Trimble's RoadLink Utility Tutorials

Trimble's RoadLink™ utility is an interface between third-party road definitions and Trimble survey devices. It lets you import or key in road definitions, view them graphically, edit them if required, and then export them to a Trimble survey device (controller) for stakeout.

Get started with RoadLink by working through the following tutorials:

- Tutorial 1: Import third-party design files defining the horizontal and vertical alignments and cross-sections. The road definition is viewed graphically and a file is sent to the controller for stakeout. (15 minutes)

- Tutorial 2: Manually enter an alignment from construction drawings. Earthworks volumes are calculated and a file is sent to the controller for stakeout. (30 minutes)

For more information about RoadLink, refer to the *Trimble Geomatics Office™ User Guide* or the Help. As you work, press F1 or click the **Help** button for detailed information about the dialog you are in.

Tutorial 1: Importing a Road Definition

This tutorial shows how to import third-party files that define a road. You will do the following:

1. Set up a project.

2. Start RoadLink.

3. Import a road definition.

4. View the horizontal and vertical alignments.

5. View the cross-sections.

6. Add the Plan view linework.

7. Transfer the road for stakeout (export the design).

Setting up a Project

To set up a new project:

1. Start the Trimble Geomatics Office software.

2. Do one of the following:

    – Select *File* / *New Project*.

    – On the Standard toolbar, click the New Project tool □ .

3. In the *Name* field, enter a project name.

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4. Select the template called RoadLink 1 and then click **OK**. The following dialog appears:

5. Make sure the *Project Details* tab is selected.

6. In the *Computer operator* field, enter your name and fill in other relevant details. Do not change the settings in the other tabs.

    Note – The Units and Format tab lets you change the grade format, side slope grade format, ratio units, station format, or volume units for a project. The format that you specify is applied to the current project. Do not change it now.

7. Click **OK**.

Starting the RoadLink Utility

To start RoadLink:

- In the Plan view, select *Tools* / *RoadLink* / *Start*.

    The *RoadLink* window appears.

Importing a Road Definition

A wizard guides you through the process of importing a road definition. To import the road definition:

1. Select *File* / *Import*. The *Import* dialog appears.

2. Select the *Road* tab.

3. From the *Types* list, select *Third-party road definition file* and click **OK**. The *File Open* wizard appears.

4. From the *Data format* list, select *Autodesk Civil Design / Softdesk* and click **Next**.

5. Select the following files from C:\ Trimble Geomatics Office \ Projects \ *your project name* \ Checkin \:

    – Autodesk Road Horiz

    – Autodesk Road Vert

    – Autodesk Road Xsec

    These files contain the horizontal and vertical alignment definitions and the cross-section data for a road designed using Autodesk Civil Design software.

6. Click **Next**.

7. Select the *Center* alignment and click **Next**.

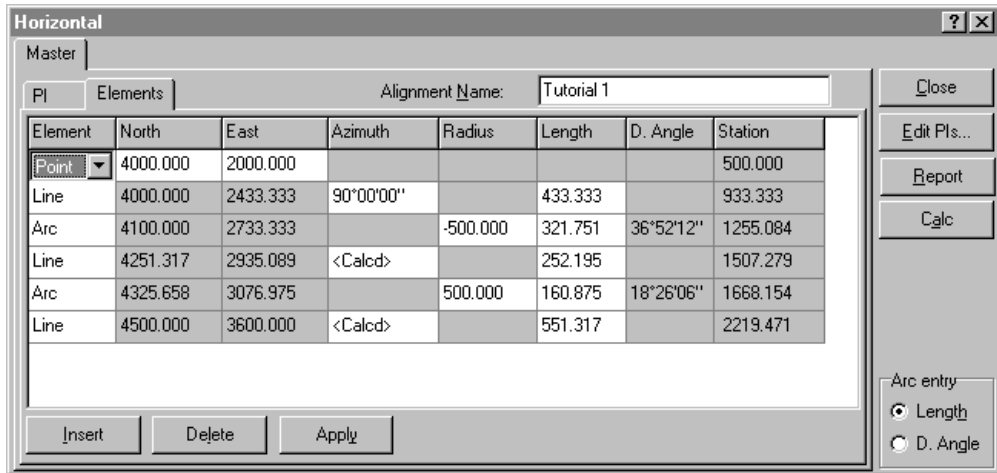8. Select the *Datum #1* surface and click **Next**.

