



TRIDENT

INTERNATIONAL



INTRO

Trident International is a high-performing, specialist consultancy delivering advanced waste water and clean water solutions across the UK and globally. Born from JIH Consultants, a team of dedicated clean water engineers, we bring decades of trusted hydraulic expertise, now enhanced by cutting-edge innovation, advanced analytics, and AI-driven technologies.

Trident Group Solutions Ltd specialises in wastewater modelling, creating smarter, more resilient systems to meet the demands of 21st-century infrastructure. Trident Hydraulic & Transient Solutions Ltd focuses on clean water engineering, delivering precise hydraulic and transient analysis for robust water supply networks. Trident Intelligent Solutions Ltd pioneers AI and data science, transforming traditional modelling into intelligent, data-led forecasting and optimisation. Together, our multi-disciplined collective of modellers, engineers, and data scientists drives innovation, redefining performance and planning in water management.

Trident International has a:

Proven Track Record

Trusted by UK water companies and international infrastructure partners, our delivery is rooted in technical excellence and real-world impact.

Innovation-First Approach

With embedded AI capability through Trident Intelligence, we push the boundaries of conventional modelling to unlock new levels of efficiency and foresight.

Commitment to Quality

We prioritise transparency, accuracy, and stakeholder alignment. Our robust QA frameworks and industry-leading standards mean our models are always audit-ready.

Agile Integrated Team

You'll work directly with modellers, engineers, and data scientists who care about the detail and are easy to talk to. We keep things collaborative and transparent. We deliver a full suite of wastewater modelling services, trusted by utilities, consultants, and international partners.



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WASTE WATER

Trident International support clients with the development and calibration of high-quality hydraulic models that accurately reflect the performance of wastewater networks. Using software such as InfoWorks ICM, our team build models by integrating asset data, topography, flow surveys, and rainfall records, ensuring all structural and connectivity issues are resolved.

We then carry out model verification using observed flow and rainfall data, refining parameters such as roughness, infiltration, and storage to align model outputs with real-world performance. Verification also draws on known historic incidents such as flooding or pollution to confirm model reliability. All models are developed in line with UKWIR and CIWEM guidance, ensuring they are suitable for use in catchment planning, capital scheme design, and regulatory reporting. A robust, verified model provides the foundation for effective network management and investment planning.

Flow Survey Scoping & Delivery

Accurate flow and rainfall data is essential for building and verifying reliable wastewater models. Trident International work with clients to design and manage bespoke survey programmes tailored to the needs of each catchment. We scope surveys by identifying key locations based on hydraulic significance, known performance issues, and network topology. Our team specify monitor types, locations, and durations, ensuring surveys capture representative dry and wet weather events.

Trident oversee all aspects of delivery, including contractor liaison, quality assurance, and data validation. We apply robust checks to ensure high data return rates and accurate flow traces, enabling confident model calibration and reducing uncertainty. Our experience ensures survey programmes are cost-effective, risk-aware, and aligned with modelling requirements, supporting investment planning and regulatory compliance.

Catchment Strategy & Drainage Planning

Trident International support long-term wastewater planning through the development of catchment strategies underpinned by robust hydraulic modelling and data analysis. We help clients understand current and future performance risks, considering population growth, climate change, urban creep, and asset deterioration.

Our work informs key regulatory processes, including Drainage and Wastewater Management Plans (DWMPs), the Water Industry National Environment Programme (WINEP), and AMP investment cycles. We identify high-risk areas, test intervention scenarios, and provide evidence to support costed, prioritised investment plans. By integrating technical expertise with regulatory insight, Trident help clients build resilient, future-ready wastewater systems.

Flood & Pollution Risk Analysis

Trident International assess flood and pollution risk using advanced hydraulic modelling to simulate network performance under current and future conditions. We help clients understand the impact of storm events, system limitations, and climate change on flooding, surcharge, and storm overflow operation.

