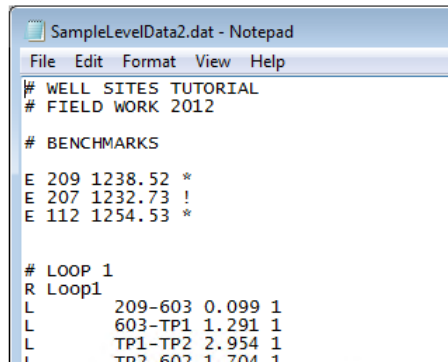
Workflow 3. Import variable row-type level data using a custom importer

In this workflow, you will use the **Import Format Editor** to copy and modify an existing variable row-type import definition by adding a new row type to import level run IDs along with observation and delta elevation data. A variable row-type import definition allows different types of data records to be included in the same level import file. For example, based on the row-type definition, some rows might be formatted to contain elevation data while other rows are formatted to contain observation data. Each row type is identified by a unique row-type code.

Step 1. Review the level data file

Before you copy and modify the default *STARxNET Level Data* custom import definition, you will review the level data file to determine the changes that need to be made to the importer.

Using **Windows Explorer**, navigate to `..\ImportingDigitalLevelData\Data` and open *SampleLevelData2.dat* in a text editor or spreadsheet.



```
SampleLevelData2.dat - Notepad
File Edit Format View Help
# WELL SITES TUTORIAL
# FIELD WORK 2012

# BENCHMARKS
E 209 1238.52 *
E 207 1232.73 !
E 112 1254.53 *

# LOOP 1
R Loop1
L      209-603 0.099 1
L      603-TP1 1.291 1
L      TP1-TP2 2.954 1
L      TP2-603 1.704 1
```

	A	B	C	D
1	# WELL SITES TUTORIAL			
2	# FIELD WORK 2012			
3				
4	# BENCHMARKS			
5				
6	E 209 1238.52 *			
7	E 207 1232.73 !			
8	E 112 1254.53 *			
9				
10				
11	# LOOP 1			
12	R Loop1			
13	L	209-603	0.099 1	
14	L	603-TP1	1.291 1	

As you can see, each of the rows (records) in the file begins with a character that identifies the row type. Each row type is configured for a specific data format:

- **#** - This identifier specifies that the row contains a comment. These rows will not be imported into the project.
- **E** - This identifier specifies that the row contains a benchmark elevation that is in the format:
 - Point ID
 - Benchmark elevation
 - Status (! for enabled and * for disabled)
- **R** - This identifier specifies that the row contains a run ID for the observations that follow it in the format:
 - Run ID

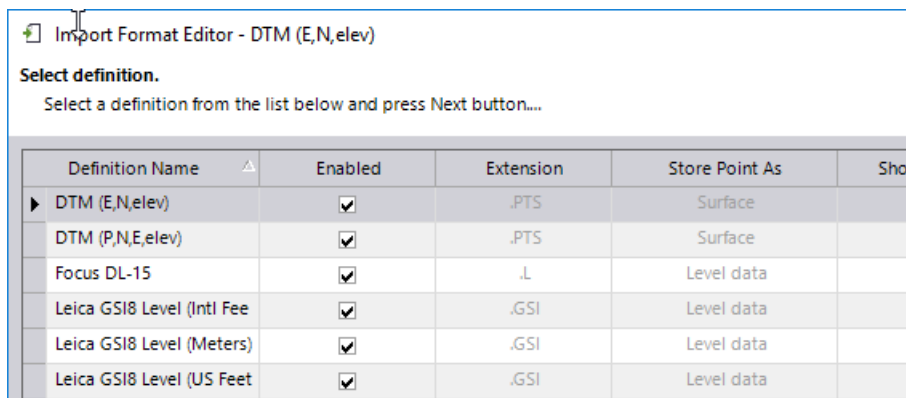
This row type is not included in the default *STARxNET Level Data* import definition.

- *L* - This identifier specifies that the row contains an observation that is in the following format:
 - Backsight point ID
 - Foresight point ID
 - Delta elevation
 - Number of setups

Using the **Import Format Editor**, you will copy and modify the default *STARxNET Level Data* custom importer to import run IDs (rows with the *R* identifier) along with observation data.

Step 2. Modify the custom importer

1. In SO, select **Home > Data Exchange > Import > Import Format Editor**.



2. In the **Import Format Editor**, do the following:
 - a. Select the *STARxNET Level Data* import definition and click the **Copy** button
The new definition *Copy of STARxNET Level Data* displays in the **Definition** list:
 - b. Rename the definition name *Copy of STARxNET Level Data* to *STARxNET Level Data with Runs*.
 - c. Click **Next**.
3. On the **Description and Search Type** screen, change the **Description** to *STAR*NET Level Data with Runs* and click **Next**.

