PipeMate

Gravity Sewer/Stormwater Design and Draughting Software for Civil Engineers

technocad
Civil Engineering Software

Description

Technocad urban design software is a suite of PC based programs for the design and automated draughting of civil engineering urban services.
Incorporated in this suite are software packages that cover all aspects of civil engineering services design such as Roads, Sewer reticulation, Stormwater reticulation and Water supply.
All the packages have been written with knowledge gained in the civil design office where the need for fully automated draughting, rather than manually manipulated computer aided draughting, was identified as the only way of increasing design and draughting productivity.
PipeMate is the gravity sewer and stormwater software solution of the Technocad urban design software.
The purpose of the software is to provide an intuitive graphical approach to sewer and stormwater reticulation design and analysis, whereby basic information pertaining to the reticulation system is gleaned directly from the AutoCAD drawing.
In addition, PipeMate gives you *final working layout and longitudinal section drawings with the minimum amount of manual input*. The designer works from within AutoCAD, the world's leading CAD software, building the drawings as the design process proceeds.

Work Smarter

Pipe networks are co-ordinated and layout and longitudinal section drawings are created automatically from parameters chosen by the designer. All manhole numbering and pipe numbering is done for you.
Quantities are also calculated, both for piping and manholes. In addition, trench excavation volumes are also available. As you are working in AutoCAD, you can easily add extra notes, background images or attach reference files etc. prior to plotting the final working drawings. Let PipeMate do all the previously boring and mundane work!

Horizontal Layout Drawings

The designer simply has to draw lines representing the gravity pipe network in plan in AutoCAD, connecting the plots/stands as required, creating a 'dendritic' drainage network in the process. Line endpoints indicate manhole requirements - you do not have to draw any of the manholes; PipeMate does it all for you. Simply draw a circle to indicate the position of the outfall. Place inflows into your network graphically optionally, for sewers, using "Red book" or Harmon Formula standards for attenuation by population. When you have created your drainage reticulation layout, simply 'window' the network in AutoCAD and PipeMate calculates the following automatically:

- Manholes are numbered for you and sorted in branch order
- Pipes are numbered and sorted
- Manhole / pipe topology automatically determined
- Manholes are co-ordinated to the required co-ordinate system

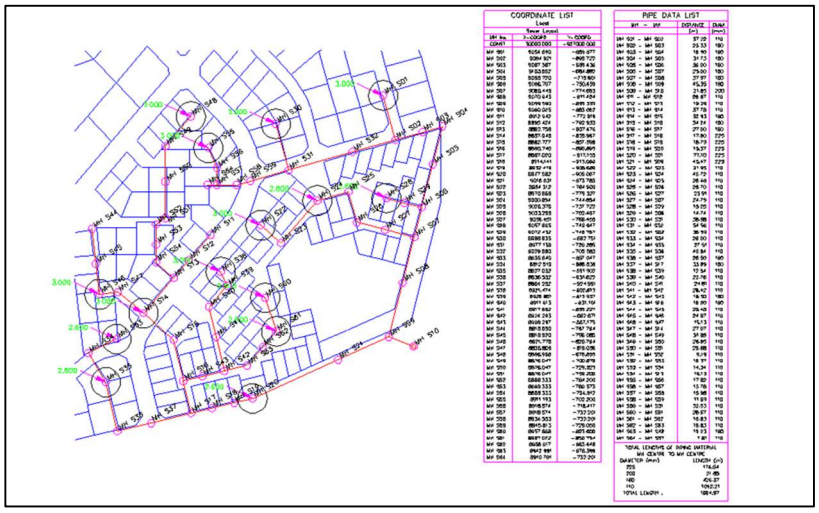


Figure 1: Pipe Network Layout & setting out data produced automatically

- Pipe lengths calculated and totalled

A layout drawing is automatically produced for any desired scale (PipeMate takes care of all your text sizes), and the following is drawn for you, all on separate layers:

- Manholes
- Manhole number text at a selected rotation angle to the horizontal
- Pipe number/diameter text placed midway above each pipe
- Pipe length text placed midway below each pipe
- A co-ordinate list for all manholes
- A pipe data list for all pipes giving:
  - From' manhole - 'To' manhole
  - Pipe length & Pipe Diameter
  - Summary of total pipe lengths by diameter

Network Pipe Branching

PipeMate will automatically compute a pipe branching configuration for you. This branching configuration can then be viewed graphically. The designer has the option to accept PipeMate's branching or to change the branching. Once again, this is easily done by simply picking the pipes that make up your required branching arrangement.

