



# Profile design and Quantities calculation

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## WHITEPAPER

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# Chapter

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# 1 About the whitepaper

## 1.1 Purpose

**Note that the procedures presented herein are not necessarily optimum. The purpose of this whitepaper is to demonstrate the main features and capabilities of the program through a small example.**

**Also note that the metric unit system is used in this example. This is not restrictive, as different unit systems can be used.**

This whitepaper is an extension to the previous one, which demonstrates the design and calculation of a small storm network at Distomo village of the Viotia area.

In this whitepaper, the names of the streets will be added. In addition, the network conduits, excavations etc will be calculated and the profiles will be drawn. The names of the streets are given in the following table:

<b>From - To junction</b>	<b>Street Name</b>
A7 to A5	Armatolon
A4 to A3	Feakon
A3-4 to A1	Mesogeion

## 1.2 Software

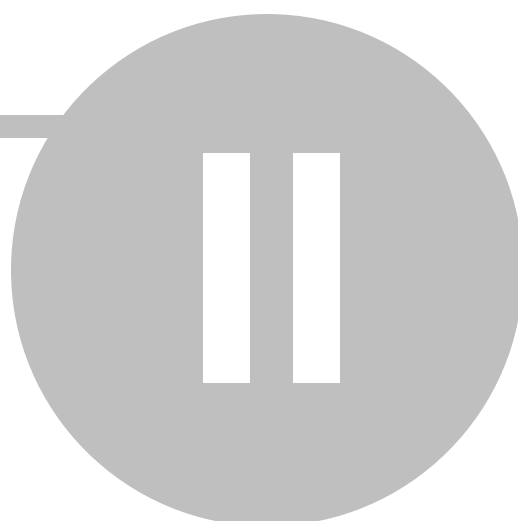
In order to complete the example successfully, the following software is required:

- Sewer Networks v11.0.

Later versions of the aforementioned software may be incompatible with the structure of the example as it is presented herein.

# Chapter

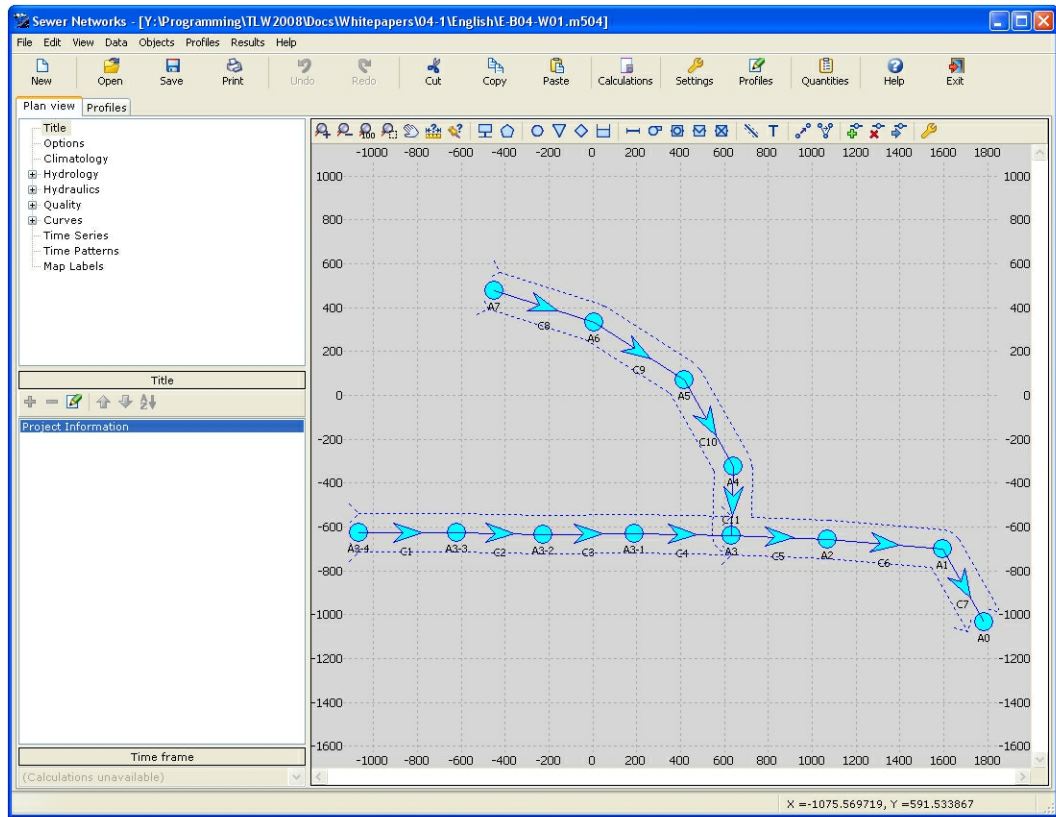
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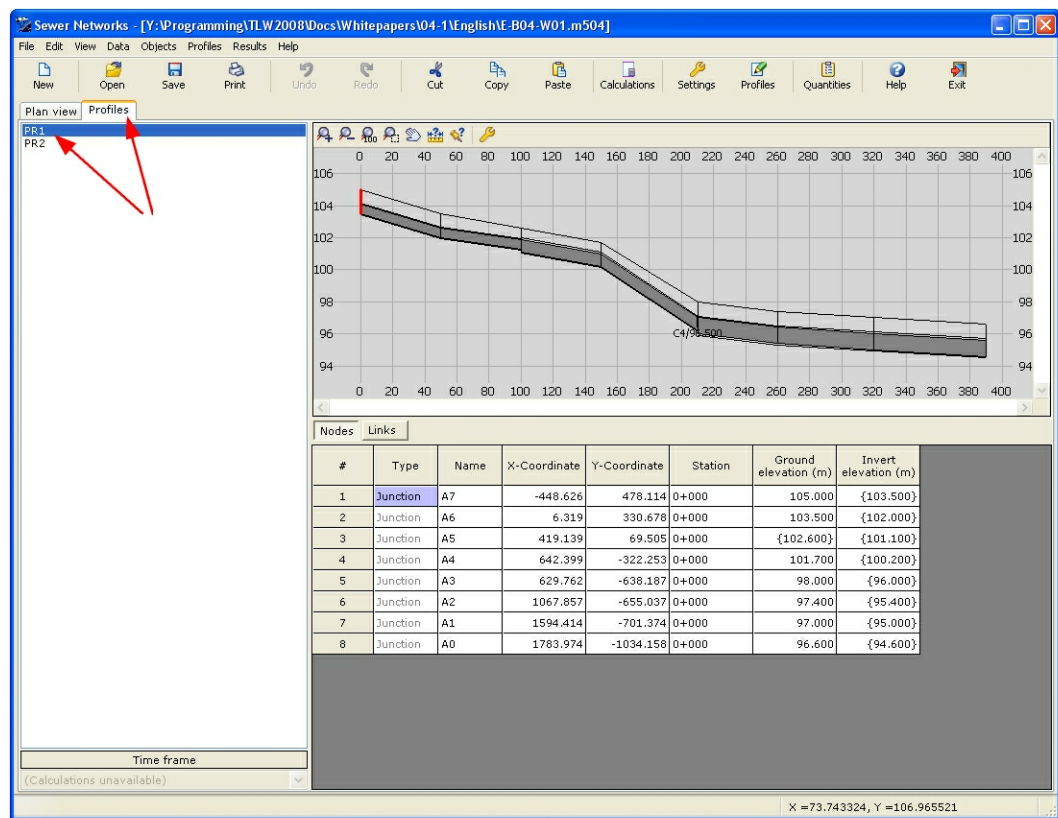
## 2 Steps

