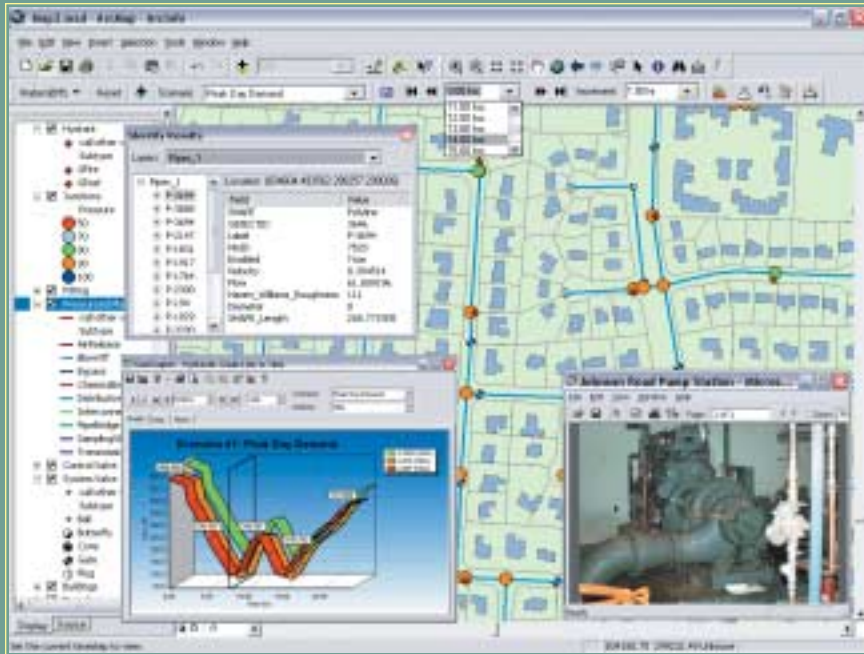


WATERGEMS™

FROM HAESTAD METHODS



THE COMPLETE GEOSPATIAL
MODELING & MANAGEMENT
SYSTEM FOR THE WATER UTILITY



HAESTAD METHODS • 37 BROOKSIDE ROAD • WATERBURY, CT 06708 USA

VOICE: +1-203-755-1666 • INTERNET: www.haestad.com • FAX: +1-203-597-1488

U.S. & CANADA TOLL FREE: 1-800-727-6555

WATERGEMS™

WaterGEMS is the world's first true geospatial water modeling and management system for the enterprise and is the most powerful GIS-based solution available for efficiently modeling, managing, and protecting our most valuable resource—water. With WaterGEMS, engineers and GIS specialists can now manage their water system data, time-series hydraulic results, current and future scenarios, and other core infrastructure data all within the same GIS environment. No need to transfer data back and forth or link to external files. The model and the GIS are now one and the same.



USE WATERGEMS FOR:

- ▶ Constructing models from existing data assets
- ▶ Seamless integration of the water distribution model and GIS
- ▶ Management and operation of complex distribution systems
- ▶ Asset management and capital budgeting
- ▶ Master planning and system expansion
- ▶ And much more

INTELLIGENT & POWERFUL

- ▶ Introduce time to your GIS. With WaterGEMS, you can run extended-period simulation models directly inside of your GIS and have results and symbology update dynamically. No extra steps required.
- ▶ Use Skelebrator™ to accurately reduce complex GIS assets and CAD data sets for modeling while maintaining hydraulic equivalency and network integrity.
- ▶ Define, assign, forecast, and manage customer demand information with eight different methods using LoadBuilder™.

CUTTING-EDGE TECHNOLOGY

Haestad Methods' product philosophy is to make intellectual investments in strong technologies and to consistently adapt to customers' changing needs. This principle was critical to the development of WaterGEMS, the complete geographic engineering modeling system for the water utility. WaterGEMS was developed using the latest ArcObjects™ technology from GIS market-leader ESRI and state-of-the-art computing tools from Microsoft's .NET initiative. With these foundations in place, WaterGEMS' functionality will continue to grow not only as Haestad Methods develops new tools, but as ESRI and Microsoft add functionality, as well.