9. Select the following check boxes:

 – *Left of road*

 – *Right of road*

 – *Exclude main alignment from template*

10. Click **Finish**.

The software creates a new road and imports the horizontal and vertical alignments. It converts cross-section data to templates and assigns them at the appropriate stations. The horizontal alignment appears in the *Plan view* window, as shown below:
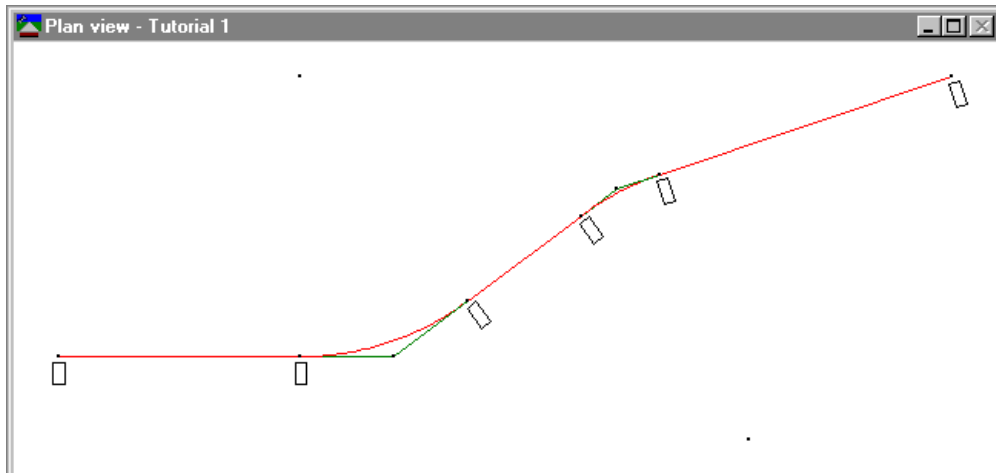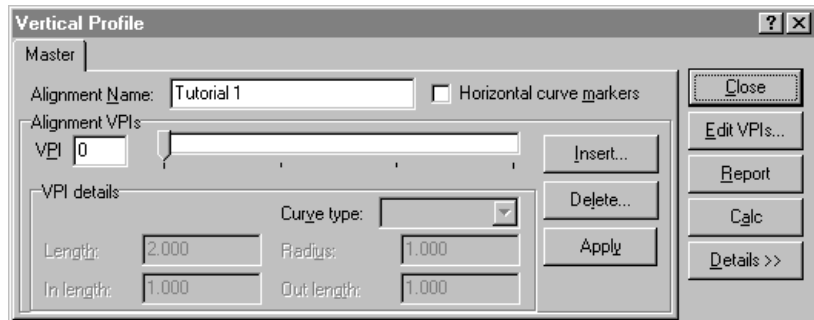
To view the horizontal alignment definition:

1. Select *Road* / *Horizontal*. The following dialog appears:

Horizontal   ? | X

Master

PI	Elements		Alignment Name:		Tutorial 1			Close

Element	North	East	Azimuth	Radius	Length	D. Angle	Station
Point ▼	4000.000	2000.000					500.000
Line	4000.000	2433.333	90°00'00"		433.333		933.333
Arc	4100.000	2733.333		-500.000	321.751	36°52'12"	1255.084
Line	4251.317	2935.089	<Calcd>		252.195		1507.279
Arc	4325.658	3076.975		500.000	160.875	18°26'06"	1668.154
Line	4500.000	3600.000	<Calcd>		551.317		2219.471

Buttons: Close, Edit PIs..., Report, Calc

Arc entry: ● Length ○ D. Angle

Buttons: Insert, Delete, Apply

2. View the imported horizontal alignment geometric details.

3. Click **Close**.

4. Select *Road* / *Vertical*. The following dialog appears:

Vertical Profile   ? | X

Master

Alignment Name: Tutorial 1   ☐ Horizontal curve markers   Close

Alignment VPIs
VPI 0   [   ]   Insert...