### 2.1 Step 01: Street Names

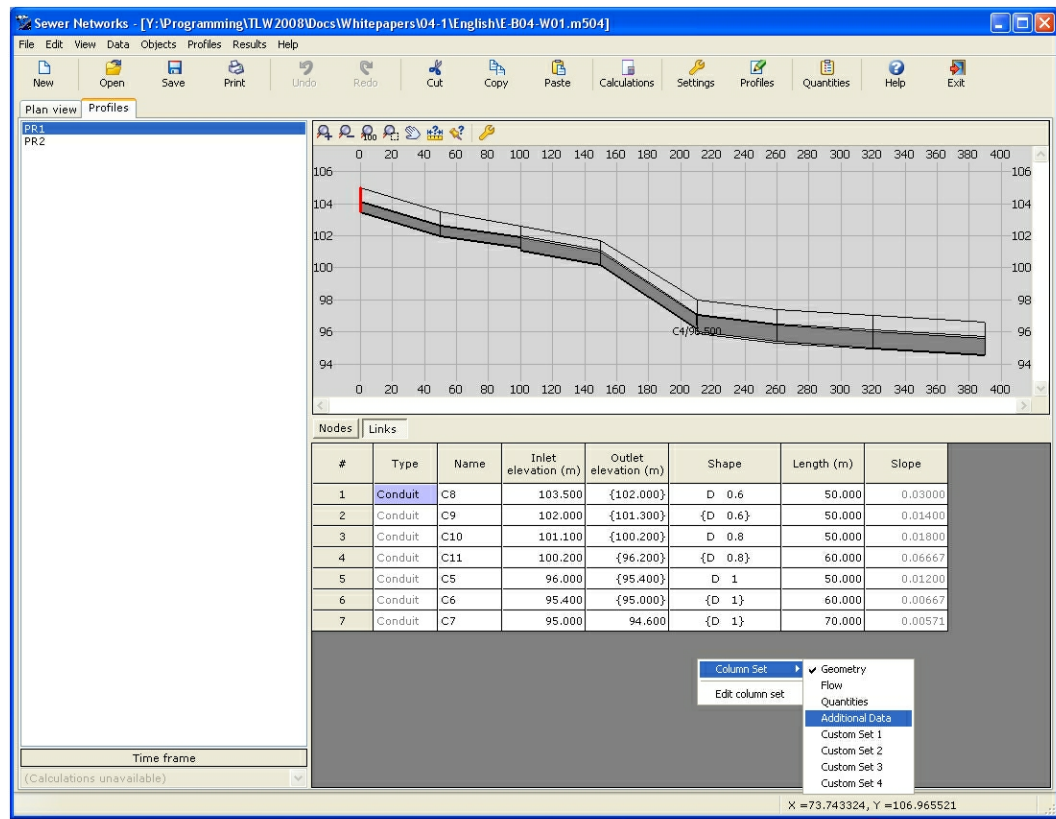
Load the file corresponding to whitepaper #1:



Click the **Profiles** tab and select the first profile named **PR1** from the list on the left:



Select the **Links** tab. Right-click on the spreadsheet and from the menu select **Column Set > Additional Data**:



The column set named **Additional Data** will be activated. By default, this includes the street names of the links. Note that four predefined column sets are available, namely **Geometry**, **Flow**, **Quantities** and **Additional Data**. In addition, four custom sets are available. To select which columns appear in each set, right-click on the spreadsheet and select **Edit column set**:

The 'Column Set' dialog box is shown, allowing users to configure the columns displayed in the spreadsheet. It has two main sections: 'Nodes' and 'Links'. Each section contains a list of columns with dropdown menus to select the data source. The 'Additional Data' column set is selected in the left pane.

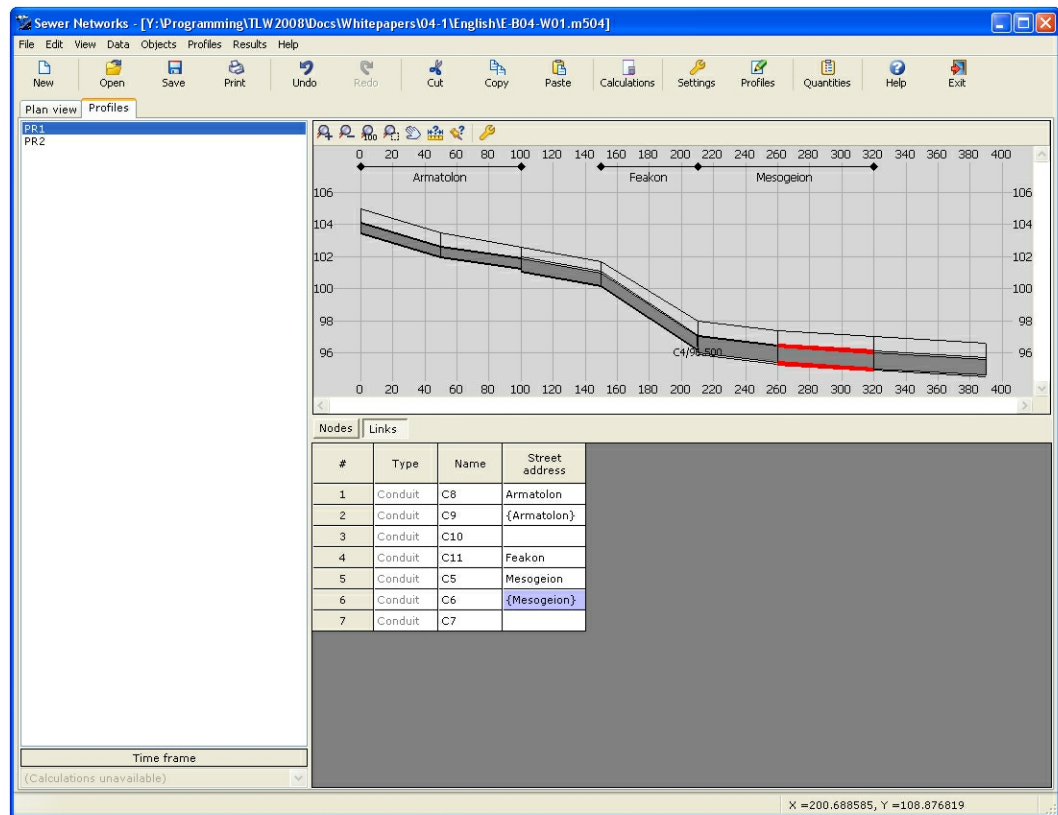
Nodes	Links
01 : Type	01 : Type
02 : Name	02 : Name
03 : X-Coordinate	03 : Inlet elevation (m)
04 : Y-Coordinate	04 : Outlet elevation (m)
05 : Station	05 : Shape
06 : Ground elevation (m)	06 : Length (m)
07 : Invert elevation (m)	07 : Slope
08 : No Property	08 : No Property
09 : No Property	09 : No Property
10 : No Property	10 : No Property
11 : No Property	11 : No Property
12 : No Property	12 : No Property
13 : No Property	13 : No Property
14 : No Property	14 : No Property
15 : No Property	15 : No Property

Buttons for 'Ok' and 'Cancel' are at the bottom right.

Make the appropriate selections and press **Ok**.



Returning to the main form, type the street names in the corresponding cells:



Note that auto-fill is supported for the **Street address** column. The logical rule is to use the name of the previous link.

In the first cell, type "**Armatolon**"

Select the second cell and press **DEL**. This activates the auto-fill mode for this cell, which now is now displayed as "**{Armatolon}**". In general, the curly braces signify auto-fill. The curly braces refer to data input only and disappear in print-outs and drawings.