"Haestad is making a wonderful contribution to the field of Hydrology and Hydraulics Modeling"

—Indian Institute of Technology

"Haestad Methods has great products. They are really geared to the practicing engineer and clearly provide a great benefit."

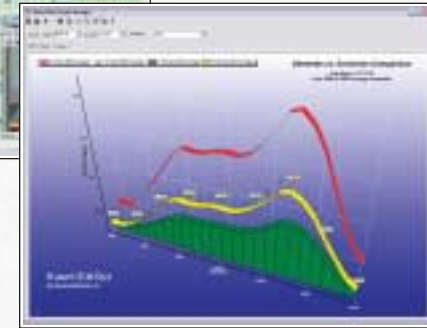
—The LA Group Landscape Architecture & Engineering PC

HIGHLY VISUAL

- ▶ Create stunning visualizations by illustrating your system in the greater context of a community with professional-quality maps.



- ▶ Use GeoGrapher™ to develop high-impact, fully customizable graphs directly within your GIS varying any combination of scenarios, time, elements, and variables.



SOPHISTICATED HYDRAULICS

- ▶ Manage an unlimited number of scenarios with the Scenario Control Center™.
- ▶ Streamline model calibration with the genetic-algorithm based Darwin™ Calibrator.
- ▶ Perform advanced hydraulic and water quality analysis such as automated fireflow analysis; constituent, age, and trace analysis; leakage and sprinkler modeling; energy and capital cost evaluation; and more.
- ▶ Simulate the most complex of situations, including true variable-speed pump modeling that automatically calculates pump speeds during EPS runs.

MORE INFORMATION:

www.haestad.com/WaterGEMS

GROUNDBREAKING FLEXIBILITY

With WaterGEMS, you can now work on one file in ArcGIS, AutoCAD, and Stand-Alone, with no need to synchronize data back and forth. Haestad Methods is now the only com-

pany in the world to offer water, sewer, and stormwater modeling solutions for the GIS, CAD, and Stand-Alone environments.

OPEN & ACCESSIBLE

- ▶ WaterGEMS' open database architecture allows modeling data to be completely integrated into existing systems and accessed from any application, including the Web.
- ▶ Use ModelForge™ to take full advantage of available data sets for model building including GIS, enterprise databases, SCADA systems, CAD systems, and more.

CUSTOMIZABLE & EXTENSIBLE

WaterGEMS is the first and the only fully customizable and programmable water distribution modeling and management solution in the world. Using our WaterObjects™ technology, you can now extend, modify, and/or replace any step of the modeling process from data preprocessing and model calculations, to results presentation.

ADVANCED HYDRAULICS & COST ANALYSIS

In addition to its advanced geospatial processing capabilities, WaterGEMS is a complete hydraulic design and analysis package. Whether you need to run just simple steady-state analyses or extended-period water quality simulations, WaterGEMS has the tools you need. Simulate your system in real time; develop master plans; evaluate water quality; determine energy cost savings; analyze the tradeoffs of different capital improvement plans; formulate emergency response plans; determine fire-fighting capabilities; establish flushing programs; and much more.



USE WATERGEMS FOR:

- ▶ Performing steady-state and extended-period simulations
- ▶ Determining system fire protection capabilities
- ▶ Evaluating water quality and conducting vulnerability assessments
- ▶ Simulating system operational strategies and computing energy costs
- ▶ Estimating capital costs and determining the most cost-effective rehabilitation approaches

DESIGN, ANALYZE, & OPERATE

- ▶ Accurately establish acceptability of service throughout your distribution system and assess its ability to provide adequate protection against fires.
- ▶ Determine how much flow you have available at one hydrant, a group of hydrants, or all of the hydrants in your system automatically, while simultaneously maintaining pressure and flow constraints throughout the rest of your system.
- ▶ Command complete control over pressure and flow with flexible valve configurations, including pressure reducing, pressure sustaining, pressure breaking, flow control, and throttle control valves.
- ▶ Handle a wide range of pumping configurations and automatically generate system head curves to assist in pump design and selection.