VPI details   Curve type: [▼]   Delete...

Length: 2.000   Radius: 1.000   Apply

In length: 1.000   Out length: 1.000

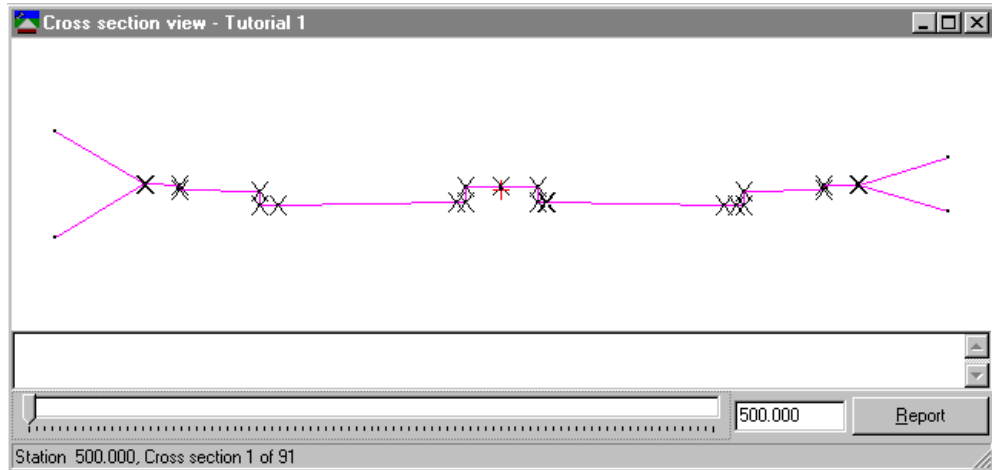Buttons: Close, Edit VPIs..., Report, Calc, Details >>

5. View the imported vertical alignment details.

6. Click **Close**.

The next stage is viewing the imported cross-sections.

Viewing the Imported Cross-Sections

You can view the imported cross-sections. To do this:

1. Select *Road* / *Sections*. The *Cross section view* window appears. It shows the first cross-section.


💡 **Tip –** Arrange the *Cross section view* window and the *Plan view* window on the desktop so that you can see them both. An icon on the horizontal alignment indicates where the currently displayed cross-section is on the horizontal alignment.

2. Use the track bar to select each cross-section in turn.

3. Close the *Cross section view* window.

Displaying the Road Linework

You can now display the linework in the Plan view. It connects
common cross-sections. To display the linework:

- Select *Road / Display Road Linework*. The following linework
  appears:
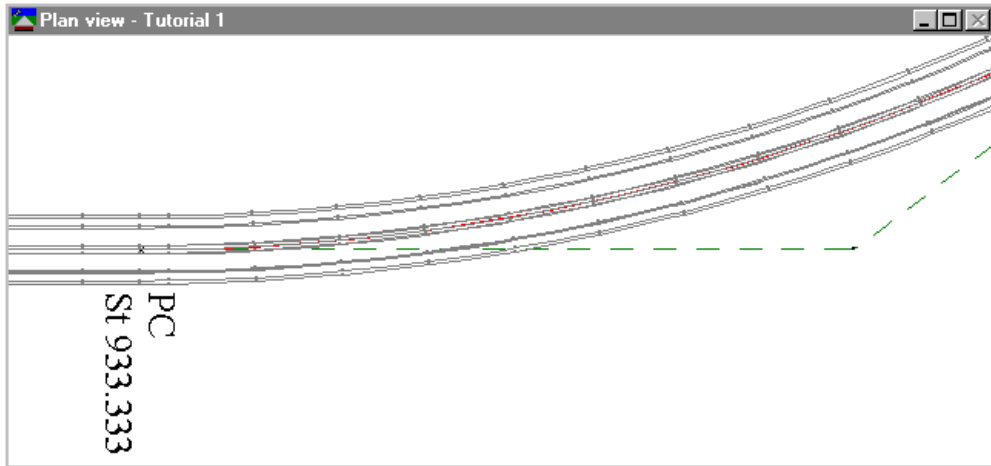
*Note – You can also display a surface model of the road by selecting
Road / Display Road Surface. This option and the Display Road
Linework option provide visual confirmation of the road.*

Transferring the Road

You can now transfer the road alignment to a Trimble controller ready for stakeout. You can transfer:

- the horizontal and vertical alignments

- the templates

To export the road:

1. Do one of the following:

    – Select *File* / *Export*.