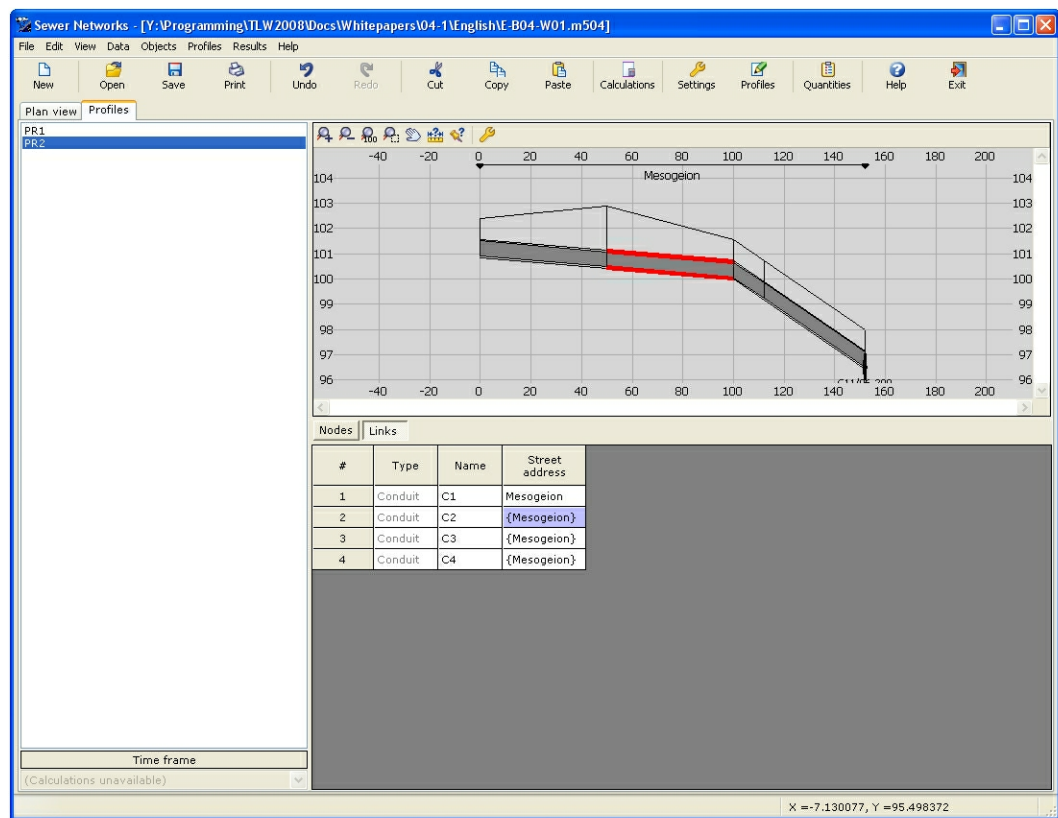
Leave the third cell empty.

Type "**Feakon**" in the fourth cell.

Type "**Mesogeion**" in the fifth cell.

Supposedly, you made a mistake and activated auto-fill in both the sixth and seventh cell. This may have happened, for example, if you selected both cells and pressed **DEL**. The last cell has no street name and auto-fill assigns a wrong value. To delete this field, type a space " ". The program understands that you want to deactivate auto-fill and leave the field empty.

Follow the same procedure for the street names of profile **PR2**:



## 2.2 Step 02: Quantities

The program can calculate the necessary conduits, excavations etc of the whole network with a touch of a button.

First, you should input the project information. From the menu, select **Data > Project info:**

Project information...

Settings

Project title:

Firm:

Comments:

☒ Include the project time and date.

11 / 12 / 2007 15 : 30

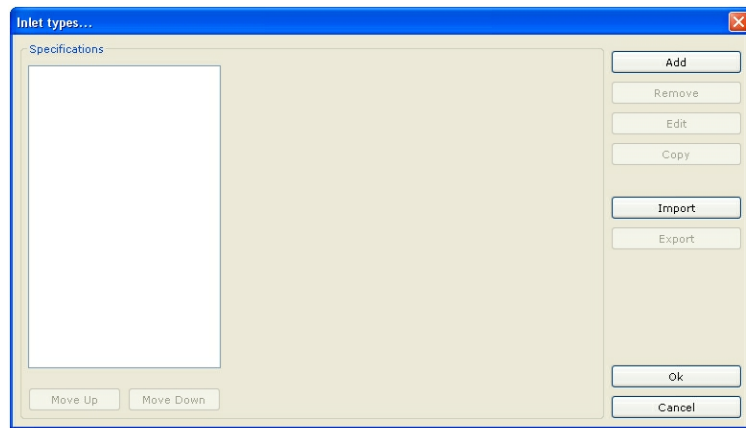
☒ Include the name of the project file.