"Integration with our existing GIS data has saved time and money."

—Town of Guilderland

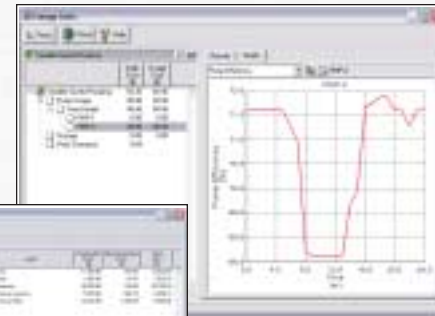
"Haestad has really expanded the utility of hydraulic modeling software to new levels."

—HydroScience Engineers, Inc.

- ▶ Simulate system leakage, fire sprinklers, irrigation systems and any other situation where the node demand varies in proportion to the pressure.

WATER QUALITY AND SYSTEM SECURITY

- ▶ Investigate and predict a wide range of water quality characteristics using water age, source tracing, and constituent transport analyses.
- ▶ Simulate a wide range of tank mixing behaviors to assist in mitigating tank-related water quality problems.



- ▶ Apply WaterSafe™ technology to simulate potential terrorist attacks and disruptions to the water system, predict contaminant propagation and concentration, prepare for emergencies, identify impacted populations, and support real-time decision-making.

COST ANALYSIS

- ▶ Assess the costs associated with the network including pumps, valves, and storage facilities and recommend rehabilitation strategies and capital improvement plans based on both hydraulic and financial impacts.
- ▶ Determine the cost of operating constant-speed and variable-speed pumps using any energy tariff and account for peak demand charges and the effects of storage within the network.

- ▶ Accurately simulate variable-speed pumping with APEX™ Technology that automatically calculates pump speeds during EPS runs, enables full logical controls, and targets nodes anywhere in the system.

- ▶ Realistically emulate programmable logic controllers with rule-based controls that automatically command

the status of your pipes, pumps, and valves based on any combination of system conditions, including time of day, tank drain and fill times, total system demand, hydraulic grades, flows, and pressures.

MODEL BUILDING & DATA MANAGEMENT

It is often said that knowledge is power. This ubiquitous expression has also found a home at Haestad Methods. Data is what drives the modern world, and effective management and use of this data brings efficiency to business and work practices. With the volumes of data involved in applying GIS to water distribution modeling, there is a distinct need for robust and effective data management tools. WaterGEMS' open database architecture along with tools such as ModelForge™ and the Scenario Control Center™, enable you to efficiently construct models and manage large data sets with ease.



USE WATERGEMS FOR:

- ▶ Constructing hydraulic models from multiple data sources
- ▶ Extracting node elevation data from DEM and DTM datasets
- ▶ Evaluating an unlimited number of "what if" scenarios
- ▶ Creating customizable tabular reports for data editing and analysis
- ▶ Simulating multiple planning horizons within the same file
- ▶ Managing and merging submodels
- ▶ Creating reusable engineering specifications

MODEL DEVELOPMENT

- ▶ Fully leverage enterprise databases, SDE® layers, WaterCAD files, shapefiles and coverages, ArcFM® data, or anything else you can imagine. With ModelForge™, you can now build your model from any data source or combination of data sources in minutes.
- ▶ Automatically mine junction elevation data from DEM and DTM datasets using the TRex™ terrain extraction tool.
- ▶ Establish more efficient workflow with larger systems by constructing functional submodels and then merging them to create a complete hydraulically contiguous model.
- ▶ Share pump curves, pipe material types, minor loss types, liquids, and water quality

"Congratulations. I really have seen satisfaction in my customers when consulting and advising using your software. That has added value in my job."

—AMANCO

"Haestad has always been a step above all its competitors. I am glad to see Haestad's aggressive strive for excellence has continued leading into the new millennium."

—Nolte Associates

constituents across projects using the fully customizable Engineering Libraries.

- ▶ Conveniently model the growth of the system over time, simulating multiple planning horizons within the same file.