    – Click the Export tool ⬚ on the *Standard* toolbar.

2. In the Road tab, select the *Road definition to Survey Devices* option.

3. Click **OK** to begin the export process.

4. In the *Save as* dialog select the appropriate controller.

5. Connect the controller to the computer.

6. Make sure that the controller software is ready to receive the file.

7. Click **Open** to connect to the controller.

8. In the *Save as* dialog (in RoadLink), select one of the following:

    – Main memory, saves the file in the main memory of the controller.

    – PC Card, saves the file on the PC card in the controller.

9. Click **Open**.

10. Click **Save**.

The file transfers to the Trimble controller.

You have successfully completed the first tutorial.

Tutorial 2: Manually Entering a Road Definition

This tutorial shows how to input a road definition manually. You will do the following:

1. Set up a project.

2. Form a surface model using the DTMLink™ utility.

3. Start RoadLink.

4. Create a template.

5. Input the horizontal alignment.

6. Input the vertical alignment.

7. Apply templates.

8. Apply superelevation.

9. Calculate the volumes.

10. Export the design (transfer the road for stakeout).

Setting up a Project

To set up a new project:

1. Start Trimble Geomatics Office.

2. Do one of the following:

    – Select *File* / *New Project*.

    – Click the *New Project* tool ☐ on the *Standard* toolbar.

3. In the *Name* field, enter a project name.

4. Click the template called RoadLink 2.

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5. Click **OK** to create a new project. The following dialog appears with the *Project Details* tab selected:

6. In the *Computer operator* field, enter your name and fill in relevant details. Do not change the settings in the other tabs.

    Note – The Units and Format tab lets you change the grade format, side slope grade format, ratio units, station format, or volume units for a project. The format that you specify is applied to the current project. Do not change it now.

7. Click **OK**.

    Note – In this case, the project that is created already has points in the database.
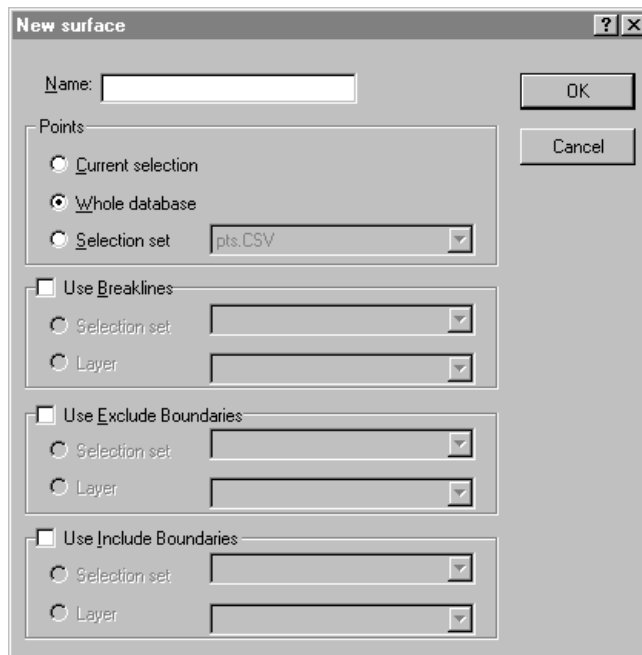
Creating a Surface Model

A surface model lets you compute earthworks volumes.