Flow Survey Scoping & Delivery

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Our work supports regulatory reporting, environmental compliance, and resilience planning. We identify high-risk areas, quantify risk exposure, and test mitigation strategies ranging from storage solutions to real-time control. Outputs are used to inform business cases, engage stakeholders, and support investment decisions aimed at reducing flooding and improving environmental outcomes.

Capital Scheme Enablement

Trident International support the development of capital schemes by translating complex hydraulic model outputs into clear, actionable insights. We help clients understand root causes, define performance requirements, and explore feasible interventions through scenario testing and sensitivity analysis.

Our work feeds directly into solution optioneering, outline design, and cost-benefit assessments, ensuring proposed schemes are technically robust and aligned with regulatory drivers. By bridging the gap between modelling and engineering design, Trident enable informed investment decisions and accelerate project delivery.

Smart Network Design & Real Time Control

Trident International design and implement smart network solutions that use real-time control (RTC) and AI-driven optimisation to improve wastewater system performance. We help clients reduce storm overflow activations, manage hydraulic stress, and make better use of existing capacity.

Our team develop control strategies using hydraulic models, telemetry data, and predictive analytics. We configure RTC assets such as gates, pumps, and storage to respond dynamically to forecasted conditions. These intelligent systems support proactive network operation, increase resilience, and contribute to environmental compliance and cost efficiency.

Development Impact Assessment

Trident International assess the impact of proposed developments on existing wastewater networks, ensuring capacity and environmental risks are fully understood before construction begins. We carry out developer-funded modelling to evaluate flow increases, identify pinch points, and test mitigation options.

Our assessments support planning applications, Section 104/106 agreements, and enable informed decisions on infrastructure upgrades. Where needed, we design cost-effective solutions to manage additional load while maintaining network performance and compliance. Trident help clients and developers navigate the planning process with confidence, balancing growth with sustainable drainage. Assessing capacity and risk implications of new developments on wastewater networks, including developer-funded modelling and mitigation design.

Model Auditing & Quality Assurance

Trident International provide independent model audits and quality assurance services to ensure wastewater models meet industry standards and are fit for purpose. We carry out detailed reviews of model structure, data inputs, calibration, and documentation against UKWIR and CIWEM best practice.

Our audits support internal assurance processes, regulatory submissions, and third-party validation. We identify gaps, recommend improvements, and help clients maintain consistency and credibility in their modelling outputs. By ensuring transparency and compliance, Trident give stakeholders confidence in their modelling evidence.

Infrastructure Design & Optimisation

Trident International provide expert support in the design, analysis, and optimisation of key wastewater infrastructure. From rising mains and pumping stations to treatment works and storage assets, our work ensures systems are resilient, hydraulically efficient, and designed for long term performance.

We specialise in the design and assessment of pressurised rising mains, including detailed transient (surge) analysis. By simulating operational scenarios such as pump starts, stops, filling, draining, and power failures, we ensure pressure transients are controlled and rising mains operate safely and efficiently. We also advise on the placement and specification of air valves, ensuring these critical components function correctly to prevent transients caused by air valve operation.

Our Capabilities:

Sewage Pumping Stations (SPS)

Including control philosophy, on/off levels, pump selection, wet well sizing, and rising main discharge design.

Wastewater Treatment Works (WwTW)

Including analysis of treatment capacity, flow balancing, storm handling, and overflow management.

Network Assets

Including Combined Sewer Overflows (CSOs), siphons, online and offline storage, and control structures. These are integrated into network models to assess their performance and role in strategic and local system resilience.

By combining hydraulic modelling with engineering judgement, Trident help clients optimise asset performance, reduce operational risk, and deliver cost-effective, future-proof designs.

TRIDENT GROUP Summary

“Trident International strives to support our client's wastewater operations which are at the heart of their service delivery. The services we provide involve a complex interplay of engineering, data analytics, regulatory compliance, and customer engagement. As the industry faces increasing pressures from climate change, population growth, and ageing infrastructure, innovation and resilience planning are more important than ever. Trident aim to be at the forefront of continuous investment, smart technologies, and close collaboration with regulators to deliver safe, reliable wastewater services for generations to come.”