Import Format Editor - STARxNET Level Data with Runs

Description and Search Type.
Enter a description for this definition and select format of the fields.

Description (optional):

Type: Delimited Regular Ex
 Fixed Width
 Search for Text (advanced)

4. On the **Select General Properties** screen, note the following (you will not make any changes):
 - In the **Delimiter** drop-down list, *white space* is selected to specify that fields in each row are separated by white space.
 - In the **Store data as** drop-down list, *Level data* is selected. This ensures that only level data-type fields are available to add to the import definition.
 - In the **Default file extension** field, *.dat* has been entered, which matches the file extension of the import file.
 - The **Show editor on import** check box is checked. This specifies that the **Import Format Editor** displays when it is used to import this type of data file, allowing you to verify the importer properties and test it with your import file before performing the import.
 - The **Variable row type definitions** check box is checked, indicating that the data file includes variable record types, each of which requires a different row definition.
 - In the **Coordinate quality** drop-down list, *Control* is selected. This specifies that Control quality be used for imported points that assign a benchmark elevation.

Import Format Editor - STARxNET Level Data with Runs

Select general properties.
Selecting these properties affect how the definition works.

Delimiter:

Store data as:

Default file extension:

Show editor on import

Text qualifier:

Number of header lines to skip:

Start undefined ID numbering:

Undefined elevation:

Variable row type definitions

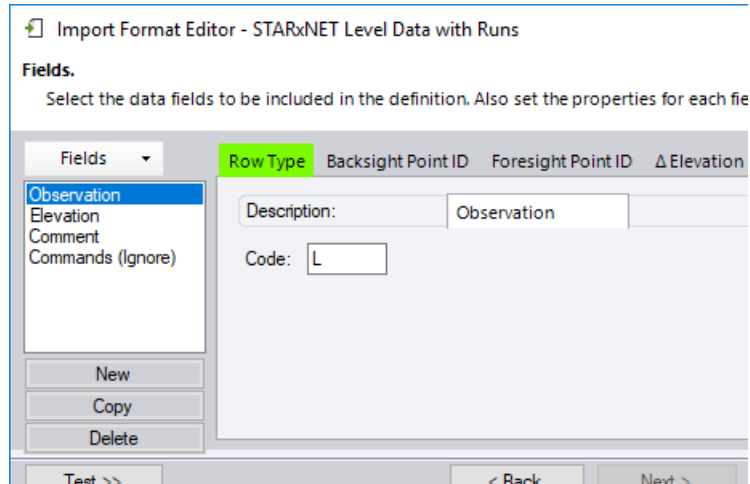
Import as grid-only points, which can be moved or elevation not transform with coordinate system changes.

Coordinate quality:

5. Click **Next**.

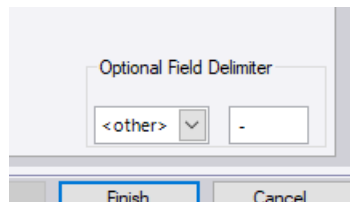
The **Fields** screen includes four predefined row definitions that match the layout of the records in the *SampleLevelData2.dat* with two exceptions:

- The data file does not include any instances of the "Commands (Ignore)" row type, so this row type will be ignored.
- There is no row definition to support the *Run ID* field in the data file, so you will create one.




Note the following when working with variable row type definitions:

- Each row type definition includes a **Row Type** field definition that includes a row-type identifier code.
- Although *white space* was specified as the default field delimiter on the **General Properties** screen, this default is overwritten for the *Backsight Point ID* field in the *Observation* record definition. In this case, a hyphen follows the field instead of white space.



- Although not used in this import definition, some field types include a **Multiply on import** drop-down list that allows you to select a value by which the imported value will be multiplied to correctly position the decimal point (if a specific unit type is selected).
- Also not used in this import definition, the **Remove leading character in import** check box allows you to specify a leading character contained in the field that you do not want to import into your project. If the character repeats multiple times in sequence at the beginning of the field, all instances in the sequence will be removed from the import. For example, if you specify *0* as the lead character to remove from a PointID field, a value such as *00000000000P011* would be imported as *P011*.

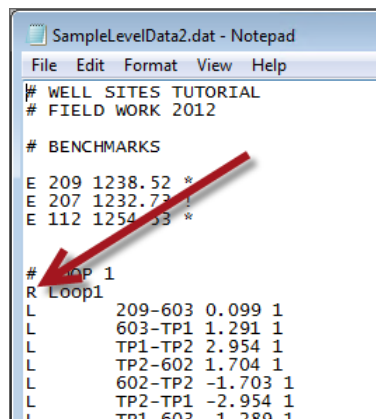
6. Click the **Test** button to display the two view panes: **Import Preview** and **File View**. Then click the **Browse** button  and browse to `..\ImportingDigitalLevelData\Data\SampleLevelData2.dat` and click **Open**.