Hydraulic Design

Hydraulic design of the gravity sewers can be done with determination of drop manholes, pipe diameter choice from schedules of commercially available sizes (user-definable), starting and flattest pipe grades per pipe diameter and minimum cover required.
In addition, the user can specify:

- Minimum pipe cover
- Minimum manhole drop
- Maximum depth of flow in pipe for design purposes
- Depth categories for manhole and pipe earthworks excavation quantities
- Pipe Manning's 'n' value
- Force soffit tie-in or invert tie-in at manholes

PipeMate computes the required pipe sizes and soffits / inverts *for all branches* in the network including calculations to ensure that all interconnecting pipe branches 'tie-up'. This unique feature alone can save you many hours of manual work. Imagine being able to have a whole network designed for you by simply pressing a button!

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Hydraulic results include design flow/velocity, maximum flow/velocity, capacity %, grade, length etc. for every pipe in each branch. Low/high velocities are highlighted.

PipeMate.out - Notepad

File Edit Search Help

Pipe No	U/S MH	D/S MH	Grade 1:	Length (m)	Diam (mm)	Qdes (l/s)	Vdes (m/s)	Qmax (l/s)	Vmax (m/s)	Cap. %
BRANCH No 1										
1	1	2	80.0	37.22	110	3.00	0.8	7.36	1.0	40.8
2	2	3	58.2	23.33	160	9.00	1.2	23.42	1.4	38.4
3	3	4	249.9	16.90	160	9.00	0.7	11.30	0.7	79.6
4	4	5	249.9	31.73	160	9.00	0.7	11.30	0.7	79.6
5	5	6	125.7	36.00	160	9.00	0.9	15.94	1.0	56.5
6	6	7	123.2	25.00	160	11.60	0.9	16.10	1.0	72.0
7	7	8	50.8	37.97	160	17.20	1.4	25.08	1.6	68.6
8	8	9	81.0	45.35	160	17.20	1.2	19.86	1.2	86.6
9	9	10	29.6	21.85	200	42.20	2.2	59.59	2.4	70.8
BRANCH No 2										
10	11	12	80.0	26.67	110	0.00	0.0	7.36	1.0	0.0
11	12	13	127.1	19.29	110	0.00	0.0	5.84	0.8	0.0

Figure 2 Hydraulic results

Extraction of ground level surveys

Existing ground levels are required at manholes and along all pipe branches. Digital terrain models (DTM's) of existing or proposed earthworks levels can be extracted by PipeMate using in-memory link to SurfMate or Autodesk Civil3D surfaces with one surface used for design and two more optional surfaces to show existing vs proposed or rock levels as an example. Break-lines in a TIN (triangulated irregular network) surface will be picked up accurately.

Longitudinal section drafting

Longitudinal sections can be designed and drawn of the sewer/stormwater branches. Features of longitudinal sections include:

- Choice of any horizontal or vertical scales
- Longitudinal section ground profiles extracted automatically for every branch of the network.
- Annotation of levels on the longitudinal section at any chosen chainage interval.
- Dynamic preview and editing of ground profile files and sewer profile files with ability to force inverts, pipe grades or drops.
- Move pipes in the drawing and the design data updates; revise the design data and the drawing updates
- Ground and invert levels interpolated if required at constant chainage intervals. Ground and invert levels determined at special chainages such as pipe or road crossings
- Manhole inverts and pipe grades either designed automatically or else entered manually by specifying either:
  - Manhole invert
  - Pipe grade
  - Drop manhole
- Longitudinal sections annotated automatically with pipe specifications, diameters and bedding specifications. Hydraulic information also placed automatically on longitudinal section (Qmax, Vmax, QDesign, VDesign, d/D ratio)
- User customisable presentation of longitudinal sections
- User able to draw 'partial' longitudinal sections; simply input the required 'starting' manhole and 'ending' manhole

Output is in high quality final drawing format inside AutoCAD. This allows for further editing and enhancement if required prior to plotting.