Now

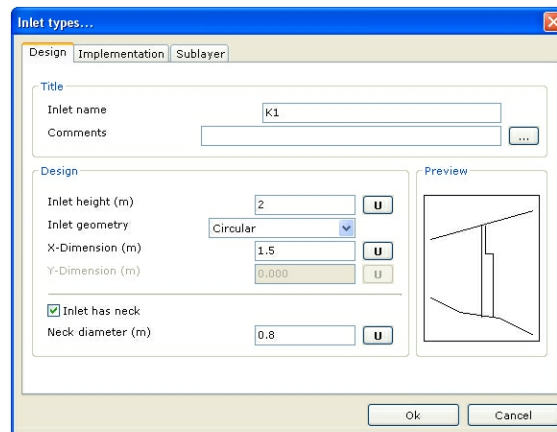
Ok Cancel

Make the appropriate changes and press **Ok**.

In order for the program to calculate the quantities properly, we need to define manhole and trench specifications. Note that we have already defined conduit shapes in the first whitepaper. From the menu, select **Data > Manhole specifications**:



Press **Add**:



Type the inlet name, e.g. **K1**. Select circular inlet, with X-dimension (external diameter) equal to **1.5m** and **height** equal to **2m**. The **inlet has neck** with **diameter** equal to **0.8m**.

Select the **Implementation** tab and input the data as follows:

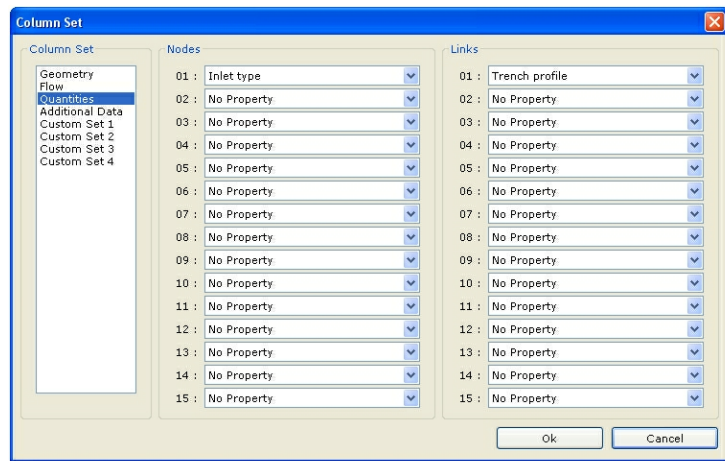
Select the **Sublayer** tab and input the data as follows:

Press **Ok** to store the new specification.

Note that this procedure needs not be repeated for each project. After you have defined a full set of manhole specifications, select **Export** to export the data to an external file. This file may be imported by pressing the **Import** button in other projects.

Press **Ok** to close the manhole specification form.

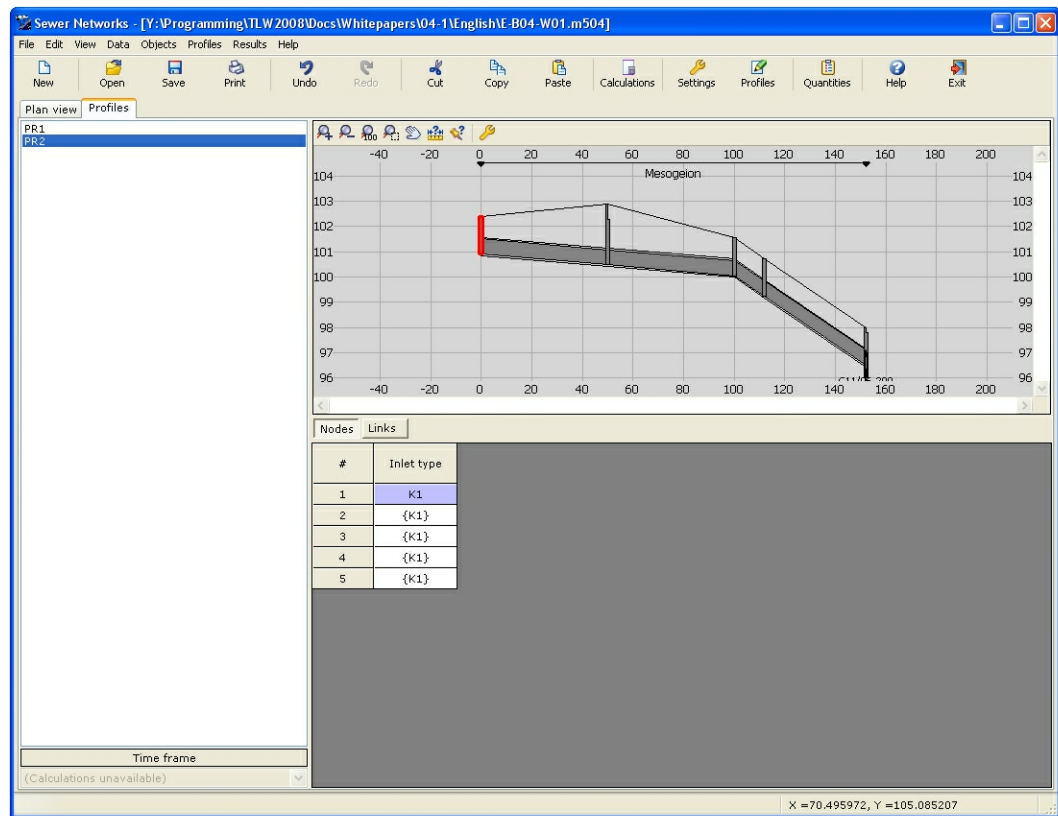
In the main form, select the **Profiles** tab. Right-click on the spreadsheet and from the menu select **Edit column set**:



Select the **Quantities** column set on the left. Select the **Inlet type** for the nodes and the **Trench profile** for the links. Press **Ok**.