TRIDENT
GROUP SOLUTIONS

CLEAN WATER

At Trident International, our primary focus is offering our water sector clients a complete solution to the unique challenges they face in providing customers with a high-quality water service. Network operations form the backbone of water service delivery, encompassing the management, maintenance, and optimisation of the infrastructure that transports water from source to tap.

Subject matter experts at Trident bring vast experience to clients in the water sector across key aspects including network management, pressure regulation, leakage control, water quality, incident response, and regulatory compliance. We support clients with meeting targets set by regulatory bodies such as Ofwat, the Drinking Water Inspectorate (DWI) in England Wales, the Northern Ireland Drinking Water Inspectorate (NI DWI) in Northern Ireland, the Drinking Water Quality Regulator (DWQR) in Scotland, and the Environment Agency (EA), all of which play pivotal roles in ensuring performance standards and environmental protection across the sector.

Water Management & Strategy

Trident Group actively supports clean water management for UK water companies by utilising the expertise of their staff, many of whom have direct experience working within the UK water sector for water companies before joining Trident. This insider knowledge allows Trident to offer tailored solutions that address the specific demands and challenges faced by companies, including climate change impacts, demand usage and leakage. By employing advanced technologies and modelling techniques, Trident assists water companies in optimising their operations, meeting regulatory requirements, and ensuring a sustainable and resilient clean water supply for the future.

Network Management

Network management involves the day-to-day operation and maintenance of an extensive system of pipelines, valves, pumps, reservoirs, and service connections. Trident staff support the operation of clients sophisticated monitoring systems, assisting operational teams and maximising efficiency to ensure continuous supply. Trident experts leverage data systems to aid the management and understanding of network performance and conduct root cause analysis to understand ongoing issues and incidents. These systems include SCADA (Supervisory Control and Data Acquisition), which provides real-time data on flow, pressure, and GIS (Geographic Information Systems), which map assets and track performance over time, aiding in maintenance planning and operational optimisation.

Network Design

Good design of a water network is an essential part of managing the system. Trident utilises its vast experience of network design to configure and setup the best locations for pumping stations, reservoirs, control valves and the associated control systems.

We have proven to be an essential part of the solution delivery team across the UK providing the results needed to design networks that deliver quality to water company consumers, whilst ensuring that the network performs at its optimum best at all times. This includes the integration of AI systems to provide data regarding asset health, performance as well as early warning.

Pressure Management

Effective pressure management ensures optimal water delivery without causing stress on the network. Over-pressurisation can lead to bursts and increased leakage, while too little pressure may result in poor service levels for consumers. Trident work with water company clients to carefully design and manage pressure management systems to ensure all standards are met, and to improve leakage, bursts reductions and preserve water use.

A well designed and controlled pressure managed system, significantly prolongs asset life. Trident plan and improve District Metered Areas (DMAs) design to break networks into manageable zones, allowing utilities to monitor and control pressure precisely. We also implement Advanced Pressure Management (APM) using pressure-reducing valves (PRVs), variable speed pumps, and smart control algorithms and controllers to maintain optimal pressure while conserving energy and reducing leakage risk.

Trident provides expert advice to clients regarding their valving needs. We can specify appropriate control, pressure reducing and air valves to suit a client's situation and operational requirements as well as arrange their supply.



Leakage and Leakage Analysis

Leakage remains a critical challenge for all water companies, with for example over 2.4 billion litres of water lost daily across the UK. Trident International bring a range of leakage analysis techniques such as flow analysis, hydraulic modelling, pressure testing, and smart sensor data to identify and locate leaks.

Our experts utilise innovative technologies such as artificial intelligence (AI) models to enhance leak prediction, identify trends, high risk areas/pipework and improve response times. We work closely with operational and asset management teams to interpret data, locate non-visible leaks, and prioritise repair efforts and factor in customer reported issues into prioritisation algorithms. Through all these offerings Trident assist clients with achieving set targets through Performance Commitments (PCs) made to regulators such as Ofwat

Reservoir Inspection and Cleaning

Service reservoirs act as crucial storage points in the network, balancing demand and maintaining supply during peak usage or disruptions. Efficient design, routine inspections and cleaning are vital to maintaining hygiene and ensuring water quality.