Quantities Calculations

Earthworks quantities are calculated in user selectable depth categories for both the "design" mode and "analysis" mode. Output includes:

- Pipe length and pipe diameter for each pipe in each branch in the network
- Pipe earthworks excavation quantities listed per branch for each diameter and depth category
- Cumulative quantities for all branches in the network
- Number of manholes per depth category and total number in network
- Length of piping material by diameter for the complete network
- Total length of piping for all the network
- A fully priced Schedule of Quantities can be written directly to Microsoft Excel.

Hydraulic Analysis

This allows the hydraulic analysis of an existing system (as opposed to the *design* of a new system) where the pipe sizes and inverts are known and the designer wishes to calculate the hydraulic capacities of the existing network and produce longitudinal sections.

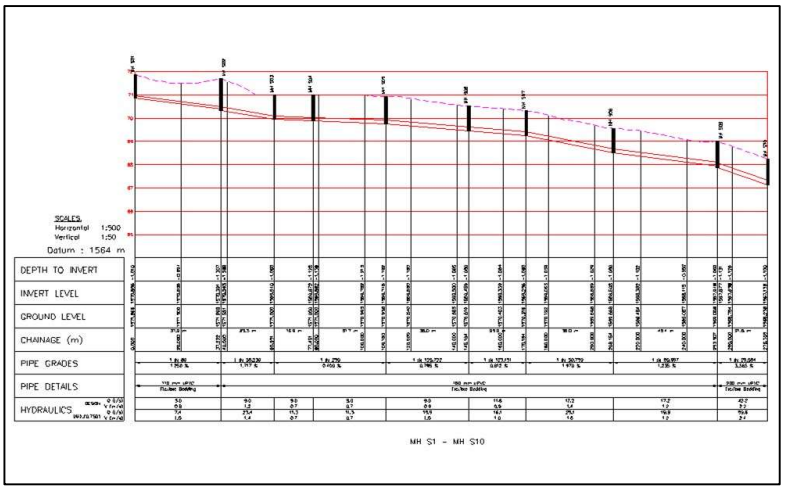


Figure 3 Typical Profile

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Hydraulic analysis of the gravity sewer/stormwater network can be carried out allowing for drop manholes, varying diameters and pipe grades, varying Manning "n" values and flows.

House connections can now also be visualised in 3D.

3D-Network

The complete gravity pipe network can be visualised in 3D (together with manholes)

Schedule of Quantities	C:\TECHNOCAD\PipeMate2011\Samples\sewer network.bat					
	Item	Unit	Quantity	Unit price	Total	Accumulative
1.0	*Piping - PVC-Class 51 Solid normal duty*					
	1.1 160mm uPVC Class 51	(m)	21.848	R 18.00	R 393.26	
	1.2 110mm uPVC Class 51	(m)	1613.605	R 16.00	R 25 817.68	
	Total		1635.453		R 26 210.94	R 26 210.94
2.0	*Excavation*					
	2.1 0.0 - 0.5	(m^3)	-	R 6.00	R -	
	2.2 0.5 - 1.0	(m^3)	648.913	R 10.00	R 6 489.13	
	2.3 1.0 - 1.5	(m^3)	292.099	R 20.00	R 5 841.99	
	2.4 1.5 - 2.0	(m^3)	78.013	R 30.00	R 2 340.38	
	2.5 2.0 - 2.5	(m^3)	211.375	R 40.00	R 8 454.99	
	2.6 2.5 - 3.0	(m^3)	76.732	R 50.00	R 3 836.60	
	2.7 3.0 -50.0	(m^3)	-	R 100.00	R -	
	Total		1 307.132		R 26 963.09	R 26 963.09
3.0	*Bedding*	Bedding	174.340	R 8.23	R 1 434.81	R 1 434.81
4.0	*Selected backfill*	Selected Backfill	462.169	R 15.50	R 7 163.63	R 7 163.63
5.0	*Backfill*	Backfill	655.434	R 6.75	R 4 424.18	R 4 424.18
6.0	*Manholes*					
	6.1 0.0 - 0.5	No	-	R 900.00	R -	
	6.2 0.5 - 0.9	No	-	R 1 100.00	R -	
	6.3 0.9 - 1.2	No	47	R 1 300.00	R 61 100.00	
	6.4 1.2 - 2.5	No	16	R 1 400.00	R 22 400.00	
	6.5 2.5 - 3.2	No	2	R 1 500.00	R 3 000.00	
	6.6 3.2 - 5.0	No	-	R 1 700.00	R -	
	Total		65		R 86 500.00	R 86 500.00
	Total Cost					R 152 696.66

