WATER INFRASTRUCTURE EXPERIENCE

RAEF KOBEISSI CEng, FIMechE

Water Infrastructure
Selected Professional Experience

Evidence-led engineering decisions in water infrastructure.

Selected professional experience spanning infrastructure strategy, advanced modelling, asset analytics and practical delivery.

CREDENTIALS / AUGUST 2026

POSITION

Complex evidence. Confident action.

The value is in knowing what should be tested, what the evidence means and what should happen next.

Raef Kobeissi is a Chartered Engineer with selected experience in water-infrastructure investment, performance and asset decisions. The professional record combines strategic judgement with modelling, asset and operational evidence.

18	SELECTED	CEng, FIMechE
YEARS IN INFRASTRUCTURE LEADERSHIP	WATER-SECTOR EXPERIENCE	CHARTERED ENGINEERING JUDGEMENT

THE OPERATING IDEA

Strategy, diagnostics and assurance are connected parts of the same decision process.

Advanced methods provide evidence for clear investment, operational and governance decisions.

DECISION CONTEXTS

Examples of decisions represented across the work.

01 *Which assets should receive investment first?*

Selected work has considered capital priorities where risk, performance and lifecycle value converge.

02 *Can the current evidence support this decision?*

The record includes challenge of assumptions, uncertainty and the strength of model or data evidence.

03 *Why is the network or asset underperforming?*

Past studies diagnosed physical and operational causes before intervention options were considered.

04 *Which option provides the best long-term value?*

Selected work compared performance, delivery risk, cost and resilience as one decision.

05 *Is the proposed strategy technically defensible?*

The professional record includes technical assurance before key commitments were made.

THREE AREAS OF PROFESSIONAL EXPERTISE

Evidence connected to a decision.

01

Water infrastructure strategy and investment

Selected work includes resilient, value-led investment pathways for networks and assets.

Evidence: option assessments, investment pathways, lifecycle cases and asset priorities.

02

Performance diagnostics and optimisation

Selected work investigated the causes of underperformance and assessed operating, retrofit or reinforcement actions.

Evidence: hydraulic and CFD diagnostics, leakage priorities and pressure-control strategies.

03

Technical assurance

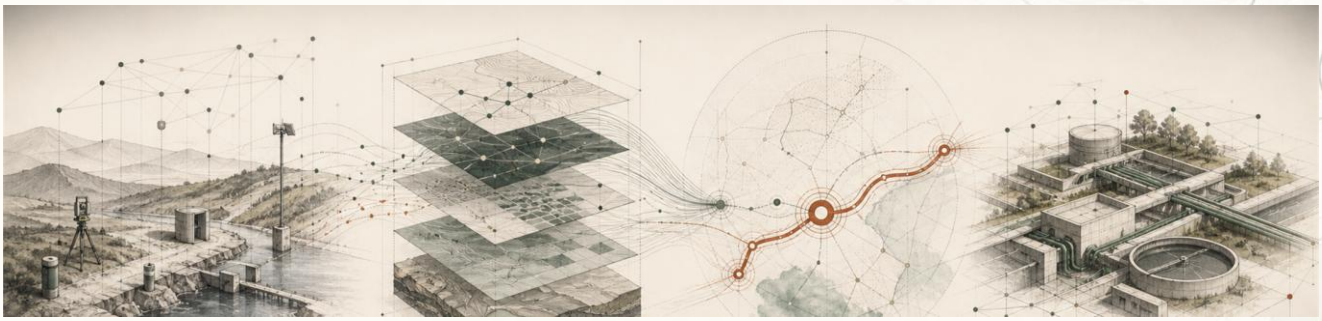
Selected work includes technical challenge of strategies, models, designs and investment cases.

Evidence: model audits, design-basis reviews, option assurance and technical due diligence.

WORKING APPROACH

A disciplined approach from diagnosis to engineering assurance.