In this part of the tutorial, you create a surface model using DTMLink, and select this as the surface in the RoadLink project.
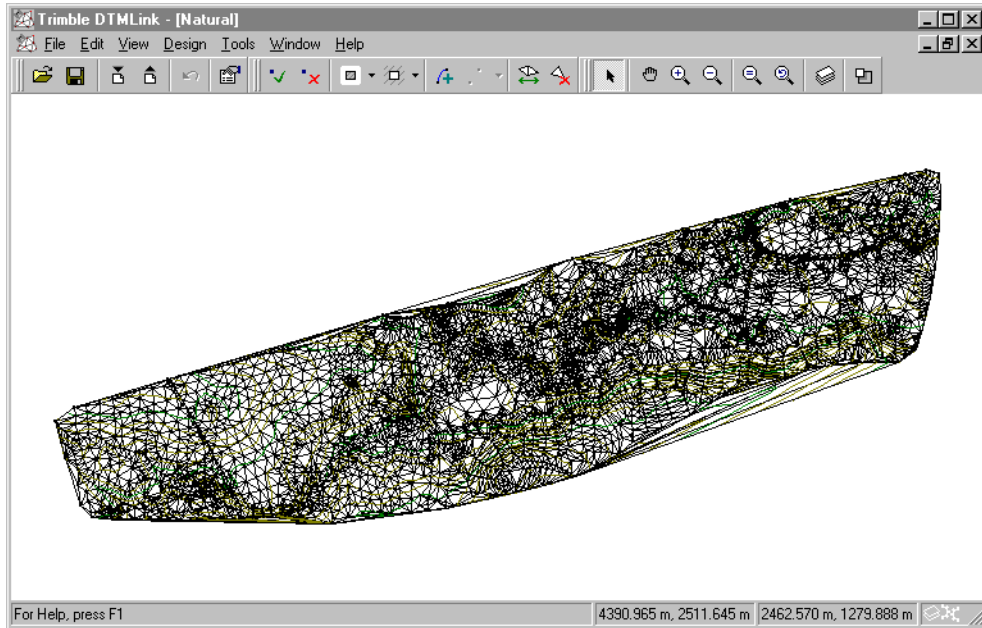
To create a surface model:

1. In the Plan view, select *Tools / DTMLink / New Surface*. The following dialog appears:

2. In the *Name* field, enter a name for the surface.

3. From the *Points* group, select the *Whole database* option.

4. Click **OK**.

A detailed surface is formed using all points in the database. This surface appears in the following graphical display window:

💡 **Tip –** At this stage, you can use DTMLink to edit the surface. For more information, refer to the *Trimble DTMLink Utility Tutorial*.

5.   Select *File / Save Surface* to save the surface.

6.   Select *File / Exit* to close DTMLink.

This surface will be used with the road definition to calculate volumes.

Starting the RoadLink Utility

Start RoadLink now:

- In the Plan view, select *Tools / RoadLink / Start*.

  The *Plan View* window appears.

Creating a Template

A template represents the design cross-section for the road definition. In this second tutorial, you create a new template.

To create a template:

1. Select *Utilities / Template Editor*. The *Edit Template* dialog appears.

2. Select *Library / New*. The *Create New Template Library* dialog appears.

3. Enter Tutorial_2 as the name for the new library.

4. Click **OK**.

5. Select *Template / New*.

6. Enter Section3 as the name for the new template.

7. Click **OK**.

The template name appears. The default design surface (Subgrade) and the first element in the template (Subgrade01) are added. They appear as a tree structure.

Note – All templates begin with the element Subgrade01 which has default Delta elevation and Offset values of 0.000. This element is automatically created when you define a new template.

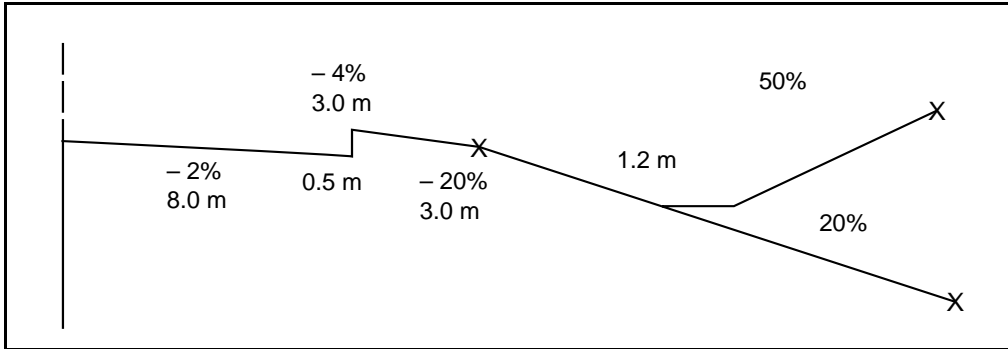Figure 1 shows the template that you are going to define.