Trident International have a team of CFD modellers who utilise Ansys CFX/Fluent software to provide highly visual specialised modelling to the water industry which illustrates how water moves within water fittings, pipes and storage tanks. CFD modelling illustrates the path of water in, around, and out of a reservoir, while highlighting low and high velocities, and areas of recirculation which can cause high water age.

Regulators require reservoirs to be inspected and cleaned at intervals determined by risk assessments, typically every 6-10 years. Trident assist clients with developing and managing the delivery of plans for temporary tank bypass systems while maintaining supply without impacting customers. This facilitates draining the reservoir, removing sediment or biofilm, and disinfecting the structure.

Network Modelling

The team at Trident International have years of experience in hydraulic modelling of potable water networks. Our experts have utilised all the major modelling software packages for clients including Infoworks, Synergi, Bentley and Epanet. Trident utilises modelling as an essential tool for strategic planning, operational optimisation, and incident response. We use models to support demand forecasting, asset investment planning, the assessment of network resilience, simulate the impact of new developments, main bursts, or source outages, and to design mitigation strategies.

Trident staff are represented on the Clean Water Modelling Advisory Group (CWMAG) which helps to develop standards and specifications for clean water network modelling across the industry.

Surge Analysis

Trident offers surge and transient modelling to understand the cause of network bursts and reduce the risk of re-occurrence by introducing tailored, implementable, prevention measures based on client requirements.

Trident's Surge Analysis is critical for understanding and mitigating against the potential risks associated with pressure surges which can be found in a water network.

Incident Management

Trident International have wide ranging experience with incident management, including main bursts, contamination, or equipment failures which require rapid a response to protect public health and service continuity.

Our modellers work with client control rooms as well as Operational and Water Quality teams to manage incidents as they happen and reduce customer impact. Data driven approaches with Artificial Intelligence are used to provide early warnings prior to customers being aware of an issue. Trident work with clients to develop and implement Incident Response Plans (IRPs) to coordinate across functions while also conducting post-incident reviews help improve future resilience and to allow companies to understand the cause of the problem.

Supply Interruptions

Supply interruptions are closely monitored and reported on as part of Ofwat's performance measures. Companies are incentivised to minimise both the frequency and duration of unplanned interruptions. Trident provides expertise in post interruption reviews, quantifying customer impact – loss of supply in customer seconds lost, utilising hydraulic modelling and data analysis techniques to provide accurate reporting outputs.

Asset Management & Regulatory Price Reviews

Trident subject matter experts support clients with planning for periodic price review processes (e.g., PR24), preparing business plans that detail how they will meet customer needs, manage risks, and improve performance. Our staff provide industry recognised expertise in forecasts on leakage, asset health, investment in innovation, and customer engagement.

TRIDENT HYDRAULIC & TRANSIENT Summary

“Trident International strives to support our client's network operations which are at the heart of water service delivery. The services we provide involve a complex interplay of engineering, data analytics, regulatory compliance, and customer engagement. As the industry faces increasing pressures from climate change, population growth, and ageing infrastructure, innovation and resilience planning are more important than ever. Trident aim to be at the forefront of continuous investment, smart technologies, and close collaboration with regulators to deliver safe, reliable water services for generations to come.”



TRIDENT
HYDRAULIC & TRANSIENT
SOLUTIONS



AI & DATA

The water industry is at a critical juncture, grappling with the challenges of aging infrastructure, stringent regulatory requirements, and the pressing need to address environmental sustainability. As populations grow and climate patterns shift, utilities must adopt innovative approaches to ensure reliable service delivery while minimizing operational costs and environmental impacts. Our comprehensive suite of services harnesses cutting-edge technologies such as predictive analytics, machine learning, and bespoke software development to empower water utilities to overcome these challenges. By enabling proactive decision-making, optimising resource use, and modernising legacy systems, we support utilities in transforming their operations to achieve greater efficiency, resilience, and compliance, all while maintaining the highest standards of service for communities and the environment.