Across the selected record, work was structured to clarify the next decision: establish the evidence, test the choices, define the decision basis and assure implementation considerations.



A repeatable engineering approach connecting technical evidence to decision context.

DECISION CONTEXT

The professional record includes evidence-led, proportionate analysis with clear implementation considerations.

Examples span strategy, diagnostics, options review and technical assurance.

CASE 01 / STRATEGY & INVESTMENT

ANONYMISED WATER UTILITY / MULTI-YEAR PROGRAMME / STRATEGY LEAD

3,600 km	600 km	Multi-million pound
TRUNK-MAIN NETWORK	HIGHEST-RISK MAINS TARGETED	REGULATORY CASE CO-AUTHORED

Risk-led trunk-main strategy supported a resilient investment pathway.

A complex transmission network required a defensible way to balance failure exposure, consequence, affordability and long-term resilience. The decision was not simply which mains to renew; it was how to establish a credible investment pathway for the highest-risk assets.

DECISION FACED

How should a major water utility protect customers and reduce failure exposure without committing capital to the wrong assets?

PERSONAL ROLE Led the infrastructure strategy work and co-authored a multi-million-pound regulatory enhancement case within a wider multi-disciplinary programme.

WHY IT MATTERED The highest-risk 600 km sat within a 3,600 km transmission network.

ENGINEERING APPROACH

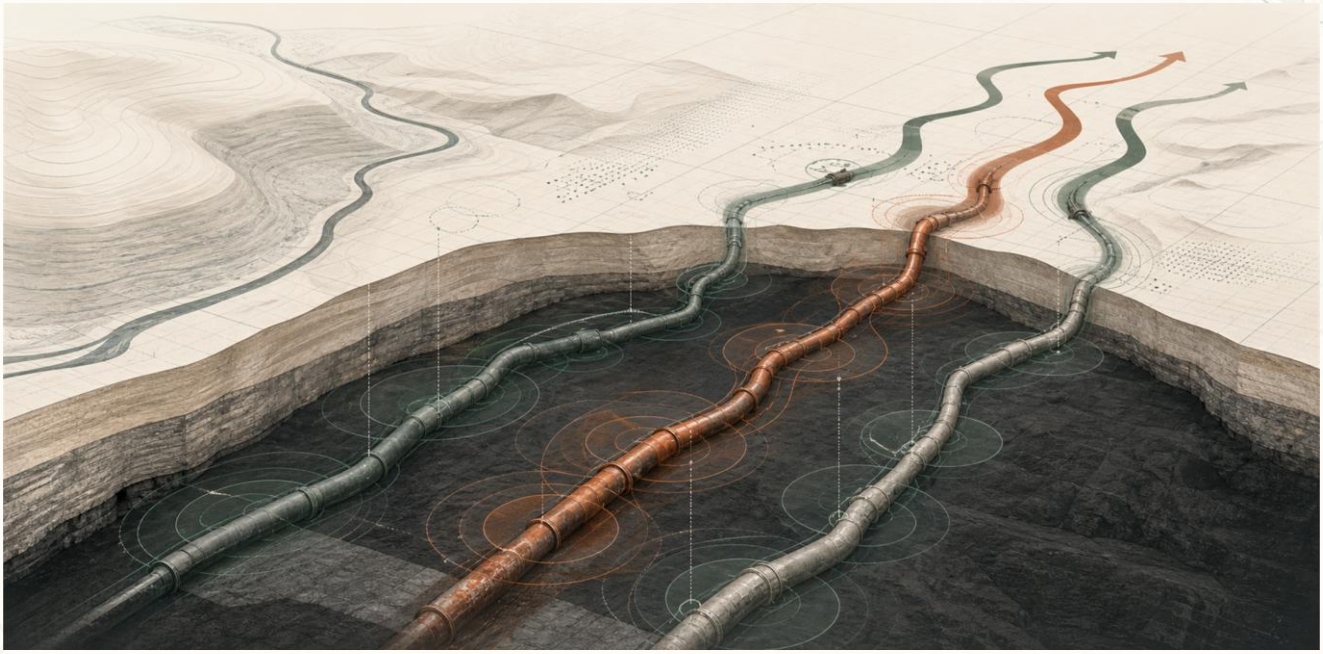
An adaptive, multi-period trunk-main strategy was assessed rather than a single, undifferentiated renewal programme.