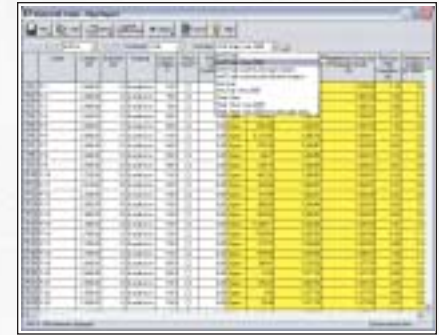
SCENARIO CONTROL CENTER™

The Scenario Control Center is an indispensable decision-support tool that enables you to evaluate an unlimited number of scenarios in your distribution system, run multiple scenarios simultaneously, and compare modeling results both graphically and in tables.

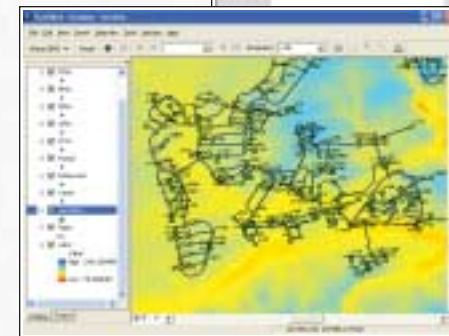
WaterGEM's tree-based Scenario Control Center makes every aspect of modeling more powerful—from simulating proposed construction to evaluating improved pumping strategies, to assessing water quality standards. Make data changes in one scenario and have them cascade through the inheritance tree updating child datasets automatically.

FLEXTABLES™

- ▶ Create tables for data reporting and editing and maintain complete control over the variables to display, the order in which they appear, the labels and the units and display precision.



- ▶ Customize any of the standard tables, or create your own from scratch.
- ▶ Perform queries and filtering to include only elements that match specific criteria, sort data in any order with multiple sort keys, and globally apply mathematical operations to selected elements.



SCHELEBRATOR™

Comprehensive GIS coverages and CAD datasets of water infrastructure often include details that are unnecessary for analyzing system hydraulics. This can include hydrant leads, service connections, and high levels of pipe segmentation for fittings and valving. The patent-pending Skelebrator technology can help to reliably remove this complexity by automating the reduction of GIS, CAD, and modeling data to create more manageable networks. With one tool you can now reduce model size with exceptional speed and accuracy using the customizable data scrubbing, branch trimming, series pipe removal, and parallel pipe removal options—all while maintaining hydraulic equivalency and preserving network integrity.



SELECT SCHELEBRATOR FOR:

- ▶ Reducing the size of models created from GIS and CAD data
- ▶ Automating the skeletonization process
- ▶ Improving hydraulic model manageability
- ▶ Producing reduced-size models for specific studies such as master plans, system rehabilitation studies, and pump scheduling

SCHELEBRATOR OPERATIONS

- ▶ Automatically remove pipes from your system based on user-defined criteria such as length and diameter and remove orphaned nodes while preserving system demands. In addition, you can control the skeletonization process further by specifying different loop retaining sensitivities.
- ▶ Remove short pipe segments, including dead ends, service connections, and hydrant leads, based on custom criteria such as number of trimming levels and pipe and junction removal criteria. In addition, automatically transfer the removed demands to the upstream node.
- ▶ Eliminate unnecessary pipe segmentation by dissolving interior nodes and isolation valves based on user-defined pipe and node conditions. Set the maximum number of removal levels, specify the hydraulic equivalency method, and choose from four load redistribution strategies.

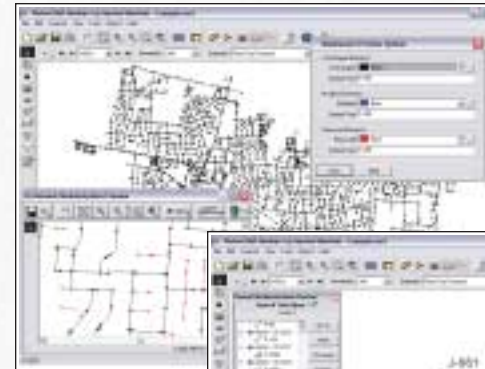
"I enjoy working with your software products and appreciate the prompt technical support you provide when I have problems."