Software

At Trident Intelligent Solutions, our software engineering team specialises in delivering bespoke digital solutions to support the evolving needs of the water sector. Our developer-led approach ensures that the people building your systems are the same experts guiding your technical decisions, eliminating communication gaps and accelerating delivery. Our software is designed to be robust, secure, and seamlessly integrated with existing infrastructure, from field data collection tools to real-time dashboards, empowering utilities to work smarter, faster, and more effectively.

We have significant experience modernising legacy systems in regulated environments, where stability and compliance are non-negotiable. Our engineers refactor legacy codebases, improve user interfaces, and transition outdated platforms to cloud-ready architectures without disrupting mission-critical operations. We automate repetitive processes like asset monitoring, scheduling inspections, and reporting, freeing engineering teams for higher-value tasks. Our agile development ensures continuous feedback, adaptive planning, and a product that meets user needs in the field.

Bespoke Software Development

At Trident, we understand that off-the-shelf software rarely meets the unique operational demands of water utilities. We build bespoke software to solve domain-specific challenges, such as monitoring burst risk, managing asset life cycles, and improving field service coordination. Our applications integrate with SCADA, GIS, telemetry, and other utility systems, creating secure, optimised digital ecosystems. Our agile, collaborative, outcome-focused process co-designs user-friendly, battle-tested solutions for control rooms, field technicians, or back-office planning, delivering measurable improvements in efficiency and service quality.

Legacy Code Maintenance & Modernisation

Many water utilities rely on legacy systems that are outdated but perform vital functions. Our team maintains and modernises these systems, improving reliability, performance, and compatibility without disruptive rebuilds. We assess codebases to identify risks, inefficiencies, and technical debt, then refactor components, migrate to modern platforms like cloud or containerised environments, and introduce APIs for better integration. Our approach ensures compliance with evolving standards, enhances user experience, and reduces operational risk while extending system life.

Process Automation

In the water sector, many tasks like data entry and performance reporting remain manual and error-prone. Trident automates these with intelligent processes using scripting, APIs, and workflow engines that connect existing systems. Our tools reduce man-hours on activities like DMA leakage reporting, pump run-time analysis, and compliance auditing, freeing staff for strategic tasks. We build stable, scalable automation solutions for single processes or end-to-end workflows, designed for real-world use.

Data and Analytics

At Trident Intelligent Solutions, we turn complex utility data into actionable intelligence. Our team of data scientists, machine learning engineers, and optimisation specialists, many with PhDs in AI and statistics, apply advanced analytics to predict infrastructure failures and optimise field operations. We offer statistical modelling, forecasting, machine learning, and operational optimisation, built with MLOps and cloud integration for sustainable, real-world performance, helping utilities become more efficient, proactive, and data-driven.

Data Science

Our data science services enable proactive, insight-driven strategies with models for forecasting demand, detecting anomalies, segmenting customers, and optimising asset use. We deliver end-to-end analytical solutions with visualisations, reports, and actionable guidance, focusing on metrics like leakage reduction, service level compliance, or OPEX savings. Each engagement starts with understanding your business goals and operational constraints to ensure relevant, impactful results.

Machine Learning & AI

At Trident, we go beyond proof-of-concept machine learning. We deliver real, production-grade systems that integrate seamlessly into utility operations. Our ML engineers build models to predict pipe bursts, identify pump failure risk, detect telemetry faults, and optimise intervention timing. These tools help organisations prioritise resources more effectively and prevent issues before they escalate.

We also support full ML operations (MLOps) capabilities - automating model retraining, version control, monitoring, and CI/CD deployment pipelines. That means your predictive tools remain accurate and adaptive as conditions evolve. Our focus is on reliability, interpretability, and impact: models that utilities can trust, understand, and act on.

Data Quality Assessments

High-quality data is critical for operations and asset planning. We audit data for completeness, consistency, accuracy, and validity, identifying issues like sensor drift, incorrect mappings, or missing metadata. Our actionable recommendations improve data pipelines through reprocessing, metadata enrichment, and optimised ETL pipelines, ensuring trustworthy data for operations and analytics with fewer errors.