OUTCOME Co-authored a multi-million-pound regulatory enhancement case and strengthened long-term investment governance.

Programme contribution within a wider multidisciplinary team; organisation name is intentionally generalised.

Evidence: a clear risk pathway supported selective renewal rather than blanket replacement.

Risk was assembled from asset condition, consequence, operational behaviour and network criticality. The analysis informed adaptive pathways combining targeted renewal with pressure management and digital assessment.



Generalised analytical schematic. It shows the type of decision logic used, not organisation network data.

EVIDENCE DEVELOPED Risk segmentation, failure exposure and investment pathways informed by condition, consequence and network resilience.

IMPLEMENTATION CONTEXT **The strategy informed investigation, targeted intervention and future investment planning.**

CASE 02 / PERFORMANCE DIAGNOSTICS & OPTIMISATION

ANONYMISED WATER UTILITY PROGRAMME / MULTI-YEAR / PROGRAMME LEAD

12 MLD/year	120	Risk-led
LEAKAGE SAVINGS SUPPORTED	PROACTIVE REPAIRS PER YEAR	ANNUAL PROGRAMME

Probabilistic analysis focused intervention on the most material leakage opportunities.

The programme addressed the limitations of a reactive search for leaks on ageing trunk mains. The central question was where to direct investigation and repair resources when the water balance itself was uncertain.

DECISION FACED

How can a leakage programme use imperfect data to target field resources where the chance and consequence of loss are greatest?

PERSONAL ROLE Led the programme analytical framework, combining probabilistic water-balance analysis with condition and operational risk scoring.

ENGINEERING APPROACH

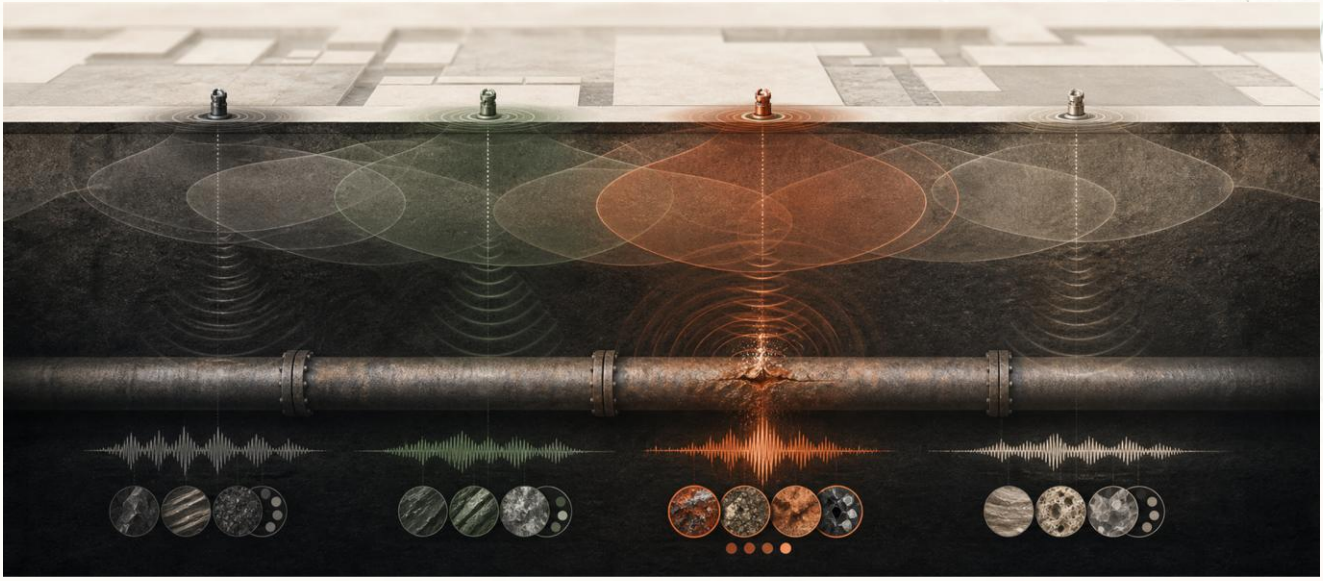
A risk-weighted detection programme combined field technologies with probabilistic network evidence.