—MPE Engineering Ltd

"Haestad's products always reflect state-of-the-art techniques and are of a user-friendly nature. Therefore, they are my choice."

—Mahaweli Authority of Sri Lanka

- ▶ Consolidate parallel pipes into one hydraulically equivalent pipe.



- ▶ Harness the "Network Aware" Intelligence to automatically prevent network disconnections that could invalidate the model.
- ▶ Ensure that the skeletonized system will behave with the same degree of accuracy as the more complex model by automatically employing hydraulic equivalency.

DEFINING FEATURES

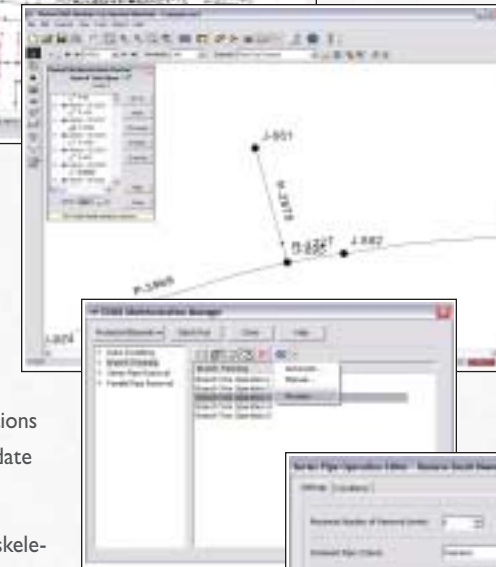
- ▶ Undertake model skeletonization through an intuitive, integrated user interface.
- ▶ Save time by previewing skeletonization

results graphically before applying them to your model.

- ▶ Mark important elements, such as large industries, as non-removable so they are immune to skeletonization.
- ▶ Choose between automated or manual skeletonization review options.

▶ Save all the settings on your skeletonization runs as reusable templates.

▶ Specify flexible tolerances and conditions to control every step of the skeletonization process.



- ▶ Skeletonize files from WaterCAD, WaterGEMS, GIS, CAD, and other data sources—all from within the same environment and with identical, robust functionality.

LOADBUILDER™

LoadBuilder is a fully GIS-integrated suite of tools for allocating, distributing, forecasting, and managing customer water usage data. Eight unique methods enable engineers to flexibly identify and apply model demands with unprecedented speed and accuracy. With LoadBuilder, every step of the model loading process is enhanced, from the initial gathering and analysis of historical billing data to the employment of various allocation strategies. By combining state-of-the-art geoprocessing and spatial analysis capabilities with the latest hydraulic modeling advancements, LoadBuilder drastically streamlines one of the most time-consuming steps of building an accurate hydraulic model.

USE LOADBUILDER FOR:

- ▶ Automating the demand allocation process
- ▶ Mining complicated data sources
- ▶ Distributing demands from a range of data sources
- ▶ Categorizing water consumption in your network
- ▶ Projecting future demands
- ▶ Master planning and decision support
- ▶ Determining unaccounted-for water

OVERVIEW:

- ▶ Leverage a full suite of tools for mining the data you need from sources such as geocoded billing meter records, water production data, census tracts, land use, pressure zones, traffic analysis zones (TAZ), and more.
- ▶ Utilize the intuitive, GIS-integrated user interface to collect, manage, and apply your usage data to efficiently determine demand allocation, distribution, and projection.
- ▶ Automatically create demand alternatives from LoadBuilder calculations, append to existing demand alternatives, or overwrite them. You can even save templates for future use in order to duplicate preferred methodologies.
- ▶ Apply global multipliers to demands to simulate unaccounted-for water that falls outside of the metered demands, or choose to apply individual multipliers separately to your different demand types.

"Haestad Methods is an Enterprise that is always concerned about its customers. It is really important."

—Camel SRL

"I am a strong advocate of your products, and I highly recommend them to all that I deal with."