Optimisation

Our optimisation techniques maximise efficiency and reduce costs using algorithmic modelling, real-time data, and simulation. We optimise tanker and technician routes, minimise pumping energy, and balance demand, capacity, and risk, factoring in constraints like asset availability and regulations. Our solutions integrate with existing systems for immediate use, delivering operational precision while reducing environmental and financial waste.

IT Services

Trident provides a full spectrum of IT services designed to enhance digital operations across the water industry. Our agile-certified team - including Microsoft Azure-certified engineers and experienced Scrum practitioners - delivers secure, scalable solutions that support both day-to-day operations and long-term transformation. We manage projects with precision, working closely with client stakeholders to ensure alignment with regulatory frameworks, operational objectives, and user requirements. Whether leading digital infrastructure upgrades or deploying new technology platforms, we bring clarity and control to complex IT initiatives.

Operational optimisation is a key focus area, particularly for utilities seeking to improve uptime, reduce manual interventions, and streamline cross-team workflows. We support clients in diagnosing inefficiencies in current systems and designing IT architectures that are lean, interoperable, and future-proof. Our cybersecurity specialists conduct detailed audits, identify vulnerabilities, and implement best-practice controls - ensuring compliance with sector standards like ISO 27001 and GDPR where applicable. For organisations moving to the cloud, we design secure Azure environments tailored to the unique data, performance, and integration needs of water utility applications. From strateg to execution, Trident delivers IT that works - securely, efficiently, and with measurable impact.

Project Management

Trident's project managers bring deep experience in delivering complex IT projects across the water and public utility sectors. Using agile methodologies, Scrum practices, and collaborative tools, we ensure that milestones are met, risks are managed, and stakeholders remain engaged throughout the project lifecycle.

Whether you need rapid prototyping, waterfall planning for infrastructure upgrades, or hybrid models for phased deployment, our team keeps projects moving without losing sight of quality, regulatory compliance, or user adoption. Whether managing a cloud migration or a software rollout, we combine technical leadership with delivery precision.

Cyber Security

At Trident, our cybersecurity specialists conduct rigorous assessments of your IT and OT environments - identifying vulnerabilities in cloud platforms, web applications, and internal networks. We help clients meet regulatory requirements, including ISO 27001, OWASP, and GDPR, and support incident response planning and recovery.

Our work with utilities has demonstrated our ability to strengthen cyber posture while maintaining operational availability. From hardening Azure deployments to implementing secure authentication systems and ongoing threat monitoring, we provide peace of mind that your systems are safe, compliant, and resilient against emerging threats.

Cloud Computin

Cloud technology can transform how utilities operate - providing flexibility, scalability, and cost control. Our Azure-certified team helps water utilities adopt cloud infrastructure without compromising on performance or security. We design, build, and manage cloud-native and hybrid environments that support telemetry ingestion, data analytics, remote access, and secure app deployment.

We focus on creating architectures that are compliant, resilient, and aligned with your long-term IT roadmap. Whether migrating legacy applications to the cloud, developing new platforms in Azure, or integrating with existing systems, our team ensures smooth transitions and minimal disruption. We also provide guidance on cost optimisation, monitoring, and automated scaling to get the most out of your cloud investment.

TRIDENT INTELLIGENCE Summary

“Our services provide water utilities with a robust framework for navigating the complexities of modern water management. By integrating predictive analytics, data quality assessments, and machine learning, we enable proactive issue detection and smarter decision-making. Process automation and operational optimisation streamline workflows and reduce inefficiencies, while bespoke software and legacy system modernisation ensure seamless, secure operations. Supported by expert data science and IT project management, our solutions deliver tailored, data-driven outcomes that enhance performance, compliance, and sustainability across treatment plants, distribution networks, and control rooms.”



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INTELLIGENT SOLUTIONS



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To discuss your needs or explore how Trident International can support your water utility, please reach out using the contact details below. Our team is ready to connect, answer your questions and tailor solutions to your unique challenges.

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