OUTCOME The programme contributed to approximately 12 MLD/year of leakage savings and informed proactive control of around 120 major trunk-main repairs each year.

Programme-level outcome presented as personal professional experience within a wider delivery team.

Uncertainty became a basis for prioritisation rather than a reason to delay action.

Monte Carlo techniques quantified a range of plausible leakage conditions. The programme combined this with flow and hydraulic evidence, acoustic correlation, satellite sensing and thermal aerial information to prioritise investigation.



KEY DIAGNOSTIC RESULT A risk-weighted score made it possible to compare the value of further investigation across a large, complex trunk-main estate.

CASE 03 / PERFORMANCE DIAGNOSTICS & OPTIMISATION

WATER UTILITIES / MULTI-YEAR / CFD SERVICE LINE LEAD

8+	4	1
SPECIALIST CFD COMMISSIONS	WATER UTILITIES	SPECIALIST SERVICE LINE ESTABLISHED

CFD diagnostics informed water-quality and asset-performance decisions.

For reservoirs, contact tanks and dosing systems, geometry alone rarely explains performance. The analysis considered mixing, residence time, dead zones and hydraulic short-circuiting before operating, retrofit or capital options were assessed.

DECISION FACED

What does the flow behaviour mean for water quality, compliance risk and the case for investment?

PERSONAL ROLE Established and led a specialist CFD service line, from scoping and model development through interpretation and recommendation.