Right-click on the spreadsheet and from the menu select **Column set > Quantities**. The sheet will display the columns that you have just selected.

Select both profiles **PR1**, **PR2** successively and in the **Node** tab, select **K1** as the inlet type of all junctions. You can activate auto-fill, as usual. The logical rule is using the inlet type of the previous junction:



Note that the profile sketch includes the manholes with their actual dimensions. You may use the CAD tools from the toolbar, such as zoom, pan, distance etc to obtain useful information.

In similar manner, we will define trench specifications. Select **Data > Trench specifications:**



Press **Add**. In the **Data** tab, select **Type I** template and type **T1** as the trench name:

The 'Add new specification...' dialog box is shown with the 'Data' tab selected. It contains the following fields and controls:

- Trench data:**
  - Template: Type I (dropdown)
  - Trench name: T1 (text box)
  - Comments: (empty text box)
- Dimensions:**
  - d1 (m): 0.000 (text box)
  - d3 (m): 0.000 (text box)
- Materials:**
  - Material (1): C8/10 (dropdown)
  - Material (2): C8/10 (dropdown)
  - Material (3): C8/10 (dropdown)
  - Material (4): C8/10 (dropdown)
  - Foundation concrete type: C8/10 (dropdown)
  - Confinement concrete type: C8/10 (dropdown)
- Diagram:** A schematic diagram of a trench cross-section showing dimensions: Bc (top width), Bd (bottom width), d (depth), and 15cm (side slope).
- Buttons:** Ok, Cancel

Select the **Profile** tab:

The 'Add new specification...' dialog box is shown with the 'Profile' tab selected. It contains the following elements:

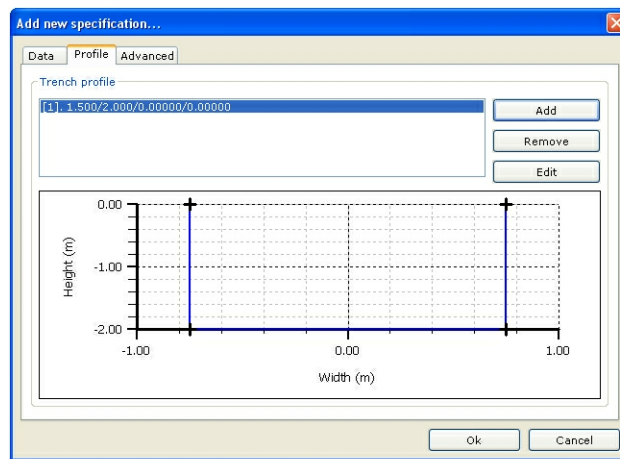
- Trench profile:** A large empty text area for defining the profile.
- Buttons:** Add, Remove, Edit (located to the right of the text area).
- Buttons:** Ok, Cancel (at the bottom right).

To define the trench profile, press **Add**. The profile is defined as a set of trapezoidal layers, from bottom to top. In this example, we will add a single layer with width of 1.5m and vertical slopes in both sides:

The 'Add new layer...' dialog box is shown with the 'Data' tab selected. It contains the following fields and controls:

- Height (m):** 2 (text box)
- Width (m):** 1.5 (text box)
- Left slope (H/V):** 0.00000 (text box)
- Right slope (H/V):** 0.00000 (text box)
- Buttons:** Ok, Cancel

For simplicity, we will apply this trench specification to all conduits, irrespectively of their diameter. Obviously, the trench should depend, among others, on the width of the conduit. The program draws the trench profile:



Note that if the total height of the profile is insufficient, the program automatically extends the topmost layer as necessary.

Select the **Advanced** tab:

To define the geological profile, press **Add**. The geological profile is defined in layers, from top to bottom. In this example, we will add a single layer with height of 2m, 20% rock percentage, augmentation coefficient equal to 1.15 and need for support:



Note that if the total height of the profile is insufficient, the program automatically extends the bottommost layer as necessary.

Press **Ok** to store the new layer.

