

WaterMate

Pressurised Water Reticulation Design and Draughting Software for Civil Engineers

TECHNoCAD

Civil Engineering Software

Fully Integrated with AutoCAD®

Description

TECHNoCAD urban design software is a suite of personal-computer 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.

WaterMate is the water reticulation software package of the TECHNoCAD urban design software.

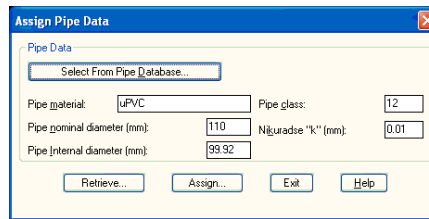
The purpose of the software is to provide an intuitive graphical approach to water reticulation design, whereby information for the hydraulic analysis is gleaned directly from the AutoCAD drawing. In addition, WaterMate gives you *final working layout drawings with the minimum amount of manual input*. WaterMate can be used for networked systems and overland distribution pipelines.

Work smarter

Water networks have the nodes and pipes numbered and co-ordinated automatically. This allows for easy re-arrangement of the network layout without having to manually re-number nodes and pipes. Layout drawings are created automatically from parameters chosen by the designer. Because you are working in AutoCAD, you can easily add extra notes, insert background aerial photographs or attach reference contour files etc. prior to plotting the final working drawings. Let WaterMate do all the previously boring and mundane work!

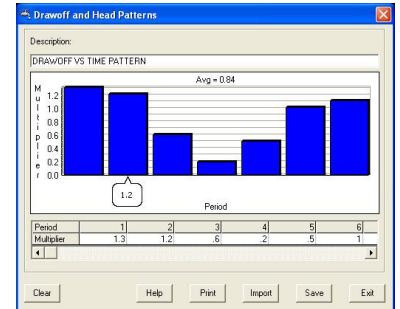
A static hydraulic analysis or time simulation of the water network is

done with a selection of reservoirs and/or tanks and hydraulic devices which can be placed anywhere in the network. Pipe information is stored in your drawing, so you only have to enter it once. Enter data using user-friendly dialog boxes.



Horizontal layout drawings

The designer simply has to draw the lines of the water network in plan in AutoCAD, connecting the plots/stands as required, creating a closed / open-looped network in the process. Line endpoints will indicate node-positioning requirements. You can use both lines and polylines to represent your pipes. Pipe properties can be selected from a database and assigned to the lines/polylines. Simply place a reservoir or elevated tank at one or more places indicating sources of water. Place drawoffs on your network graphically; even assign peak draw-off factors to discrete areas of your network graphically. Drawoffs can



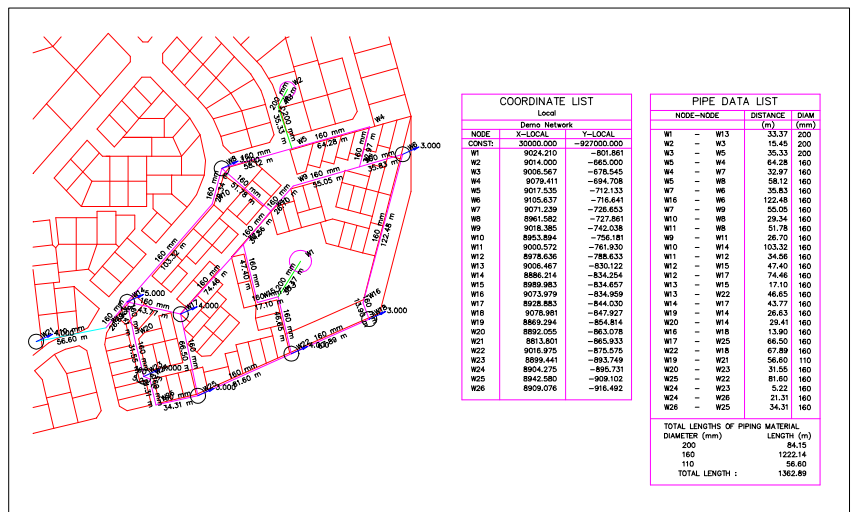
vary with time according to user specified time patterns.

When you have created your water reticulation layout, simply 'window' the network and WaterMate does the following automatically:

- Nodes are numbered and sorted
- Pipes are numbered and sorted
- Node/pipe topology determined
- Nodes are co-ordinated to the specified survey system
- Pipe lengths are calculated and totalled

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

- Nodes
- Node numbers at a selected angle to the horizontal
- Pipe numbers or diameters



Layout plan automatically annotated

- midway above each pipe
- Pipe lengths midway below each pipe
- A co-ordinate list of all nodes
- A Pipe Data list of all pipes giving:
 - From node - To node
 - Pipe length
 - Pipe diameter
 - A summary of total pipe lengths by diameter/class

Linking to DTM for Levels

WaterMate can link to DTM surfaces created in either AutoCAD Civil3D or SurfMate for automatic extraction of ground levels at nodes or for extraction of detailed longitudinal sections along pumping / gravity mains.