Figure 4: Automatic Manhole and pipe quantities schedule for whole network

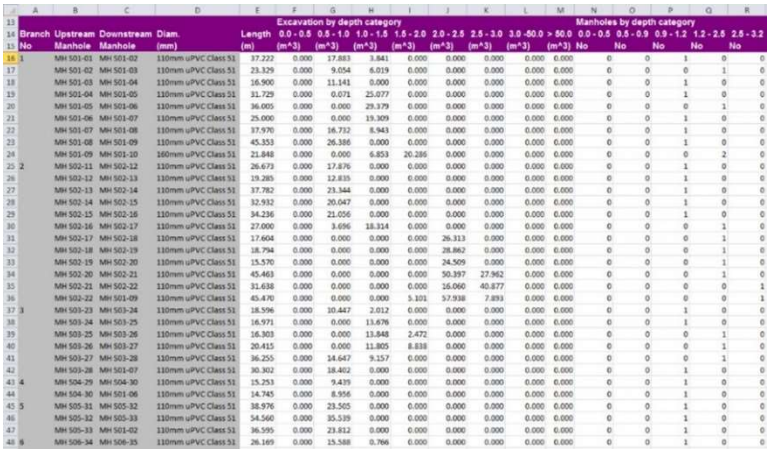


Figure 5: Automatic Quantities per network branch for piping, manholes, bedding & trench backfill

Clash Detection

Automatic determination and visualisation of pipe network clash detection can be done with other networks in 3-D, such as clash detection between a stormwater network and a sewer network.

House Connections

House connections from each Plot/Stand to the main sewer can be calculated and shown automatically on all long-sections.

and exported to a separate drawing or taken through to Autodesk Navisworks for clash detection with other objects.

Utility Crossings

Utility services such as water lines, cables, telecom lines etc. can automatically be shown on long-sections when simply indicated in plan.

Autodesk Civil3D networks

Should the designer be using Autodesk Civil3D then the following options are also available:

- Pipes and manholes can be automatically drawn & labelled in Autodesk Civil 3D as 3D pipe and structure elements. Pipe branches are taken into cognisance automatically creating alignments along each branch of the network.
- Automatic drawing of Autodesk Civil 3D profiles (long-sections) for all branches in the network (or just those selected). All styles required are supplied as per local standards.
- Hydraulic information automatically placed on the Autodesk Civil 3D Profiles
- Dynamic updating of hydraulic data if pipe adjusted in profile view

On-line help

PipeMate has a full-featured HTML style on-line help with indexing and search features. Detailed explanations of the workflow and functions with an abundance of graphics.

Technical Support

Professional technical support is available with your subscription.

Purchase Options

You can purchase a short-term or long-term subscription. The choice is yours – whatever suits your budget and project requirements!

- Network licensing (LAN) is also available

Hardware Requirements

As per Autodesk recommendation for AutoCAD, AutoCAD Map or Autodesk Civil3D

Software Requirements

- AutoCAD Release 2027, 2026, 2025 & 2024 supported. Also, Autodesk Map 2027, 2026, 2025 & 2024 and Autodesk Civil 3D 2027-2024
- Operating systems: Windows 10 64-bit and Windows 11 64-bit
- Microsoft Excel

Contact Details

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