Figure 1   Template sections

> **Tip –** Arrange the *Template View* window and the *Edit template* dialog on the desktop so that you can see them both.
> To edit an element, highlight it in the tree structure and change the appropriate fields. The corresponding element appears highlighted in the *Template View* window.

To define the template:

1. Click **Apply** to accept the default setting of 0.000 in the *Delta elevation* and *Offset* fields. This position represents the intersection of the horizontal and vertical alignments.

2. Click **New**.

    Subgrade02 is added to the tree structure.

3. Select the *Apply Superelevation* check box. (The *Apply Widening* check box becomes available. Do not select it.)

4. Edit the *Crossfall* field to –2% and the *Offset* field to 8.0 meters.

    Note – The units and format in these fields are determined by the settings in the Units and Format tab for the current project in Trimble Geomatics Office.

5. Click **Apply** to draw the graphics.

> ***Note** – You have entered the first two element types from Table 1.1.*

6. Repeat Step 2 through Step 5 for each of the other element types in Table 1.1, starting with the third row. This table shows each template element and its method of construction for the template called Section3.

Table 1.1   Template elements

Element type	Method	Super	Widen	Crossfall	Elev	Offset	Code
Start	—	—	—	—	0.00	0.00	—
Design line	Crossfall and Offset	Yes	No	–2.0	—	8.00	—
Design line	Delta Elevation and Offset	No	No	—	0.5	0.00	—
Design line	Crossfall and Offset	Yes	No	–4.0	—	3.00	Shoulder
Design line	Crossfall and Offset	No	No	–20.0	—	3.00	—
Side slope	Cut slope 50%		Fill slope 20%		Cut ditch width 1.2		Catch

7. Select *Library* / *Save* to save the template.

8. Click **OK**.

Applying the Horizontal Alignment

To apply a horizontal alignment to the new road:

1. Select *File* / *New Road*.

2. In the *Road name* field, enter `Demo`.

3. Set the *Start Station* field to 500.

4. From the Surface list, select the surface that you created using the DTMLink.

    Note – Select View / Surface to view this surface. This is optional.

5. Click **OK**. The *Horizontal* dialog appears.

6. Select the *PI* tab.

7. Click **Insert** and enter the coordinates of the first point of intersection (PI 0). Table 1.2 shows the four points of intersection and their coordinates. Make sure that the *After current PI* check box is selected.

    Table 1.2   PI coordinates

Point of intersection	North	East
PI 0	4000.000	2000.000
PI 1	4000.000	2600.000
PI 2	4300.000	3000.000
PI 3	4500.000	3600.000

8. Click **Apply**.

9. Repeat Step 7 and Step 8 for each of the other PIs.

    The *PI* tab in the *Horizontal* dialog is updated to show the number of PIs currently in the alignment.

10. Click **Close**.

> **Tip –** To view the graphics, select *View* / *Zoom Extents*. To confirm the entries, click **Edit PIs**. Then click **Close** again.

To apply the curve details to each of the points of intersection:

1. Use the track bar to select PI 1.

2. In the *Curve type* field, select Circular.

3. Set the *Radius* field to 500.000.

4. Click **Apply** (or select PI 2) to accept the defaults in the other fields.

To apply the curve details for PI 2:

1. In the *Curve type* field, select Circular.

2. Set the *Radius* field to 500.000.
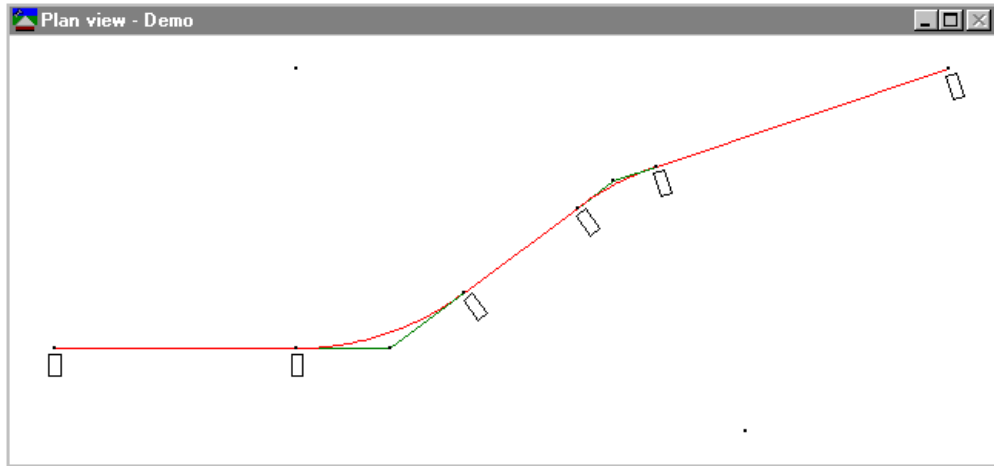
3. Click **Apply**.

    The relevant fields are updated. For example, at PI 2 the arc length is calculated.

> **Tip –** To generate a report of the horizontal alignment, click **Report**.

4. Click **Close**.

The stationing is shown at the key curve positions in the following window:

Tip – Zoom in to view the stationing on the alignment.

Applying the Vertical Alignment

To apply the vertical alignment:

1. Select *Road* / *Vertical*. The *Vertical* dialog appears.

2. Click **Insert**.

3. In the appropriate fields, enter the station and elevation values for the first vertical point of intersection (VPI 0).

Table 1.3 shows the values for each of the four vertical points of intersection.

Table 1.3   VPI values

	Station	Elevation
VPI 0	500.000	46.000
VPI 1	900.000	28.000
VPI 2	1 + 600.000	24.000
VPI 3	2 + 219.470	17.000

4.   Click **Apply**.

5.   Repeat Step 2 and Step 3 for each of the other VPIs in Table 1.3. Make sure that the *After current VPI* check box is selected.

6.   Click **Close**.

> $-\bigcirc\!\!\!-$ **Tip –** To check that these entries are correct, click **Edit VPIs**. Then click **Close** again.

To apply the curve details to each of the vertical points of intersection:

1.   Use the track bar to select VPI 1.

> $-\bigcirc\!\!\!-$ **Tip –** If you enter **1** in the *VPI* field and press ⸤Tab⸥ to update the entry, the track bar moves to VPI 1.

2.   In the *Curve type* field, select Sym Parabola from the list.

3.   Set the *Length* field to 500.000.

4.   Click **Apply** (or select VPI 2) to accept the defaults in the other fields.

5.   Repeat Step 1 through Step 4 for VPI 2. Use the same settings.

6.   Click **Close**.

The *Profile View* window is as follows:

Note – The irregular line is the natural surface as derived from the surface model.
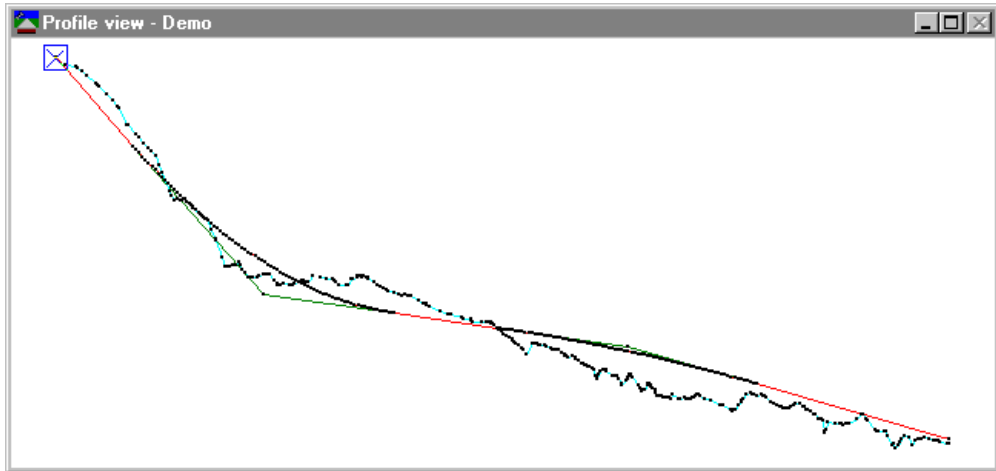
Note – When you close the Vertical dialog, the associated window also closes.