—Ramona Municipal Water District

DEMAND ALLOCATION:

- ▶ Automatically assign geocoded customer meters to the nearest demand node in the water distribution network.
- ▶ Instantly allocate metered demand data to the nearest pipe and then specify how the demand will be split among the bounding nodes, including equal distribution, distance weighted, and closest and furthest node.
- ▶ Aggregate metered consumption data for individual service polygons and then assign it to the associated demand node.
- ▶ Assign large user consumption to an individual demand node.

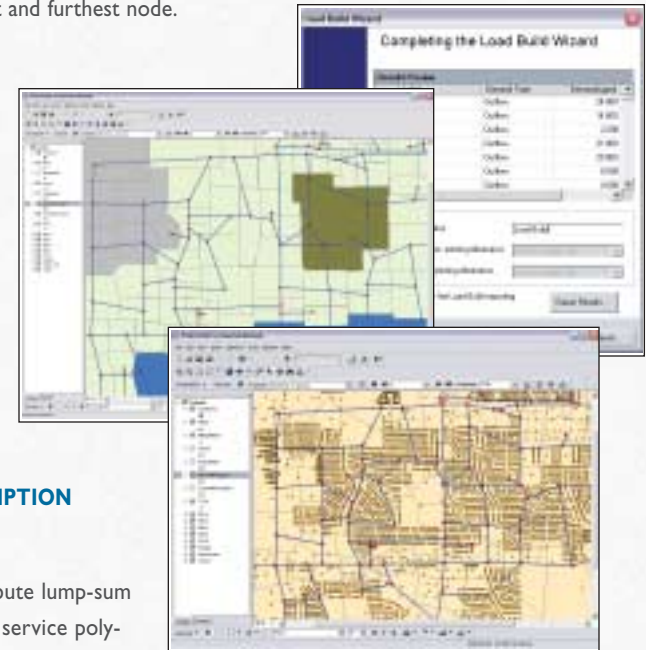
LUMP-SUM CONSUMPTION DISTRIBUTION:

- ▶ Proportionally distribute lump-sum consumption among service polygons based on area or population. Utilize integrated tools to automatically intersect service polygons with consumption categorization polygons, such as land use, TAZ, pressure zones, meter routes, and others.

- ▶ Equally distribute lump-sum demands based on the number of demand nodes contained in the lump-sum area.

DEMAND PROJECTION:

- ▶ Project future demands quickly and accurately based on data such as phased land use projections and projected population.



You can even consider the impact of system build-out on demand projections.

- ▶ Efficiently create multiple demand alternatives by intersecting any combination of future service area layers with different possible land use or population forecast layers.

DARWIN™ CALIBRATOR

It is well-established that a properly calibrated hydraulic model is the only tool that allows you to operate, maintain, and upgrade your water network efficiently and safely. Darwin Calibrator revolutionizes hydraulic network modeling and sets the new global standard for network calibration accuracy. Darwin Calibrator streamlines the time-consuming model calibration process by evolving and testing millions of solutions and identifying those that best simulate your network. In the shortest possible time, you will develop an unparalleled level of confidence in your model as a decision-support tool.



USE DARWIN FOR:

- ▶ Finding optimal model calibration solutions
- ▶ Automatically adjusting pipe roughness, junction demands, and valve status
- ▶ Incorporating SCADA data into the calibration process
- ▶ Maintaining a traceable record of calibration runs

OPTIMIZING YOUR SYSTEM

Darwin Calibrator is the result of recent groundbreaking advances in genetic-algorithm optimization technology. It enables you to take full control of model calibration to improve your modeling productivity and solution confidence.

Powered by Haestad Methods' proprietary "MAGIC™" technology (Multi-Attribute Genetic Inference Computing), the Darwin Calibrator automatically adjusts pipe roughness, junction demands, and pipe and valve status by quickly determining values of these parameters that will result in the best correlation with field data observations and operational boundary conditions.

Using Darwin, you simply enter confidence factors and estimated ranges for demands and roughness coefficients, pipe and valve status parameters, and known and appropriately located field parameters, and let Darwin do the rest. You then easily guide Darwin to remarkably accurate solutions using the Calibration Manager.