The contents of the `SampleLevelData2.dat` file are displayed in the **File View** pane. The various row layouts defined for the import definition are displayed in the **Import Preview** pane. Note that the observations are not organized by level runs.

C:\Trimble Tutorials\ImportingDigitalLevelData\Data\SampleLevelData2.dat			Read File
Import Preview			
Point ID	Benchmark Elevation	Status	
▶ 209	1238.52	*	
207	1232.73	!	
112	1254.53	*	
Backsight Point ID	Foresight Point ID	Δ Elevation	
▶ 209	603	0.099	
603	TP1	1.291	
TP1	TP2	2.954	
TP2	602	1.704	
602	TP2	-1.703	

Note: You can click the drop-down arrow button located next to the **Read File** button to specify how many import records to display in the **Field View**.

7. To add a new *Run* row to the import definition, do the following:
 - a. Click the **New** button located beneath the **Fields** list.
A new **Row Type** tab displays.
 - b. In the **Description** field on the **Row Type** tab, enter *Run*.
 - c. In the **Code** field, enter *R* as the row-type identifier.



```

SampleLevelData2.dat - Notepad
File Edit Format View Help
# WELL SITES TUTORIAL
# FIELD WORK 2012
# BENCHMARKS
E 209 1238.52 *
E 207 1232.73 !
E 112 1254.53 *
# LOOP 1
R Loop1
L 209-603 0.099 1
L 603-TP1 1.291 1
L TP1-TP2 2.954 1
L TP2-602 1.704 1
L 602-TP2 -1.703 1
L TP2-TP1 -2.954 1
L TP1-603 -1.291 1

```

- d. In the **Fields** drop-down list, select **Run ID**.

Note that when you scroll down in the **Import Preview**, the observation rows are now organized by runs (*Loop1*, *Loop2*, and so on), just as they are in the data file.

Run ID		
▶ Loop1		
Backsight Point ID	Foresight Point ID	
▶ 209	603	0.099
603	TP1	1.291
TP1	TP2	2.954
TP2	603	1.704

8. Click **Finish**.

The **Import Format Editor** dialog closes and the new custom importer is ready for use.

Step 3. Import the level data file

In this step, you will import data contained in the *SampleLevelData2.dat* data file using the new custom importer you created.

1. Import `..\ImportingDigitalLevelData\Data\SampleLevelData2.dat`.

The **Import Format Editor** dialog displays.

2. If it is not already selected, select *STARxNET Level Data with Runs* in the **Definition Name** list.

You can view the **Import Preview** and **File View** panes to verify that the selected definition matches the import file.

The screenshot shows the **Import Format Editor** dialog with the following components:

- Definition Name list:** A list of definitions with checkboxes and file extensions.

Definition Name	Checked	Extension	Category
STARxNET Level Data	<input checked="" type="checkbox"/>	.dat	Level data
▶ STARxNET Level Data with Runs	<input checked="" type="checkbox"/>	.dat	Level data
STARxNET with HzDist	<input checked="" type="checkbox"/>	.dat	Level data
Topcon Level (Intl Feet)	<input checked="" type="checkbox"/>	.dl	Level data
- Buttons:** Test <<, < Back, Next >, Import
- File Path:** C:\Trimble Tutorials\ImportingDigitalLevelData\Data\SampleLevelData2.dat
- Import Preview:** A table showing point IDs and benchmark elevations.

Point ID	Benchmark Elevation
▶ 209	1238.52
207	1232.73
112	1254.53
- File View:** A list of files including # WELL SITES TUTORIAL and # FIELD WORK 2012.

3. Click **Import**.

The **Level Editor** dialog displays, allowing you to make changes to the import as described earlier in this tutorial. Note that the observations are organized into various tabs based on the field-defined run IDs.

Level Editor - SampleLevelData2.dat

Run - RJ **Run - Loop1** Run - Loop2 Run - Loop3 Run - Loop4 Run - Loop5 Run - Loop6 Run - Loop7 Run - ALD

Use adjusted elevations Sum of BS distances: 0.000 m Misclosure: 0.00300 m Standard error per km: ?

Use raw elevations Sum of FS distances: ? Run name: Loop1 Standard error per tum: ?

Create	Point ID	Backsight	H.I.	Side Shot
<input checked="" type="checkbox"/>	209	0.000 <input checked="" type="checkbox"/>		?
<input checked="" type="checkbox"/>	603			
	603	0.000 <input checked="" type="checkbox"/>		?
<input checked="" type="checkbox"/>	TP1			
	TP1	0.000 <input checked="" type="checkbox"/>		?
<input checked="" type="checkbox"/>	TP2			
	TP2	0.000 <input checked="" type="checkbox"/>		?

Since there is no other survey data in the project, you can click **Cancel** to close the **Level Editor** and cancel the import.

This completes the tutorial.