Applying Templates

To apply the template Section3 to the horizontal alignment:

1. Select *Road* / *Templates*. The *Templates* dialog appears.

2. For *Start Station* 500.000 meters, select from the *Left Template* and *Right Template* lists, the template *Section3*.

3. Click **OK**.

Applying Superelevation

To apply superelevation to the curves:

1. Select *Road* / *Superelevation*. The *Superelevation* dialog appears.

💡 **Tip –** Arrange the *Superelevation View* window and *Superelevation* dialog on the desktop so that you can see them both.

2. Select PI 1.

3. Set the *Pivot* field to Crown.

4. Select the *Auto Insert* check box.

5. In the *Maximum Superelevation* field, enter **8.000**.

6. In the *Unsupered crossfall* field, enter –**2.000**.

7. In the *Runoff % in curve In* and *Out* fields, enter **33.333**.

8. In the *Runoff length In* and *Out* fields, enter **60.000** and click **Apply**.

The table is completed with the calculated superelevation values and the superelevation graph appears as follows:

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9. Select PI 2.

10. Select the *Auto Insert* check box.

11. Accept the Maximum Superelevation and Unsupered crossfall default values.

12. In the *Runoff % in curve In* and *Out* fields, enter 33.333.

13. In the *Runoff length In* and *Out* fields, enter 60.000.

14. Click **Apply**.

Tip – To see the super graph for both curves, in the *Superelevation view* window, right-click to access the shortcut menu and then select *Zoom extents*.

15. Click **Close**.

Calculating the Volumes

Use the automatic report generation feature of RoadLink to create an earthworks Volume report.

To create and view an earthworks Volume report:

1. Select *Road* / *Reports* / *Volumes*.

2. The *Volume Report* dialog appears.

3. Click **OK** to accept the default *Start* and *End station* values.

   The report appears.

4. View the report, then close.

Figure 2 shows part of the Volume report.

Project name Tutorial_2						
Road	Demo					
Units	Meters					
Date printed 28/04/00 2:28pm						
Station:	500.000 to: 2219.470					
Road:	Demo					
	------ XS area ------		------ Volume ------		----- Accumulated ----	
Statn	Cut	Fill	Cut	Fill	Cut	Fill
Meters	Sq m	Sq m	Cu m	Cu m	Cu m	Cu m
500.000	14.98	32.19	0.00	0.00	0.00	0.00
520.000	29.51	8.14	444.86	403.24	444.86	403.24
540.000	45.45	1.98	749.57	101.19	1194.43	504.43
560.000	54.54	0.00	999.88	19.83	2194.31	524.26
580.000	63.14	0.00	1176.79	0.00	3371.10	524.26
600.000	65.63	0.00	1287.70	0.00	4658.81	524.26
620.000	58.16	0.00	1237.89	0.00	5896.69	524.26
640.000	40.84	0.00	990.01	0.00	6886.70	524.26

Figure 2   Volume report

Transferring the Road Definition

You can now transfer the road definition to a Trimble controller ready for stakeout. You can transfer:

- the horizontal and vertical alignments

- the templates

- the superelevation and widening records

To export the road definition:

1. Do one of the following:

    – Select *File* / *Export*.

    – Click the *Export* tool ⬆️ on the *Standard* toolbar.

2. In the *Road* tab, select the *Road definition to Survey Devices* option.

3. Click **OK** to begin the export process.

4. In the *Save as* dialog, select the appropriate controller.

5. Connect the controller to the computer.

6. Make sure that the controller software is ready to receive the file.

7. Click **Open** to connect to the controller.

8. In the *Save as* dialog (in RoadLink), select one of the following:

    – Main memory, saves the file in the main memory of the controller.

    – PC Card, saves the file on the PC Card in the controller.

9. Click **Open**.

10. Click **Save**.

The file transfers to the Trimble controller.

You have successfully completed the second tutorial.

Thank you for taking time to learn some of the features of Trimble's RoadLink.

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