ENGINEERING APPROACH

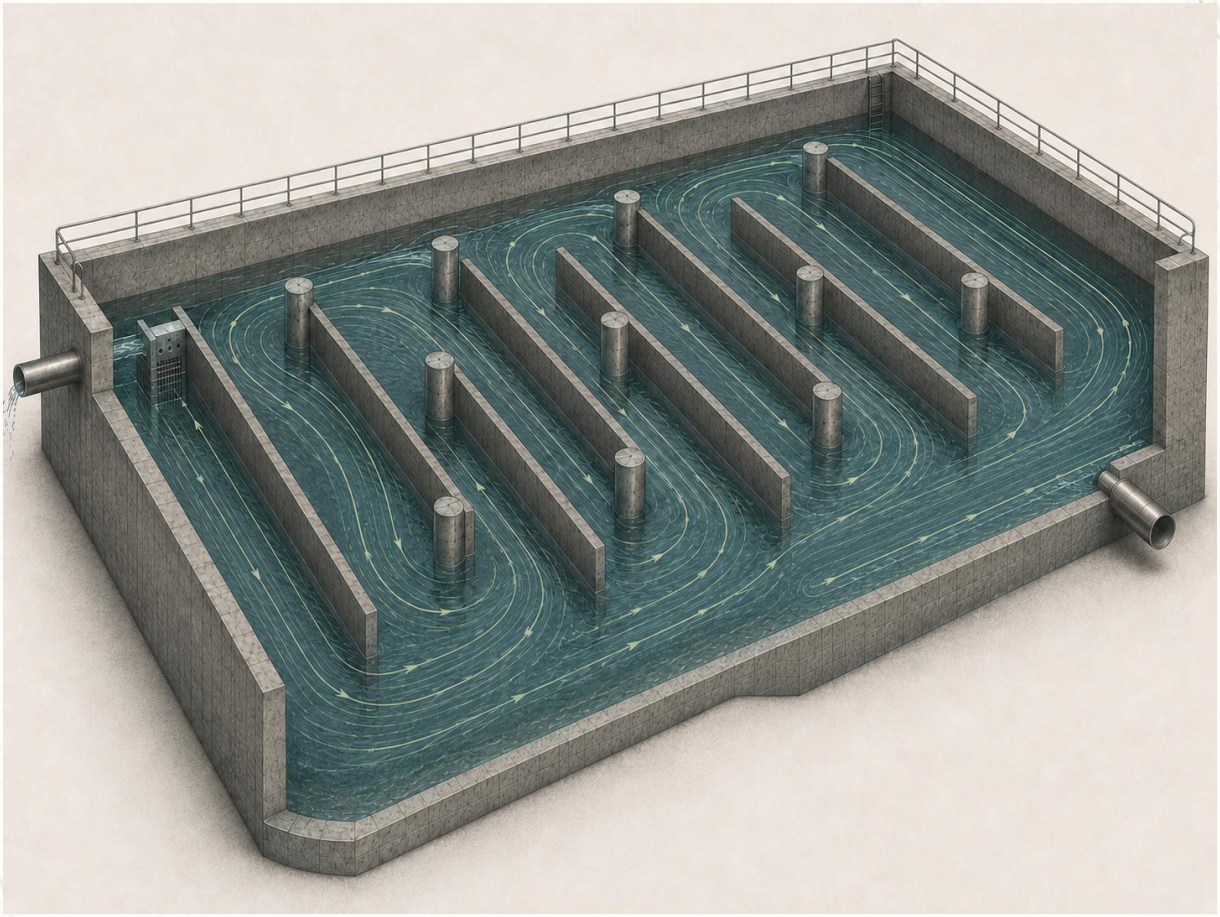
Interventions were assessed after testing how they changed flow paths relevant to water quality and asset performance.

OUTCOME More than 8 specialist commissions developed technical evidence for investment, compliance assurance and performance optimisation.

Organisations and assets are omitted; all graphic content is conceptual and generalised.

Evidence: high-fidelity modelling made the decision-relevant flow paths visible.

The work translated computational outputs into engineering implications: where short-circuiting could undermine residence time, where mixing might be ineffective and which interventions warranted further design or operational testing.



Conceptual evidence graphic. It is intentionally not an organisation CFD output or software screenshot.

EVIDENCE DEVELOPED Residence-time, mixing-efficiency, dead-zone and hydraulic-short-circuiting assessments tailored to the asset decision.

CASE 04 / TECHNICAL ASSURANCE

MAJOR TRANSMISSION PROGRAMME / MULTI-YEAR / TECHNICAL DISCIPLINE LEAD

LIVE SYSTEM	SYSTEM	TRANSMISSION
PUMPING AND STORAGE	INTEGRATION	MAINS

Technical assurance supported live-system interfaces on a major transmission upgrade.

The supervision-stage review considered whether design, pumping-station works, storage and large-diameter transmission interfaces could be integrated into a live water system safely and constructibly.

DECISION FACED

Can the proposed transmission works be relied upon to provide capacity and resilience without compromising live-network operation?

PERSONAL ROLE Led construction-stage design review and technical assurance across design submissions, interfaces and stakeholder coordination.

ENGINEERING APPROACH

Technical review was maintained through detailed, construction and commissioning interfaces of a live transmission-system upgrade.

OUTCOME Design governance supported construction readiness and resilient integration of pumping, storage and major transmission assets.

Contribution formed part of a wider supervision and delivery team; project identifiers are generalised.

Evidence: capacity, constructability and operational resilience were reviewed as one system question.