Select **Use marking grid**, **Asphalt** as **Ground type** and **asphalt thickness** equal to **0.15m**:

The screenshot shows the 'Add new specification...' dialog box with the 'Advanced' tab selected. The 'Advanced' section contains the following settings:

- ☒ Use marking grid
- Grid distance from ground (m): 0.000 [U]
- Select ground type: Asphalt [v]
- Asphalt / concrete thickness (m): 0.15 [U]
- Extra surface width for construction (m): 0.000 [U]

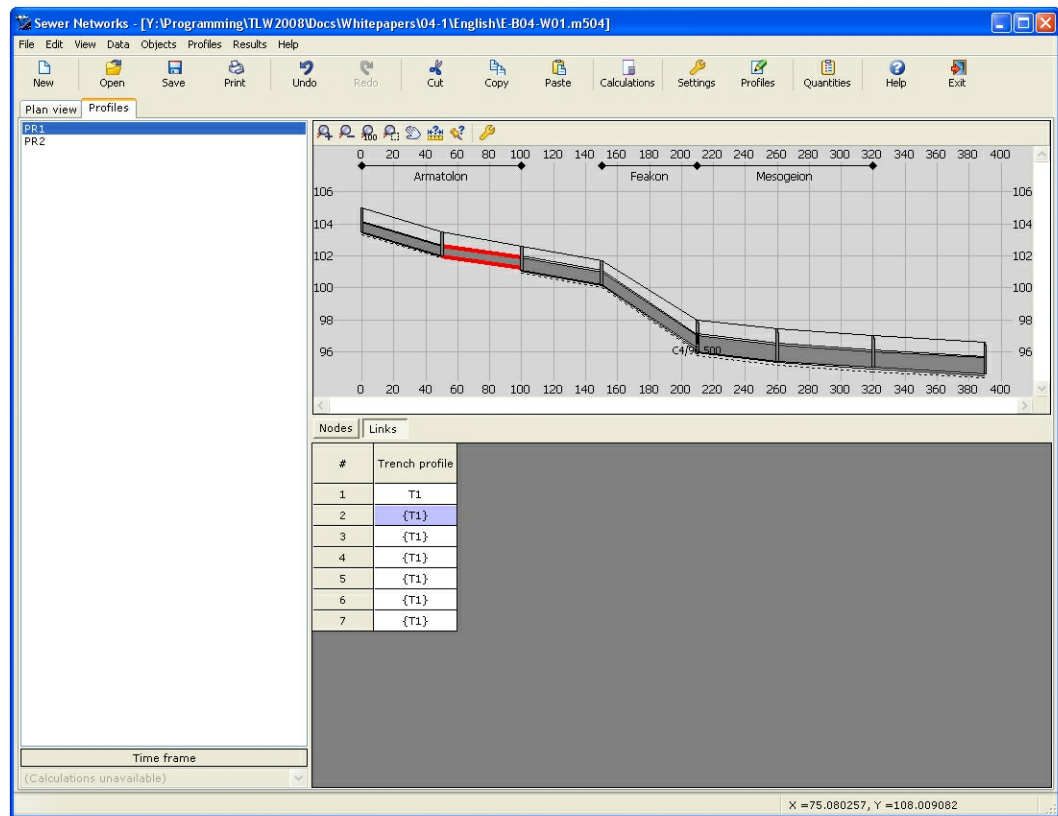
The 'Geology' section contains a list with one entry: '1. 2.000/20.00/1.1500/yes'. To the right of the list are buttons for 'Add', 'Remove', and 'Edit'. At the bottom of the dialog are 'Ok' and 'Cancel' buttons.

Press **Ok** to store the new specification.

Note that this procedure needs not be repeated for each project. After you have defined a full set of trench specifications, select **Export** to export the data to an external file. This file may be imported by pressing the **Import** button in other projects.

Press **Ok** to close the trench specification form.

Select both profiles **PR1**, **PR2** successively and, in the **Links** tab, select **T1** as the trench profile for all conduits. You can activate auto-fill, as usual. The logical rule is using the trench type of the previous conduit:



Note that the profile sketch includes the excavation level (in dotted line).

To conclude the data input regarding the quantities, from the menu select **Data > General Data > Excavation options:**

**Excavations options...**

**Data**

Dislocation of public utilities (m) 150 U

Average transport distance (m) 5000 U

Number of pumps used for pumping out rainfall water 1

Pump diameter (in) 2"

Hours of pump operation (h) 2 U

Ok Cancel

Input the data as shown in the picture.

At this point, the data input regarding the quantities is concluded. Select **Results > Quantities** to calculate the quantities of the whole network. A full report will be compiled and sent to the print manager:

Sewer Networks - Quantities calculation									
Project title						Project title			
Form						Form			
Comments						Comments			
Project file						Y:\Programing\T.W.2008\poc\Whisperers\94-1\English\5-S04-003.m904			
1. Conduit Excavations									
#	Name	Length (m)	Bedding	Excavation Depth (m)	Trench	Soil Volume (m³)	Rock Volume (m³)	Excavation Volume (m³)	
1	C1	50.000	1.650	2.575	T1	126.750	31.688	158.438	
2	C2	50.000	2.575	1.650	T1	126.750	31.688	158.438	
3	C3	12.000	1.650	1.650	T1	23.738	5.940	29.678	
4	C4	40.000	1.650	1.650	T1	79.194	19.799	98.993	
5	C5	50.000	2.250	2.250	T1	115.000	33.750	148.750	
6	C6	60.000	2.250	2.250	T1	162.000	40.500	202.500	
7	C7	70.000	2.250	2.250	T1	189.000	47.250	236.250	
8	C8	50.000	1.650	1.650	T1	99.000	24.750	123.750	
9	C9	50.000	1.650	1.650	T1	93.000	23.250	116.250	
10	C10	50.000	1.700	1.700	T1	102.000	25.500	127.500	
11	C11	60.000	1.700	2.000	T1	133.200	33.300	166.500	
542.000						1269.653	317.413	1587.066	
2. Excavation volume									
2.1. Conduit excavations									
From excavation matrix (m³)						1587.066			
2.1.1. Soft soil excavation									
From excavation matrix (m³)						1269.653			
2.1.2. Rock excavations									
From excavation matrix (m³)						317.413			
2.2. Trench backfill									
2.2.1. Total backfill volume									
Total volume (m³)						694.250			
2.2.2. Restoration (asphalt)									
Total area (m²)						813.0000			
Total volume (m³)						123.9500			
Mean thickness (m)						0.155			