Hydraulic design

WaterMate creates all the information it requires for hydraulic analysis or time simulation directly from the drawing:

- Reservoir/tank positions, ground levels and water levels
- Node numbers and associated pipe numbers
- Node ground levels (directly from an in-memory interrogation of the SurfMate digital terrain model - lightning fast!)
- Pipe lengths
- Friction (roughness) "k" factors for each pipe
- Internal diameter of each pipe

All this information is kept in open ASCII type data files.

Various types of hydraulic devices can be placed in any pipe in the network:

- Reservoirs or tanks can be placed at any node
- Pumps, using commercial pump curves
- Pressure reducing valves
- Flow control valves
- Non-return valves

Minor losses can be allowed for.

The hydraulic analysis / time simulation uses a linear method of convergence which is extremely fast.

Hydraulic results include:

- A schedule of piping quantities
- For each pipe:

Pipe No	From N1	To N2	Int. Diam. (mm)	Flow (l/s)	Vel. (m/s)	Calcd. DARCY F	Equiv. HAZ/W C	Energy at N2 (m)	Press. at N2 (m)	Head Loss (m)	Head Loss/m (m/m)
1	1	13	194	18.6	0.6	0.017	151	1583.9	9.2	0.06	0.002
2	2	3	194	14.4	0.5	0.018	150	1584.0	10.5	0.02	0.001
3	3	5	194	14.4	0.5	0.018	150	1583.9	10.9	0.04	0.001
4	5	4	155	6.1	0.3	0.021	147	1583.9	12.9	0.05	0.001
5	4	7	155	6.0	0.3	0.021	147	1583.9	12.5	0.02	0.001
6	5	8	155	8.3	0.4	0.020	149	1583.9	9.6	0.07	0.001
7	7	6	155	5.0	0.3	0.022	146	1583.9	13.3	0.02	0.001
8	16	6	155	-2.0	-0.1	0.027	140	1583.9	13.3	0.01	0.000
9	7	9	155	0.9	0.0	0.034	133	1583.9	10.9	0.00	0.000

Hydraulic results report

- Diameter chosen (mm)
- Flow (l/s)
- Velocity (m/s)
- Calculated Darcy friction factor
- Calculated equivalent Hazen Williams friction factor
- Friction loss in metres and metres / metre
- For each node:
 - Energy level (m)
 - Pressure (m)
- For each reservoir/tank:
 - Level (m)
 - Flow from reservoir (l/s)
- For each pump or other hydraulic device:
 - Pumping head (m)
 - Flow (l/s)

View results graphically

As well as providing your results in the traditional 'calculation-pad' style, WaterMate allows you to view your results graphically. Flow / velocity arrows give the designer an overall graphical visualisation of the hydraulics of the network. The nodal pressures in the network can be contoured so as to highlight low

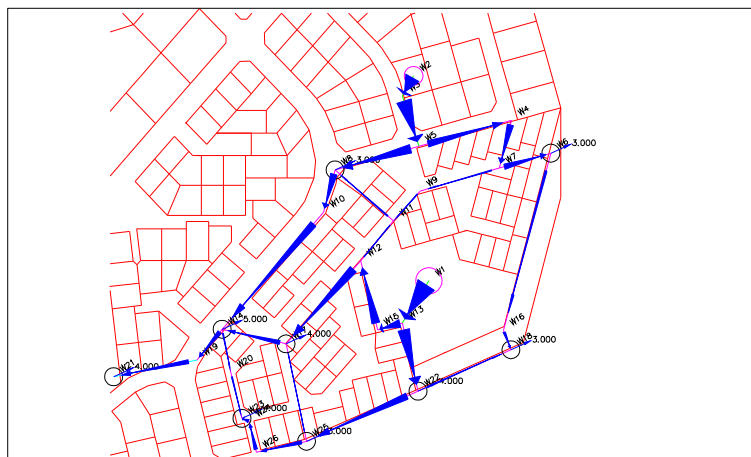
or high-pressure zones.