On this short journey, you will inevitably discover many interesting facts about your system. These results, observations, and insights will lead you to new operational strategies

"An investment in WaterCAD today allows you to deliver safer and better quality water for less cost tomorrow."

—Sedapal

"Your products are consistently of excellent quality and have rapidly become the go-to software of choice."

—CH2M Hill

and improvements that could easily save you many millions of dollars in operating, rehabilitation, and capital improvement costs.

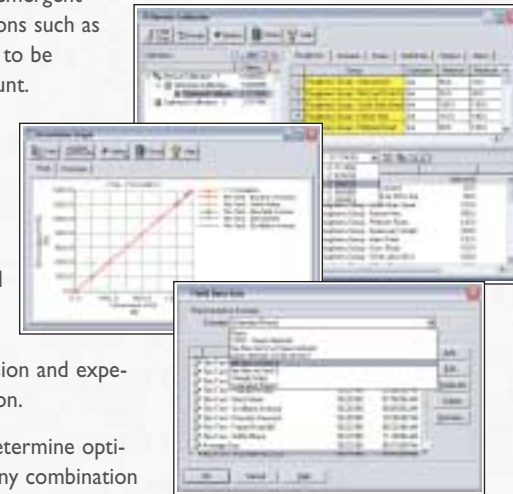
More than just a software package, the Darwin Calibrator is an investment that will save you both time and money for applications that include master planning, system expansion, rehabilitation, system operation, and management.

CALIBRATING WITH DARWIN

- ▶ Simultaneously calibrate the model for multiple demand loading conditions that accurately capture the demand variation over time and allow emergent demand conditions such as fire flow testing to be taken into account.
- ▶ Easily define pipe roughness and demand adjustment groups to aggregate model parameters for reduction of problem dimension and expeditious calculation.
- ▶ Automatically determine optimal values for any combination of model parameters, including pipe roughness, junction demands, and pipe and valve operational statuses, that best matches the real-life situation in your hydraulic system.
- ▶ Enable consistent, multiple-boundary conditions such as pump speed, tank levels, and valve settings that correspond to the actual

times of field data collection, for remarkable solution quality.

- ▶ Incorporate live SCADA data into the calibration process to ensure that your model reflects the actual network conditions.
- ▶ Manually tweak or adjust model parameters for sensitivity analysis of the calibration solutions.
- ▶ Automatically identify abnormal conditions such as faulty valve settings and field data inconsistencies.
- ▶ Exert full control over genetic-algorithm parameters, including the fitness evaluation



type, flow weighting functions, and flow versus pressure weighting.

▶ Quickly view comparisons of calibration solution results, whether they

were achieved manually, or by pure GA optimization, or through a combination of both.

▶ Maintain a traceable record of calibration runs performed on the model so that other users can quickly identify the steps that were taken and continue work in the shortest amount of time.

- ▶ Visualize calibration results graphically through HGL and flow correlation plots.

A hydraulic model is only as good as its ability to clearly and concisely present results so that you can extract information and make informed decisions quickly. WaterGEMS' GeoGrapher does just this, with a powerful graphics engine and complete suite of reporting tools. With GeoGrapher, you can now communicate more effectively than ever from directly within your GIS.

DYNAMIC DATA LABELING

Annotate your network with input data, calculated results, user-defined attributes, or any combination thereof and watch the annotations update dynamically as you change data, switch scenarios, or progress through time-steps.



- ▶ Leverage high-end cartographic tools to prepare and plot professional-quality system maps.

GRAPHING

- ▶ Communicate effectively in multiple dimensions by varying scenarios, time, elements, and attributes, all on the same graph.
- ▶ Choose from a wide range of fully customizable graph types to most effectively present your data.
- ▶ Include multiple elements and multiple element types on the same graph.
- ▶ Store graphs as you create them for easy retrieval.

VISUALIZATION

- ▶ Flexibly symbolize your data for high impact presentations including graduated colors, element size, and charts.

REPORTING

- ▶ Create detailed reports for any element or group of elements and generate system-wide summaries and project inventories.
- ▶ Customize tables to present data in the order and format you choose and manipulate each table to suit your needs, making use of the built-in filtering, sorting, and editing tools.