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## 2.3 Step 03: Profile Drawing

The program is able to create profile drawings automatically. To modify the way the profiles are drawn, from the menu select **Results > Profiles > Options:**

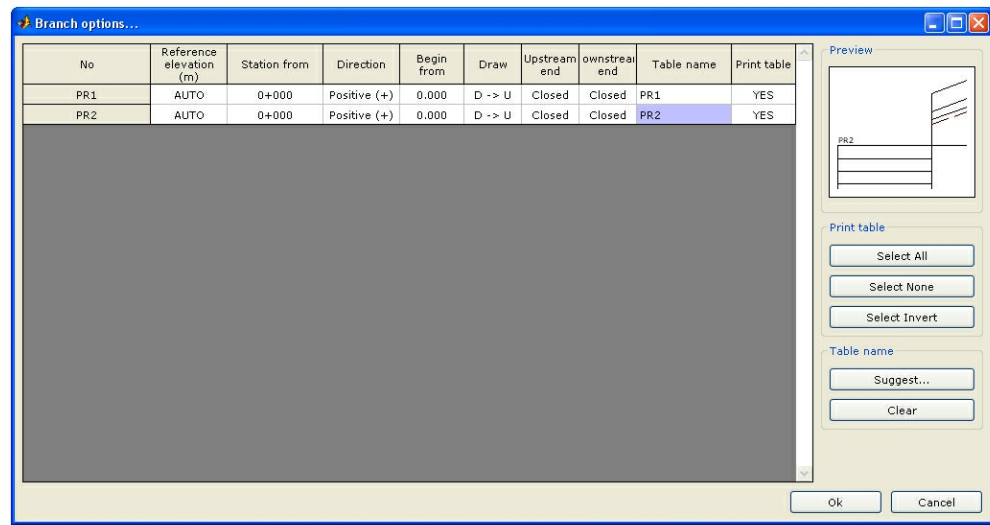
The 'Settings' dialog box contains the following sections and options:

- Settings**
  - ☐ Do not display the inlet types.
  - ☐ Do not display the inlet stations.
  - ☐ Draw all pipes flat (no thickness line)
- Hydraulic calculations**
  - ☒ Q (m³/s)
  - ☒ V (m/s)
  - ☒ h/H (-)
  - ☒ h (cm)
- Custom line**
  - ☒ Draw custom line along the profiles
  - Custom Label:
- ☐ Default values for all new projects

Buttons: Ok, Cancel

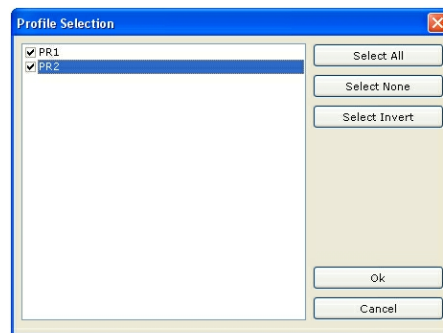
After making the appropriate selections, press **Ok**.

Additional options are available from the menu **Profiles > Profile options:**



After making the appropriate selections, press **Ok**.

To create the profile drawings, from the menu select **Results > Profiles > Design:**



Select the profiles that you want to include in the drawing and press **Ok**. The drawings are prepared and sent to the profile designer:



# Chapter

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## 3 Help

### 3.1 Technical support

#### Technical Support

TechnoLogismiki offers technical support 24 hours per day, 365 days per year, through the Web site where you can get information on the latest programs and services.

#### Support by e-mail

Please use the dedicated e-mail addresses for better customer service:

- for questions regarding sales: [sales@technologismiki.com](mailto:sales@technologismiki.com)
- for questions regarding the usage of programs: [support@technologismiki.com](mailto:support@technologismiki.com)
- for any other question or comment: [info@technologismiki.com](mailto:info@technologismiki.com)

The normal response time is within two business days. If your inquiry cannot be answered via e-mail, a customer service representative will contact you via telephone.

#### Interactive Support

Business days, 09:00 - 17:00 Eastern European Time:

- Telephone [3 lines]: ++30-210-656-4147
- FAX: ++30-210-654-8461
- Address: 5, Imitou str, Cholargos, 15561, Athens, Greece.