BENTLEY® WATERGEMS®

Water Distribution Modeling and Management

ArcGIS, AutoCAD, MicroStation, and stand-alone environments within one single product

WaterGEMS® is a hydraulic and water quality modeling solution for water distribution systems with advanced interoperability, geospatial model-building, optimization, and asset management tools. From fire flow and constituent concentration analyses, to energy consumption and capital cost management, WaterGEMS provides an easy-to-use environment for engineers to analyze, design, and optimize water distribution systems.

Stand-alone, ArcGIS, MicroStation, and AutoCAD environments within one single product

Out of the box, WaterGEMS users can enjoy the easy-to-use Windows stand-alone interface – or choose to work directly inside ArcGIS, MicroStation, or AutoCAD. Utilities and consultants can share a single dataset using different interfaces, and modeling teams can leverage the skills of engineers from different departments. Engineers can flatten learning curves by choosing the environment they already know and provide results that can be visualized on multiple platforms.

Use LoadBuilder to allocate demands using customer meters, service polygons, and more.

WaterGEMS' ArcGIS interface allows GIS professionals to leverage ESRI's geodatabase architecture to guarantee a single dataset for modeling and GIS. They can create, edit, calculate, and visualize WaterGEMS models directly from ArcMap with full access to every hydraulic modeling tool, as well as geoprocessing features that streamline the model-building process.

Geospatial model-building tools

Engineers can leverage geospatial data, CAD drawings, databases, and spreadsheets to jumpstart the model building process. WaterGEMS provides synchronized database connections, geospatial links, and advanced model-building modules that connect with virtually any digital data format.

WaterGEMS' Darwin Calibrator module saves time and money by quickly giving you a calibrated model

WaterGEMS' included LoadBuilder module helps engineers allocate water demands based on GIS water consumption data from any point, line, or polygon feature using customer meters, lump-sum demand distribution, population-estimation polygons, or utility meter routes.

The TRex module, also included, extracts elevation data from DEMs; TINs; elevation shapefiles or feature datasets; and 3D CAD drawings and surfaces. It automatically assigns elevation values to junctions, tanks, pumps, valves, reservoirs, and fire hydrants, saving engineers time and avoiding potential manual-input mistakes.

WaterGEMS also provides drawing and connectivity review tools to guarantee a hydraulically coherent model. Skelebrator automatically removes network complexity, while maintaining hydraulic equivalence, to efficiently tackle a wider range of modeling applications.

Optimized model calibration, design, and operations

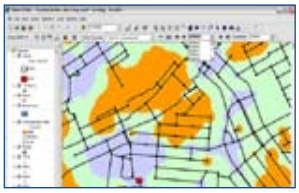
WaterGEMS includes state-of-the-art genetic algorithm optimization engines for automated calibration, design, and rehabilitation.

Darwin Calibrator™ lets users quickly find a calibration hypothesis that best matches measured flows, pressures, and element status. This empowers users to make reliable decisions based on accurate hydraulic simulation of the real world, which is the most important reason to invest in a water distribution model. Darwin Calibrator evaluates millions of possible solutions to return the best possible calibration hypothesis.

Darwin Designer™ automatically finds maximum-benefit or minimum-cost designs and rehabilitation strategies, based on capital investment, reposition cost, and pressure and velocity constraints. Engineers can also manage infrastructure capital cost, and analyze energy consumption to identify the most energy-efficient pump scheduling strategy.

WaterGEMS includes four interoperable platforms: ArcGIS, MicroStation, AutoCAD and Windows stand-alone

Flip through scenarios from your plan view, FlexTables, contour maps and graphs



Perform constituent, water age, tank mixing, and source trace analysis

Bentley WaterGEMS System Requirements

Processor
Pentium III at 1 GHz (recommended: Pentium 4 at 1.2 GHz)

Operating System
Windows Server 2003 and Windows XP

Memory
256 MB (384 MB recommended, 1Gb recommended for large networks)

Hard Disk
500 MB of free storage space, with additional room for data files

Display
800 x 600 resolution, 256 colors

Platform pre-requirements
- Stand-alone: none
- ArcGIS: 8.x, 9.x
- MicroStation: V8 XM Edition
- AutoCAD: 2004, 2005, 2006

WaterGEMS At-A-Glance

Interface and graphical editing
- Stand-alone Windows interface
- ArcGIS-based interface (ArcMap)
- MicroStation-based interface
- AutoCAD-based interface
- Unlimited undo and redo
- Element morphing, splitting and reconnection
- Automatic element labeling
- Scaled, schematic, and hybrid environments
- Element prototypes
- Aerial view and dynamic zooming
- Named views library
- Multiple background-layer support
- Image, CAD, and GIS background support

Interoperability and data connections
- One set of files for four compatible interfaces
- Bidirectional synchronized connections
- Shapefile, Geodatabase, Geometric Network and SDE
- Polyline-to-pipe connections from DXF files
- Spreadsheet, database and ODBC connections
- SCADAConnect™ available for live data connections

Hydraulics, operations, and water quality
- Steady-state simulation
- Extended-period simulation
- Constituent-concentration analysis
- Source tracing
- Criticality analysis
- Tank-mixing analysis
- Water-age analysis
- Fire-flow analysis
- Rule-based or logical controls
- Variable-speed pumping
- Leakage and sprinkler modeling
- Pressure-dependent demands
- Scenario modeling-based unidirectional flushing
- Valve modeling

Results presentation
- Direct ArcMap visualization and mapping
- Thematic mapping
- Dynamic, multi-parameter, and multi-scenario graphing
- Shapefile contouring
- Advance profiling
- Advanced tabular reporting with FlexTables
- Property-based color coding and symbology
- Property-based annotation

Model building
- Polyline-to-pipe conversion from DXF files
- Spreadsheet, database, and ODBC connections
- Automatic demand allocation from geospatial data
- Geospatial demand allocation from customer meters
- Demand allocation from lump-sum geospatial data
- Geospatial-based water-consumption projection
- Daily, weekly, monthly, and superimposed patterns
- Unaccounted-for water and leakage estimation
- Composite demands global edition
- Area, count, discharge, and population-based loading
- Pipe-length-based demand loading
- Elevation extraction from DEM, TIN, and shapefiles
- Elevation extraction from CAD drawings and surfaces
- Series skeletonization of pipes
- Parallel skeletonization of pipes
- Branch-trimming skeletonization
- Multi-criteria automated skeletonization

Model management
- Unlimited scenarios and alternatives
- Comprehensive scenario management
- Global attribute tabular edition
- Sorting and persistent filtering on tabular reports
- Statistical analysis from tabular reports
- Automated model skeletonization
- Personalizable engineering libraries
- Dynamic and static selection sets
- Local and global engineering-units management
- Sub-model management
- Drawing review tools for connectivity consistency
- Automatic topology review
- Orphaned nodes and dead-end pipes queries

Optimization
- Genetic algorithm calibration, design and rehabilitation
- Automated model calibration with Darwin Calibrator
- Optimized design and rehabilitation with Darwin Designer

Energy and capital-cost management
- Energy cost analysis
- Capital cost analysis
- Automatic design and rehabilitation

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