Query your data graphically

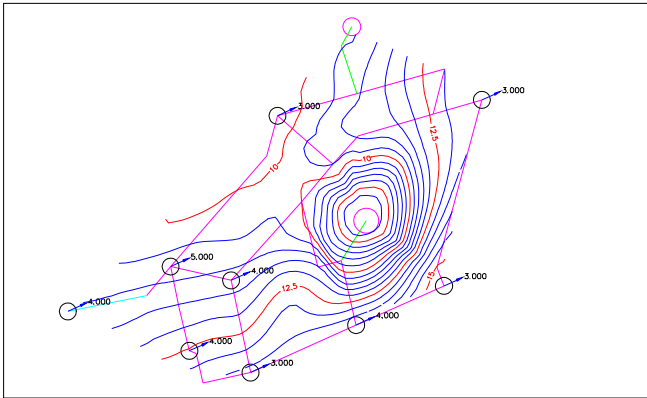
As you have input your data graphically, WaterMate allows you to query your data. You can perform queries such as "Show me all the 150 diameter pipes that have a pressure class = 10". You can perform global edits on your input data; for example, change all existing 200 diameter uPVC pipes that are class 10 to class 12. This unique feature makes it easy for the designer to change network parameters!

Hydraulic device controls

Hydraulic devices and pumps can be controlled by user specified rules as to when they must open / close / start / stop etc during a time simulation. An example would be to start a pump when the level in a tank drops below a minimum level and to stop again when it is above a maximum level.



Graphical visualisation of hydraulic results



Pressure contours

Longitudinal sections

If you need to produce longitudinal sections along any of the pipes in the network, simply show WaterMate the relevant pipes by picking them and WaterMate will instantly produce *fully detailed* longitudinal sections showing required air/scour valve locations and detailed horizontal / vertical / compound bends. WaterMate includes a 2-way link to Vent-O-Mat CATT design software for the calculation of required air valve sizing and positioning along a pipeline. The results can then be imported into WaterMate and the fully detailed air valves can be shown in plan view as well as on your longitudinal section.

The pipe vertical profile can be modified (simply by using AutoCAD 'grips'). Trench excavation quantities can also be calculated, using user defined depth categories.

Toolbox

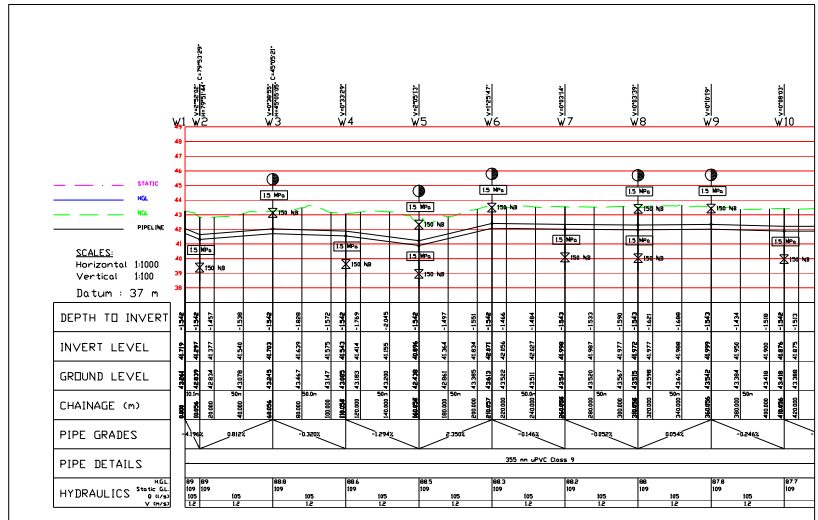
Included with WaterMate is the Technocad toolbox featuring lots of useful functions to make your draughting a pleasure!

The toolbox is accessible via the pull-down menu or directly from a specially designed toolbar.



On-line help

WaterMate has a full-featured Windows on-line help feature with indexing and search features. This documentation has been written by engineers making it *really* useful.



Fully detailed Longitudinal Section

Hardware requirements

- Dual Core processor based computer (the faster the better!)
- RAM - sufficient to run AutoCAD software; Autodesk recommendation is 2GB or greater
- Hard disk capacity - program files need approx. 20MB; always ensure that you have more than 250MB free when running AutoCAD software
- Graphics resolution - minimum resolution 1024 x 768 or greater

Ordering Details

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Software requirements

- AutoCAD Release 2008/2009/2010 & 2011, Autodesk Map 2008/2009/2010 & 2011 and AutoCAD Civil3D 2010/2011
- Either AutoCAD Civil3D or SurfMate for extracting elevations. SurfMate for pressure contours.
- Operating systems: Windows XP Pro/Vista/Win 7 (32-bit and 64-bit)

