

Evaluating Water Hydraulic & Transient Modeling Software

A Practical Guide for Municipalities & Utilities

Prepared by HydraLink Solutions

Purpose

Selecting water hydraulic and transient modeling software is a significant technical and financial commitment. This guide gives municipalities and utilities a concise framework for structuring a rigorous, defensible software evaluation - from initial preparation through to a final recommendation.

The guide is intentionally high-level. It describes what to prepare, how to organize the evaluation, and what areas to cover, without prescribing specific vendor questions or scoring weights, which should be tailored to your organization's priorities.

What to Have Ready Before You Start

A software evaluation is only as useful as the preparation behind it. Before approaching vendors, your team should have clear internal agreement on the following:

Organizational Scope & Priorities

- Confirm which modeling categories are in scope: water distribution hydraulics, transient (water hammer) analysis, or both. These can be evaluated together but should be scored separately, as few products lead equally in both.
- Identify who the end users will be - modelling engineers, GIS staff, operations, or all three - and what their current tools and workflows look like.
- Define the key use cases the software must support: fire flow analysis, extended period simulation, pump energy optimization, watermain break response, surge protection design, or others.

IT & Integration Requirements

- Determine whether software must integrate with an existing GIS platform (e.g., Esri ArcGIS Pro) or operate as a standalone application. This is one of the most consequential decisions in the evaluation.
- Clarify IT constraints upfront: on-premise vs. cloud hosting, data residency requirements, cybersecurity approval processes, and compatibility with existing servers or asset databases.
- Confirm whether SCADA data integration or near-real-time operational capability is a current or near-term requirement.

Budget & Licensing Expectations

- Establish a realistic budget envelope that includes software licensing, implementation, training, and ongoing annual support - not just the initial purchase price.
- Decide on the preferred licensing model (floating/concurrent, per-user, subscription, or perpetual) before contacting vendors, as this shapes the total cost comparison across products.

- Confirm the number of expected concurrent users and whether that number is likely to grow, since some vendors price by user count and others by network size.

Internal Stakeholders & Timeline

- Involve engineering, GIS, IT, and operations from the start - not after a product has already been shortlisted. Each group surfaces different requirements that affect the final decision.
- Set a realistic evaluation timeline covering: long-list compilation, questionnaire distribution and response period, shortlisting, live demonstrations, and recommendation sign-off.

How to Structure the Evaluation

A well-run software evaluation follows five phases. Skipping or compressing early phases tends to produce a recommendation that is difficult to defend and hard to implement.

PHASE	ACTIVITY	WHAT TO PREPARE	OUTPUT
1	Internal Alignment	Scope, budget, IT constraints, licensing preference, stakeholder list	Confirmed requirements document
2	Market Scan	Long-list of COTS products; vendor contacts; bundled vs. standalone transient modules	Long-list with product summary
3	Vendor Questionnaire	Structured question sets by evaluation category; distribution format; response deadline	Completed vendor responses
4	Short-list & Demo	Weighted scoring criteria; sample network data for vendor testing; pricing request template	Short-listed products with scores
5	Recommendation	Scoring matrix; demo notes; reference checks; integration/sandbox test results	Final recommendation report

A few principles to keep the process on track:

- Use a consistent questionnaire across all vendors. Bespoke questions per vendor make comparison impossible. Standardize the format, question set, and response scale before sending anything out.
- Collect detailed pricing only from shortlisted vendors. Requesting full pricing from every long-listed product creates unnecessary vendor burden and generates data you cannot meaningfully compare until after shortlisting.
- Test with your own data. Vendor demonstrations are most valuable when run against a sample of your actual network. Arrange this in advance and provide the file early enough for the vendor to prepare.
- Check references directly. Short-listed vendors should provide reference contacts at comparable utilities. Speaking with those contacts is often more informative than any demo.
- Separate the transient evaluation. Even if a transient module is bundled with a water hydraulic product, assess its technical capabilities explicitly - not all bundled modules are full-featured surge analysis tools.

What to Evaluate

Organize your evaluation criteria into the following seven areas. Each should be assessed for both the water hydraulic product and the transient product (if separate). Weight the areas according to your organization's priorities before scoring.

EVALUATION AREA	CORE QUESTION	WHY IT MATTERS
Map Control & GIS Integration	Does it work natively with your GIS environment?	Determines daily modelling workflow and data import effort
License Management	What is the licensing model and how does cost scale with users?	Drives total cost of ownership over the contract horizon
Model Building & Data Tools	How efficient and flexible is the model-building environment?	Affects staff productivity and long-term model maintainability
Water Hydraulic Simulation Engine	Which engine is used, and what analysis types are supported?	Core technical capability - must cover your operational scenarios
Transient (Water Hammer) Analysis	Is transient analysis included or a separate purchase?	Critical for pump station design and transmission main risk work
Reporting & Data Sharing	Can results reach engineers, operations staff, and stakeholders easily?	Affects how model outputs drive real decisions
Vendor Support & Viability	Is the product actively developed with reliable support?	Governs long-term risk and the value of your investment

Current Insights from HydraLink

Based on HydraLink Solutions' experience with the current COTS landscape for water hydraulic and transient modeling software:

- GIS integration is the single most impactful differentiator in the water hydraulic space. Software built natively on ArcGIS Pro can consume existing GIS data without re-importing it, saving significant model preparation time. Confirm how deeply a product integrates - not just whether integration is offered.
- Transient modules bundled with water hydraulic packages vary widely in capability. A bundled module may range from a basic Joukowski calculator to a full surge-analysis engine with scenario management and surge protection device modeling. Treat the transient component as a distinct evaluation item regardless of how it is licensed.
- Licensing models are in flux. Floating/concurrent licenses are being phased out by some major vendors in favour of per-user or subscription arrangements. Confirm current terms directly with each vendor rather than relying on published documentation, which is often outdated.
- Core hydraulic features are increasingly commoditized. Most established products now offer steady-state, EPS, fire flow, water quality, and UDF simulation. Differentiation has shifted to ease of use, model-building productivity, customization depth, and support quality - weight these accordingly in your scoring.
- Digital twin and SCADA integration capability is no longer niche. Several vendors now offer real-time data ingestion and operational analytics. If your utility has a near-term digital twin roadmap, include this as an evaluation criterion from the start rather than treating it as a future consideration.

About HydraLink Infrastructure Solutions

HydraLink Infrastructure Solutions is a water engineering consultancy with over 15 years of experience in hydraulic modelling, infrastructure planning, and operational intelligence for municipalities, utilities, and developers across Canada and internationally.

Our team has hands-on experience with a wide range of commercially available hydraulic modelling software, as well as emerging AI-powered tools - and we help clients make informed, unbiased decisions about which platform best suits their needs, budget, and technical capacity.

If you have a software evaluation project in mind, we would be happy to assist. Contact us directly or visit our website for more information about the services we offer.

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