YES, I WANT TO ORDER:

	250 pipes	500	1,000	2,000	5,000	10,000	Unlimited
WaterGEMS*	\$4,995	\$7,995	\$9,995	\$14,995	\$19,995	\$29,995	\$39,995

Product	# of Pipes	Price
_____	_____	_____
_____	_____	_____

Total Price (CT residents add 6% sales tax) \$ _____

Name _____

Title _____
Tape _____

Company _____
Your Business Card _____


Address _____
Here _____

City _____ Zip / Postal Code _____

Country _____ Email _____

Phone _____ Fax _____
Please include a copy of the signed P.O.

Bill to Approved P.O.# _____

Charge to Credit Card    Cards Exp Date _____

Card # _____

Card Holder _____

Signature _____

MAIL TO: Haestad Methods, 37 Brookside Road, Waterbury, CT 06708 USA

FAX TO: +1-203-597-1488

*3 months Bronze ClientCare is included with WaterGEMS.

Prices are in US Dollars and are subject to change without notice. Multi-user and Network Licensing are available. Please call for pricing.

30 Day money-back guarantee if you are not completely satisfied.

WaterCAD is a registered trademark of Haestad Methods, Inc. GEMS, WaterGEMS, ModelForge, LoadBuilder, Skelebrator, TRex, WaterSafe, APEX, GeoGrapher, WaterObjects, Darwin, MAGIC, and ClientCare are trademarks of Haestad Methods, Inc. ArcGIS, SDE, ArcObjects, and ArcFM are registered trademarks of Environmental Systems Corporation. AutoCAD is a registered trademark of Autodesk, Inc.

HAESTAD METHODS—

WORKING HARD FOR YOUR BUSINESS

Haestad Methods is internationally recognized as the world's leading water resources software company, and we are proud to have built lasting relationships at over 40,000 client sites for the past 20 years.

Today our network of users spans over 10,000 cities in 170 countries and our clients range from the largest utilities and government agencies to the smallest consulting firms. But we never forget that we owe our commercial success to our customers. Working hard for your business is our number one priority.

Haestad Methods was the first company in any industry to move software designed for large mainframe computers to PCs, and we pioneered the development of Windows-based hydraulic and hydrologic software applications. We made these complex programs usable and available to the entire world.

And with innovations like our revolutionary GEMS™ architecture, Darwin™ optimization tools, and ClientCare™ program, we are still setting the standards today—standards that have made the name Haestad Methods synonymous with impeccable service around the globe.

THE HAESTAD COMMUNITY

With WaterCAD® and the new WaterGEMS™ technology, Haestad Methods brings together the largest water distribution modeling community in the world. Tens of thousands of water supply professionals are relying on models built with Haestad Methods products to analyze, design, map, manage and plan their water systems.

Join this community for FREE by visiting www.haestad.com/forums or sending a blank e-mail to: watertalk-subscribe@lists.mycivil.com.

*“Absolutely fantastic!
Easy to learn, easy to use, with
convenient output summaries.”*

—Rimtide Pty Ltd

*“Haestad Methods products are very
useful in our work and always provide
accurate, dependable results that we have
a high degree of confidence in.”*

—Morley & Associates Inc

*“Your software applications are great.
Thanks!”*

—Washington Infrastructure Services

*“All of your products we currently own are
heavily used in our day-to-day business and
well worth the money! You can bet we will
continue to rely on Haestad software.”*

—Poggemeyer Design Group

*“This is the most full service software
company I have ever worked with. You guys
are great, not only with the software you
provide but with the support and help
you give all year. Thanks for your help!”*

—Summit Engineering Corp

*“Haestad products let you improve
your knowledge, and your designs,
so you can do your job better!”*

—Proande Co.

*“Great software. Very easy to learn
and to use. Keep up the great work.”*

—Vanasse Hangen Brustlin Inc

FOR MORE INFORMATION:

CALL

1-800-727-6555 (US/CAN)
+1-203-755-1666 (Worldwide)

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INTERNET

www.haestad.com/WaterGEMS

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