Assurance considered how new and upgraded pump stations, reservoir and transmission mains would perform at their interfaces, not solely whether individual components met their design requirements.

Generalised system schematic. Geometry and interface detail have been redrawn to preserve project confidentiality.

EVIDENCE DEVELOPED Design-submission review, pumping and surge-mitigation checks, constructability assessment and live-network interface assurance.

TECHNICAL METHODS

Methods are selected for the decision, not presented as separate products.

The methods below created evidence across strategy, diagnostics and assurance. The record is framed around the intervention, investment or governance choice under consideration.

Hydraulic modelling

Test capacity, pressure, resilience and reinforcement options.

Computational fluid dynamics

Understand mixing, residence time and decision-relevant flow behaviour.

Probabilistic analysis

Make uncertainty visible in risk and leakage prioritisation.

Asset risk modelling

Link condition, consequence and operational exposure to investment choices.

GIS & operational analytics

Connect spatial, SCADA, monitoring and field evidence.

Digital decision tools

Create transparent, repeatable pathways from evidence to action.

Advanced methods connect strategy, diagnostics and assurance; they are not presented as isolated software activities.

TECHNICAL PERSPECTIVE

The most useful technical work is rigorous, clear and decision-relevant.

SELECTED EXPERIENCE

Selected experience that demonstrates range without diluting the water focus.

The record centres on water-system decisions. The wider leadership context shows the scale at which those decisions have been made, reviewed and delivered.

18+ years

Water and infrastructure leadership.

Multi-million pound

Regulatory trunk-main enhancement case co-authored.

Risk-led

Investment and asset strategy across confidential programmes.

12 MLD/year

Leakage savings supported through risk-led trunk-main analysis.

Network analytics

District-metered-area experience.

8+ commissions

Specialist water-asset CFD assignments within an established service line.

Figures are generalised examples from selected professional experience; no project-specific financial data is published.

APPLICATIONS OF EXPERIENCE

Decision contexts represented across selected professional experience.

The examples below show the kinds of decision context represented across the professional record.

01 Engineering decision review

The professional record includes review of models, strategies, concepts and investment decisions, identifying material risks and evidence requirements.

02 Advanced modelling and performance diagnostics

Past assignments investigated underperforming networks, pressure zones, pumping systems, reservoirs and treatment assets, testing interventions and implementation priorities.
Past CFD studies assessed mixing, residence time, dead zones and short-circuiting when comparing operational, retrofit and capital options.

03 Asset investment and prioritisation

The record includes work integrating risk, performance and uncertainty into evidence-led asset and intervention pathways.

PROFILE

Senior engineering judgement with the technical depth to interrogate evidence.

Raef Kobeissi is a Chartered Engineer and infrastructure leader with 18+ years of experience in water and major infrastructure programmes. His water-sector work combines long-term network strategy, performance diagnostics, modelling, asset analytics and delivery assurance.

CREDENTIALS

CEng, FIMechE

MSc Advanced Mechanical Engineering / English, Arabic and French.

Leadership context

EXECUTIVE LEADERSHIP Led multi-disciplinary teams of up to 40 specialists across complex infrastructure programmes.

WATER-NETWORK LEADERSHIP Directed water-network disciplines and delivery teams across complex programmes.

ENGINEERING JUDGEMENT Shaped investment cases, lifecycle optimisation and specialist technical capability.

DELIVERY ASSURANCE Established governance, QA/QC and technical review frameworks that supported confident implementation.

PROFESSIONAL CONTACT

Selected water-infrastructure experience.

Water infrastructure experience across strategy, performance and technical assurance.

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KOMEC GLOBAL / WATER INFRASTRUCTURE

Selected professional experience and anonymised technical examples.

Project descriptions reflect Raef Kobeissi's selected professional experience. Organisation and project identifiers are generalised. All diagrams are anonymised conceptual graphics, not project data or drawings.